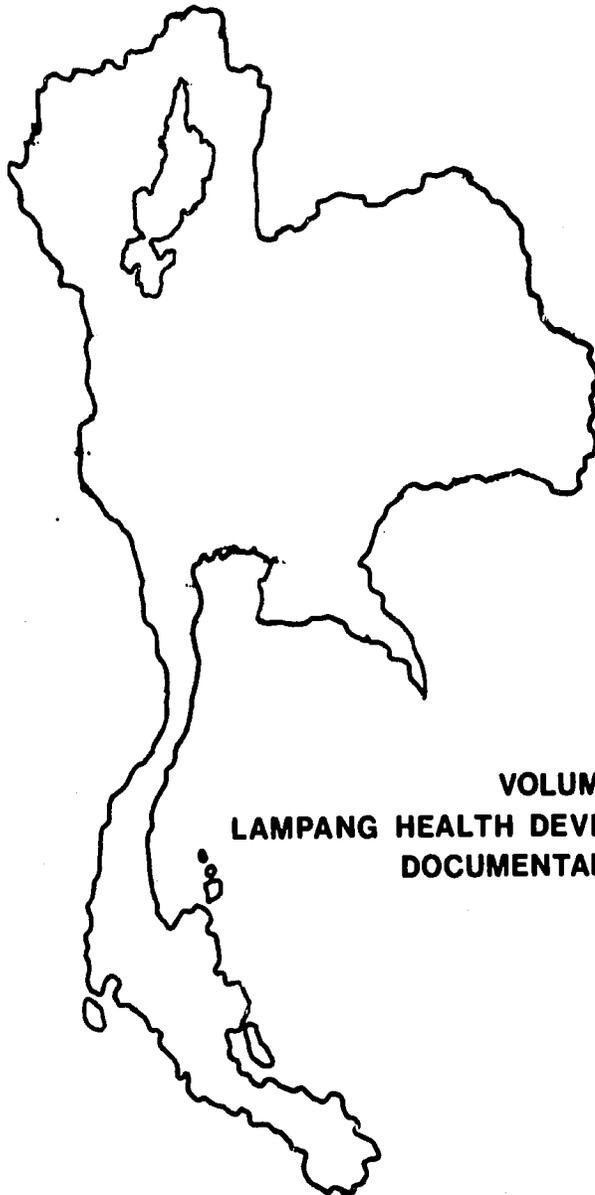


By Order 730  
21132

9310171/65



# **COMMUNITY HEALTH PARAPHYSICIAN (WECHAKORN) TRAINING IN MEDICAL CARE**



**VOLUME V  
LAMPANG HEALTH DEVELOPMENT PROJECT  
DOCUMENTARY SERIES**



**MINISTRY OF PUBLIC HEALTH THAILAND 1981**



**LAMPANG HEALTH DEVELOPMENT PROJECT  
DOCUMENTARY SERIES**

**VOLUME V**

**COMMUNITY HEALTH PARAPHYSICIAN (WECHAKORN)  
TRAINING IN MEDICAL CARE  
MODULES 1-13**

**Edited by**

**Choomnoom Promkutkao, M.D., Dr. P.H.  
and  
Ronald Wilson, M.D., M.P.H.**

**Ministry of Public Health  
Thailand  
1981**

**The Lampang Health Development Project Documentary Series**

**Is Dedicated To**

**DR. SOMBOON VACHROTAI**

**(1924 - 1980)**

**Project Director**

**1974 - 1980**



**CONTENT OF THE LAMPANG HEALTH DEVELOPMENT PROJECT**  
**DOCUMENTARY SERIES**

The documentary series comprises six volumes. Volume I summarizes the development, evaluation, conclusions and recommendations of the Project. Volume II describes the development of the Project, focussing on it's key features, and Volume III presents the Project's evaluation, results, conclusions and recommendations. The remaining three volumes present translations of materials used in developing community health volunteers and paraphysicians, key manpower of the Lampang rural health care system.

**VOLUME I:**            **SUMMARY FINAL REPORT, CONCLUSIONS AND RECOMMENDATIONS OF THE LAMPANG HEALTH DEVELOPMENT PROJECT** (Monograph 12)

**VOLUME II:**        **DEVELOPMENT OF AN INTEGRATED RURAL HEALTH SERVICES AND PRIMARY HEALTH CARE SYSTEM IN LAMPANG THAILAND**

- Monograph 1 - The Lampang Health Development Project: New Approaches to Rural Health Care
- Monograph 2 - Developing Community Health Volunteers and Primary Health Care
- Monograph 3 - Developing Community Health Paraphysicians (Wechakorn)
- Monograph 4 - Expanding the Community Health Role of the Provincial Hospital
- Monograph 5 - Strengthening Management, Supervision, and Support for Rural Health Care
- Monograph 6 - A System of Evaluation and Management Information for Rural Health Care

**VOLUME III:**        **EVALUATION OF THE LAMPANG INTEGRATED RURAL HEALTH SERVICES AND PRIMARY HEALTH CARE SYSTEM**

- Monograph 7 - Evaluating and Monitoring Integrated Rural Health Services: Lessons from the Lampang Experience
- Monograph 8 - Consumer Accessibility to and Acceptance of Rural Health Services in Lampang
- Monograph 9 - Health System and Personnel Performance and Costs
- Monograph 10 - Impact on the Population's Health

**Monograph 11 - Feasibility and Affordability of Implementing  
the Lampang System's Key Features  
Nationwide: Implications for the Future**

**VOLUME IV:      COMMUNITY HEALTH VOLUNTEERS' MANUALS**

- Section 1 - Health Post Volunteer Manual**
- Section 2 - Health Post Volunteer Nutrition Manual**
- Section 3 - Health Communicator Manual**
- Section 4 - Health Communicator Nutrition Manual**
- Section 5 - Traditional Birth Attendant Manual**

**VOLUME V:      COMMUNITY HEALTH PARAPHYSICIAN (WECHAKORN)  
TRAINING IN CLINICAL CARE**

- Module 1 - Introduction to Comprehensive Health Care**
- Module 2 - Medical Terminology**
- Module 3 - Anatomy and Physiology**
- Module 4 - Medical History-Taking**
- Module 5 - Physical Examination**
- Module 7 - Formulary: Essential Drugs for Wechakorn**
- Module 8 - Skin Problems**
- Module 9 - Eye, Ear, Nose and Throat Problems**
- Module 10 - Medical Problems**
- Module 11 - Pediatric Problems**
- Module 12 - Gynecological Problems**
- Module 13 - Emergency Problems**

**VOLUME VI:      COMMUNITY HEALTH PARAPHYSICIAN (WECHAKORN)  
TRAINING IN PUBLIC HEALTH**

- Module 14 - Public Health Administration and Primary Health Care**
- Module 15 - Community Health Services: Organization, Management and Supervision**
- Module 16 - Maternal and Child Health Care**
- Module 17 - Family Planning**
- Module 18 - Nutrition**
- Module 19 - Dental Health**
- Module 20 - Environmental Sanitation**
- Module 21 - Statistics**
- Module 22 - Epidemiology**
- Module 23 - Communicable Diseases Control**
- Module 24 - Health Education**

## **ACKNOWLEDGEMENT**

The Lampang Health Development Project, a collaborative effort of the Royal Thai Government, the University of Hawaii, and the American Public Health Association, was supported partly by the Royal Thai Government and partly through the following contracts of the U.S. Agency for International Development:

Contract AID/csd-3423 with the American Public Health Association;  
Contract AID/ca-C-1320 with the American Public Health Association; and  
Contract AID/493-9025-T with the University of Hawaii.

Additional support was provided by the following organizations:

Asia Foundation  
United Nations International Children's Emergency Fund  
United States International Communications Agency  
World Health Organization

## FOREWORD

From 1974 to 1981 the Ministry of Public Health implemented the Lampang Health Development Project, a seven year effort to pioneer and research many approaches for integrating and expanding medical and health service coverage and for creating village-based primary health care services. During this period, I followed closely the reorganization of the provincial health administration, the integration of medical and health services, and the creation of the Department of Community Health in the Lampang Provincial Hospital with its outreach programs in rural health and medical care delivery. The major thrust of the health manpower development effort involved the training of three types of government health workers to serve as wechakorn paraphysicians in all subdistrict health centers and district hospitals, the training of thousands of villagers to serve as health volunteers and health communicators, and the training of hundreds of traditional birth attendants. The effort included the organization and orientation of village health committees, and stimulating contributions by the private sector and by the communities themselves. Beyond the increased demand for health services which resulted, I also noted with great interest evidence of village-based health activities supported by villagers in many localities: improvements in community water sources, installation and maintenance of handpumps for the newly improved and covered wells, nutritional surveillance, family planning supply distribution, and so on. The focus of the Lampang Project was primarily on the district, subdistrict and village levels.

In 1977 and 1978 the Ministry of Public Health drew upon the personnel and experience of the Lampang Project to help plan and conduct two national primary health care seminars. In March, 1979, the Cabinet of the Royal Thai Government approved primary health care as a National Health Development Policy. The Ministry drew heavily from the Lampang Project again in 1979 as it planned with the WHO and UNICEF a biregional primary health care workshop, participated by nine countries of the South East Asia and Western Pacific regions. The first workshop was conducted in 1980, and we are currently planning with WHO and UNICEF for the next biregional workshop. The aim of these national and inter-regional activities is to rapidly feedback to planners and health leaders the field experience that is accumulating in Lampang and in similar efforts. One result, at the Thai national level, is the adoption of primary health care program implementation as a high priority in the National Social and Economic Development Plan.

The lessons and experience coming from Lampang over the past seven years have been quite useful to the Ministry of Public Health in planning and implementing similar approaches for nationwide coverage. In a similar manner, the Lampang experience may be useful to others and this is one of the major aims of the documentary series that is presented herewith.

I wish to take this opportunity to express my gratitude and thanks to all institutions and agencies in Thailand and abroad that have contributed to the Lampang

effort. While all the organizations in Thailand that have made contributions are too numerous to list here, two deserve special recognition for their longstanding support: the Chiangmai University which provided two senior professionals to the Project who served as Chiefs of the Project's Division of Personnel Development and Division of Research and Evaluation, and the National Institute of Development Administration which played a key role in the research and evaluation effort. Special acknowledgement and appreciation is expressed for the contributions of the University of Hawaii who provided technical and managerial assistance throughout the seven year period, the American Public Health Association for its five year role in project management and liaison, and the U.S. Agency for International Development which was the major source of outside funding. We also appreciate and acknowledge the special purpose contributions of the U.S. Information Service Agency, the Asia Foundation, the World Health Organization, and the U.N. Children's Fund.

As Thailand enters the 1980's, the greatest aim of the Ministry of Public Health is to extend basic health services and to achieve health for all Thai citizens, if possible, by the turn of the century. The success of this effort will depend on three major factors: the seriousness and commitment of the Royal Thai Government in implementing its new Health Development Policy, the seriousness of health workers at all levels in serving those in need, and the ability and willingness of health workers to teach and guide villagers in matters of health and development, helping them to help themselves. Through continued effort and collaboration, like that of the Lampang Health Development Project, we have good reason to be optimistic.

May, 1981



Dr. Sem Pringpuangeo  
Minister of Public Health  
Royal Thai Government

## PREFACE

The Lampang Health Development Project, originally called the "DEIDS/Thailand Project" to signify the development and evaluation of an integrated health care delivery system, was conceptualized, planned, implemented and evaluated by the Ministry of Public Health, Royal Thai Government, through shared commitment and collegial collaboration with the University of Hawaii and the American Public Health Association.

Health professionals and leaders from these institutions recognized that conventional approaches to health care delivery were not reaching those most in need -- underserved rural villagers who comprised the majority of the population. Further, new approaches had to be conceptualized and tested in the context of Thailand's health care system if basic health services were to become available to and utilized by rural villagers.

Project planners hypothesized that basic health services could be delivered more cost-effectively if integrated; that the demand for medical care services could be met, to a great extent, by upgrading existing health personnel to be clinically-competent paraprofessionals; and, that the need for health promotion and disease prevention services could be more broadly and effectively extended through community participation. This participation could be achieved by training community health volunteers -- health post volunteers, traditional birth attendants and village health communicators as well as involving the private sector. Some elements of these approaches had been implemented in Thailand on a small (district-level) scale in earlier projects, but they had not been adequately evaluated. The Ministry of Public Health, already committed to the concept of integration of health promotion, disease prevention and medical care services, was ready to embark on a major effort to test this approach, and to find ways to broadly extend integrated basic health services to all rural villagers in Thailand.

Lampang Province in northern Thailand (see Figures 1 and 2) was selected as the project area because it had a population of over half a million people, fair communications, moderate economic status, minimal security and insurgency problems, and the endorsement of provincial authorities. While the overall and longterm goal of the Project was to improve the health status of the rural population of Lampang, the specific objectives of the Project were:

- (1) to expand health care coverage to at least two-thirds of the rural population, particularly women in their child-bearing years and preschool age children, with an emphasis on family planning, nutrition and other maternal and child health services;
- (2) to establish an integrated provincial health care services delivery system with the capacity to extend integrated medical, health promotion and

disease prevention services to every subdistrict health center, and to establish simple medical care, health promotion and disease prevention services in every village through community participation and private sector involvement; and,

- (3) to establish an integrated provincial health care services delivery system that is more cost-effective, meaning lower cost per service unit, the key features of which could be replicated nationwide within the limitations of resources available to the Royal Thai Government.

Given these objectives, Project planners and implementors developed a number of innovations and modifications of the existing health system which constituted the key features of the Project, as viewed in Figure 3 and as summarized below.

- (1) Reorganization and Strengthening of the Provincial Health Service Infrastructure by:
  - Integrating the curative, disease prevention, and health promotion services by coordinating and administering them under a single provincial health administration;
  - Establishing a Department of Community Health within the Provincial Hospital, and
  - Improving management and supervisory practices, in part by developing a practical management information system;
- (2) Development of Community Health Paraphysicians (wechakorn) from existing health service personnel to be deployed to every district hospital and subdistrict health center;
- (3) Development of Community Health Volunteers in every village, including training of a village health volunteer (health post volunteer) in every village, training of traditional birth attendants in every village where qualified candidates could be identified, and training of village health communicators for every 10-15 households in every village; and,
- (4) Stimulating other Community and Private Sector Involvement by establishing health committees in every village and at every administrative level, and by eliciting the interest and support of other private sector groups.

The Ministry of Public Health and other agencies of the Royal Thai Government began planning nationwide programs that would carry these approaches and key features, as modified, to the whole of the country during implementation of the 1977-1981 and 1982-1986 National Economic and Social Development Plans.

Several notable characteristics of Project development, planning and implementation had a bearing on the progress of the Project and on the acceptance of its approaches and key features:

- \* *The Lampang Health Development Project was viewed from the beginning as a Thai project: Project planners, Project implementors, and Project leaders decision-makers were predominantly Thai.*
- \* *The Project was established and directed by the Thai Ministry of Public Health, the official RTG authority that would be responsible for nationwide implementation if the approaches and key features were found to be worthy of "replication".*
- \* *Project and Ministry leaders developed and maintained a broad base of involvement of Ministry of Public Health personnel and other Royal Thai Government officials in all phases of Project development, planning, implementation, and evaluation.*
- \* *The Project maintained a continuing dialogue on Project approaches and progress with both Thai and international health agencies by providing Project information through periodic progress reports, organizing annual reviews and by conducting special workshops and seminars for review and refinement of Project approaches and key features.*
- \* *Project administrative, managerial, and technical assistance from the University of Hawaii and the American Public Health Association was characterized by a spirit of mutualism, a shared commitment, and a collegial collaboration. Technical assistance was not limited to one institution, but involved a number of international organizations, U.S. and Thai institutions and agencies. Project leaders recognized that the Project was dealing with a universal problem of how to achieve "health for all", and that this problem was best approached through broad collaboration and solid commitment, based on a spirit of mutualism and learning together.*

This Lampang Health Development Project Documentary Series serves to comprehensively document the planning, implementation and evaluation processes, and to present the major findings and evaluation results of this seven-year effort. Volume 1 summarizes the Project's approaches and key features, evaluation and research findings, conclusions and recommendations. Volume II comprises six monographs which describe in detail the development and functioning of the Project's major approaches and components. Volume III comprises six monographs on evaluation findings, and discusses the Project results, conclusions and recommendations, based on the broad array of survey data, service statistics and other operational data that have been collected and analyzed. Volume IV presents the English language translations of Thai language materials used in developing and supporting community health volunteers -- health post volunteers, health communicators, and traditional birth attendants. Finally, Volumes V and VI comprise English language translations of the twenty-four Thai language training modules used in the development of *wechakorn*, community health paraprofessionals.

It is the sincere wish of Ministry of Public Health and Lampang Project leaders, and of the authors, contributors, and editors of the Lampang Health Development Project Documentary Series, that readers of these materials will find the lessons learned and experience gained in Lampang useful in their own work.

*Prakorb Tuchinda .*

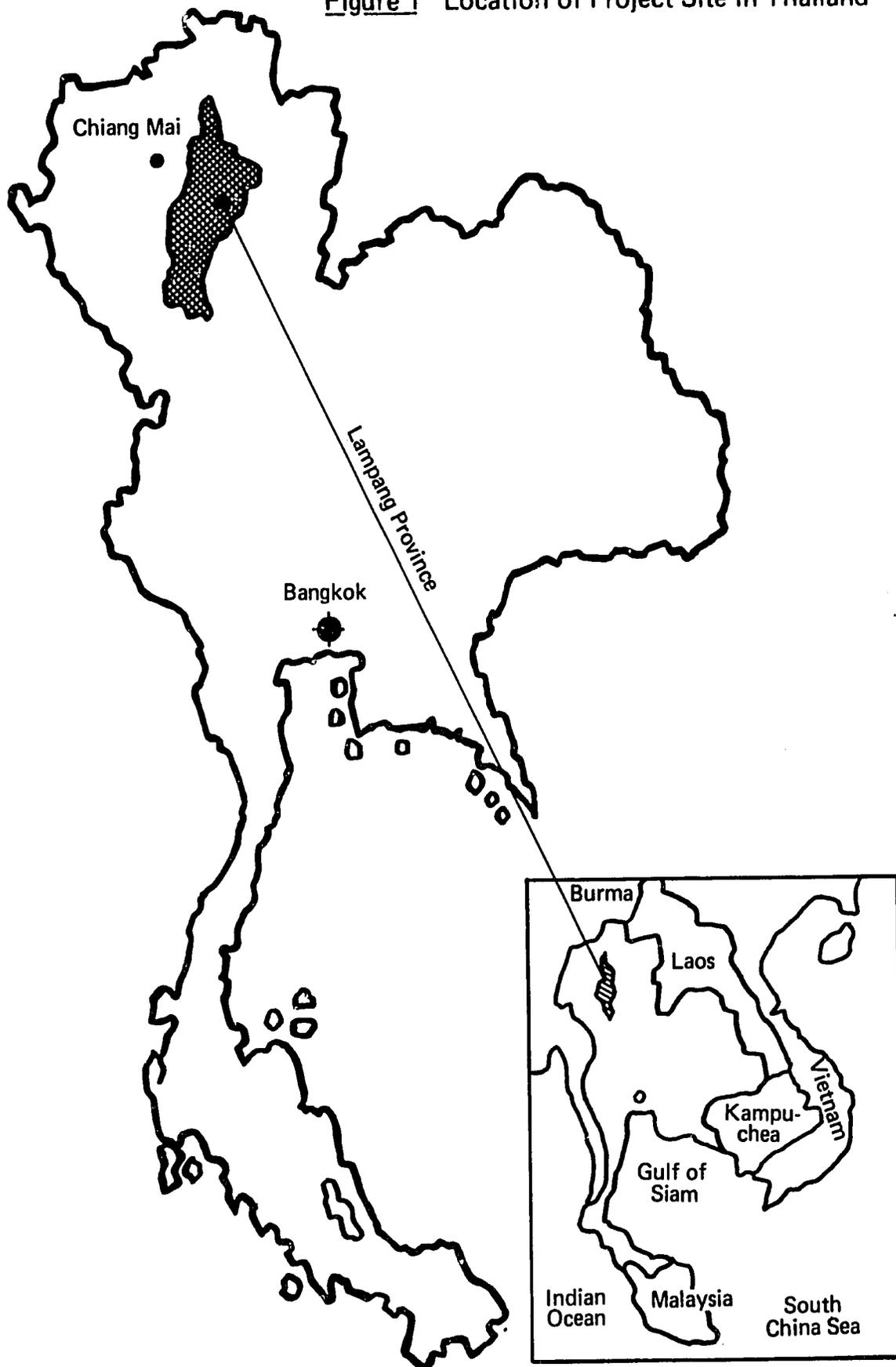
Dr. Prakorb Tuchinda  
Under-Secretary of State  
for Public Health  
Ministry of Public Health

July, 1981

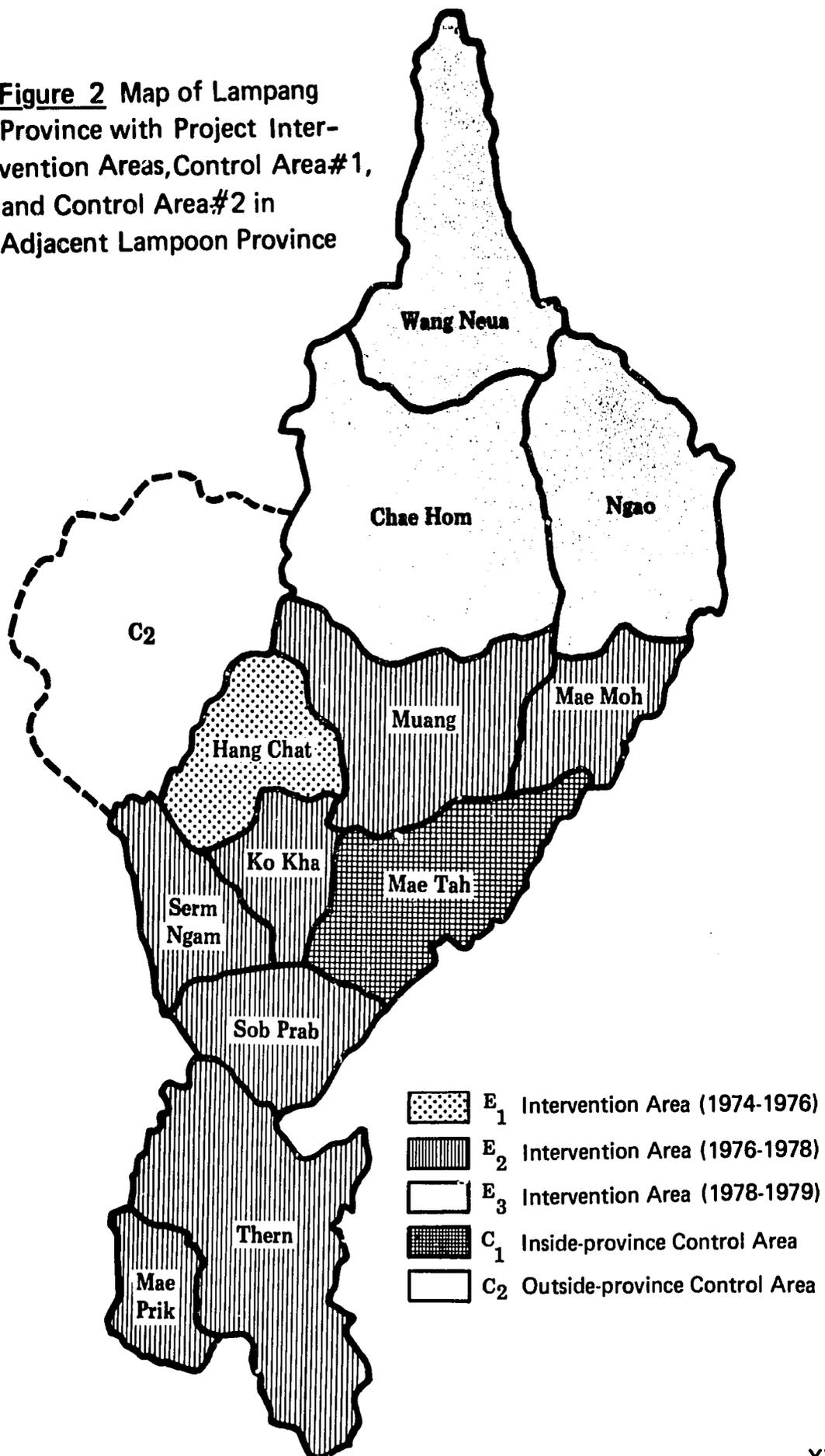
*P. Ningsanonda*

Dr. Pirote Ningsanonda  
Deputy Under-Secretary of  
State for Public Health  
and  
Project Director  
Lampang Health Development Project

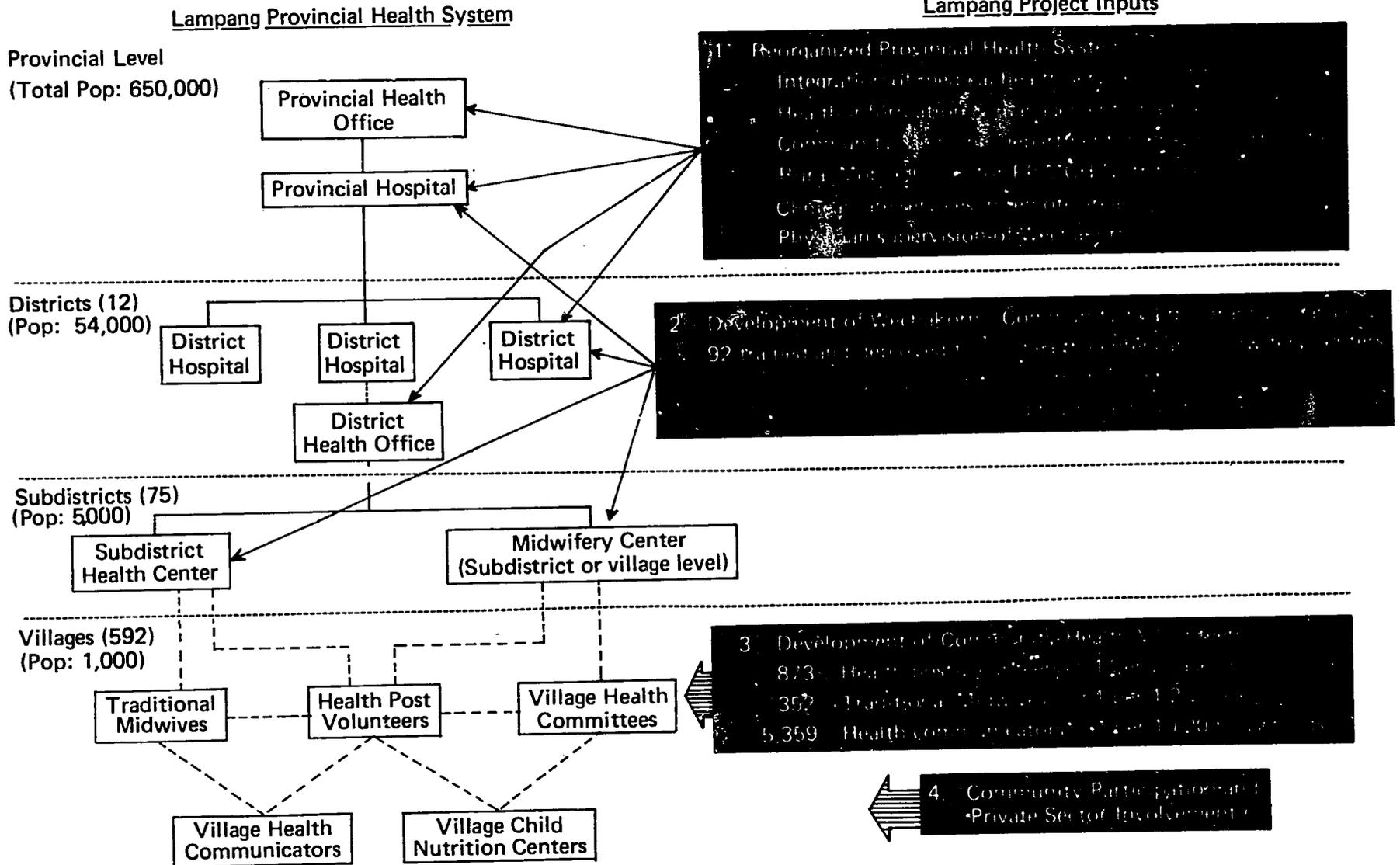
**Figure 1** Location of Project Site in Thailand



**Figure 2** Map of Lampang Province with Project Intervention Areas, Control Area#1, and Control Area#2 in Adjacent Lamphoon Province



**Figure 3** Lampung Provincial Health System and the Inputs of the Lampung Health Development Project



## INTRODUCTION AND SPECIAL ACKNOWLEDGEMENTS

The wechakorn, or community health paraphysicians, of the Lampang Health Development Project, have made a substantial contribution to strengthening the government health service infrastructure in Lampang, particularly at the subdistrict level where the greatest gap occurred in the government's ability to provide integrated medical and health services. The Lampang Health Development Project mobilized and trained wechakorn from three types of existing government health personnel: nurses, midwives, and junior health workers (sometimes called sanitation workers). Most wechakorn are assigned to serve at the subdistrict-level rural health centers, while some are assigned to the district hospital and a few are assigned to the provincial hospital to work as medical care screeners and family planning services providers.

At the rural health centers, wechakorn generally serve as the chief of the health center, supervising the work of other health personnel assigned there, providing integrated medical and health care services from the health center, and promoting local health programs through health center personnel and the health post volunteers and other elements of the primary health care networks in the villages of their respective subdistricts. The functional linkage between the wechakorn (and other health center personnel) and the health post volunteers and traditional birth attendants of the nearby villages is the basis for the partnership between the government health service system and the primary health care network which has evolved in Lampang.

Wechakorn were trained in a twelve month training program, organized by the Personnel Development Division of the Lampang Project, conducted at the Lampang Provincial Hospital and various district hospitals and rural health centers. Training staff included personnel from the Personnel Development Division of the Lampang Project, the Lampang Provincial Hospital, and the Faculty of Medicine, Chiang Mai University. The training approach was problem-oriented, and the methods applied were competency-based. About four months was allocated for the didactic phase which utilized twenty-four training modules, most of which are problem-oriented (with particular reference to those in Volume V on clinical care), and about eight months was allocated to the preceptorship phase which stressed competency-based approaches, learning by actual on-the-job practice under the direct supervision of a physician or of other health care providers at the respective training sites. This type of problem-oriented, competency-based training was found to be effective for all three types of health workers — nurses, midwives, and junior health workers — who entered the wechakorn training program. The best work attitudes and the lowest attrition rates, for rural health center wechakorn, however, were observed among those who had formerly served as midwives and junior health workers.

The twenty-four training modules contained in Volumes V and VI of the Lampang Health Development Project Documentary Series were written originally in the Thai language by personnel of the Lampang Project Personnel Division, the

Lampang Provincial Hospital, and the Faculty of Medicine, Chiang Mai University. In the early planning phase, technical assistance was provided by the Health Manpower Development Staff of the University of Hawaii for the orientation of authors and training of trainers. Following several revisions of the Thai-language modules during the course of the wechakorn training program, the materials were then translated from Thai to English for potential benefit to others, outside of Thailand, who are planning and implementing similar paraphysician – or mid-level medical and health care provider – training programs.

The major credits for Volumes V and VI have been earned by the original authors of the Thai-language modules and those who worked on the subsequent revisions. These professionals are listed as Contributors to Volumes V and VI in the following pages. Special acknowledgements are deserved by all those who participated in the extensive work of translating the Thai-language modules into the English language and reviewing of the modules.

Translators are listed below by the number of titles of the respective modules:

- Module 1 - Introduction to Comprehensive Health Care  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 2 - Medical Terminology  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 3 - Anatomy and Physiology  
Tejatat Tejasen M.D., Ph.D.
- Module 4 - Medical History-Taking  
Okas Balankura M.D., F.A.C.S., F.I.S.
- Module 5 - Physical Examination  
Okas Balankura M.D., F.A.C.S., F.I.S.
- Module 6 - Laboratory Examination  
Sanong Chaiyarasamee B.S., M.T. (ASCP)
- Module 7 - Formulary: Essential Drugs for Wechakorn  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 8 - Skin Problem  
Jit Jiraratsatit M.D., Cert. of Proficiency in  
Int. Med., Dr. med.
- Module 9 - Eye, Ear, Nose and Throat Problems  
Somsanguan Ausayakhun M.D.

- Module 10 - Medical Problems**  
Jit Jirratsatit M.D., Cert. of Proficiency in  
Int. Med., Dr. med.
- Module 11 - Pediatric Problems**  
Prapasi Rangsiyanond M.D.
- Module 12 - Gynaecological Problems**  
Kamjad Swadio M.D., Cert. Am. Board in Obgyn.
- Module 13 - Emergency Problems**  
Okas Baiankura M.D., F.A.C.S., F.I.S.
- Module 14 - Public Health Administration and Primary Health Care**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 15 - Community Health Services. Organization, Management and Supervision**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 16 - Maternal and Child Health Care**  
Kamjad Swadio M.D., Cert. Am. Board in Obgyn.
- Module 17 - Family Planning**  
Virote Sahapong M.D.
- Module 18 - Nutrition**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 19 - Dental Health**  
Uthaiwan Kanchanakamol D.D.S., Cert. in D.P.H. (Lond.)  
Thomas R. D' Agnes D.D.S., M.P.H.
- Module 20 - Environmental Sanitation**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 21 - Statistics**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 22 - Epidemiology**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 23 - Communicable Disease Control**  
Choomnoom Promkutkao M.D., Dr. P.H.
- Module 24 - Health Education**  
Choomnoom Promkutkao M.D., Dr. P.H.

I also wish to thank Judith Maurier who provided assistance in proofing English and setting the format, and to Ronald G. Wilson, M.D., M.P.H. who provided substantial assistance. Finally, I wish to express sincere thanks to World Health Organization for providing financial assistance for translation and printing of these materials.



**Choomnoom Promkutkao, M.D. Dr. P.H.**  
**Chief**  
**Personnel Development Division**  
**Lampang Health Development Project**

## CONTRIBUTORS TO VOLUME V

1. **OKAS BALANKURA, M.D., F.A.C.S., F.I.S., Fellow of the Royal College of Surgeons of Thailand**  
**Professor, Head, Department of Surgery, Faculty of Medicine, Chiang Mai University**
2. **WANNARAT CHANNUKUL, M.D., M.P.H.**  
**Ministry of Public Health**
3. **JIT JIRARATSATIT M.D., Cert. of Proficiency in Int. Med., Dr. med.**  
**Assistant Professor, Department of Medicine, Faculty of Medicine, Chiang Mai University**
4. **CHOOMNOOM PROMKUTKAO, M.D., Cert. in Nutrition, M.P.H.T.M., Dr. P.H.**  
**Associate Professor, Department of Community Medicine, Faculty of Medicine, Chiang Mai University**
5. **SURASAK PUCKDEE, B.Sc.**  
**Lampang Hospital, Ministry of Public Health**
6. **NOPADOL SOMBOON, B. Sc. (Pharm.), M.D., Dip. in Obst. (N.Z.)**  
**Lampang Hospital, Ministry of Public Health**
7. **PANEE TEJASEN, M.D., M.A.**  
**Associate Professor, Head, Department of Pharmacology, Faculty of Medicine, Chiang Mai University**
8. **TEJATAT TEJASEN, M.D., Ph.D.**  
**Associate Professor, Head, Department of Anatomy, Faculty of Medicine, Chiang Mai University**

## TABLE OF CONTENTS

DEDICATION	II
DOCUMENTARY SERIES OUTLINE	V
ACKNOWLEDGEMENTS	VII
FOREWORD	VIII
PREFACE TO DOCUMENTARY SERIES	X
INTRODUCTION AND SPECIAL ACKNOWLEDGEMENTS	XVII
CONTRIBUTORS TO VOLUME V	XXI
VOLUME V: TRAINING IN MEDICAL CARE:	
MODULE 1 - INTRODUCTION TO COMPREHENSIVE HEALTH CARE	3
MODULE 2 - MEDICAL TERMINOLOGY	13
MODULE 3 - ANATOMY AND PHYSIOLOGY	21
MODULE 4 - MEDICAL HISTORY-TAKING	57
MODULE 5 - PHYSICAL EXAMINATION	65
MODULE 6 - LABORATORY EXAMINATIONS	77
MODULE 7 - FORMULARY: ESSENTIAL DRUGS FOR WECHAKORN	91
MODULE 8 - COMMON SKIN DISEASES	131
MODULE 9 - EYE, EAR, NOSE AND THROAT PROBLEMS	157
MODULE 10 - MEDICAL PROBLEMS	189
MODULE 11 - PEDIATRIC PROBLEMS	275
MODULE 12 - GYNECOLOGICAL PROBLEMS	305
MODULE 13 - EMERGENCY PROBLEMS	319

**MODULE 1**

**INTRODUCTION TO COMPREHENSIVE HEALTH CARE**

**CHOOMNOOM PROMKUTKAO, M.D., Dr. P.H.**

สถานีอนามัยตำบลสมพงษ์

สำนักงานสาธารณสุขตำบลสมพงษ์  
อำเภอเมือง จังหวัดขอนแก่น

บริการทางการแพทย์  
• บริการทันตกรรม  
• บริการเภสัชกรรม  
• บริการสุขภาพ  
• บริการสุขภาพจิต



## MODULE 1

### INTRODUCTION TO COMPREHENSIVE HEALTH CARE

#### 1. INSTRUCTIONAL OBJECTIVES

At the end of the course the wechakorn will be able to explain the concepts of comprehensive health care, health service system, health agencies, health care program, and health care provider so that a wechakorn can provide comprehensive health care for the community within the limitations of available resources.

#### 2. INTRODUCTION

Uncle Daeng is a 40 - year old farmer. His wife is Mrs. Dam. They are breadwinners. Of their five children, the eldest daughter finished 6th grade, the second child is now in 6th grade, the third is in 4th grade, the fourth is in primary school, and the youngest is just a few months old. The family is faced with a chronic shortage of food and lives in a small hut with only one sleeping quarter. Uncle Daeng keeps his pig and poultry under his hut and the compound is quite unsanitary. Drinking water comes from a shallow well which is located not far from his hut. The family does not have a toilet; they defecate in a bushy area from which, in the rainy season, the rain washes off the waste or excreta, which may drain into the well.

Uncle Daeng is not healthy; he has a bloody cough and anorexia. He cannot support his family financially, and this creates a broken home. The children are unemployed and delinquent, and some are trying to get drugs and narcotics. Uncle Daeng is now an alcoholic. Recently, Uncle Daeng went to a district hospital, and his tuberculosis was detected; it is in the infectious stage. The hospital director advised him to rest and treated him for tuberculosis. The family is in trouble because of money shortages, and Mrs. Dam is becoming ill.

Assume you are a wechakorn. One day Uncle Daeng comes to see you for treatment and assistance. What can you do for him? How can you help his family? Will you give him only an antituberculosis drug or will you also advise him how to prevent spreading this communicable disease? How about his financial problems? Can you find jobs for his son and daughter? Is this a proper time for BCG vaccination for the youngest child? How can Uncle Daeng improve his housing sanitation, and to what extent? Are you the only one who can help him, or can somebody else help? What will you tell his neighbors?

#### 3. OBJECTIVE AND APPROACH OF COMPREHENSIVE HEALTH CARE

The objective of comprehensive health care is to treat Uncle Daeng's disease and support his family as well as to prevent the spread of disease to his

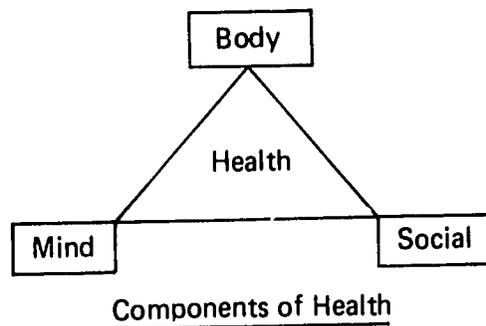
neighbors. This approach can be applied in other diseases such as diabetes mellitus, dysentery, leprosy, trachoma, heart disease, psychopathy, intestinal parasitic infection, malnutrition, venereal diseases and others. Patients should receive health services including treatment, disease prevention, health promotion, and social welfare properly, according to the condition of a disease, patient status, family problems, and community health resources. This simply means to give the best care to your patient. But, how can you do this?

#### 4. KEY CONCEPTS AND SCOPE OF COMPREHENSIVE HEALTH CARE

Comprehensive health care service applies many important concepts, for example:

##### 4.1 Health

A healthy person has a strong physical body and a sound mind. Health means physical, mental, and social well-being. A diseased or unhealthy person will suffer from physical illness, a troubled mind, and lack of social acceptance (e.g., a tuberculous patient). Therefore, physical treatment alone is not enough and the result is not satisfactory. The World Health Organization defines health as follows: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Comprehensive health care service must provide adequately for a patient's body, mind, and social life.



##### 4.2 Characteristics of Health Care Services

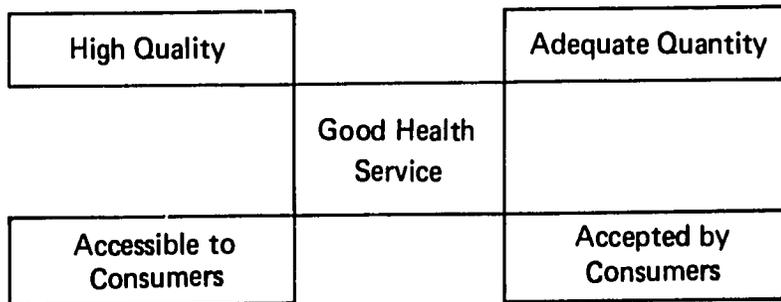
4.2.1 Quantity of Health Services. Health service quantity should be adequate for all people in all parts of a country. The health service program should cover all health problems as needed -- for example, health service programs for mother and child, heart disease, nutrition, sanitation, laboratory, procedures, parasitic infection, and mental health. There should be enough health agencies so that there is a health center for every subdistrict.

4.2.2 Quality of Health Services. The quality of health services should be sufficient to meet primary medical care needs. The quality of health service personnel should be adequate and efficient for providing necessary care and solving problems.

4.2.3 Accessibility of Health Services. Health services should be accessible

to the users. Door-to-door service should be provided if possible. However, in certain cases, users may have to seek for particular services outside their villages.

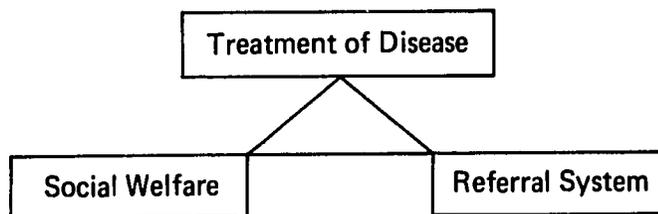
4.2.4 Acceptability of Health Services. Health service should be acceptable to the users in the context of their social norm, culture, and economic condition.



Components of Good Health Service

#### 4.3 Comprehensiveness of Services

Comprehensiveness in this context means provision of an adequate variety of care and adequate quality of each type of care which a health agency and its closely related agencies can provide with an efficient referral system. Such health services should be geared for all ages and both sexes. Problem solving of common local problems, social welfare (e.g., occupation guidance, job employment), and the patient referral system should also be incorporated. In short, comprehensiveness refers to adequate quantity and quality of all health care provided by a health agency or its closely related agencies. The health service must also be integrated, which means that promotive, preventive, curative, and rehabilitative services must be provided by a health agency under one single administration.

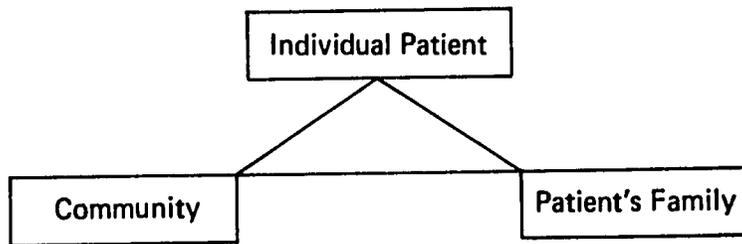


Comprehensive Health Care Components

#### 4.4 Consumers of Health Services

A wechakorn should not treat a patient as an isolated individual, because disease can easily spread to a patient's relatives or community, and thus bring problems for the family and community. The wechakorn must provide care for the patient, his family, and his community. The quality and quantity

of health service provided should meet the needs of each patient, but they usually are limited by the available resources of the particular health agency. Sometimes it is difficult to provide comprehensive health care within a single health agency.

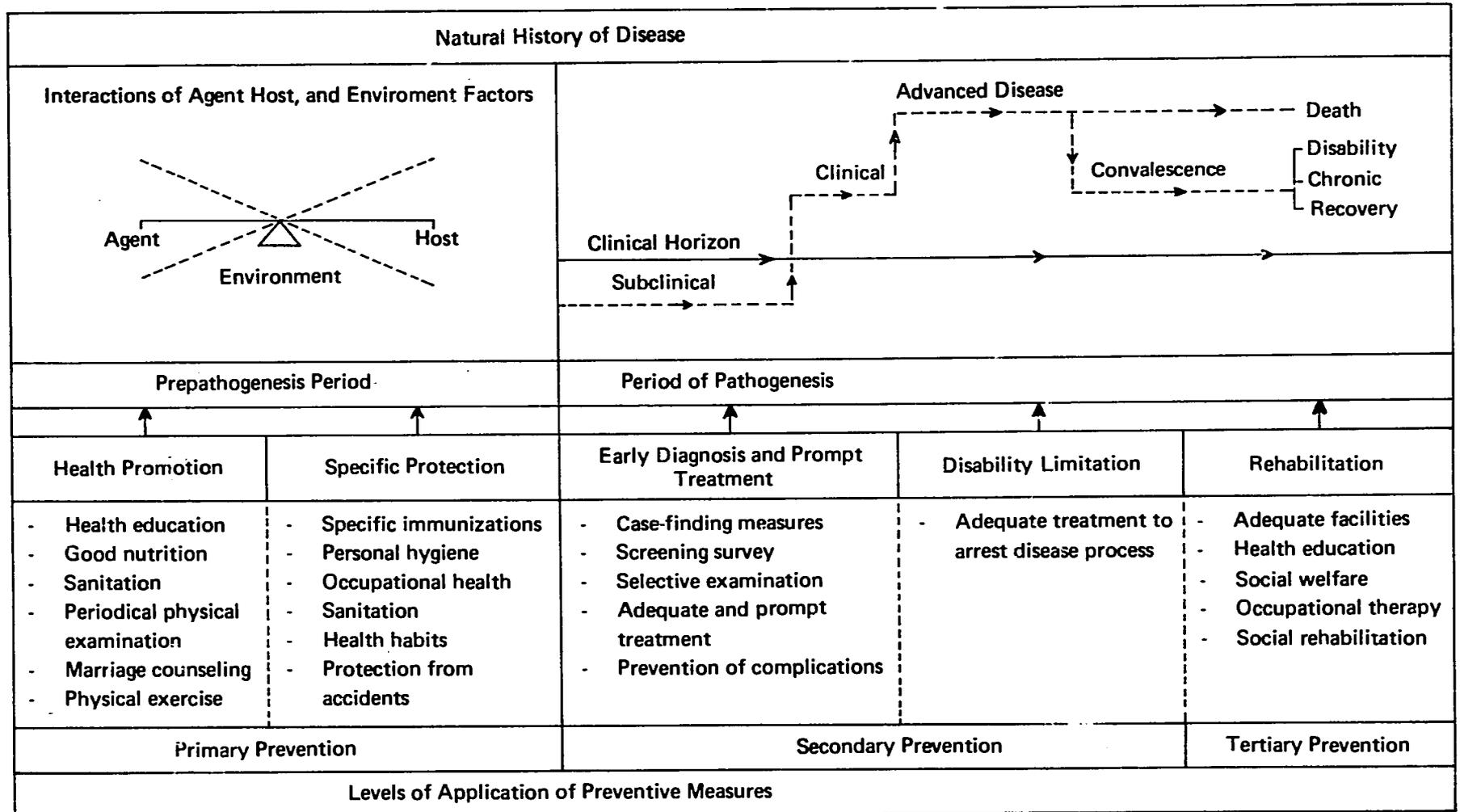


Consumers of Health Services

#### 4.5 Natural History of Disease and Prevention Measures

A disease has its own natural history, or course, which may reflect differing effective measures. Health services must be provided according to the stages of a disease. A general outline of the natural history of a disease in humans, and of preventive measures, is presented in Figure 1.1

Natural History of Disease and Preventive Measures Figure 1.1

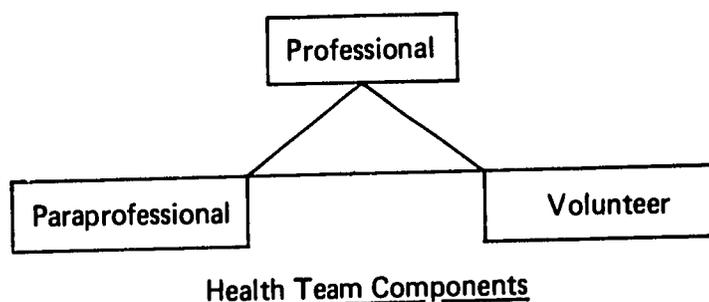


## 5. HEALTH TEAM FOR COMPREHENSIVE HEALTH CARE

It is obvious that comprehensive health care requires a health team whose members are from many professions and subprofessional levels. No single profession can provide comprehensive health care for the benefit of all patients and the community. The health team leader (or coordinator) and members of the team must be oriented adequately concerning health team concepts and practices.

In providing comprehensive health care, a team member must fully recognize his own position and job, as well as understanding team coordination and good human relationships.

A health team consists of many categories of health personnel, ranging from professional and paraprofessional to auxiliary and volunteer.



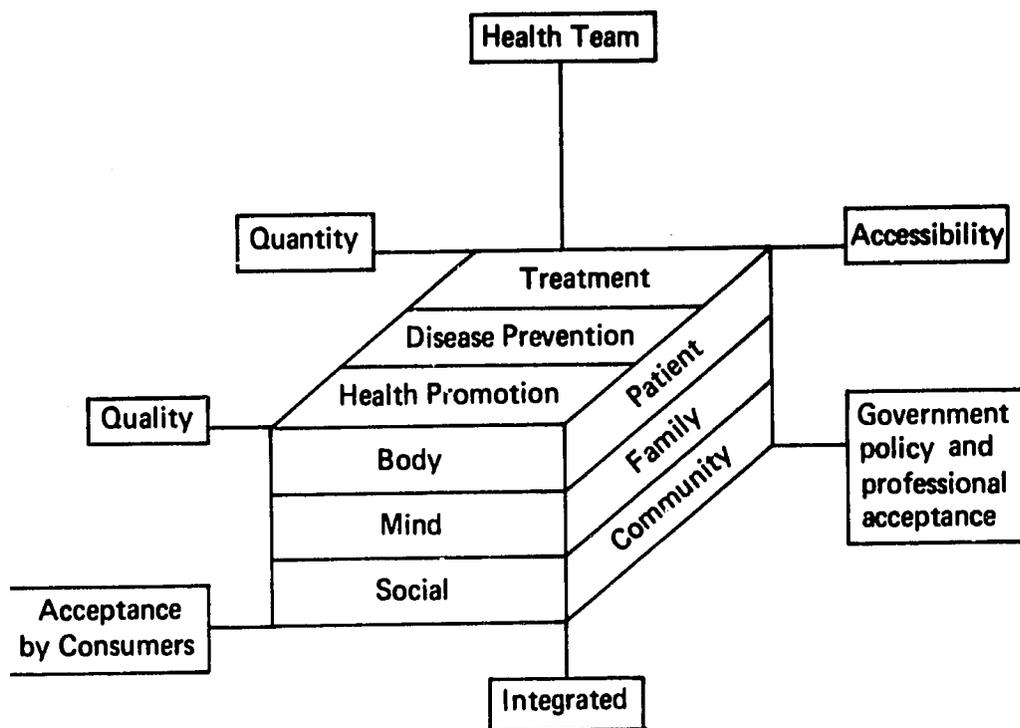
## 6. HEALTH AGENCY

The functions of different health agencies vary, but in any agency, the service must be comprehensive and integrated.

Health agencies include regional hospitals or medical schools, provincial hospitals, district hospitals or medical and health centers, health centers or midwifery centers, and health posts. The main function of each agency varies according to its type. The quantity and quality of health manpower and facilities also vary. But good coordination and cooperation must be assured at all levels of health care units, as mentioned above.

## 7. HEALTH CARE PRACTICES

The concept of comprehensive health care must be followed and practiced at an optimal level for every patient, with some consideration of etiology, course of disease, and effects on the community. In providing comprehensive health care, questions such as these must be answered: What can the health agency or wechakorn do? What service should be given, by whom, when, where, and how? What is the expected result? Is it worthwhile? All these questions must be answered by a health agency's policy and objectives.



Comprehensive and Integrated Health Care Model

**MODULE 2**  
**MEDICAL TERMINOLOGY**

**CHOOMNOOM PROMKUTKAO, M.D., Dr. P.H.**



## MODULE 2

### MEDICAL TERMINOLOGY

#### 1. INSTRUCTIONAL OBJECTIVE

At the end of the course the wechakorn will be able to understand and use the common medical terms specified in this module.

#### 2. INTRODUCTION

As a health team member the wechakorn has to communicate with other team members and record a patient's condition or write patient progress reports. In doing this, the wechakorn has to understand and use some common medical terms which convey more specific meanings than ordinary written language. The following medical terms are those commonly used by physicians and nurses.

#### 3. MEDICAL TERMS AND MEANINGS

Abnormal	:	Deviation from the normal
Abortion	:	Expulsion of the fetus from the uterus before the twenty-eighth week of pregnancy
Abrasion	:	Rubbed or scraped off
Acute	:	A severe and relatively short course of illness
Adnexa	:	Structures attached to each other or accessory parts adjoining (annexa is often used instead of adnexa.)
Albuminuria	:	Protein in urine
Alopecia	:	Baldness.
Ambulant	:	Able to walk; not confined to bed
Analgesia	:	Painless or absence of feeling pain
Anesthesia	:	No feeling or loss of feeling
Aneurysm	:	A widening (dilatation) of a blood vessel
Angina	:	A choking sensation or pain which causes feeling of impending disaster or suffocation
Anomaly	:	An irregularity ; something out of the ordinary or not normal
Anorexia	:	Loss of appetite.
Anuria	:	Suppression of urine in kidney
Apex	:	The upper or pointed end
Aphasia	:	Inability to speak
Aphonia	:	Loss of voice
Apnea	:	Breathlessness; no respiration
Ascites	:	Fluid in the peritoneal sac or abdominal cavity

<b>Asepsis</b>	:	<b>A condition of being free of infection</b>
<b>Asthenia</b>	:	<b>Weakness</b>
<b>Atony</b>	:	<b>Lack of normal tone or vital energy</b>
<b>Atrophy</b>	:	<b>Not fed, or undersized</b>
<b>Auscultation</b>	:	<b>One of the oldest methods of examination of a patient was to place the ear against the chest to listen to breathing and the heart beat. This is direct auscultation. With the invention of the stethoscope, this type of examination is now done by indirect auscultation.</b>
<b>Autopsy</b>	:	<b>Dissection of a dead body.</b>
<b>Bacterium</b>	:	<b>A minute staff-shaped animal or plant seen only under a microscope, which may cause disease. Bacteria are preferably called microorganisms.</b>
<b>Blood Pressure</b>	:	<b>The pressure of blood on the walls of the arteries</b>
<b>Bradycardia</b>	:	<b>A slow heart beat</b>
<b>Breech</b>	:	<b>The buttocks</b>
<b>Cachexia</b>	:	<b>General debility or ill health with malnutrition</b>
<b>Cancer</b>	:	<b>A malignant growth or tumor</b>
<b>Caries</b>	:	<b>Used to indicate the decay of bonelike structures when they become softened, discolored, porous and fetid.</b>
<b>Catharsis</b>	:	<b>A purging of the bowels</b>
<b>Catheter</b>	:	<b>A tube sent down a passage for the purpose of feeding or draining</b>
<b>Cephalalgia</b>	:	<b>A headache</b>
<b>Chronic</b>	:	<b>Anything of long duration; the opposite of acute</b>
<b>Climacteric</b>	:	<b>The ancients considered that life changed every seven years. This change was called a climacteric because it was another rung up on the ladder of life. The greatest change or grand climacteric was supposed to come about the 63rd year of life. The word now signifies menopause or "change of life" in women.</b>
<b>Clinician</b>	:	<b>A physician who practices at the bedside; as distinguished from those who do laboratory work.</b>
<b>Coition</b>	:	<b>Sexual intercourse</b>
<b>Colic</b>	:	<b>Severe griping pain</b>
<b>Coma</b>	:	<b>Unconsciousness</b>
<b>Congenital</b>	:	<b>A medical condition present at birth, not necessarily hereditary</b>
<b>Crepitus</b>	:	<b>Crackling noise</b>
<b>Cul-de-sac</b>	:	<b>Bottom of a bag, or, a blind passage</b>
<b>Culture</b>	:	<b>In medicine this applies to an artificial growth of bacteria</b>

<b>Cyanosis</b>	<b>:</b>	<b>A condition of blueness of the skin produced by lack of oxygen. It means usually that the patient is not breathing deeply.</b>
<b>Decubitus</b>	<b>:</b>	<b>The recumbent position; bedsore caused from lying abed in prolonged illness</b>
<b>Dehydration</b>	<b>:</b>	<b>A condition resulting from loss of water from tissues</b>
<b>Diagnosis</b>	<b>:</b>	<b>A conclusion reached. In medicine, this means naming the disease</b>
<b>Diffuse</b>	<b>:</b>	<b>Widely scattered; not localized</b>
<b>Dyspareunia</b>	<b>:</b>	<b>Painful intercourse</b>
<b>Dysphagia</b>	<b>:</b>	<b>Painful swallowing</b>
<b>Dyspnea</b>	<b>:</b>	<b>Difficult or painful breathing</b>
<b>Eclampsia</b>	<b>:</b>	<b>To flash out or break forth suddenly. At one time this word indicated a sudden fever. It has come to mean the presence of toxins in the system during pregnancy – toxemia of pregnancy. This name was probably given this condition because of its sudden onset with convulsions.</b>
<b>Ectopic</b>	<b>:</b>	<b>A thing which is out of place</b>
<b>Edema</b>	<b>:</b>	<b>Dropsy. This term is used to indicate a collection of fluid in the tissues</b>
<b>Endemic</b>	<b>:</b>	<b>Used to denote a disease prevalent in people in a localized region</b>
<b>Epidemic</b>	<b>:</b>	<b>A disease attacking many people over a wide area</b>
<b>Etiology</b>	<b>:</b>	<b>The study of causation of disease; the conclusions reached by such study</b>
<b>Exophthalmos</b>	<b>:</b>	<b>Bulging out or protrusion of the eye</b>
<b>Expectoration</b>	<b>:</b>	<b>Cough and spitting out material from air passages</b>
<b>Exudate</b>	<b>:</b>	<b>Drainage or fluid which has oozed out of the body</b>
<b>Febrile</b>	<b>:</b>	<b>Feverish</b>
<b>Feces</b>	<b>:</b>	<b>Excrement</b>
<b>Fetus</b>	<b>:</b>	<b>Child in the uterus, after the third month</b>
<b>Fissure</b>	<b>:</b>	<b>A normal or abnormal groove or cleft in the anatomical makeup</b>
<b>Fistula</b>	<b>:</b>	<b>An abnormal passageway between two hollow parts or extending to an external surface of the body</b>
<b>Flatus</b>	<b>:</b>	<b>Gas or air in stomach or intestine</b>
<b>Flatulence</b>	<b>:</b>	<b>Excessive formation of gases in stomach or causing distension</b>
<b>Foci of Infection</b>	<b>:</b>	<b>Seat of infection (or, central point of fire)</b>
<b>Fornix</b>	<b>:</b>	<b>A vaultlike space</b>
<b>Fossa</b>	<b>:</b>	<b>Depressed areas on body</b>
<b>Fracture</b>	<b>:</b>	<b>A broken bone</b>

<b>Fundus</b>	:	That part of a hollow organ which is farthest away from its external opening
<b>Gestation</b>	:	Pregnancy
<b>Hallucination</b>	:	A word used to indicate that a patient is sensing things which are not real
<b>Hematuria</b>	:	Blood in the urine
<b>Hemoptysis</b>	:	Expectoration of blood
<b>Hirsutism</b>	:	Condition of being abnormally hairy
<b>Hormone</b>	:	A substance produced by one organ and transported to another to cause a specific effect
<b>Hypertrophy</b>	:	Overgrown or enlarged (not simply swollen)
<b>Icterus</b>	:	Jaundice
<b>Idiopathic</b>	:	A term used to show that a disease is self-originated; usually it is thought of as being of unknown cause, and only the functional reaction can be noted
<b>Incontinence</b>	:	Inability to control natural drainage
<b>Incubation Period</b>	:	The period between contacting an infection and the time when signs and symptoms appear in the diagnosable stage
<b>Infarct</b>	:	A coagulation necrosis resulting from lack of blood supply to any part
<b>Insomnia</b>	:	Inability to sleep
<b>Jaundice</b>	:	Yellowness of skin and mucous linings due to absorption of bile into the blood stream
<b>Keloid</b>	:	Dense new tissue growth of skin
<b>Latent</b>	:	Something concealed. (In medicine it is used with reference to infections or diseases which have not manifested themselves over a period of time.)
<b>Lesion</b>	:	An injury or disease; any pathology
<b>Ligature</b>	:	An article used as a thread to tie off a part
<b>Lipoid</b>	:	A thing resembling fat
<b>Lochia</b>	:	The discharges following birth of a child
<b>Lymphadenopathy</b>	:	Disease of the lymph glands
<b>Macula</b>	:	In medicine, this refers to an abnormal spot or a blemish
<b>Malaise</b>	:	Ill at ease; sick and in distress
<b>Marasmus</b>	:	A gradual wasting of tissues from malnutrition
<b>Menarche</b>	:	Beginning of menstrual function
<b>Metabolism</b>	:	The change of nutritive material into a substance which is growing and alive
<b>Metastasis</b>	:	Spreading by means of direct invasion or infiltration
<b>Micturition</b>	:	Urinating
<b>Morbidity</b>	:	The quality of being diseased
<b>Moribund</b>	:	In a dying condition

<b>Mortality</b>	:	<b>The quality of being mortal</b>
<b>Multiparous</b>	:	<b>Having given birth to two or more children</b>
<b>Nausea</b>	:	<b>Airsickness or seasickness; the ill feeling which comes before vomiting</b>
<b>Necrosis</b>	:	<b>Condition or process of tissue dying in a live body</b>
<b>Neonatal</b>	:	<b>Pertaining to a newborn</b>
<b>Neoplasm</b>	:	<b>A new growth; a tumor</b>
<b>Nocturia</b>	:	<b>Excessive urination at night</b>
<b>Nulliparous</b>	:	<b>A woman who has never given birth to a child</b>
<b>Nystagmus</b>	:	<b>A quick, uncontrolled movement of the eyeballs. It may be to the side, up and down, rotary, or a combination.</b>
<b>Obese, Obesity</b>	:	<b>Excessively fat</b>
<b>Oliguria</b>	:	<b>Reduced output of urine</b>
<b>Orientation</b>	:	<b>Determination of the position of a person or thing (originally with relation to the rising sun)</b>
<b>Orthopnea</b>	:	<b>Being able to breathe only in an upright position</b>
<b>Otorrhea</b>	:	<b>A draining ear</b>
<b>Palliative</b>	:	<b>In medicine it means to give relief by treatment, but not necessarily to cure</b>
<b>Palpation</b>	:	<b>Touching with the fingers the external surfaces of the body in order to feel the structures beneath</b>
<b>Palpitation</b>	:	<b>A fluttering condition</b>
<b>Papule</b>	:	<b>A small swelling not containing fluid or pus</b>
<b>Paresthesia</b>	:	<b>A burning, prickling, or feeling of numbness</b>
<b>Paroxysm</b>	:	<b>A seizure beyond control</b>
<b>Parturition</b>	:	<b>Giving birth to a child</b>
<b>Percussion</b>	:	<b>A method of diagnosis done by tapping over parts of the body to distinguish areas of dullness, density, or hollowness</b>
<b>Peristalsis</b>	:	<b>The waves or movements of the intestines which propel its contents</b>
<b>Petechia</b>	:	<b>Small areas of hemorrhage under the skin or in an organ</b>
<b>Polypus</b>	:	<b>Smooth growths on mucous linings</b>
<b>Polyuria</b>	:	<b>Much urine</b>
<b>Precordial</b>	:	<b>Referring to the region overlying the heart</b>
<b>Prenatal</b>	:	<b>During pregnancy or before the birth of a child</b>
<b>Primipara</b>	:	<b>A woman who has given birth to a first child</b>
<b>Prognosis</b>	:	<b>Foretelling possible outcome of a disease</b>
<b>Prosthesis</b>	:	<b>Replacement of a missing part by an artificial substitute</b>
<b>Pruritus</b>	:	<b>Intense itching</b>
<b>Ptosis</b>	:	<b>An organ dropping down out of its normal place</b>

<b>Puerperium</b>	:	The lying-in period after childbirth. It covers the period from birth of the child until return to normal of the uterus.
<b>Pulse</b>	;	Expansion and contraction of an artery which can be felt by the finger
<b>Purulent</b>	:	Consisting of or containing pus
<b>Pyrexia</b>	:	Condition of being feverish
<b>Rale</b>	:	A rattle-like sound
<b>Reflex</b>	:	Involuntary action or reaction
<b>Regurgitation</b>	:	A flowing or gushing backward
<b>Rigor</b>	:	Chill or cold shiver
<b>Sedative</b>	:	An agent used to allay excitement
<b>Senile</b>	:	Pertaining to old age
<b>Sepsis</b>	:	An infection or poisoning
<b>Sequela</b>	:	A morbid condition as a result of disease
<b>Sibling</b>	:	Children of the same parent or parents
<b>Spasmodic</b>	:	Like a spasm; characterized by a sudden tightening
<b>Spastic</b>	:	Characterized by a drawing or stiffening of muscles
<b>Sputum</b>	:	Spittle
<b>Stenosis</b>	:	A narrowing or closing of a part
<b>Stridor</b>	:	A harsh whistling sound
<b>Suppression</b>	:	A sudden cessation of secretion
<b>Syncope</b>	:	Fainting
<b>Syndrome</b>	:	A set of symptoms which occur together
<b>Tachypnea</b>	:	Rapid breathing (not dyspnea, difficult or labored breathing)
<b>Therapy,</b>	:	The art or science of healing
<b>Therapeutics</b>	:	
<b>Thrills</b>	:	Reaction felt on application of hand or finger tips to body.
<b>Thrombus</b>	:	A plug or clot of blood in a vessel or heart cavity which remains stationary
<b>Toxic</b>	:	Being poisoned or absorbing poisons
<b>Trauma</b>	:	An injury or wound
<b>Tremor</b>	:	A trembling
<b>Tubercle</b>	:	A small nodule or rounded eminence
<b>Tumor</b>	:	A mass or swelling which serves no useful purpose; a neoplasm; a new growth
<b>Tussis</b>	:	Cough
<b>Ulcer</b>	:	A sore; necrosis; loss of substance
<b>Vaccine</b>	:	Originally this term was used to mean an injection of cowpox virus to produce an immunity from smallpox. It has come to mean the hypodermic injection of any

		preparation of attenuated or killed bacteria or virus in order to produce an immunity.
Ventilation	:	To give vent to one's feelings; free discussion; to open up and tell all
Version	:	The obstetrical procedure of turning the fetus in utero
Virus	:	Extremely poisonous or infectious agent
Voiding	:	The act of urinating or defecating
Wheal	:	A raised skin defect, usually pustular
Xerosis	:	Condition of dryness

**MODULE 3**  
**ANATOMY AND PHYSIOLOGY**

**TEJATAT TEJASEN, M.D., Ph.D.**

## MODULE 3

### ANATOMY AND PHYSIOLOGY

#### 1. INSTRUCTIONAL OBJECTIVES

At the end of the course the wechakorn will be able to:

- (1) Explain the anatomy of the skin, head, neck, lymphatic system, thorax, abdomen, urinary system, male and female genital organs, breast, upper and lower limbs, and vertebral column and spinal cord.
- (2) Explain the normal physiology of the human body.

#### 2. SKIN

Skin envelops the outer surface of the body and may be divided into 2 layers. The outermost layer, the epidermis, is composed of keratinized, stratified, squamous epithelium. It plays the following roles:

- (1) Minimizes mechanical injury of the underlying structures.
- (2) Protects against entry of microorganisms and even water.
- (3) Prevents the evaporation of body fluid.
- (4) Bars entry of excess sunlight because of the presence of melanin pigment in the deep part of the epidermis.

The inner layer, the dermis, contains connective tissue, the sebaceous glands, and some of the hair follicles. It merges below with the subcutaneous tissue which contains fat, the sweat glands, and the remainder of the hair follicles.

Hair, nails, and sebaceous and sweat glands are considered appendages of the skin. Hair performs a protective function. Sweat glands function as excretory organs and help maintain homeostasis of fluid and electrolytes and of body temperature. Sebaceous glands secrete oil for the hair and keep the skin soft and pliant. If the secretory duct of the sebaceous gland is obstructed, its oily secretion will burst through the epidermis; the infected gland is called furuncle or boil (an infection of a hair follicle).

Blood vessels in the dermis not only nourish the cells in the skin, but also help to control body temperature and account for variations in skin color. Red skin may be caused by fever, sunlight, local inflammation, or polycythemia. Blue skin (or cyanosis) may be caused by increased amounts of reduced (unoxxygenated) hemoglobin secondary to hypoxia. Yellow skin (jaundice) may be caused by increased bilirubin levels in blood. Decreased color or pallor may be caused by decreased blood flow in superficial vessels or decreased amounts of oxyhemoglobin.

Nerve endings in the skin are for the most part sensory, and are of different kinds. They give the various different sensations of which the skin is

capable – the sensations of touch, heat, cold, and pain. Through these senses we are made aware of our environment. These nerve endings may be blocked by analgesic drugs.

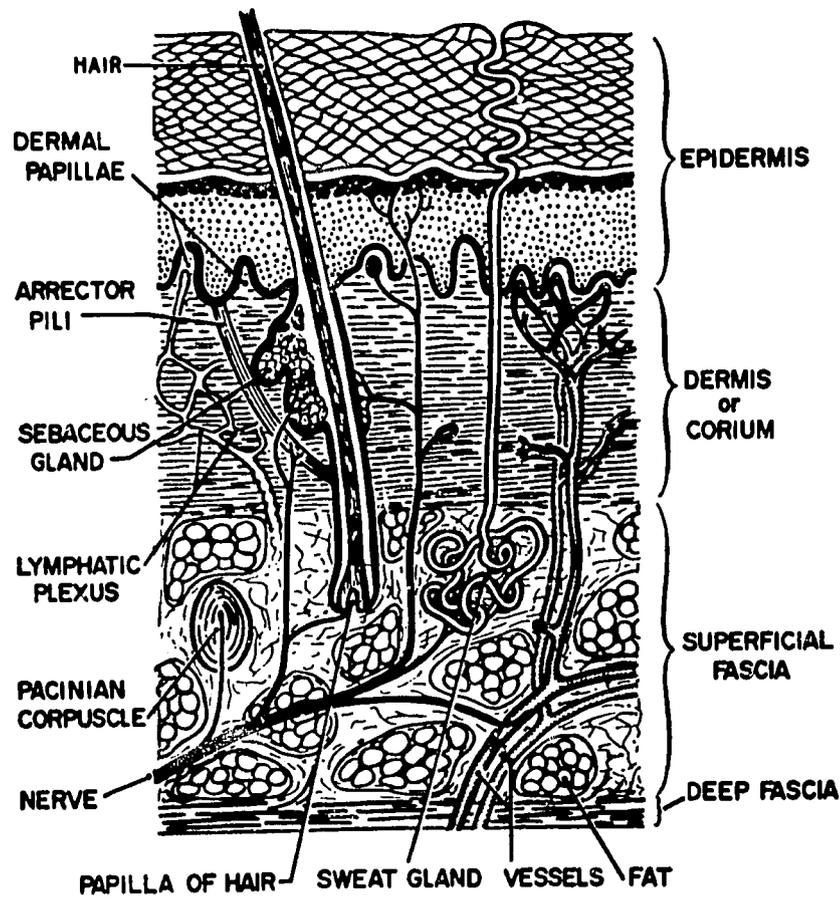


Figure 3.1 Skin

### 3. HEAD

#### 3.1 Bones of the Head

The bones of the head, collectively, are called the skull. For purposes of description the skull may be divided into the bones of the cranium and of the face.

The cranium is a box-like cavity which contains and protects the brain. It has a dome-shape roof called the calvaria or skull cap, and its floor is known as the base of the skull.

The frontal bone is a large, flat bone forming the forehead and most of the orbit. The bone contains two irregular cavities called the frontal sinuses which lie one over each orbit and which open into the nasal cavity. The sinuses contain air and are lined with mucous membrane which is continuous with the mucous membrane lining the nasal cavity. The sinuses add resonance to the voice and they serve to lighten the skull. The mucous membrane may become infected, causing a condition known as sinusitis.

The parietal bones form the sides and roof of the cranium; they articulate with the frontal bone, the occipital bone and with each other to form the sutures. At birth there are membranous gaps in the skull at the angles of the parietal bone which are called fontanelles.

The occipital bone forms the back of the skull. There is a large oval opening, known as the foramen magnum, through which the cranial cavity communicates with the vertebral canal. On either side of the foramen are two smooth, oval processes, called the occipital condyles, for articulation with the first cervical vertebra. This joint allows the nodding movement of the head.

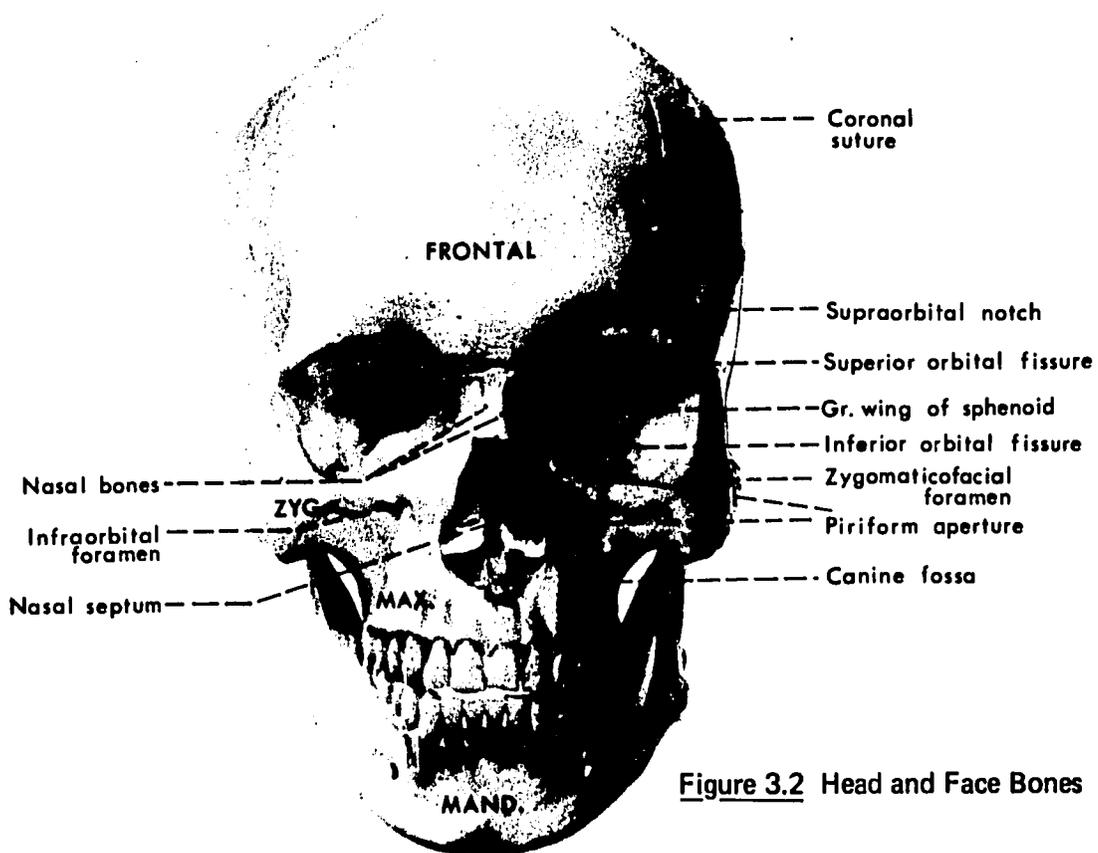
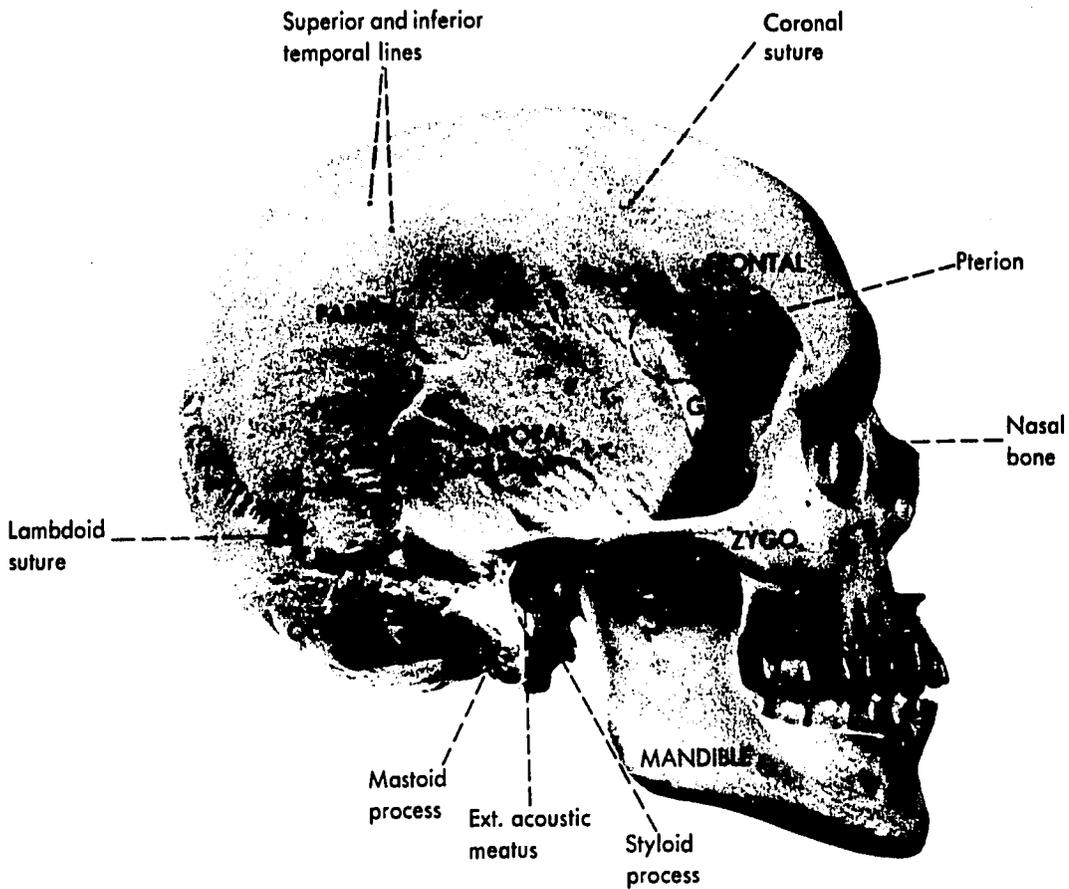
The temporal bones are situated at the sides and base of the skull. Each consists of four parts

- (1) The squamous part forms the anterior and upper part of the bone. It is thin and flat. A long, arched process, called the zygomatic process, projects forward from the lower portion.
- (2) The petromastoid part forms the posterior portion of the bone. It is divided into the mastoid portion, which continues into a conical projection called the mastoid process, containing air cells, and the petrous portion which contains the structures forming the internal ear.
- (3) The tympanic part contains the external acoustic meatus.
- (4) The styloid process.

The diamond-shaped anterior fontanelle is the largest. It lies at the junction of the two parietal bones with the frontal bone. It does not close completely until a child is aged 15 to 18 months. Dehydration in infancy causes the fontanelle to become depressed, which is a serious sign. A large, venous sinus runs under the fontanelle, from which it is possible to obtain a specimen of blood and into which intravenous fluids may be injected into the infant.

The posterior fontanelle lies at the junction of the parietal bones with the occipital bone. It is triangular in shape. It closes shortly after birth. Delay in the closure of the fontanelles may be caused by hydrocephalus.

The bones of the face form the boundaries of the orbital cavity, nasal cavity and oral cavity. The orbit helps to protect the eyeball and its associated structures. Within the frontal, ethmoid, sphenoid, and maxillae bones form air sinuses which open into the nasal cavity. They add resonance to the voice and they serve to lighten the skull, but mucous membrane may become infected causing a condition known as sinusitis.



**Figure 3.2** Head and Face Bones

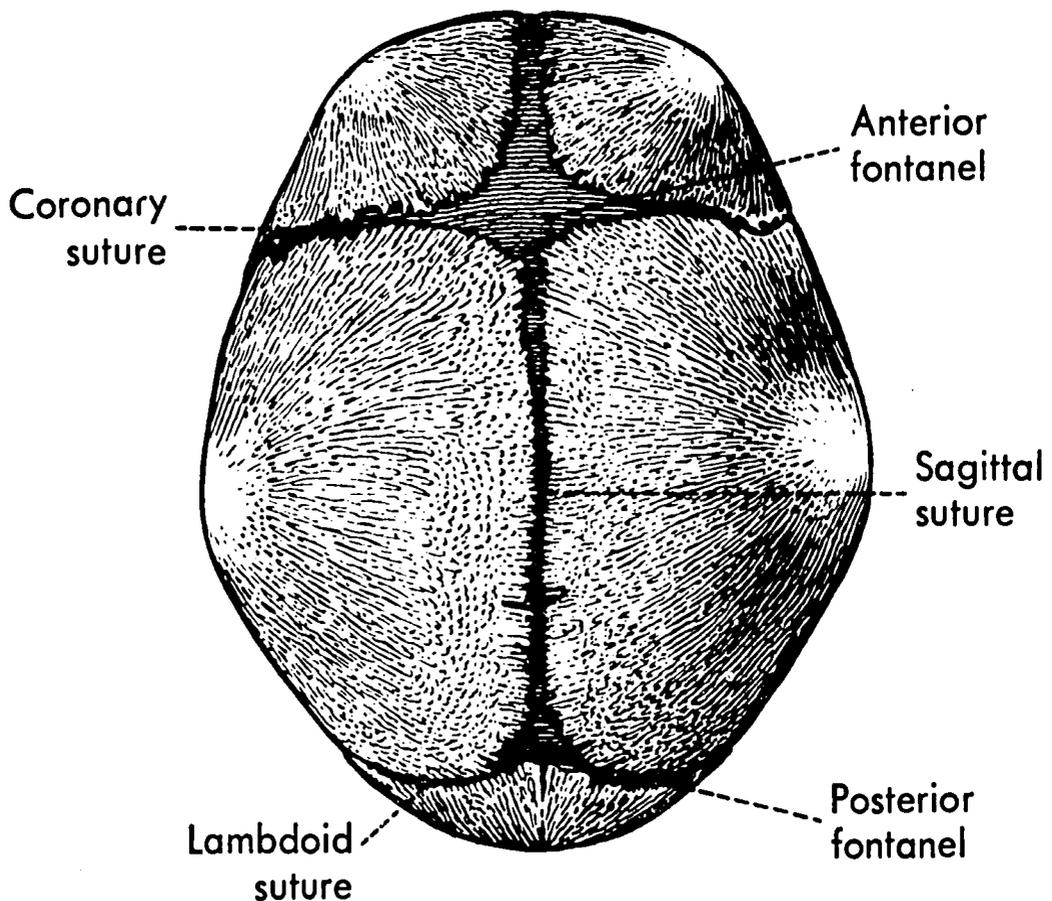


Figure 3.3 Skull Bones

### 3.2 The Eye

The eye is the organ of sight. It is situated in the orbit, which protects it from injury. The eye is spherical in shape and is embedded in fat. It has three coats : an outer, fibrous coat ; a vascular, pigmented coat ; and an inner, nervous coat.

The outer, fibrous coat has two parts. The opaque, posterior part is called the sclera. Its external surface forms the white of the eye. The anterior part of the sclera is covered with conjunctiva, which is reflected onto it from the inner side of the eyelid and is continuous with the corneal epithelium covering the cornea. The cornea is the anterior part of the fibrous coat. It projects a little from the surface of the eye and is transparent, allowing light rays to enter the eye and bending them to focus on the retina.

The vascular, pigmented coat has three parts. The choroid lines all but the front part of the eye. It is dark brown in colour and supplies blood to the other layers of the eye, particularly the retina. The ciliary body is a thickened part of the middle coat containing muscular and glandular tissue. The ciliary muscles control the shape of the lens, enabling it to focus light rays from near or far away as required. They are known as the muscles of accommodation. The ciliary glands produce a watery fluid, the aqueous humour, which fills the

eye in front of the lens and passes into the veins through the small openings in the angle between the iris and the cornea. The iris is the colored part of the eye. It lies between the cornea and the lens and divides the space between them into anterior and posterior chambers. There is a circular opening in the center of the iris called the pupil, which is contracted in bright light to prevent too much light entering the eye. The circular fibers in the iris contract the pupil. The pupil is dilated in poor light, to allow as much light as possible to reach the retina. The radiating fibers in the iris dilate the pupil.

The inner lining of the eye is called the retina. It is a delicate membrane adapted for the reception of light rays and contains many nerve cells and fibers. It is made of rods and cones which are thought to have separate functions. The cones are more numerous in the center of the eye ; they are responsible for detailed vision and colour perception. The rods are more numerous around the outer edge of the retina ; they are sensitive to the movements of objects within the field of vision.

The eye contains the aqueous humor, the vitreous humor, and the lens.

**3.2.1 Protection of the Eyes.** The eyes are very delicate organs. They are protected by the eyebrows, the eyelids, and the lacrimal apparatus, as well as by the bony orbits in which they lie embedded in fatty tissue.

The overhanging eyebrows protect eyes from injury and excessive light, while the hairs entangle sweat and prevent it from running into the eyes.

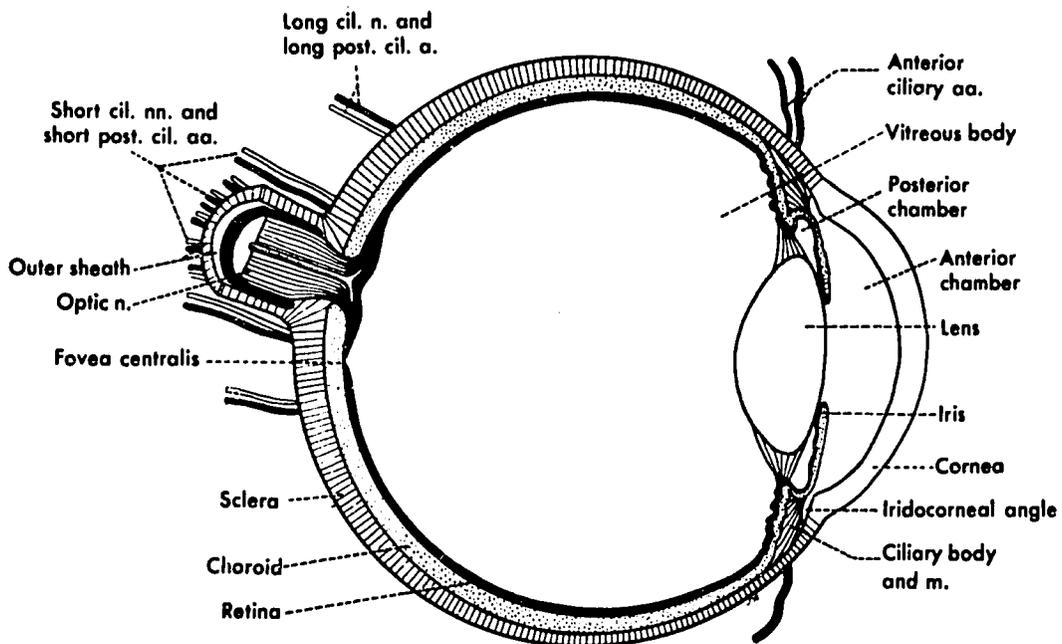
The eyelids consist of a plate of fibrous tissue covered by skin and lined with mucous membrane. The edges of the lids are provided with hairs (the eyelashes) which keep out dust, insects, and too much light. The transparent mucous membrane which lines the lids is reflected over the front of the eyeball; it is called the conjunctiva. Upper and lower conjunctival sacs form under the upper and lower lids, respectively. Dust and bacteria tend to stick to the moist surface of this membrane, and to keep it clean it is constantly washed by the lacrimal apparatus.

The lacrimal apparatus consists of :

- (1) The lacrimal gland, lying over the eye at the outer side and secreting lacrimal fluid into the conjunctival sac.
- (2) Two fine canals, called lacrimal canaliculi, leading from the inner angle of the lids to the lacrimal sac.
- (3) The lacrimal sac, which lies in the groove on the lacrimal bone.
- (4) The nasolacrimal duct, which runs from the lacrimal sac down to the nose.

The opening into the canaliculi which can be seen at the inner angle of the eyelids is called the punctum.

The fluid secreted by the lacrimal glands washes over the eyeball and is swept up by the blinking action of the eyelids. The lacrimal fluid is composed of water, salts, and an antibacterial substance called lysozyme.



**Figure 3.4 Eye**

### **3.3 The Nose**

The external, or visible, part of the nose is both covered and lined by skin; inside the nasal cavity there are hairs which help to prevent foreign material from entering. The nasal cavity is divided by a septum. The anterior nares are the openings which lead in from outside; the posterior nares are openings at the back, leading into the pharynx. The roof is formed by the ethmoid bone at the base of the skull, and the floor by the hard palate at the roof of the mouth. The lateral walls of the cavity are formed by the maxilla, the superior and middle nasal conchae of the ethmoid bone, and the inferior nasal concha. The posterior part of the dividing septum is formed by the perpendicular plate of the ethmoid bone and by the vomer, while the anterior part is made of cartilage.

The three nasal conchae project into the nasal cavity on each side and greatly increase the surface area of the inside of the nose. The cavity is lined throughout with ciliated mucous membrane, which is extremely vascular. Atmospheric air is warmed as it passes over the epithelium, which contains many capillaries. The mucus moistens the air and entraps some of the dust, and the cilia move the mucus back into the pharynx for swallowing or expectoration. The nerve endings of the sense of smell are situated in the highest part of the nasal cavity.

### **3.4 The Ear**

The ear, the organ of hearing, also plays an important part in the maintenance of balance. The external ear, the middle ear, and the cochlear of the internal ear are concerned with hearing; the semicircular canals, the utricle, and the saccule of the internal ear are concerned with balance.

The external ear has two parts:

- (1) The auricle is composed of a thin piece of elastic fibrocartilage, covered with skin, which funnels sound waves towards the external acoustic meatus.
- (2) The external acoustic meatus is a tubular passage about 4 cm long, leading into the temporal bone. The inner end of the meatus is closed by the tympanic membrane.

The skin lining the meatus contains hair follicles and numerous glands which secrete cerumen. These protect the canal from foreign bodies by entangling them, but the cerumen may itself block the canal if it accumulates.

The middle ear is a small space within the temporal bone. The tympanic membrane separates it from the external ear, and its medial wall is formed by the lateral wall of the internal ear. The cavity is lined with mucous membrane and is filled with air which enters from the pharynx through the auditory tube. This equalizes air pressure on both sides of the tympanic membrane. The middle ear contains a chain of three ossicles which transmit the vibrations of the tympanic membrane across to the internal ear. The posterior wall of the middle ear has an irregular opening which leads into the mastoid antrum; this in turn leads to a number of mastoid air cells.

The internal ear lies in the petrous part of the temporal bone. It consists of two parts, the bony labyrinth and the membranous labyrinth. The membranous labyrinth is contained within the bony labyrinth. It includes the utricle, saccule, semicircular ducts and cochlear duct.

The utricle, saccule and semicircular ducts contain the receptors for the sense of equilibrium, while the cochlear contains the receptors for the hearing sense.

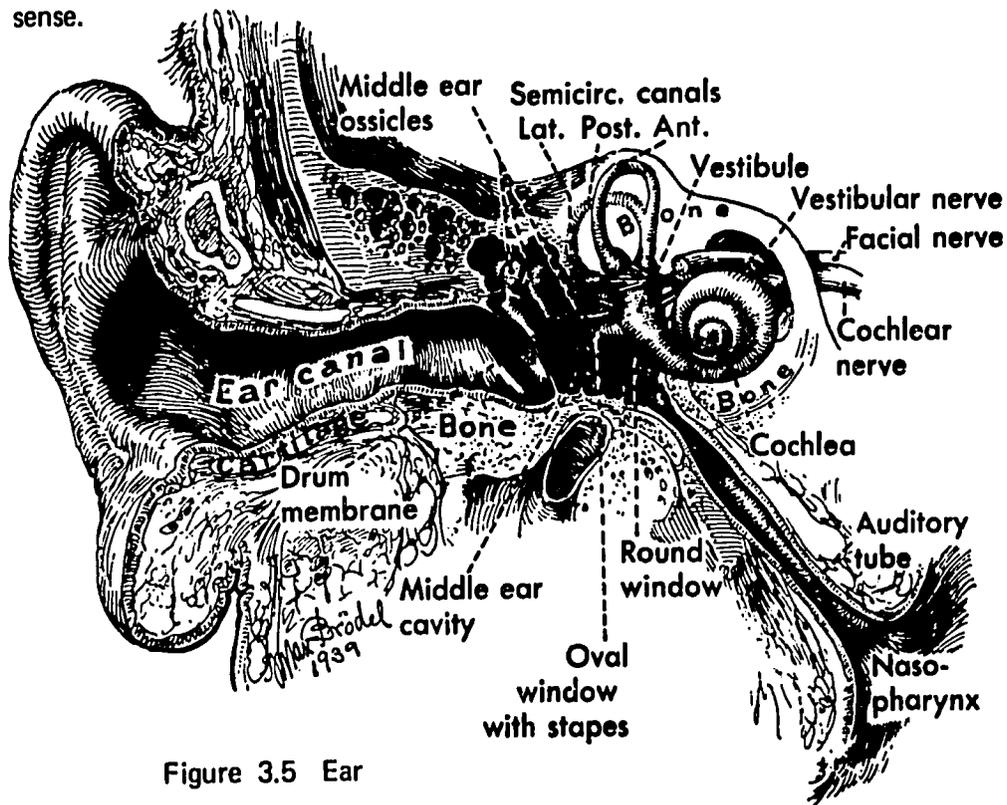


Figure 3.5 Ear

### 3.5 The Mouth

The mouth is a cavity leading into the pharynx. It is bounded externally by the lips and cheeks. The roof is formed by the hard palate and the anterior two-thirds of the tongue fills the floor of the mouth. The walls are formed by the muscles of the cheeks and lips. The mucous membrane which lines the mouth is continuous with the skin of the lips and with the mucous membrane lining of the pharynx. The lips enclose the orbicularis oris muscle which keeps the mouth closed.

The hard palate is formed by parts of the palatine bones and the maxillae; its upper surface forms the floor of the nasal cavity. The soft palate is suspended from the posterior border of the hard palate and extends down between the oral and nasal parts of the pharynx. Its lower border hangs like a curtain between the mouth and the pharynx, and a small conical process, called the uvula, hangs down from it. Two curved folds of mucous membrane extend sideways and downwards from each side of the base of the uvula; these folds are called the palatoglossal and palatopharyngeal arches, between which lie the masses of lymphoid tissue known as the palatine tonsils.

**3.5.1 The Tongue.** The tongue is a muscular organ which is attached to the hyoid bone, mandible and styloid process. It is covered in certain areas with modifications of the mucous membrane, called papillae, which appear as projections to increase the surface area. In addition, specialized areas called taste buds are widespread over almost the entire area of the tongue. The under surface of the anterior part of the tongue is connected to the floor of the mouth by a fold of mucous membrane called the frenulum. The functions of the tongue are: to taste, to assist in mastication of food, to assist in swallowing, and to assist with speech.

**3.5.2 The Teeth.** Man is provided with two sets of teeth, which make their appearance at different periods of life. The first set, the deciduous or primary teeth, erupts through the gums during the first and second years of life. The second set begins to replace the first about the sixth year and the process is usually complete by the twenty-fifth year. Since they cannot be replaced, and may be retained until old age, they are known as the permanent teeth.

Each tooth consists of three parts : (1) the crown, projecting beyond the gum, (2) the root, embedded in the alveolus of the maxilla and mandible, and (3) the neck, the constricted part between the crown and the root. In the center of all these parts is the pulp; immediately outside the pulp is a yellowish-white layer, called dentine, which forms the main part of the tooth. The outer layer of the tooth is in two parts: that covering the crown is called enamel, and that covering the root is called cement. The pulp is richly supplied with blood vessels and nerves which enter the tooth through foramina at the apex of each root.

There are four types of teeth:

(1) The incisor teeth have chisel-shaped crowns to give a sharp cutting edge for biting food.

- (2) The canine teeth have large, conical crowns.
- (3) The premolar or bicuspid teeth have almost circular crowns with two cusps for grinding.
- (4) The molar teeth are the largest; they have broad crowns with four or five cusps.

There are 20 deciduous teeth and 32 permanent teeth.

**3.5.3 Salivary Glands.** There are three pairs of salivary glands. The parotid gland, the largest, lies just below the ear; its duct opens into the mouth opposite the second upper molar tooth. It is this gland which is affected by the disease commonly known as mumps. The submandibular gland and the sublingual gland both open into the floor of the mouth.

Saliva is secreted reflexly by the presence of food in the mouth and by a conditioned reflex which enables saliva to be secreted by the sight, smell or thought of food. Saliva contains a large amount of water which moistens and softens the food; mucus, which combines the food and lubricates it for its passage down the esophagus; and the enzyme ptyalin, which acts on cooked starch (carbohydrate) and splits it into maltose and dextrin. Saliva also cleans the mouth and teeth and keeps the soft parts supple.

#### 4. THE NECK

The neck, a part of the trunk, is located between the head and the chest. The skeleton of the neck consists of the seven cervical vertebrae, which are articulated to form the cervical part of the vertebral column. This part of the vertebral column is surrounded by muscles which help to flex, extend and rotate the head and neck. In front of this musculoskeletal compartment is the visceral compartment, which contains the cervical viscera. Anterior to the visceral compartment are infrahyoid muscles, strap-like muscles that form the shield for the cervical viscera.

Within the visceral compartment are the larynx and trachea (respiratory tract), pharynx and esophagus (alimentary tract), and the thyroid glands and parathyroid glands.

##### 4.1 The Pharynx

The roof of the pharynx is formed by the body of the sphenoid bone; inferiorly it is continuous with the esophagus. At the back it is separated from the cervical vertebrae by loose connective tissue, while the front wall is incomplete and communicates with the nose, mouth and larynx. The pharynx is divided into three sections, the nasopharynx which lies behind the nose, the oropharynx which lies behind the mouth, and the laryngeal pharynx which lies behind the larynx.

##### 4.2 The Larynx

The larynx is continuous with the oropharynx above and with the trachea below. Above it lie the hyoid bone and the root of the tongue. The muscles of the neck lie in front of the larynx, and behind the larynx lie the

laryngopharynx and the cervical vertebrae. On either side are the lobes of the thyroid gland. The larynx is composed of several irregular cartilages joined together by the ligaments and membranes. One of these, the cricothyroid membrane, is attached all round to the upper edge of the cricoid cartilage and has a free upper border, which is not circular like the lower border but makes two parallel lines running from front to back. The two parallel edges are the vocal ligaments. They are fixed to the middle of the thyroid cartilage in front and to the arytenoid cartilages behind, and they contain much elastic tissue. When the intrinsic muscles of the larynx alter the position of the arytenoid cartilages, the vocal ligaments are pulled together, narrowing the gap between them. If air is forced through the narrow gap during expiration, the vocal ligaments vibrate and sound is produced. The pitch of the sound produced depends on the length and tightness of the ligaments; an increased tension gives a higher note, a slacker tension a lower note. Loudness depends on the force with which the air is expired. The alteration of the sound into different words depends on the movements of the mouth, tongue, lips and facial muscles.

#### 4.3 The Trachea

The trachea begins below the larynx and runs down the front of the neck into the chest. It divides into the right and left main bronchi at the level of the fifth thoracic vertebra. The isthmus of the thyroid gland crosses in front of the upper part of the trachea, and the arch of the aorta lies in front of the lower part, with the manubrium of the sternum in front of it. The esophagus lies behind the trachea, separating it from the bodies of the thoracic vertebrae. On either side of the trachea lie the lungs, with the lobes of the thyroid gland above them. The trachea is lined with ciliated epithelium containing goblet cells which secrete mucus. The cilia sweep the mucus and foreign particles upward towards the larynx.

#### 4.4 The Thyroid Gland

The thyroid gland is situated at the front and sides of the trachea, opposite the lower cervical and first thoracic vertebrae. It consists of two lobes, one on either side, joined by a narrower portion called the isthmus which crosses the front of the trachea just below the larynx.

The cells of the thyroid gland produce a hormone called thyroxine. This hormone may be released directly into the blood stream if it is required, or it may be linked to the thyroglobulin and stored in the colloid of the follicles. The amino acid tyrosine and the mineral iodine are both essential for the formation of thyroxine.

The function of thyroxine is to regulate metabolism in the tissues. Together with growth hormone it ensures proper development of the brain; it increases urine production, protein breakdown and the uptake of glucose by the cells.

#### 4.5 The Parathyroid Glands

The parathyroid glands usually lie between the posterior borders of the lobes of the thyroid gland and its capsule. They are about the size of pea

and there are usually four, two behind each lobe. The glands produce a hormone called parathormone which regulates the distribution and metabolism of calcium and phosphorus in the body.

#### 4.6 Neurovascular Compartments

Both sides of the visceral compartment are neurovascular compartments. Within the compartment are the common carotid artery, internal jugular vein, vagus nerve and deep cervical lymph nodes.

The common carotid arteries supply the head and neck. Each divides into two at the level of the thyroid cartilage to form the external and internal carotid arteries. At the point where the common carotid artery divides there is a dilated area called the carotid sinus. The sinus reacts to changes in arterial blood pressure and assists in making appropriate changes to return it to normal. A small reddishbrown structure behind the division of the common carotid artery is called the carotid body ; it acts as a chemoreceptor.

The blood from the brain is collected into vessels which are called venous sinuses. These in turn empty into the internal jugular veins along with blood from the superficial parts of the face and from the neck.

The external jugular veins receive blood from the exterior of the cranium and from the deep parts of the face.

At the root of the neck the internal jugular vein joins with the subclavian vein to form the brachiocephalic vein ; these in turn unite to form the superior vena cava through which blood is poured into the right atrium.

1. Nasal cavity
2. Hard palate
3. Soft palate
4. Pharynx
5. Tongue
6. Epiglottis
7. Pharynx
8. Larynx
9. Esophagus

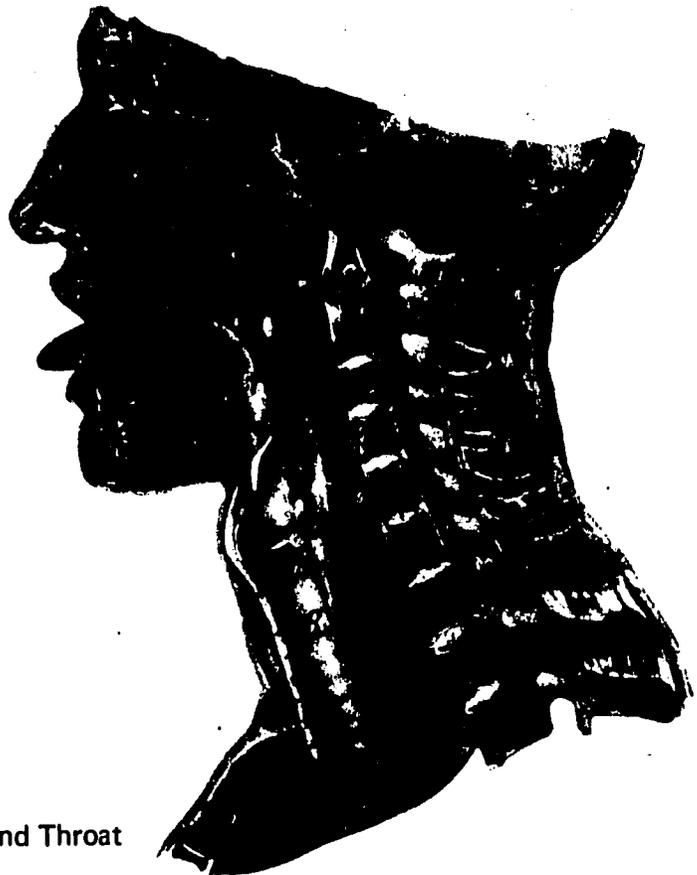


Figure 3.6 Mouth, Nose and Throat

## 5. THE LYMPHATIC SYSTEM

As blood passes through the capillaries in the tissues, fluid oozes out through the porous walls and circulates through the tissues themselves, bathing every cell. This fluid is called tissue or interstitial fluid ; it fills the spaces between cells which form different tissues. It is clear, watery, straw-coloured fluid similar to the plasma of the blood from which it is derived. While blood circulates only through the blood vessels, tissue fluid circulates through the actual tissue and carries food, oxygen and water from the blood stream to each individual cell and carries away its waste products such as carbon dioxide, urea and water, transmitting them to the blood. It is, in other words, the carrying medium between the tissue cells and the blood.

Of the fluid which escapes from the capillaries into the tissues a certain amount passes back through the capillary wall, but its return is more difficult than its escape owing to the constant stream of on-coming blood which fills the capillaries. The excess fluid which cannot return directly into the blood stream is collected and returned to the blood by a second set of vessels, which form the lymphatic system. The fluid that these vessels contain is called lymph.

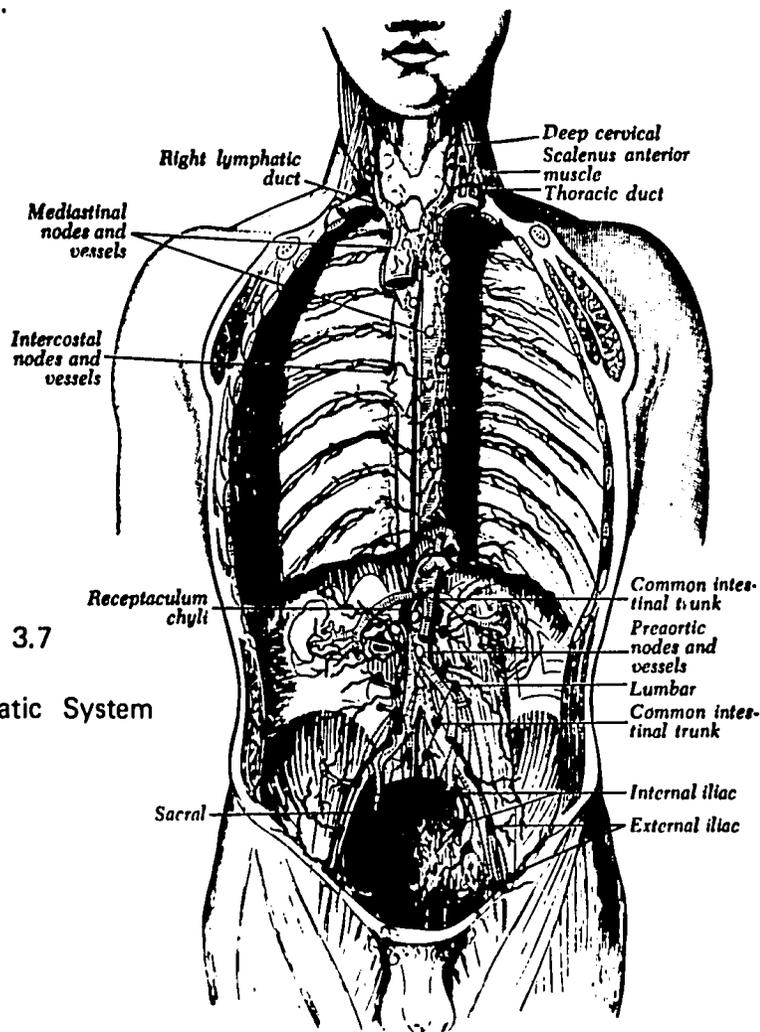


Figure 3.7

Lymphatic System

The lymphatic system consists lymphatic capillaries, vessels, nodes, and ducts. The functions of the lymphatic system are as follows:

- (1) The lymphatic vessels gather up excessive fluid or lymph from tissues and thus permit a constant stream of fresh fluid to circulate through them.
- (2) It is the channel by which excess proteins in the tissue fluid pass back into the blood stream.
- (3) The nodes filter the lymph of bacterial infection and harmful substances.
- (4) The nodes produce fresh lymphocytes for circulation.
- (5) The lymphatic vessels in the abdominal organs assist in the absorption of digested food, especially fat.

## 6. THE THORAX

The trunk contains the three major cavities of the body: the thoracic cavity, the abdominal cavity, and the pelvic cavity. The thoracic cavity contains the heart, the lungs, and the food and air passages. This cavity is surrounded by the ribs, which form a bony cage. The ribs are attached posteriorly to the 12 thoracic vertebrae, which are continuous above with the cervical vertebrae and below with the lumbar vertebrae. The ribs are attached anteriorly to the sternum. A muscular septum called the diaphragm separates the thoracic cavity from the abdominal cavity.

### 6.1 The Thoracic.

First, identify on your body the bony landmarks which can easily be felt. The sternum is a dagger-shaped bone at the front of the rib cage. The clavicles are attached anteriorly to the top of the sternum. The heart separates the right lung and the left lung.

Study a transverse section of the thorax. The bony cage is formed by the ribs on the sides, and by the thoracic vertebrae at the back. The right and left pleural sacs (which contain the lungs) are separated by a septum called the mediastinum. This is formed by the heart, the trachea or the air passage, the esophagus or food passage and the great artery from the heart, the aorta. The space in front of the heart is called the anterior mediastinum; it contains some fat and a few lymph nodes. The space behind the heart is called the posterior mediastinum; it contains the trachea, the esophagus and the aorta.

### 6.2 The Heart

The heart and the roots of the great blood vessels are contained in a tough fibrous bag called the fibrous pericardium, which is lined with a thin, glistening membrane called the serous pericardium.

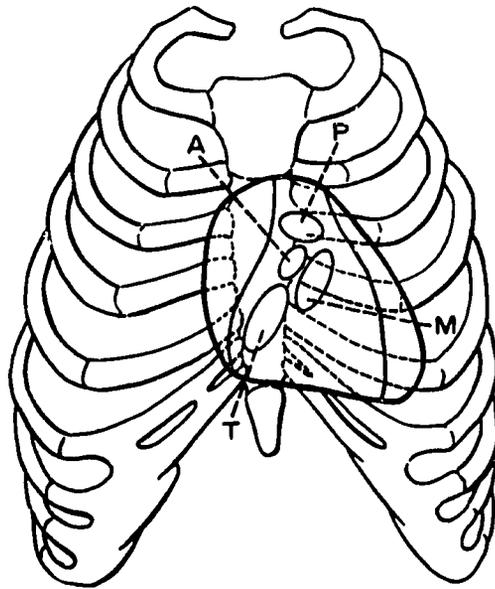
6.2.1 Parts of the Heart The right atrium forms the right border of the heart. The right ventricle takes up most of the anterior surface, while the left ventricle forms most of the left border. Most of the left atrium is seen from the posterior aspect. The apex of the heart swings forward and upward during contraction of the ventricles and hits the chest wall. This apex beat can usually be felt in the space below the fifth rib, about 3½ inches from the midline.

Three great vessels are seen at the upper border of the heart. They are the superior vena cava, aorta and pulmonary trunk.

**6.2.2 Flow of Blood through the Heart.** The heart consists of four chambers : left atrium, right atrium, left ventricle, and right ventricle. Unoxygenated venous blood enters the right atrium from the vena cavae, during diastole. Oxygenated blood enters the left atrium at the same time from the pulmonary veins. Contraction of the right atrium forces the blood through the tricuspid valve into the right ventricle. Contraction of the left atrium at the same time forces oxygenated blood into the left ventricle through the mitral valve. Contraction of the right ventricle forces blood through the pulmonary valve into the pulmonary artery. Contraction of the left ventricle forces blood through the aortic valve into the aorta. During diastole, the valves between the atria and ventricles are open and the semilunar valves of aortic and pulmonary valves are closed. During systole, the semilunar valves are forced open by the pressure of blood from the ventricles, and the tricuspid and mitral valves are forced shut.

Relation of the anterior surfaces of the heart to the anterior thoracic wall is of importance. The exact outline of the heart as projected against the chest wall varies somewhat in individual cases, but on average is about as follows. Beginning at a point corresponding to the lower border of the second left costal cartilage about  $\frac{1}{2}$  inch to the left of the edge of the sternum, the left border follows a line somewhat convex to the left, running down to the fifth intercostal space about  $3\frac{1}{2}$  inches from the midline. From here, the inferior border follows a nearly straight line across the sixth right costal cartilage about  $\frac{1}{2}$  inch from the junction of this cartilage with the sternum. From here, the right margin, somewhat convex to the right, runs upward to the upper border of the third costal cartilage about  $\frac{1}{2}$  inch from the sternum. The upper border, which corresponds to the junction of the superior vena cava with the right atrium and the junction of the right ventricle with the pulmonary artery, lies behind a line running from the upper border of the third right cartilage about  $\frac{1}{2}$  inch to the right of the sternum to the lower border of the second left cartilage about  $\frac{1}{2}$  inch to the left of the sternum.

**6.2.3 Thoracic Projection of the Heart Valves and Their Maximum Audibility.** The right chambers and their valves lie superficial to the left chambers and valves. The sounds from the pulmonary and tricuspid valves can be heard best at their normal anatomical location, behind the third left sternal joint and the right half of the lower part of the body of the sternum, respectively. The sounds from the left valves, mitral and aortic, are projected along the course of blood flow along the arch of the aorta (to the back of anterior end of the second right intercostal space) and to the apex of the left ventricle.



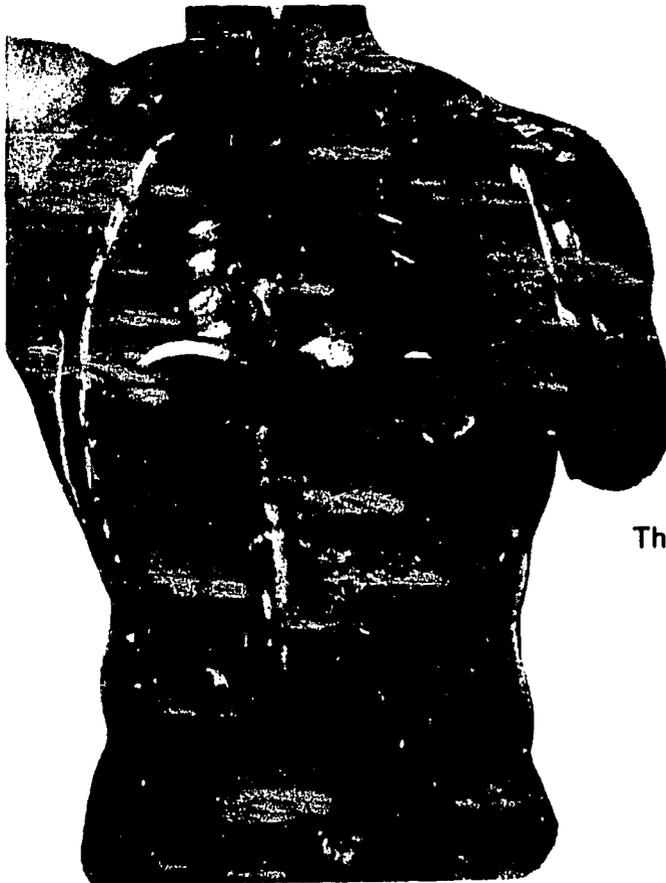
Approximate projection of the heart onto the anterior thoracic wall. The large middle portion of the anterior surface of the heart is formed by the right ventricle; the left and right borders of this surface are formed by the left ventricle and the right atrium, respectively. The letters, P, A, M, and T identify the positions of the pulmonary, aortic, mitral, and tricuspid valves, respectively.

Figure 3.8 Heart Valves

### 6.3 The Lung

The lungs are two large, spongy organs lying in the thorax on either side of the heart and great vessels. They extend from the root of the neck to the diaphragm and are roughly cone-shaped, with the apex above and the base below. The lungs are divided into lobes. The left lung has two lobes, separated by the oblique fissure. The superior lobe is above and in front of the inferior lobe, which is conical in shape. The right lung has three lobes. The inferior lobe is separated by an oblique fissure in a similar manner to the left inferior lobe. The remainder of the lung is separated by a horizontal fissure into the superior lobe and the middle lobe. Each lobe is further divided into bronchopulmonary segments, separated from each other by a wall of connective tissue and each having an artery and a vein.

6.3.1 The Pleura. The pleura is a serous membrane which surrounds each lung. The visceral pleura is firmly attached to the lungs, covering their surfaces and dipping into the interlobar fissures. At the root of the lungs the visceral layer is reflected back to become the parietal layer which lines the chest wall and covers the superior surface of the diaphragm. The two layers of the pleura are normally in close contact with each other, separated only by a film of serous fluid which enables them to glide over one another without friction. This potential space between the layers is called the pleural cavity.



#### The Heart and Major Blood Vessels

1. Innominate artery
2. Thoracic aorta
3. Heart
4. Left diaphragm
5. Vena cava
6. Right kidney
7. Left kidney
8. Abdominal aorta

Figure 3.9 Heart, Lungs and Abdomen

## 7. THE ABDOMEN

The abdomen is the portion of the trunk between the diaphragm and the pelvic inlet. The abdomen consists of a great cavity filled with viscera and membranes bound by musculoskeletal walls. Above, the abdomen is roofed by the thoracic diaphragm; below, it is continuous with the cavity of the pelvis. Anterolaterally, the abdomen is bounded by the lower extent of the thoracic cage and three musculotendinous sheets interrupted in the midline by the straight muscle of the abdomen, known as the rectus abdominis. Posteriorly, the abdomen is supported by the stanchions of the lower thoracic and lumbar vertebrae and reinforced by the muscles of the posterior wall and back.

Interiorly, the cavity is lined with a layer of serous membrane (peritoneum) which is reflected onto and fitted tightly around most of the abdominal viscera.

The viscera found in the abdomen consist of :

- (1) A string of structures, the alimentary tract, continuing distally from the esophagus to the anus.
- (2) Secretory organs associated with the alimentary tract.
- (3) Certain endocrine organs.

(4) Structures associated with the urinary system.

(5) The spleen, part of the lymphatic system.

### 7.1 Regions of the Abdomen

For the purposes of description the abdomen is divided into nine regions by two transverse and two upright lines. In describing the position of organs, the region in which they lie may be used, e.g., the stomach lies in the left hypochondriac, epigastric and umbilical regions. The kidneys are in the right and left lumbar regions respectively. The caecum is in the right iliac fossa. The bladder rises when full into the hypogastric region.

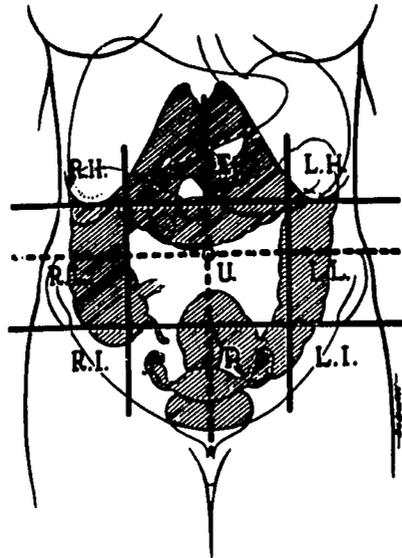


Figure 3.10 Regions of the Abdomen

### 7.2 Functions of the Organs of the Digestive System

The esophagus is a muscular canal about 25 cm long, extending from the pharynx to the stomach. It takes about nine seconds for a wave, or peristalsis, to pass the bolus of food from the pharynx to the stomach.

The stomach is the most dilated part of the digestive tube and is situated between the end of the esophagus and the beginning of the small intestine. Functions of the stomach are:

(1) To churn up the food, breaking it up still further and mixing it with the secretions from the gastric glands.

(2) To continue the digestion of food by means of the gastric juice.

The churning action of the stomach serves to emulsify coarsely any fat which may be present and which the body heat will have melted. This converts the food into a greyish-white fluid called chyme.

The small intestine is a convoluted tube extending from the pyloric sphincter of the stomach to its junction with the large intestine at the ileocaecal valve. The small intestine consists of the duodenum, the jejunum and

the ileum. The functions of the small intestine are the digestion and absorption of food.

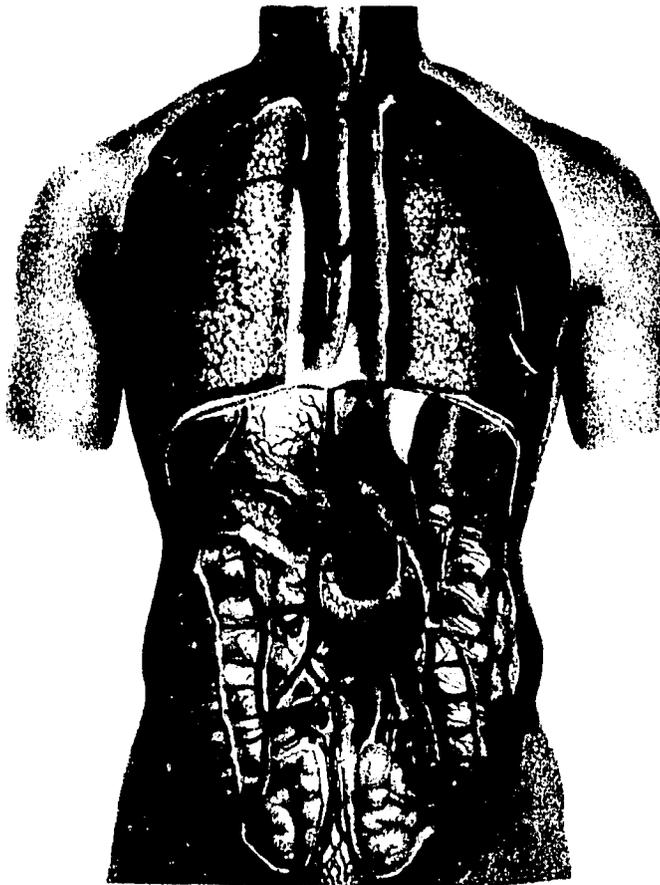
The large intestine extends from the end of the ileum to the anus. It forms an arch which encloses most of the small intestine, and is divided into seven sections :

- (1) the caecum,
- (2) the ascending colon,
- (3) the transverse colon,
- (4) the descending colon,
- (5) the sigmoid colon,
- (6) the rectum, and
- (7) the anal canal.

The material which enters the large intestine consists of water, salts, very little food material (as this has been digested and absorbed in the small intestine), cellulose, which is indigestible, and bacteria. The bacteria are very numerous ; although they are largely killed in the stomach, the alkaline reaction, food, warmth and moisture in the small intestine encourage their growth here. In the colon, water and salts are quickly absorbed, so that the fluid is rapidly turned into a paste containing cellulose and bacteria, many of which die from lack of water and food. At intervals mass movements propel the faeces into the rectum, from which it is excreted.

The liver is the largest gland in the body. It is situated in the upper right part of the abdominal cavity, occupying almost all of the right hypochondrium and fitting under the diaphragm. The functions of the liver can be divided into three sections : metabolic, storage, and secretory.

The pancreas is a soft, greyish-pink gland lying transversely across the posterior abdominal wall behind the stomach. The pancreas secretes enzymes called trypsinogen, amylase and lipase. Between the alveoli, collections of cells are found, forming interalveolar cell islets ; they secrete glucagon and insulin to the blood stream. A deficiency of insulin results in diabetes mellitus. The blood sugar level rises above the renal threshold and glucose is lost in urine.

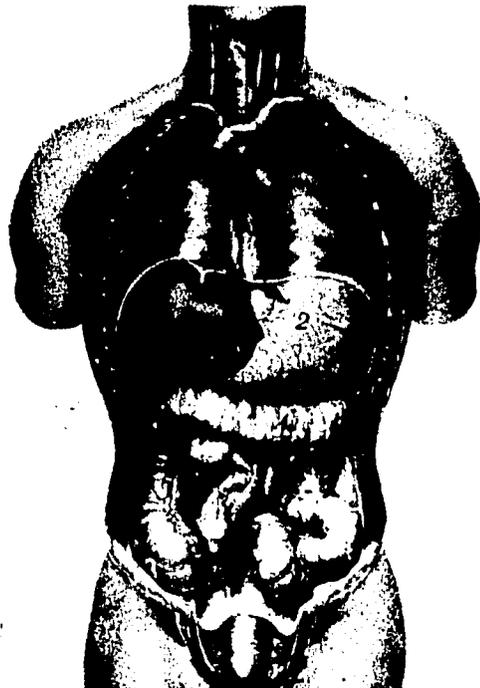


1. Pharynx
2. Esophagus
3. Left lung
4. Right lung
5. Spleen
6. Liver
7. Pancreas
8. Small intestine
9. Large intestine

**Figure 3.11 Digestive and Other Organs (Rear View)**

**Digestive Organs**

1. Esophagus
2. Stomach
3. Liver
4. Transverse colon
5. Ascending colon



**3.12 Digestive and Other Organs (Front View)**

## 8. THE URINARY SYSTEM

The urinary system consists of

- (1) the kidneys,
- (2) the ureters,
- (3) the bladder, and
- (4) the urethra.

The kidneys are two bean-shaped organs situated in the posterior part of the abdomen, one on each side of the vertebral column, behind the peritoneum. The function of the kidneys is to secrete and excrete urine. The composition of the blood must not vary beyond certain limits if the tissues are to remain healthy, and this regulation depends on the removal of harmful waste products and the conservation of water and electrolytes in the body.

Urine is produced by three processes : filtration under pressure, selective reabsorption, and active secretion. Normal urine is an amber-colored fluid varying in color according to its quantity. It is acid in reaction and has a specific gravity of 1.015 to 1.025. The average composition is : water 96%, urea 2%, uric acid and salts, 2%.

The ureters are the two tubes which carry the urine from the kidneys to the bladder. The bladder is a reservoir for urine, its size, shape and position vary with the amount of fluid it contains. When empty it lies within the lesser pelvis, but as it becomes distended with urine it expands upward and forward into the abdominal cavity.

The urethra extends from the internal urethral orifice in the bladder to the external urethral orifice.

## 9. THE MALE GENITAL ORGANS

The male genital organs consist of:

- (1) the testes and epididymides,
- (2) the deferent ducts,
- (3) the seminal vesicles,
- (4) the ejaculatory ducts and the penis,
- (5) the prostate, and
- (6) the bulbourethral glands.

The testes are the reproductive glands in the male. They are suspended in the scrotum by spermatic cords. Each testis contains many convoluted, seminiferous tubules. The epithelial lining of their walls contains cells which develop into spermatozoa by a process of cell division. The tubules are supported by loose connective tissue which contains groups of interstitial cells; these cells secrete the male hormone testosterone.

The epididymis is a fine, tightly coiled tube which is packed into the form of a long, narrow body attached to the back of the testis. The seminiferous tubules of the testis open into it and it leads into the deferent duct.

The deferent duct is a continuation of the duct of the epididymis. It passes through the inguinal canal and runs between the base of the bladder and the rectum to the base of the prostate gland, where it is joined by the duct of the seminal vesicle.

The seminal vesicles are two pouches lying between the base of the bladder and the rectum. They secrete alkaline fluid containing nourishment which forms a large part of the seminal fluid.

The ejaculatory ducts are formed by the union of the ducts of the seminal vesicles and the deferent ducts. They commence at the base of the prostate and end at the opening of the prostatic utricle in the urethra.

The penis is a tubular organ plentifully supplied with large venous sinuses which can fill with blood, causing erection of the organ. It contains the urethra, which is common to both the urinary and reproductive systems in the male. At the tip of the penis is an enlargement called the glans penis, in the center of which lies the urinary meatus. The glans is normally covered by a loose double fold of skin called the prepuce or foreskin. It should be possible to draw the foreskin back over the glans penis, but sometimes the opening in it is too small. This is known as phimosis, and is treated either by stretching the foreskin or by circumcision.

The prostate surrounds the commencement of the urethra in the male. It is about the size of a chestnut and contains the urethra and the ejaculatory ducts. It consists partly of glandular tissue and partly of involuntary muscle and produces a secretion which is alkaline in reaction and provides nourishment for the sperm.

The bulbo-urethral glands are situated on either side of the membranous portion of the urethra. The ducts open into the spongy portion of the urethra and the glands secrete a substance which forms part of the seminal fluid.

The seminal fluid is composed of substances secreted by the testes, the seminal vesicles and the prostate ; it contains the spermatozoa.

The spermatozoa are minute cells, each with a tail-like projection joined to the cell by a constricted portion called the neck. The tail has a lashing movement which enables the cell to move after the semen leaves the male reproductive tract. As a result, when the spermatozoa are deposited in the female vagina they can make their way up the uterus and uterine tubes in search of the ova. They are produced in enormous numbers and it is estimated that on average, 300,000,000 are deposited in the vagina at one time, though only one is necessary to fertilize the ovum.

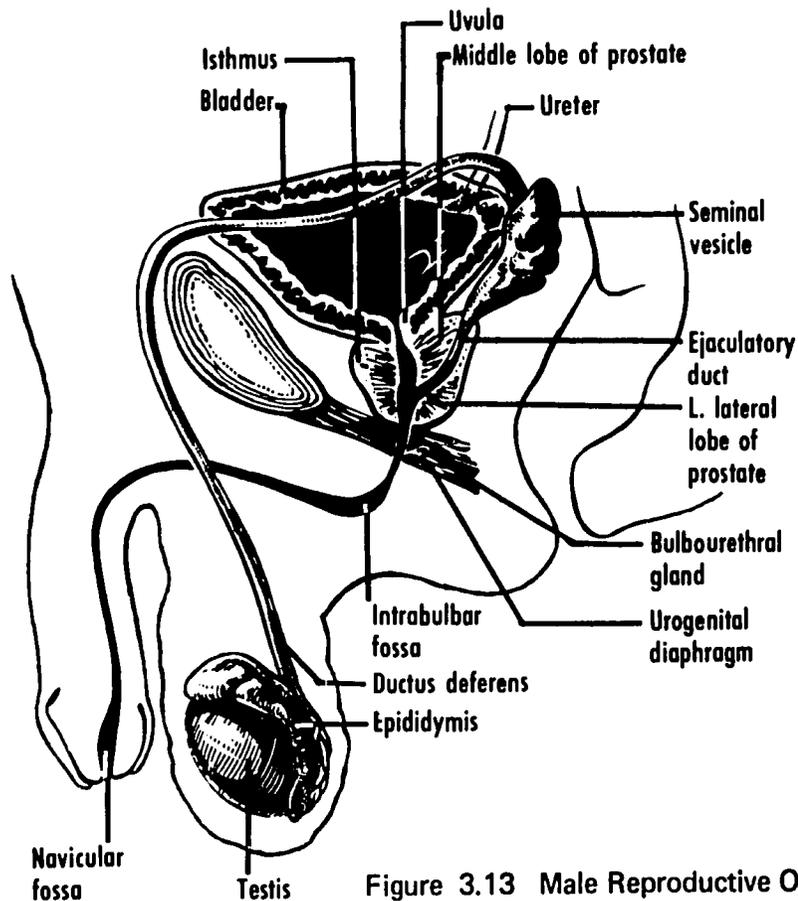


Figure 3.13 Male Reproductive Organs

## 10. THE FEMALE GENITAL ORGANS

The female genital organs consist of an internal and an external groups.

### 10.1 Internal Organs

The internal organs, situated within the lesser pelvis, are:

- (1) the ovaries,
- (2) the uterine tube,
- (3) the uterus, and
- (4) the vagina.

The ovaries are two small glands about the size and shape of almonds, which are situated in the lesser pelvis, one on either side of the uterus, behind and below the uterine tubes. Each is attached to the broad ligament by a fold called the mesovarium. The fimbriated ends of the uterine tube and a suspensory ligament are also attached to the ovary.

After puberty the ovary has a thick cortex surrounding a very vascular medulla. At birth the cortex contains numerous primary ovarian follicles. After puberty some develop each month to form vesicular ovarian follicles (Graafian follicles), one of which usually matures and ruptures, releasing an ovum. This process is called ovulation. The ovum passes into the uterine tube along its fimbriated end and may be fertilized by a male sperm. If fertilization occurs it usually takes place in the lateral third of the uterine tube.

After ovulation the vesicular ovarian follicle is converted to a mass of specialized tissue called the corpus luteum. If fertilization occurs the corpus luteum remains active until late in pregnancy; if fertilization does not occur the corpus luteum begins to degenerate after about 14 days. The corpus luteum produces the hormones progesterone and estrogen; these hormones cause the lining of the uterus, the endometrium, to become thickened, ready to receive the fertilized ovum. However, if fertilization does not occur, the hormones are withdrawn and the corpus luteum degenerates and the endometrium is shed in the process called menstruation.

The functions of the ovary are controlled by the follicle stimulating hormone and luteinizing hormone from the hypophysis. Hormones from the ovaries are also responsible for the development of the reproductive system and the general development which marks puberty in the female; puberty occurs at about 13 years of age.

The uterine tubes are situated in the upper part of the broad ligaments of the uterus. They transmit the ova from the ovaries to the cavity of the uterus.

The uterus is a hollow, thick-walled, muscular organ situated in the lesser pelvis between the rectum and the bladder. It communicates with the uterine tubes, which open into the upper part of the uterus, and the vagina, which leads from the lower part. The uterus forms almost a right angle with the vagina, into which the cervix of the uterus protrudes.

If the ovum is fertilized in the uterine tube it embeds itself in the thickened, vascular endometrium which has been prepared to receive it by the action of the ovarian hormones. It remains there, increasing in size, until it fills the uterus, after which the uterus grows with it until the end of the period of pregnancy. At the site of implantation the placenta develops; this is the organ through which the fetus receives nourishment and oxygen from the maternal blood during intrauterine life.

Menstruation is the shedding of the thickened endometrium, with some blood, which occurs each month after puberty until the menopause (age of approximately 45 years).

The vagina extends from the uterus to the labia; it lies behind the bladder and urethra and in front of the rectum and anal canal. The cervix enters the anterior wall of the vagina at right angle, so the posterior wall of the vagina is longer than the anterior wall. The recesses formed by the projection of the cervix into the vagina are called fornices.

## 10.2 External Organs

The external genital organs in the female are collectively called the vulva. They consist of the mons pubis, labia majora and minora, clitoris, vestibule of the vagina, and greater vestibular glands.

The mons pubis is a pad of fat covered with skin lying over the symphysis pubis. It bears hairs after puberty.

The labia majora are two folds of fatty tissue, covered with skin, extending backwards from the mons on either side of the vulva and disappearing into

the perineum behind. They develop at puberty and are covered with hair on the outer surface after that stage. They atrophy after the menopause.

The labia minora are two smaller fleshy folds within the labia majora. They meet in front to form a hood-like structure called the prepuce, which surrounds and protects the clitoris. The labia minora unite behind in the frenulum of the labia minora (fourchette). This is merely a fold of skin which is often torn in the first labor. The labia minora are covered with modified skin rich in sweat and sebaceous glands to lubricate their surfaces.

The clitoris is a small, sensitive organ containing erectile tissue corresponding to the male penis. It lies in front of the vulva immediately below the mons pubis and is protected by the prepuce.

The vestibule is the cleft between the labia minora. The orifice of the vagina and the orifice of the urethra open into it.

The orifice of the urethra lies at the floor of the vestibule, projecting slightly from the normal surface level. At the entrance there are two fine tubular glands, called urethral glands, which secrete lubricating fluid and are important because they tend to harbor infection in cases of gonorrhoea.

The orifice of the vagina occupies the space between the labia minora behind the orifice of the urethra. It is normally a slit from front to back, the side walls of the vagina being in contact. The orifice is largely blocked in the virgin by the hymen.

The greater vestibular glands are two small glands lying one under each labium majus on either side of the vaginal orifice. Their ducts open laterally to the hymen. They secrete a lubricating fluid to moisten the surface of the vulva and so facilitate sexual intercourse.

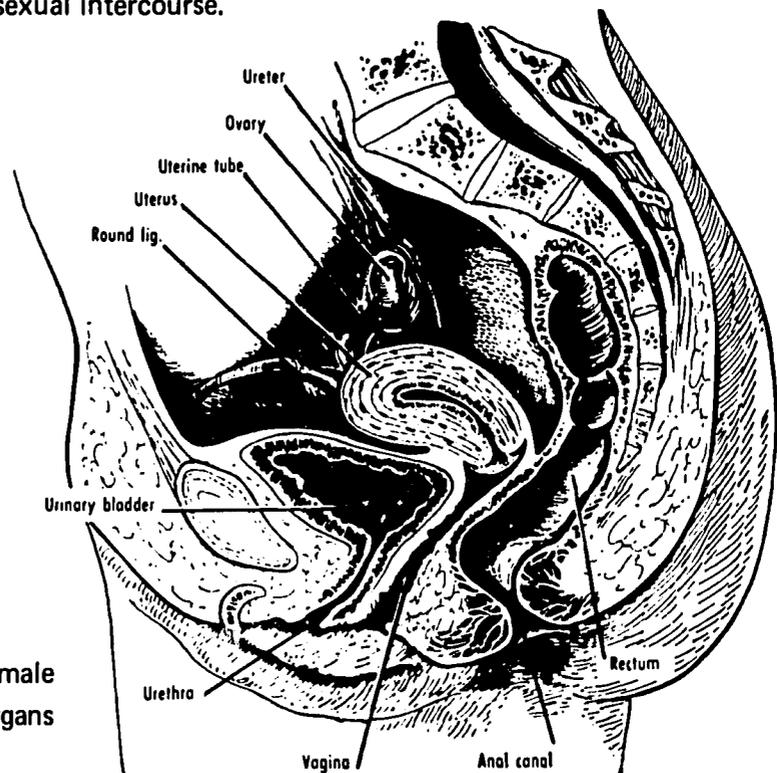
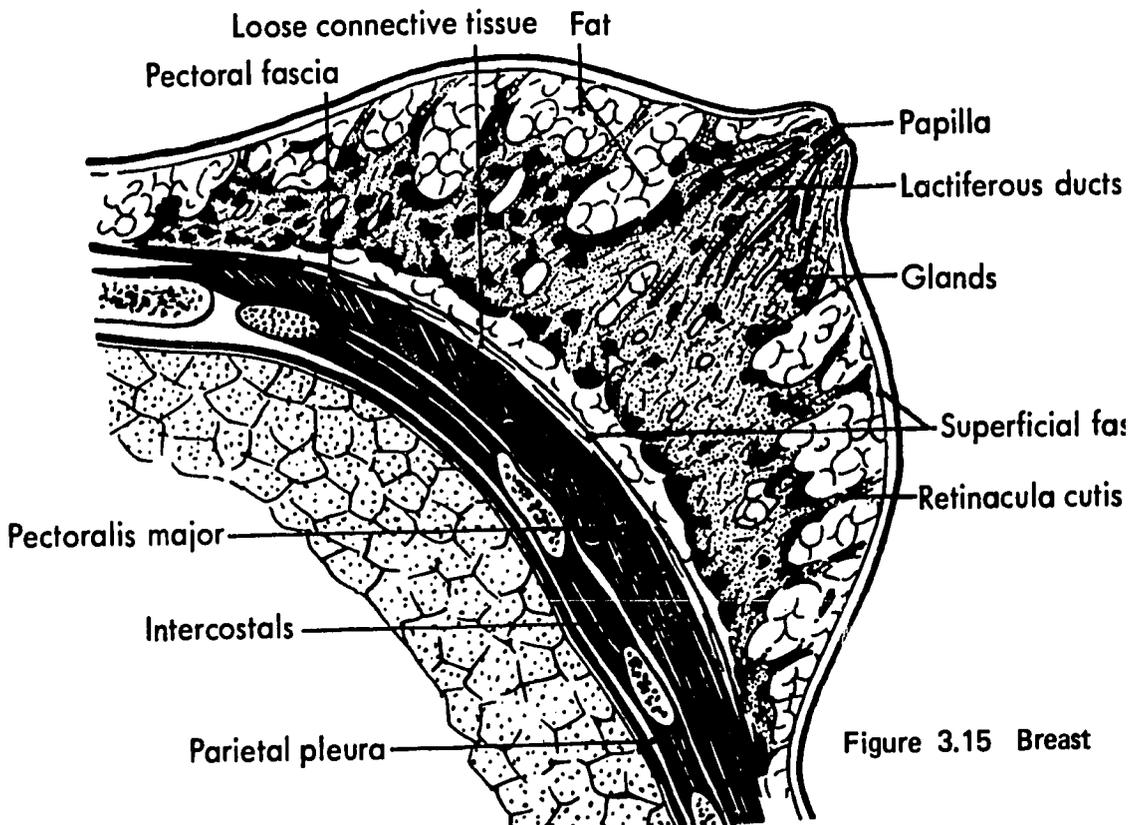


Figure 3.14 Female Genital Organs

## 11. THE BREASTS

The breasts are two glands which secrete milk and are accessory organs to the female reproductive system. They are present in rudimentary form in the male. They lie on the front aspect of the thorax and vary considerably in size. They are circular in outline and convex anteriorly. In the center of the surface is the nipple, which projects normally from the skin level and is pink in the virgin, but pigmented after the first pregnancy.

The breasts develop at puberty under the influence of hormones, and further development occurs during pregnancy as a result of hormones from the pituitary gland and ovaries. Fluid known as colostrum is secreted in small amounts by the glands during pregnancy and at the time of childbirth, but the true milk is not secreted till about the third day of the puerperium or lying-in period.



## 12. THE UPPER LIMBS

The upper limbs consist of the arm, which extends from the shoulder to the elbow; the forearm, which extends from the elbow to the wrist; and the hand.

### 12.1 Movements of Various Parts

12.1.1 Arm Movements. When the upper limb is in the anatomical position the arm is hanging down beside the trunk. Flexion of the arm consists of

swinging it forward and upward. Movement is taking place between the humerus and the shoulder joint. The opposite movement is extension; it starts at the end of flexion and brings the arm back to the starting position. Abduction is the movement of the arm away from the side of the body toward the side of the head. The opposite movement, bringing the arm back to the side of the body, is called adduction. Medial rotation is the movement in which the lateral side of the arm is turned towards the body anteriorly. The opposite rotation is called lateral rotation.

The shoulder, as a whole, can be elevated (as in shrugging), or moved in the opposite direction, which is called depression. It can also be moved forward, called protrusion, or backward, called retraction.

**12.1.2 Forearm Movements.** When the upper limb is in the anatomical position, the elbow joint is in extension. Flexion consists of swinging the forearm forward and upward. The position of flexion of the forearm can be more acutely flexed and the hand can be brought up to touch the shoulder in the position of full flexion. Extension is the opposite movement, which brings the forearm back to the anatomical position of full extension. The position of the forearm in flexion, with the palm facing upward, is called supination. The forearm can be turned round so that the palm faces the floor; this movement is called pronation.

**12.1.3 Hand Movements.** Flexion of the hand is the movement that bends the hand forward to a right angle with the forearm. Extension is the movement in the opposite direction. When the upper limb is in the anatomical position, the hand alone can be bent away from the body. This movement is abduction of the hand. Movement in the opposite direction is called adduction.

## **12.2 Surface Anatomy of the Upper Limbs**

The bony parts of the upper extremity can be palpated. The clavicle, with its medial sternoclavicular joint and its lateral acromioclavicular joint, can be palpated throughout its length. The acromion is palpable at the top of the shoulder. The coracoid process of scapula is immediately inferior and anterior to the acromial process. The inferior angle of scapula is easily palpated. The integrity of the scapula can be determined by placing a hand against the inferior angle and the other hand on the acromial process; clinically, fracture of the scapula can be identified by this maneuver. The humerus can be palpated throughout its length. The tuberosities can be palpated if the humerus is grasped between thumb and fingers immediately below the acromial process while the humerus is being rotated. The condyle and epicondyle are easily palpated. The ulna is palpable throughout its length. The olecranon process of the ulna is most obvious and palpable. The radius is palpable throughout its length. The neck of the radius is palpable if the radius is grasped between thumb and fingers immediately below the humeral condyles while the radius is rotated. The carpal bones are difficult to identify by palpation; however, all metacarpal and phalangeal bones can be easily identified.

The deltopectoral sulcus can be palpated between the deltoid and the pectoralis major muscles. It contains the cephalic vein and is an important landmark in the shoulder region.

The axilla and its contour are important in the surface marking of the upper limb. Its anterior boundary, the pectoralis major muscle, is the anterior axillary fold; its posterior boundary, the latissimus dorsi muscle, is the posterior axillary fold; and its midpoint is the midaxillary plane. Its medial aspect is the serratus anterior muscle, and its lateral aspect is the muscles of the arm.

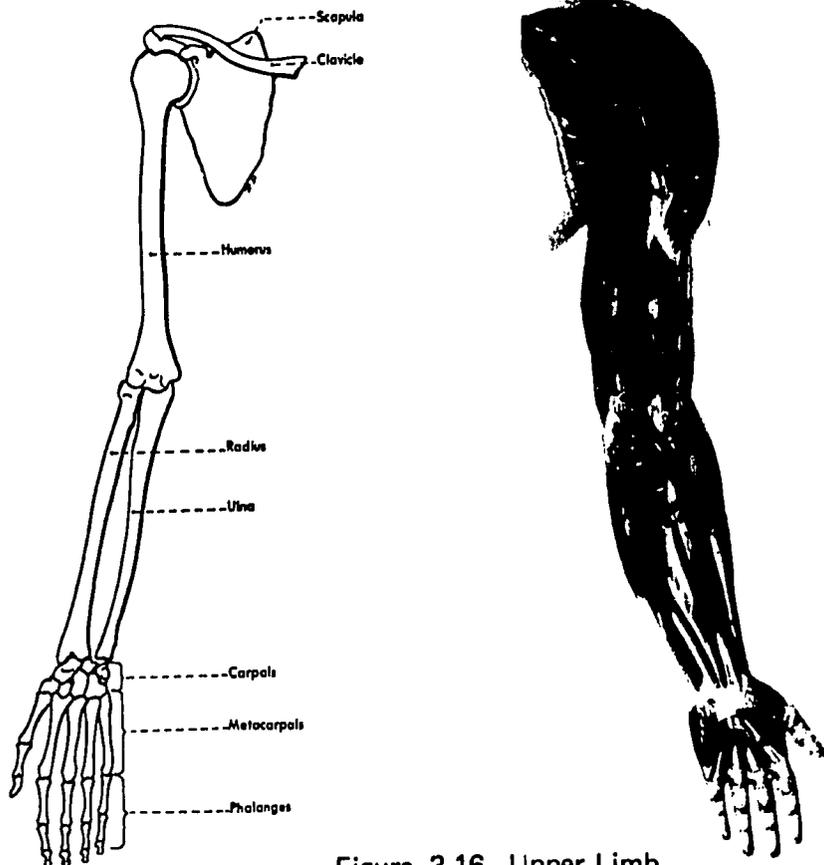


Figure 3.16 Upper Limb

The antecubital fossa is bounded above by an imaginary line joining the epicondyles of the humerus, laterally by the brachioradialis muscle, and medially by the pronator teres. The biceps tendon passes through the center of the fossa. The brachial artery is immediately medial to the biceps tendon. Both structures can be identified by palpation; if the forearm is flexed on the arm, the biceps tendon can be easily identified. If the finger is allowed to slide off the biceps tendon medially, the pulsating brachial artery is felt. Immediately medial to the pulsating brachial artery is the median nerve, but this rarely can be identified by palpation.

The surface markings of the arteries of the upper limb are simple. With the upper limb in the supine position at a right angle to the trunk, the subclavian, axillary, brachial and radial arteries are on a line drawn from the midpoint

of the clavicle to the radial pulse at the wrist on the lateral volar surface. The subclavian, axillary, brachial and ulnar arteries are on a line drawn from the midpoint of the clavicle to the pisiform bone of the wrist, or the point where the ulnar pulse is palpable at the wrist on the medial volar surface. These lines are of importance so far as the nerves are concerned. The ulnar nerve begins medial and remains medial to all the main arteries in the axilla, arm, forearm and wrist. The radial nerve begins posteriorly in the axilla and reaches the lateral side of the arm above the elbow; from there on it remains lateral to the main arteries of the arm and forearm. The median nerve begins lateral to the axillary artery; in the lower part of the arm it passes anterior to the brachial artery to find the medial side of this artery, and then passes posterior to the ulnar artery to continue through the forearm between the radial and ulnar arteries.

### 13. THE LOWER LIMBS

In the standard anatomical position, the lower limbs and feet are together and the toes point forward. The thigh extends from the groin to the knee, and the leg from the knee to the ankle. The foot is distal to the ankle. The limb has three major joints: the hip joint, the knee joint, and the ankle joint.

#### 13.1 Movement of The Lower Limbs

13.1.1 Thigh Movements: Medial rotation of the thigh is performed by turning the lateral side of the thigh to the midline. Lateral rotation is the reverse movement. Abduction of the thigh is movement away from the midline. Movement in the opposite direction, toward the midline, is adduction. The hip joint is a ball-and-socket joint which permits a wide range of movements: abduction, adduction, flexion, extension, medial rotation and lateral rotation.

13.1.2 Leg Movements: The knee joint is a hinge joint; therefore, the only major movements of the knee are flexion and extension. However, a small amount of rotation can also take place at this joint.

13.1.3 Ankle Movements: Bending the dorsum of the foot closer to the front of the leg is called dorsiflexion. The opposite movement is called plantar flexion of the foot.

13.1.4 Subtarsal Movements: The subtarsal joint is the joint of the foot bones and the talus. Turning the plantar surface outwards is called eversion of the foot. Turning the plantar surface inwards is called inversion of the foot.

#### 13.2 Surface Anatomy of the Lower Limb

In considering the alignment of the lower limb, three landmarks are very important : (1) the anterior superior iliac spine; (2) the patella; (3) the web space between the first and second toes. In the normal individual these three landmarks are in a straight line.

The great saphenous vein can be drawn on the surface of the lower limb by making a line connecting three points : (1) a point one finger-breadth below

the inguinal ligament and adjacent to the medial side of the pulsating femoral artery; (2) an inconstant point just posterior to the medial condyle of the femur; (3) a point one cm anterior to the medial malleolus. The saphenous vein at the ankle is a common site for the introduction of intravenous fluids or intravenous medication. The saphenous nerve accompanies the greater saphenous vein from the knee to the ankle and is subjected to injury when the great saphenous vein is surgically exposed in this region.

The sciatic nerve and its tibial branch can be drawn on the posterior surface of the lower limb by making a line connecting the following points : (1) With the leg straight, draw a line from the tip of the greater trochanter to the sacrococcygeal joint. Divide the line into three equal parts. The nerve is one finger lateral to the junction of the medial and middle thirds of this line (2) A point midway between the two condyles of the femur posteriorly behind the knee joint (3) A point immediately posterior and inferior to the medial malleolus. The nerve is unaccompanied by an artery of any size until it reaches the popliteal space, where it is joined by the popliteal vessels.

The main arteries of the lower limb – the femoral, the popliteal, and the posterior tibial artery – can be drawn on the surface of the lower limb by making a line connecting the following points : (1) the pulsation of the femoral artery at the inguinal ligament; (2) the point midway between the posterior aspects of the condyles of the femur in the popliteal space; and (3) a point immediately behind the medial malleolus where the pulsation of the posterior tibial artery can be palpated.

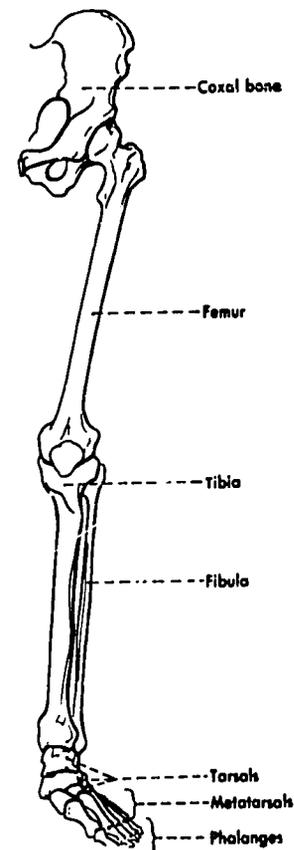


Figure 3.17 Skeleton of the Lower Limb

## 14. THE VERTEBRAL COLUMN AND THE SPINAL CORD

The vertebral column, which forms the central portion of the axial skeleton, consists of 33 vertebrae. There are 7 cervical vertebrae, 12 thoracic vertebrae and 5 lumbar vertebrae in the lower part of the back. Usually the next 5 vertebrae are fused together to form the sacrum and the remaining 4, which may or may not be fused, are the rudimentary coccygeal vertebrae.

The spinal cord and meninges are the principal contents of the vertebral canal. The spinal nerves leave the canal by way of the intervertebral foramina.

The spinal cord gives rise to 31 pairs of spinal nerves: eight cervical, twelve thoracic, five lumbar, five sacral, and one coccygeal. The portion of the spinal cord to which a pair of nerves is attached is termed a segment. The ventral and dorsal roots of each spinal nerve unite to form the spinal nerve, which has a very short course, since almost immediately it divides into dorsal and ventral rami.

The neuron is the basic structural unit of the nervous system. The neurons each have the same activity, which is to transmit electrical impulses, and they are arranged in various complex pathways.

The basic pathway is the simple reflex circuit.

The sensory pathways transmit sensory impulses from the special sense organs, the skin, and from deeper parts of the body to the central nervous system.

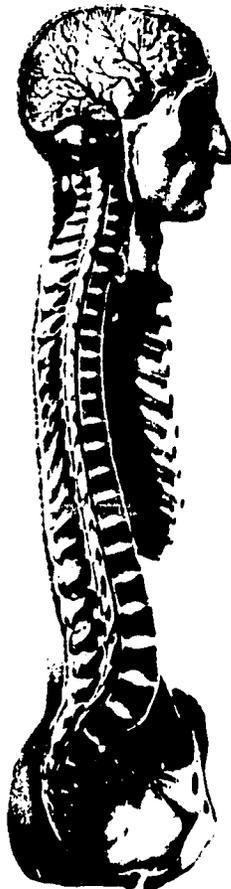


Figure 3.18 Vertebral Column and Spinal Cord

The motor pathways transmit impulses from various centers in the central nervous system to the motor nuclei in the brain stem and the spinal cord.

Sensory stimuli are pouring into the cord and brain from the tissues all the time. If they reach the sensory centers of the cerebral cortex and stimulate them they produce sensations of which we are conscious. If they stimulate motor cells they produce a reflex action e.g., a tap on the patella ligament causes contraction of the quadriceps extensor muscle and produces the "knee jerk".

The reason for the reflex being more marked when the cord is cut off from the brain is that the cerebral centers have an inhibiting effect on reflex action.

Biceps reflex tests the integrity of the fifth and sixth cervical nerves or the musculocutaneous nerve.

Triceps reflex tests C6 - T1 or the radial N.

Knee jerk tests L3 - L4 or the femoral N.

Achilles reflex tests L5 - S3 or sciatic N.

Babinski reflex tests the motor pathways in the CNS.

**MODULE 5**  
**PHYSICAL EXAMINATION**

**OKAS BALANKURA, M.D., F.A.C.S., F.I.C.S.**  
**AND**  
**WANNARAT CHANNAKUL, M.D., M.P.H.**



## MODULE 5

### PHYSICAL EXAMINATION

#### 1. INSTRUCTIONAL OBJECTIVES

At the end of this course, the wechakorn will have the ability to do an appropriate physical examination correctly. Specifically, the wechakorn will have:

(1) An understanding of the importance of pulse, blood pressure, respiration and temperature of the patient.

(2) The ability to take pulse rate, blood pressure, respiratory rate and temperature of the patient.

(3) The ability to do a general physical examination and to recognize abnormal findings.

#### 2. INTRODUCTION

Begin the examination of the patient by observing him from the first moment you see him. Continue your observations systematically throughout the interview. See whether he looks healthy, frail, acutely or chronically ill. The patient who answers your questions slowly or reluctantly may have difficulty in understanding your dialect or he may be ignorant concerning his illness. Try to integrate these behaviors with other later findings carefully before making a conclusion.

Next, ask the patient to take off his shirt and loosen his trousers and to bring them down enough to facilitate a thorough examination of the chest and abdomen. Most unmarried female patients in the rural areas are shy to undress in front of another. Try to convince her and her relatives about the necessity of a thorough examination in order to make a correct diagnosis before an effective treatment can be given. However, if this is not possible, do the best you can. Make it a habit to have a chaperone when examining a female patient to protect you from abuse. Remember that a faulty physical examination is mostly caused by incomplete examination rather than by wrong technique. Always examine the person where there is good light, preferably the sunlight and never in a dark room.

#### 3. GENERAL EXAMINATION

##### 3.1 Vital Signs

3.1.1 Pulse Rate. The pulse can be palpated on the radial artery at a point just proximal to the palmar side of the wrist. It pulsates every time the heart beats.

**Rate.** Some patients may be apprehensive when confronting the examiner for the first time and they may have an increased pulse rate. A few minutes rest and a sympathetic attitude from the practitioner will calm the patient down. Count for 30 seconds and multiply the result by 2 to get the pulse rate per minute. Normal pulse rates vary according to age as follows:

Newborn infant	140/min
2 - 4 years	100/min
10 - 14 years	80/min
Adult	70/min

One's pulse rate increases after exercise, when frightened, during an illness—especially one with fever, when one loses blood and when one is dehydrated and has dry lips and tongue.

**Amplitude.** Small and weak pulses may be difficult to palpate. A weak pulse indicates serious illness which may be from severe blood loss, dehydration or severe infection. Blood pressure should be taken in such cases. The strength of the pulse can be determined by pressing down on the artery until it disappears. A weak pulse requires a light pressure; a strong one requires strong pressure to make it disappear.

**Rhythm.** The pulse rate varies with respiration. There may be an occasional pause in a normal person. An obvious irregular pulse indicates a rather serious heart disease.

**3.1.2 Blood Pressure.** It should be taken with every patient with rapid, weak, and abnormally strong pulses.

**Technique.** The patient should be as comfortable as possible; his arm should be free and slightly flexed at the elbow; his brachial artery should be approximately at heart level. Center the inflatable bag over the brachial artery on the inside of the arm. Its lower border should be about 2.5 cm above the antecubital crease. Secure the cuff snugly.

Inflate the cuff to about 30 mmHg above the level at which the radial pulse disappears. Lower the cuff pressure slowly until the radial pulse is again detectable. This is the palpatory systolic pressure. It helps you avoid being misled by an auscultatory gap. Deflate the cuff completely.

Place a stethoscope firmly, but without undue pressure, over the brachial artery in the cubital space. This point is usually found just medial to the biceps tendon. The stethoscope should touch neither cuff nor clothing. Inflate the cuff again, to about 30 mmHg above the palpatory systolic pressure. Then deflate the cuff slowly, allowing the pressure to drop at a rate of about 3 mmHg per second. Note the level at which you hear the sounds of at least two consecutive beats. This is the systolic pressure.

Continue to lower the pressure slowly until the sounds become suddenly muffled. Continue decreasing the pressure and note the point at which all sounds disappear. This point is the diastolic pressure; however, some clinicians consider that the point at which the sounds become muffled is the diastolic pressure.

Record the blood pressure findings in mmHg, e.g., 120 (systolic pressure) /80 (diastolic pressure) mmHg.

Systolic pressure below 90 mmHg may be abnormal, especially if it is associated with a small and weak pulse which indicates severe blood loss or severe water depletion requiring immediate replacement.

Systolic pressure above 160 mmHg or diastolic pressure above 100 mmHg indicates hypertension requiring further care by a physician.

**3.1.3 Temperature.** Clean the thermometer well with soap and water or alcohol. Shake it hard, with a snap of the wrist, until it reads less than 36 degrees. Put the thermometer under the tongue, keeping the mouth shut. Or put it in the armpit if there is danger of biting the thermometer. Or, put a rectal thermometer carefully in the anus of a small child, having wet or greased it. Leave it there for 3-4 minutes. Read it. The normal oral temperature is 37 degrees Celcius. An armpit temperature will read a little lower than a mouth reading. An anus reading will read 0.5 degree higher. During a 24-hour period the normal oral temperature may vary between 36 and 37.2 degrees and the anal may vary from 36.7 to 37.8 degrees. Temperatures higher than these mean the patient has a fever, and, fever generally means the presence of an infection. A temperature higher than 40 degrees is a very high fever which can be dangerous if it is not brought down quickly. A temperature below 35.5 degrees indicates the patient is in a state of shock and the cause of shock must be found out and treatment given accordingly. After the thermometer has been used, wash it well with soap and water and put it in antiseptic solution.

**3.1.4 Respiration.** Count the number of breaths per minute. Between 12 and 20 breaths per minute is normal for adults and older children. Up to 30 breaths a minute is normal for children, and 40 breaths a minute is normal for babies. Pay special attention to the way the sick person breathes. The depth – deep or shallow – the rate, and the difficulty of breathing should be noted. Notice if both sides of the chest move equally when he breathes.

Listen carefully for the sound of the breaths. For example:

- A whistle or wheeze and difficult breathing out can mean asthma.
- A gurgling or snoring noise and difficult breathing in an unconscious person may mean the tongue, mucus, or something else is stuck in the throat and does not let enough air get through.

Look for sucking in of the skin between ribs and at the angle of the neck when the person breathes in. This means air has trouble getting through. Consider the possibility of something stuck in the throat, pneumonia, or asthma.

### **3.2 General Condition of Health**

Observe how ill or weak the patient looks, the way he moves, how he breathes, and how clear his mind seems. Look for signs of dehydration and of shock.

Notice whether the person looks well nourished or poorly nourished. Has he been losing weight? Has he any edema of any part of his body?

### 3.3 Eyes

Look at the color of the white part of the eyes. Is it normal, red, or yellow? Also note any changes in the sick person's vision.

Have the person slowly move his eyes up and down and from side to side. Jerking or uneven movement may be a sign of brain damage.

Pay attention to the size of the pupils. If they are very large, it can mean a state of shock. If they are very small, it can mean poison or it can be the effect of certain drugs.

A difference in size of the pupils of an unconscious person or a person who has had a recent head injury may indicate brain damage. It may also mean stroke.

### 3.4 Ears, Throat and Nose

**3.4.1 Ears.** Always check for signs of infection in the ears. Pull the ear gently. If this increases pain the infection is probably in the tube of the ear. Also look for redness or pus inside the ear. A small flashlight or penlight will help. Find out if the person hears well.

**3.4.2 Throat and Mouth.** With a torch or sunlight examine the mouth and throat. To do this hold down tongue with a spoon handle or have the person say "ahhh". Notice if the throat is red and if the tonsils are swollen or have spots with pus. Also examine the mouth for sores, inflamed gums, sore tongue, rotten or abscessed teeth and other problems.

**3.4.3 Nose.** Is the nose runny or plugged? Shine a light inside and look for mucus, pus, blood, redness and swelling. Check for a bad smell.

**3.5 Skin.** Look for wounds, rash, inflammation, mass, etc.

### 3.6 Methods of Systemic Examination

**Inspection.** Many problems can be diagnosed by inspection, for example, an abscess which appears as a red swelling with yellowish area of pus in the center.

**Palpation.** With palmar surface of the fingers palpate lightly and then deeply if it does not hurt the person. Notice any abnormal finding, such as masses, rigidity, tenderness, etc.

**Percussion.** Percussion helps to determine whether the underlying tissues are air-filled, fluid-filled or solid. Press the distal phalanx and joint of the middle finger firmly on the surface to be percussed. Put the right forearm close to the surface with the hand cocked upward, the right middle finger on the left middle finger with a quick, sharp, but relaxed wrist motion. Aim at the base of the terminal phalanx or at the distal interphalangeal joint. Notice the percussion note and whether there is dullness or resonance. Dullness indicates a fluid-filled or solid mass in the underlying tissue, and resonance indicates an air-filled space. Compare the sounds from both sides of the abdomen.

**Auscultation.** With a stethoscope, listen to the heart sounds, the air flow through tracheobronchial tree and the movement of the intestine in the

abdomen. Always compare BOTH sides.

### 3.7 Examination of the Thorax and Lungs

Inspection. Notice rate and rhythm of breathing. Note the shape of the patient's chest. Estimate its anteroposterior diameter in proportion to its lateral diameter; normally it is about 1:2. From a midline position behind the sitting patient, look for deformities of the thorax, abnormal retraction or bulging of interspaces and lag or impairment of respiratory movement.

Palpation. Note whether the trachea is in the midline or deviates to one side by palpating the trachea just above the suprasternal notch.

To assess respiratory excursion, place the thumbs about at the level of and parallel to the 10th ribs with your hands grasping the lateral rib cage. Slide the hands medially a bit in order to raise loose skin folds between thumbs and spine. Ask the patient to inhale deeply. Watch the excursion of the thumbs and feel for the range and symmetry of respiratory movement.

Elicit vocal or tactile fremitus. Fremitus refers to the palpable vibrations transmitted through the bronchopulmonary system directly through the chest wall when the patient speaks. Ask the patient to repeat the words "one-one-one". Palpate and compare symmetrical areas of the lungs. Use one hand, not both, to maximize accuracy. Identify, describe, and localize any areas of increased or decreased fremitus. Fremitus is decreased or absent when the voice is decreased, when the bronchus is obstructed, or when the pleural space is occupied by fluid, air or solid tissue. Increased fremitus is noted near the large bronchi and over consolidated lung.

Percussion. Identify, describe and localize any area of abnormal percussion note. Dullness replaces resonance when fluid or solid tissue replaces air-containing lung or occupies the pleural space. Hyper - resonance replaces resonance when air occupies the pleural space.

Auscultation. Identify, describe and localize any area of adventitious or abnormal sounds. Rales or crepitations are discrete, noncontinuous sounds produced by moisture in the tracheo - bronchial tree as in pneumonitis and are simulated by the rolling of a lock of hair between fingers near the ear. Rales are usually heard in inspiration. Rhonchi and wheezes are continuous sounds produced by air flow cross passages narrowed by secretion or mucosal swelling. High-pitched sibilant wheezes originate in the smaller air passages as in asthma and lower pitched sonorous rhonchi originate in the larger air passages as in bronchitis. Rhonchi and wheezes may be inspiratory and expiratory although they are often more prominent in expiration.

### 3.8 Examination of the Heart

Inspection and Palpation. Observe the left anterior chest wall for any pulsation or thrill, the vibration of valve closure at (1) the 2nd interspace to the right of the sternum, the aortic area; (2) the 2nd left interspace to the left of the sternum, the pulmonary area; (3) the lower half of the sternum and the parasternal area on the left, the right ventricular area; and (4) the 5th

intercostal space at or just medial to the midclavicular line, the apical or left ventricular area. Thrill means valvular disease; it is associated with murmurs on auscultation.

**Percussion.** Although palpation has largely replaced percussion as the more accurate method of detecting cardiac enlargement, outlining the border of cardiac dullness provides a useful orientation to both the cardiac and pulmonary examination.

Usually only the left border of the cardiac dullness in the 3rd, 4th, and 5th interspaces can be outlined. The distances between the border of dullness and the midsternal line do not exceed 4, 7, and 10 centimeters in each of the three interspaces respectively. If marked cardiac enlargement is suspected, percuss the right cardiac border. Normally cardiac dullness does not extend beyond the right edge of the sternum.

**Auscultation.** With a stethoscope, identify the first and second heart sounds starting at the aortic area, 2nd right interspace close to the sternum; proceed to the pulmonic area, 2nd left interspace close to the sternum; the tricuspid area, 5th left interspace close to the sternum; and the mitral (apical) area, 5th left interspace just medial to the mid clavicular line. The second heart sound is louder than the first at the base of the heart, i.e., the aortic and pulmonic areas; the first is louder than the second at the apex, i.e., the tricuspid and mitral areas. The abnormal heart sounds, the murmurs, are heard in valvular disease. They may be heard during systolic phase, systolic murmurs; and diastolic phase, diastolic murmurs.

First use the diaphragm of the stethoscope which is best for picking up relatively high-pitched sounds. Press the diaphragm firmly on to the chest. Then use the bell, which is best for hearing low-pitched sounds. Apply the bell very lightly, with just enough pressure to produce an air seal with its full rim.

### 3.9 Examination of the Abdomen

If a person has pain in the belly, try to locate exactly where it hurts. Learn whether it suddenly comes and goes like cramp or colic. When the practitioner examines the belly, he first look at it for any unusual swelling or lumps. The location of the pain often gives a clue to the cause. First, ask the person to point with one finger where it hurts. Then, beginning on the opposite side from the spot where he has pointed, press gently on different parts of the belly to see where it hurts most. See if the belly is soft or hard and whether the person can relax his stomach muscles. A very hard belly could mean an acute abdomen - perhaps appendicitis or peritonitis. Listen to the abdomen with a stethoscope. Bowel sounds or gurgles in the intestine are decreased or absent in peritonitis. They are increased in an obstructed bowel. If peritonitis or appendicitis is suspected, do the test for rebound pain as follows.

Slowly but forcefully press on the abdomen a little above the left groin until it hurts a little. Then quickly remove the hand. If a very sharp pain

(rebound pain) occurs when the hand is removed, appendicitis or peritonitis is likely. If no rebound pain occurs above the left groin, try the same test above the right groin.

Feel for any abnormal lumps and hardened areas in the belly.

The area of pain frequently indicates the location and/or type of problem, as follows:

Epigastric pain = stomach ulcer.

Central abdominal pain arounds the umbilicus which later migrates to the right groin = appendicitis.

Pain in the right upper abdomen that often reaches through to the back = gall bladder.

Pain in the right upper abdomen which at times spreads around to the right lower anterior chest = liver.

Mid or low back pain = kidney.

Pain above the groin, colicky in nature, often spreads down to the groin and upper thigh and may spread to the loin = urinary tube or ureter.

Pain on one side or both sides of the suprapubic area sometimes spreading to the back = female internal genital organs, i.e., tubes, ovaries or uterus.

Note whether there is bulging of the abdomen. If there is, localize the area as follows.

#### General Abdominal Distension.

If it is generally resonant on percussion it means an air-filled bowel. If it is resonant in the center and there is a level of dullness on the side, mark it, then ask the patient to turn on one side and percuss again. If the level of the dullness shifts to the center of the abdomen and the resonance is detected on the upper side, it means there is fluid in the peritoneal cavity or ascites.

#### Bulging in Suprapubic Area

It can be due to the enlarged uterus of a pregnant woman, or to a full urinary bladder due to difficulty in urination or to incontinence of urine.

#### Bulging in the Upper Abdomen

This can be due to an enlarged spleen protruding below the left costal margin. If it is markedly enlarged, it can be easily identified by palpable edge with a notch on its medial border. If it is not so large, palpate with the left hand reaching over and around the patient to support and press forward his lower left rib cage. With the right hand below the left costal margin, press in toward the spleen. Ask the patient to take a deep breath. The spleen is usually enlarged about three times its normal size before it is palpable. Repeat with the patient lying on his right side and his legs somewhat flexed at hips and knees. In this position, gravity may bring the spleen forward and to the right into a palpable location.

Bulging in the upper abdomen can be due to an enlarged liver. To palpate the liver, place the left hand behind the patient, parallel to and supporting his right 11th and 12th ribs. Remind the patient to relax on your hand if neces-

sary. By pressing the left hand forward, the patient's liver is more easily felt in front. Place the right hand on the patient's right abdomen lateral to the rectus muscle, with the fingertips well below the lower border of liver dullness and pointing toward the right costal margin. Press gently in and up. Ask the patient to take a deep breath. Try to feel the liver edge as it comes down to meet the fingertips. If palpable, trace the liver edge both medially and laterally by repeating the maneuvers. The edge may extend over into the left upper abdomen. Describe the contour and surface of the liver and note any tenderness.

To facilitate abdominal examination, the patient should be relaxed with a pillow under his head and also under his knees. The liver dullness can be detected from the 5th right interspace downward. However, liver dullness may disappear in the case of stomach ulcer perforation with air leaking into the free peritoneal cavity between the liver and the abdominal wall.

#### **Bulging in the Flank**

This may be due to an enlarged kidney. As the kidney lies on the posterior abdominal wall, the right kidney can be palpated by placing the left hand behind and supporting the patient's right loin, between the rib cage and the iliac crest. Place the right hand below the right costal margin with its fingertips pointing to the left. Press both hands firmly together. As the patient takes a deep breath try to feel the lower pole of the kidney as it comes down between the fingertips. If the kidney is palpable, describe its size, contour and tenderness. Use the same maneuvers for the left kidney. From the patient's right side support his left loin with the left hand while the right hand palpates his anterior abdominal wall. If the kidney is inflamed due to infection the area between the 12th rib and iliac crest will become tense and tender and the kidney can be palpated in the flank below the costal margin. The most common cause of kidney infection is kidney stones.

### **3.10 Examination of the Neuromuscular System**

**3.10.1 State of Awareness or Consciousness.** When a patient is in a state of loss of awareness, partial or complete, try first to detect an alcoholic smell on his breath. If an alcoholic smell is detected without a history of head injury it means he may have been drunk. If there is no alcoholic smell and no history of head injury, he may have drug poisoning. However, alcoholic drinking is often associated with head injury or drug poisoning. There are three states of loss of awareness which can be detected as follows:

(1) Confusion. The person shows mental slowness, inattentiveness, dulled perception of the environment, and incoherence in thinking.

(2) Stupor. He has marked reduction in mental and physical activity, and marked slowness and reduction in response to commands or stimuli, usually with preservation of reflexes.

(3) Coma. The person is unresponsive to stimuli, and most reflexes are absent.

Because these terms of state of awareness are not always used with suffi-

cient precision to certain changes in a patient's state, always describe the findings in some detail. Do not simply affix the appropriate label.

**3.10.2 Muscles and Nerves.** If a person complains of numbness, weakness, or loss of control in part of his body (paralysis), notice the way he walks and moves. Have him stand, sit, or lie completely straight, and carefully compare both sides of his body.

**Face.** Have him smile, frown, open his eyes wide and squeeze them shut. Notice any drooping or weakness on one side. If the problem began more or less suddenly, he may have a head injury, stroke, or Bell's palsy. If it came slowly, it may be a brain tumor. Get medical advice. Also check for normal eye movement, size of pupils, and how well he can see.

**Arms and Legs.** Look for loss of muscle. Notice or measure difference in thickness of arms or legs. Have patient squeeze your fingers to compare strength in his hands, and push and pull with his feet against your hand. Also have him hold his arms straight out and turn his hands up and down. Have him lie down and lift one leg and then the other. Note any weakness or trembling.

If muscle loss or weakness affects the whole body, suspect malnutrition or a chronic illness like tuberculosis.

If muscle loss and weakness is uneven or worse on one side, in children, think first of polio; in adults, think of a back problem, a back or head injury, or stroke.

**Stiffness or Tightness of Different Muscles.** If the jaw is stiff or will not open, suspect tetanus or a severe infection of the throat or of a tooth. If the neck or back is stiff and bends backwards, in a very sick child, suspect meningitis. If the head will not bend forward, meningitis is likely.

If strange or jerky movements come suddenly, with loss of consciousness, he may have fits (convulsion). If fits happen often, think of epilepsy. If they happen when he is ill, the cause may be high fever or dehydration or tetanus.

**Loss of Feeling in Hands, Feet, or Other Parts of Body.** Have the person cover his eyes. Lightly touch or prick the skin in different places. Ask him to say 'yes' when he feels it.

Loss of feeling in or near spots or patches on the body is probably leprosy. Loss of feeling in both hands or feet may be due to beri-beri or diabetes or leprosy. Loss of feeling on one side only could come from a back problem or injury.

**MODULE 6**

**LABORATORY EXAMINATION**

**SURASAK PUCKDEE B.Sc (Med. Tech.)**

**Previous Page Blank**

## MODULE 6

### LABORATORY EXAMINATION

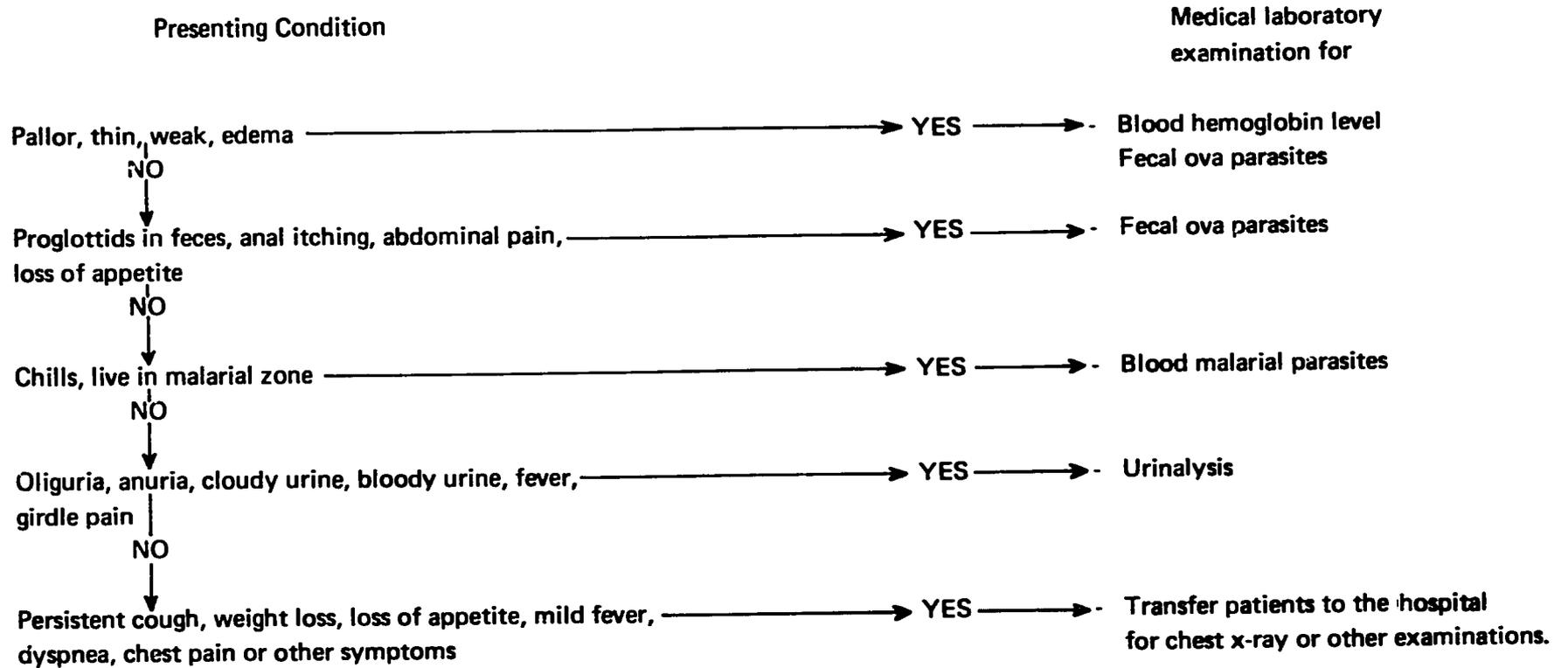
#### 1. INSTRUCTIONAL OBJECTIVES

Having studied and practiced the following medical laboratory examinations, the wechakorn will be able to:

- (1) Make his own decision about transferring patients to the medical laboratory for the determination of hemoglobin, glucose and albumin in urine, ova parasites in feces, and malarial parasites in blood when indicated.
- (2) Perform blood examination for hemoglobin determination.
- (3) Perform urine examination for glucose and albumin determinations.
- (4) Perform feces examination and identify the frequently seen ova and parasites.
- (5) Perform a blood smear and identify presence and type of malarial parasites.

**Previous Page Blank**

## PROTOCOL 6.1 : MEDICAL LABORATORY DIAGNOSIS.



## 2. SPECIMENS FOR LABORATORY EXAMINATION:

### 2.1 Blood

Blood is a fluid containing various chemicals in solution and a variety of cells in suspension. It circulates throughout the blood vessels of the body and participates in all organ activities. It provides oxygen, water and nutrients to the body cells which help control infection and hemorrhaging. Clearly, it is the essence of life since human life itself began.

Blood is comprised of approximately 45% cellular components and 55% fluid components. The cellular components include red blood cells (erythrocytes), white blood cells (leukocytes) and platelets (thrombocytes). The fluid component is called plasma and can be separated from blood by centrifugation.

The most important component of red blood cells is hemoglobin. It is the oxygen-carrying pigment from lungs to the body cells. The normal life span of red blood cells is 100-120 days.

The main function of white blood cells is the removal of invading antigens and the production of antibodies. The function of platelets is concerned with hemostasis. The plasma contains a variety of substances such as water, fat, sugar, minerals, salts and protein.

The level of hemoglobin is an indicator of normal or hypochromic red blood cells.

### 2.2 Urine

Urine is the excretion produced by the kidneys and collected in the bladder. Normal urine varies in color from faint yellow to amber and is slightly acid in reaction. The average 24 hours volume in the normal adult is 1,200-1,600 ml and the specific gravity is approximately 1.024 (1.005-1.030). Normal urine is comprised of 96 % of water and 4 % organic and inorganic constituents. In abnormal urine or urine associated with diseases, a great concentration of protein, glucose, bile, red blood cells, pus, drugs and other substances will be found. Urinalysis includes both macroscopic examination of appearance and microscopic examination.

### 2.3 Feces

Feces is the excrement discharged from the intestines, containing bacteria, cells exfoliated from the intestines and a small amount of food residue. The normal color of feces is yellow or brown, it is usually soft or formed. The normal frequency of bowel movements may vary from 1-2 per day. Abnormal fecal specimens are gelatinous mucus, putrid, bloody or rice-watery which can be observed by inspection or microscopic examination.

## 3. BLOOD EXAMINATION FOR MALARIAL PARASITES

### 3.1 Material and Equipment

- (1) Microscope
- (2) Clean glass slide, 1 x 3"

- (3) Stylets or blood lancets
- (4) Staining tray
- (5) Coplin jar

### 3.2 Procedure

**3.2.1 Thin Blood Film Technique.** Pick up a clean glass slide and label the number of the blood specimen on the left end with wax pencil. A small drop of blood is placed on the center line about 1-2 cm from the right end of the glass slide. Use another smooth-edge glass slide as a spreader and place at an angle of 30° to the slide and then move back to make contact with the drop. The drop should spread out quickly along the line of contact of the spreader with the slide. The moment this occurs, the film should be spread by a rapid, smooth, forward movement of the spreader. The drop should be of such size that the film is 3-4 cm in length. Let it dry in the air.

Before staining, fix the red blood cells of the dried blood film by immersing the slide in the Coplin Jar containing methyl alcohol for 2-3 minutes. The films are then dried in the air.

Drop about 5 ml of freshly prepared Giemsa staining solution on the blood smear and allow to stand for 4-5 minutes. Float off the stain and wash with tap water. Remove the stain on the back of the slide by gentle rubbing with gauze or cotton ball moistened with alcohol. Leave the stained blood film to dry in room temperature. Examine with a microscope using the oil immersion objective.

**3.2.2 Thick Blood Film Technique.** Pick up a clean glass slide and label the number of the blood specimen on the left end with wax pencil. Place a small drop of blood in a center of a glass slide and spread it out with a corner of another slide to cover an area about 1-1.5 cm in diameter. When a thick blood film slide is placed on piece of newspaper and the small print is just visible, it is a satisfactory preparation. Allow the blood film to dry without contact to methyl alcohol to prevent fixing of red blood cells. The slide should be left to dry overnight because absolutely fresh films, although apparently dry, are often washed off in the stain. Passing the blood smear through the flame is not recommended as this will fix the red blood cells in the films. One can make 2-3 thick films on one slide.

Drop about 5 ml of freshly prepared Giemsa staining solution on the blood smear and allow it to stand for 4-5 minutes. Float off the stain and wash with tap water. Remove the stain on the back of the slide by gentle rubbing with gauze or a cotton ball moistened with alcohol. Leave the stained blood film to dry in room temperature. Examine with a microscope using the oil immersion objective.

### 3.3 Malaria.

Malaria is an infectious febrile disease caused by protozoa of the genus Plasmodium which is transmitted by the bite of infected mosquitoes of the genus Anopheles. The disease is characterized by attacks of chills, fever, head-

ache, sweating, splenomegaly, anemia, jaundice, convulsion, collapse and unconsciousness. The symptoms occur at intervals which depend on the time required for development of a new generation of parasites in the body. After recovery from the acute attack, the disease has a tendency to become chronic with occasional relapses.

*Plasmodium falciparum* is responsible for approximately 80 percent of all malaria in Thailand ;19 percent is caused by *P. vivax* ; and 1 percent is caused by *P. malariae* but no *P. ovale* malaria has been found. The differential diagnosis of malaria made by blood examination is easier and faster than by the observation of the clinical picture such as febrile paroxysms or other symptoms.

*Plasmodium falciparum* can produce cerebral malaria characterized by delirium or coma. Patients infected by malarial parasites produce brown-black urine due to hemolysis of the red blood cells called hemolytic malaria.

Malaria caused by *P. vivax* is common and has the mildest symptoms. The febrile paroxysms commonly occur every other day. The incubation period of *P. vivax* from the first bite of the mosquitoes until the symptoms develop ranges from 10-15 days. Blood from a suspected individual should be taken during the attack of chills at which time the malarial parasite will be easily detected.

Diagnosis of malaria can be made by the examination of malarial parasites in a blood smear using either the thin or thick blood film technique. Effective drugs for the treatment of malaria are Aralen and Quinine.

#### 4. HEMOGLOBINOMETRY (The Sahli-Hellige Hemometer)

##### 4.1 Principle

Hemoglobin is converted into acid hematin with diluted hydrochloric acid and turns a brownish yellow color which can be compared to a standard.

##### 4.2 Procedure

- (1) Fill the graduated tube of the Hemometer to the 10 mark with the 1% hydrochloric acid solution.
- (2) Blood from a finger puncture or anticoagulated blood can be used for the determination of hemoglobin.
- (3) Using a hemoglobin pipette, draw blood exactly to the 20 mark with great accuracy. Wipe off the blood outside the tip of pipette.
- (4) Expel the blood into the gradual tube. Rinse the pipette several times.
- (5) Mixed with small glass stirring rod and let it stand for 10 minutes until the acid hematin develops.
- (6) Add distilled water drop by drop and mix well after each addition until the color of the solution matches the color of the standard.
- (7) Take the reading corresponding to the height to which the solution has risen and report the result in grams hemoglobin per decilitre of blood.

#### 4 3 Normal Values

Male	13.5 - 18.0	gm/dl
Female	11.5 - 16.4	gm/dl
Infants	13.6 - 19.6	gm/dl
1 yr age (average)	11.2	gm/dl
10 yrs age (average)	11.9	gm/dl

Footnote : Anemia is a condition in which there is a below normal reduction of the quantity of hemoglobin, the number of erythrocytes per cu.mm. or the volume of packed red cells per 100 ml blood. Anemia is commonly found among individuals infested with hook worms, or who have protein-calorie malnutrition, malarial infection, or other blood disease or who are pregnant, lactating, or elderly.

#### 5. USE OF THE MICROSCOPE

##### Care of the Microscope

The microscope is a complicated piece of equipment. It is recommended that you read the manual carefully in order to familiarize yourself fully with the use of the microscope, so that you can obtain the best performance. If there is any trouble, do not try repair it by yourself, the repairman from the dealer will do this job better.

Carry the microscope with two hands, one holding the body arm and another supporting the base. When placing it on a desk or table, do so with care. Avoid jarring it. Treat it like the precision instrument it is.

Avoid exposure of the microscope to direct sunlight, chemicals and vibration. Mold develops easily within the lens if the microscope has been stored in a highly humid area. Dust and dirt not only interfere with microscope efficiency, but can actually be magnified to the point where they obscure or distort your view of the specimen. The microscope should be stored in its container immediately after use. If this is not possible, it should be covered with the vinyl dust cover or plastic bag provided.

It is mandatory to keep the ocular lens (eye piece) in place at all times or to replace it with plug to prevent dust from falling into the microscope tube.

It should be wiped off immediately with soft clean gauze, if there is any spill of water, alcohol, turpentine or immersion oil on the mechanical stage. Do not use organic solutions to wipe the surfaces of various components.

Clean the body of the microscope with a well-washed, soft, clean cloth. Optical glass should be wiped with lens paper.

The objective of the microscope is a system of lenses that is nearest to the object under examination. Adjustment of objectives should be performed with great care. Place a slide on the stage and select the objective lens desired. Lower the barrel of the microscope near the slide with the coarse focusing knob. While looking through the ocular lens, slowly raise the barrel until the object is in view. Complete the focusing with the fine adjustment knob. A microscope is called parfocal if, when changing from one objective lens to another

only the fine adjustment focusing knob is necessary to achieve a sharp image.

Never disassemble the microscope for repair. Dry dust particles can be removed with a warm brush and grease should be removed with lens paper.

Introduction of an oil film between the top of the specimen and the bottom of the lens should be done with great caution, because of the very short working distance of such objective. Rack up the objective until it is about 1 cm above the slide, rotate the nosepiece, bringing the immersion oil objective into position. A small drop of immersion oil is placed on the slide. Place the eye with the top of the objective slide and lower the objective carefully until it makes contact with the oil. Some microscopes have special guarding devices which prevent the objective being forced down on to the slide. After making contact with the oil drop, the objective should be lowered very carefully towards the slide, keeping the eye level with the latter. Look through the eyepiece and pull the objective slowly upwards, using the fine adjustment knob until the object is in focus.

After use, carefully wipe off the immersion oil deposited on the lens surfaces with lens paper. Never leave oil on the lens surfaces after use as oil remnants will seriously impair the performance of the lens system.

Lubrication of the moving parts may be necessary from time to time. Do not twist the two coarse adjustment knobs in the opposite directions simultaneously, which will cause damage.

Consult the dealer if there is any problem with the microscope. Never try to be a microscope repairman by yourself.

## 6. URINE SCREENING EXAMINATIONS FOR PROTEIN AND SUGAR

### 6.1 Proteinuria (Robert's Test)

#### 6.1.1 Principle

A saturated aqueous solution of Magnesium sulfate and concentrated Nitric acid is used as Robert's reagent to precipitate protein in urine.

#### 6.1.2 Material and Equipment

- (1.) Glass test tube, 15 x 150 mm or 13 x 100 mm
- (2) Serological pipette, 5 ml
- (3) Medicine dropper
- (4) Robert's reagent

#### 6.1.3 Reagent

Add 1 part of concentrated Nitric acid to 5 parts of saturated aqueous solution of Magnesium sulfate, mix well.

#### 6.1.4 Procedure

- (1) Pipette 3 ml of Robert's reagent in a test tube.
- (2) With a pipette or medicine dropper, allow urine to run slowly down the side of the inclined tube so as to form two layers of fluid.
- (3) The white ring appearing at the junction of the fluids denotes the presence of protein, particularly albumin.

### 6.1.5 Interpretation

It is reported as follows :

Negative	.....Clear
Trace	..... Slight cloudy
1+	.....Opaque cloudy
2+	.....Granular precipitate
3+	..... Flocculent precipitate
4+	.....Solid

### 6.1.6 Comment

Very small amounts of protein occur in normal urine but the quantities are too minute to be detectable with the usual protein tests. Excretion of protein in the urine is most frequently associated with renal diseases but a number of other disorders may also give rise to proteinuria.

## 6.2 Combination Test for Protein and Glucose in Urine (Uristix)

### 6.2.1 Material

Uristix reagent strip test for the detection of albumin and glucose in urine.

### 6.2.2 Procedure

(1) Dip test end of strip in well mixed urine, or briefly pass through urine stream, removing immediately to prevent leaching of reagents.

(2) Remove the excess urine by touching the end of the strip to the side of urine container.

(3) Compare color of dipped strip with color chart.

Albumin : Compare tip immediately.

Glucose : Compare second portion of strip approximately 10 seconds after dipping.

### 6.2.3 Interpretation

#### Albumin

Yellow	..... Negative
Pale greenish yellow	..... Trace
Greenish yellow	..... 1+ or 30 mg/100 ml
Pale green	..... 2+ or 100 mg/100 ml
Green	..... 3+ or 300 mg/100 ml
Dark green	..... 4+ or over 1,000 mg/100 ml

#### Glucose

Pink	..... Negative
Pinkish purple	..... 1+
Purple	..... 2+ to 3+
Dark purple	..... 4+

### 6.3 Glucosuria (Qualitative Benedict's method, 1911)

#### 6.3.1 Principle

Glucose in urine reduces blue alkaline copper sulfate reagent (Benedict's reagent) to red cuprous oxide precipitate. A green, yellow or orange color and precipitate is formed, depending upon the amount of glucose and other reducing substances present.

#### 6.3.2 Material and Equipment

- (1) Glass test tube, 15 x 150 mm
- (2) Boiling water bath
- (3) Serological pipette, 5 ml
- (4) Benedict's reagent

#### 6.3.3 Reagent

(1) Dissolve 17.3 gm  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in 100 ml hot distilled water in large beaker.

(2) Dissolve 173 gms Sodium citrate and 100 gms anhydrous Sodium carbonate in 800 ml distilled water with heat.

(3) Cool and mix them together and add water to bring total volume to 1,000 ml.

#### 6.3.4 Procedure

- (1) Place 5 ml of Benedict's reagent in a test tube.
- (2) Add 0.5 ml (8 drops) of urine, mix by shaking.
- (3) Place the tube in boiling water bath for 5 minutes (or over flame for 2 minutes).
- (4) Remove from boiling water and read immediately.

#### 6.3.5 Interpretation

Reactions	Report as	Approximate glucose conc. mg/100 ml
No change in color of reagent	Negative	0
Clear blue or green opacity, no ppt.	0 to Trace	0 - 100
Green with yellow ppt.	1+	100 - 500
Yellow to green with yellow ppt.	2+	500 - 1,400
Muddy orange with yellow ppt.	3+	1,400 - 2,000
Orange to red ppt.	4+	2,000 or above.

The sensitivity of the test is approximately 50-80 mg glucose per 100 ml. Urine containing nonglucose reducing substances such as creatinine, uric acid, homogentisic acid, some drugs, fructose, lactose, galactose, pentose, ascorbic acid, antibiotics, glucuronides may give positive result.

Normally, urine does not contain a sufficient amount of sugar to react with any reducing tests. When sugar does appear in the urine, as evidenced by positive tests, it may be regarded as an abnormality frequently due to diabetes mellitus. Urine sugar tests are extremely useful in monitoring the treatment of diabetes.

## **7. EXAMINATION FOR OVA PARASITES IN FECES**

### **7.1 Material and Equipment**

- (1) Microscope**
- (2) Clean glass slides, 1 x 3"**
- (3) Glass cover slip, 22 x 22 mm**
- (4) Toothpicks or wooden applicator sticks.**

### **7.2 Procedure**

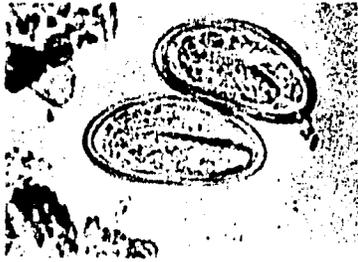
- (1) Label the specimen number on one end of glass slide with wax.**
- (2) Add 1-2 drops of 0.85% Sodium chloride solution on the left side and 1-2 drops of Lugol's solution on the right side of the slide.**
- (3) With a toothpick or wooden applicator stick, pick a small fecal material (approximately 2 mg) and mix well with saline on the slide. When the slide is placed on a piece of newspaper, if the small print is just visible, it is a satisfactory preparation. Remove the gross particles and cover an area with 22 x 22 mm glass cover slip.**
- (4) Prepare another fecal smear on the right side as step 3, using Lugol's solution in place of saline solution.**
- (5) Examine under microscope, using low power first. If the suspicious objects are found, they can be examined on higher power.**

#### **Comments:**

- (1) Only disposable wooden applicator stick can be used.**
- (2) This method is recommended for microscopic examination of fecal material. In a case of only rare ova parasites present in fecal specimen, it may not reveal.**
- (3) The procedure is designated to allow the detection of mobile Trophozoites of Protozoa.**
- (4) Lugol's solution kills the organisms, stain any cysts and facilitates their identification.**

### **7.3 Ova and Parasites Commonly Seen**

The frequently seen fecal ova and parasites are roundworms, hookworms, pinworms and amoeba. The tapeworms are confirmed by the excretion of proglottids along with the feces. Some patient may be infested with more than one type of parasites. Before reporting the result as negative, the entire slide preparation must be examined.



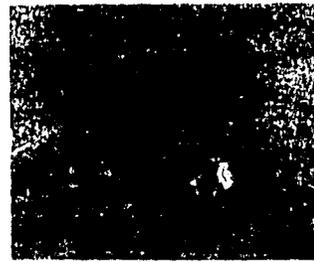
**Enterobius vermicularis ovum**



**Opisthorchis viverrini ovum**



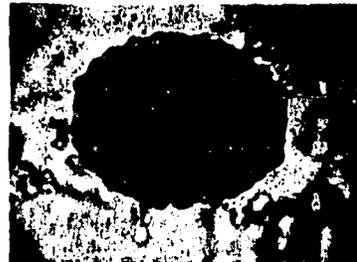
**Trichuris trichiura ovum**



**Entamoeba histolytica cyst**



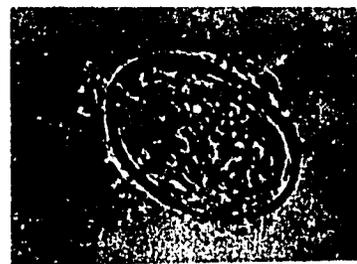
**Hookworm ovum**



**Ascaris lumbricoides ovum**



**Paragonimus ovum**



**Schistosoma japonicum ovum**

**MODULE 7**

**FORMULARY OF ESSENTIAL DRUGS FOR WECHAKORN**

**PANEE TEJASEN M.D., M.A.**

**Previous Page Blank**

## MODULE 7

### FORMULARY OF ESSENTIAL DRUGS FOR WECHAKORN

#### 1. INSTRUCTIONAL OBJECTIVES

At the end of the course the wechakorn will be able to:

1. Prescribe essential and usually available drugs for common illnesses.
2. Aware of importance of effectiveness and accuracy or seriousness of ordinary dosages and side-effects of drugs.
3. Use this formulary as a guideline in everyday practice.

#### 2. FORMULARY OF ESSENTIAL DRUGS FOR WECHAKORN

##### DRUGS USED IN MEDICAL AND PEDIATRIC PROBLEMS

1. Chloroquin phosphate (Aralen, Resochin, Nivaquine)
2. Fansidar
3. Chloramphenicol (Chloromycetin, Kemicetin)
4. Aspirin (Acetylsalicylic acid, ASA)
5. Decolgen
6. Paracetamol (Acetaminophen, Tyrenol, Acetasil, Calpol, Detamol, etc)
7. Mist Tussis
8. Ampicillin (Amcillin, Ampicyn, Amtrex, etc)
9. Benadryl Expectorant
10. Sodamint
11. Mist Carminative (Carminative mixture)
12. Mist Stomachica (Stomachic mixture)
13. Veracolate
14. Magnesium hydroxide and Aluminum hydroxide (Aludrox)
15. Antrenyl (Oxyphenonium Bromide)
16. Daricon (Oxyphencyclimine Hydrochloride)
17. Belladonna with Phenobarbital
18. Tetracyclines
19. Deparon (Diton, Mepropygin, Nominbar)
20. Baralgan
21. Spasmocibalgin
22. E.L.P. Co. (Emulsion liquid paraffin)
23. Dulcolax (Bisacodyl)
24. Phenylbutazone (Butazolidine, Butacote, Butadon-1 Butapyrazol)
25. Prednisolone (Scherisolone, Hostacortin H)
26. Indomethacin (Indocid)
27. Dexamethasone (Dexa-Scheroson, Decadron)
28. Atropine sulphate

29. Meprobamate (Meprobar, Miltown)
30. Procaine Penicillin G in Oil (P.A.M. in oil, Wycillin)
31. Ephedrine
32. Codeine Phosphate
33. Chlorpheniramine (Chlorpheniramine maleate, Chlortrimeton, Piriton)
34. Penicillin G Sodium (Benzyl Penicillin, PGS)
35. Aminophylline (Theophylline ethylenediamine)
36. INH (Isoniazid, Isonicotinic acid hydrazide, Nydrozid)
37. Para-Amino-Salicylate Sodium (PAS)
38. Streptomycin, Dihydrostreptomycin (Streptoduocin injection)
39. Penicillin V (Potassium Phenoxymethyl Penicillin, Pen V, Penvisil, Phenopen)
40. Neosynephrine (Phenylephrine)
41. Methylsalicylate ointment
42. Diuril (Chlorothiazide)
43. Reserpine (Serpasil)
44. Phenobarb (Phenobarbital, Luminal)
45. Niclosamide (Yomesan, Telmetin)
46. Piperazine Citrate (Antepar)
47. Combantrin (Pyrantel palmoate)
48. Alcopar (Bephenium Hydroxynaphthoate)
49. Mintezol (Thiabendazole)
50. Tedral
51. Lasix (Furosemide)
52. Normal Saline (Isotonic saline solution)
53. Dextrose 5% in Saline
54. Dextrose 5% in Water
55. Glucose 50% (Dextrose 50%)
56. Sulfadiazine
57. Tri-sulfa
58. Bactrim (Septrin)
59. Mezuran
60. Probenecid (Benemid)
61. Kanamycin (Kanoxin, Kantrex)
62. Pyridium (Phenazopyridine HCL)
63. Insulin (Regular Insulin, Isophane Insulin Suspension)
64. Nitrofurantoin (Furadantin)
65. Valium (Diazepam)
66. Propylthiouracil (Propacil)
67. Mist Menopause
68. Gamma Globulin (Globuman, Human Gamma globulin)
69. Dramamine (Dimenhydrinate)

70. Lomotil
71. Alumin (Aluminium Hydroxide Gel)
72. Kaomycin (Kaolin with Neomycin)
73. Kaopectate (Kaopectal, Kaolin with Pectin)
74. Diodoquin (Diiodohydroxyquin, Dysetrin)
75. Metrol (Metronidazole, Flagyl)
76. Emetine Hydrochloride
77. Tincture of Camphorated Opium
78. Fersolate (Fergon, Ferrous gluconate)
79. Folic Acid
80. Multivitamin
81. Chlorpromazine (Largactil)
82. Thiamine Hydrochloride (Vitamin B<sub>1</sub>)
83. Thalazole (Phthalylsulfathiazole, Enterazole)
84. Lugol's Solution
85. Thyroid Extract
86. Sulfacetamide Eye Drop (Albucid)
87. Oculent - T (Tetracycline HCL Eye Ointment)
88. Boric Acid 3% Solution
89. Lozenges
  - 89.1 Cepacol
  - 89.2 Dequadin
  - 89.3 Detoach
  - 89.4 Formitrol
  - 89.5 Sentril
  - 89.6 Strepsil
  - 89.7 Tyrozet
90. Carbolic Acid (Metacresylacetate, Cresatin)

#### DRUGS USED IN COMMON SKIN DISEASES

91. Calamine Lotion
92. Triple antibiotic ointment (Neosporin, Mycitracin)
93. Selsun (Selenium sulfide)
94. Cortisporin
95. Whitfield's Ointment
96. Griseofulvin (Fulvin Forte, Grisovin F.P.)
97. Sodium Thiosulphate
98. Benzyl Benzoate (Topocide, Ascabiol)
99. Eurax (Crotamiton)

#### DRUGS USED IN COMMON GYNAECOLOGICAL PROBLEMS

100. Vaginal suppositories (Sultrin, Floraquin, Nystatin)

- 101. Anal Suppositories
- 102. Podophyllin
- 103. Estrogen

#### DRUGS FOR SNAKEBITES AND TETANUS

- 104. Antevenine Serum
- 105. Tetanus Antitoxin
- 106. Tetanus Toxoid

**1. Chloroquin Phosphate (Aralen, Resochin, Nivaquine)**

**Preparation :** Tablet : 250 mg (equivalent to chloroquin base 150 mg)

Injection : 50 mg/ml in ampule (3 ml)

**Usage :** Malarial treatment for all malarial schizont forms

: Treatment for extra intestinal amebiasis, e.g., amebic liver abscess

**Dosage and Administration for Malarial Treatment**

a) Give 10 mg/kg as initial dose, followed by 5 mg/kg twice daily for 2 days.

b) If oral therapy is not possible, give chloroquin hydrochloride, 2 mg/kg intramuscularly or intravenously immediately and the same dosage once each day for 2 more days.

**Dosage For Prophylactic Treatment**

**Oral :**

Adult, 2 tabs. every week.

Children, 2 - 12 years, 1 tab. every week.

**Dosage For Extraintestinal Amebiasis**

**Oral :**

Adults and children over 12 years, 4 tabs. for the first day, then 2 tabs.

daily for 2 - 3 weeks. Children under 12 years, 2 tabs. for the first two days, then 1 tab. daily for 2 - 3 weeks.

**Injection :**

Adults and children over 12 years, 1 - 2 ampules intramuscular daily for 12 consecutive days.

**Side Effects :** Nausea, vomiting, headache, rashes

**Contraindication :** Do not use in patient with psoriasis.

**Cautions :** If patient's condition is not improved after treatment with chloroquin, consult doctor.

If patient has skin problem and psoriasis is suspected, consult doctor before using chloroquin.

Consult doctor if patient has liver disease or kidney disease.

**2. FANSIDAR**

**Preparation :** Tablet : ingredient – sulfamethoxine 500 mg and pyrimethamine 25 mg.

**Usage :** Treatment and prophylaxis of malaria.

**Dosage and Administration :**

Treatment : Adult, 2 - 3 tabs. single dose.

Prophylaxis : Adult, 3 tabs. every 4 weeks.

**Side Effects :** Anuria or hematuria can occur if water intake is low. Prolonged use may cause anemia.

**Contraindication :** Patient with kidney, jaundice, or liver disease, or allergic to sulfa drugs.

Do not use in young children or pregnant woman in last trimester period.

**Caution :** If it is necessary to use Fansidar in children or pregnant women, doctor should be consulted.

### 3. CHLORAMPHENICOL (Chloromycetin, Kemicetin)

**Preparation :** Capsule : 250 mg

Suspension : Chloramphenicol palmitate 125 mg (base)/4 ml

Injection : Chloramphenicol sodium succinate 1 gm for intravenous only.

**Usage :** For treatment of infections such as bronchitis, pneumonia, lung abscess, meningitis, typhoid fever, urinary tract infection, salpingitis and abscesses.

**Dosage and Administration :**

Adult, 2 caps. (500 mg) orally 3 - 4 times daily or 500 mg intravenous 1 - 2 times daily.

Children, Oral :

Under 2 years : ½ teaspoon 4 times daily.

2 - 6 years : 1 teaspoon 3 - 4 times daily.

6 - 12 years : 2 teaspoons 3 - 4 times daily.

Children, Injection : Newborn : 30 mg/kg/day.

2 months - 2 years : 40 - 50 mg/kg/day.

2 - 6 years : 30 - 40 mg/kg/day.

**For the Treatment of Typhoid Fever**

Adult, 2 gm initially, followed by 1 gm every 6 hours for 4 weeks (oral administration).

**Contraindication :** Patient with liver or kidney disease and anuria state.

**Caution :** Chloramphenicol is most effective for treatment of typhoid fever.

This drug can cause severe anemia. Periodic blood examination should be done during chloramphenicol therapy. Doctor should be consulted if chloramphenicol needs to be given intravenously.

### 4. ASPIRIN (Acetylsalicylic acid, ASA)

**Preparation :** Tablet : Adult form, 5 grains or 300 mg

Children's form, 1 grain or 60 mg

**Usage :** Used to relieve pain such as headache, back pain, joint pain, muscular pain, menstruation pain, toothache, pain from infection or vaccination.

Used as antipyretic (e.g., common cold and other fevers).

**Dosage and Administration :**

Adult, 2 tabs. every 4 hours but not over 12 tabs. a day.

Children, use baby aspirin (gr. 1).

Under 2 years, ¼ to ½ tab. every 4 hours.

3 years, 1 tab. every 4 hours.

4 years - 2 tabs. every 4 hrs.

5 to 7 years - 2 to 3 tabs. every 4 hrs.

8 to 12 years - 3 to 4 tabs. every 4 hrs.

**Side Effect :** Do not take a large amount for a long period, as it may cause nausea, vomiting, diarrhea. It may cause allergic reactions such as rash, abdominal pain, etc.

**Contraindication :** Patient allergic to ASA; patient with peptic or gastric ulcer; patient with blood disease.

**Caution :** ASA should be given more carefully to patients with peptic ulcers. It may cause death in children if an overdose is given. Adult form of ASA can be given to children by using ¼ tab. as equivalent to 1 grain of baby aspirin.

## 5. DECOLGEN

**Preparation :** Tablet : ingredients Acetaminophen 300 mg,  
Phenylpropanolamine HCl 12.5 mg, Chlorpheniramine maleate 1 mg, and  
Vitamin C 25 mg.

Syrup : 15 ml is equivalent to 1 tab.

**Usage :** To relieve common cold as antipyretic, analgesic and decongestant.  
To relieve allergic reaction of common cold.

**Dosage and Administration :**

Adults and children over 12 years, 1 tab. orally 3 - 4 times daily.

Children 2 - 6 years, ½ tab. 3 - 4 times daily; 7 - 12 years, 1 tab. 2 - 3 times daily.

**Side Effect :** It may cause sleepiness and dizziness.

**Contraindication :**

**Caution :** Do not drive when the drug is taken.

## 6. PARACETAMOL (Acetaminophen, Tyrenol, Acetasil, Calpol, Detamol, etc.)

**Preparation :** Tablet : 300 mg

Syrup or suspension : 120 mg/5 ml

Droplet : 50 mg/0.6 ml

**Usage :** To relieve pain (e.g., headache, muscular pain, joint pain, sprain, menstruation pain).

To relieve fever (e.g., common cold, influenza).

**Dosage and Administration :**

Adult, 300 - 600 mg (1 - 2 tab.) 3 - 4 times daily.

Children under 1 year, 60 mg 3 - 4 times daily;

1 - 4 years, 60 - 120 mg, 3 - 4 times daily;

4 - 8 years, 120 - 240 mg, 3 - 4 times daily;

8 - 12 years, 240 mg, 3 - 4 times daily.

**Side Effects :** Weakness, cyanotic face, sweating, weak pulse, dyspnea, and convulsion.

**Indication :** Use as a substitute for ASA in ASA-allergic patient or patient with abdominal pain from ASA.

**Contraindication :** Patient allergic to paracetamol.

**Caution :** Do not use this drug for a long period (for example, not longer than 10 days).

**7. MIST TUSSIS**

**Preparation : Solution : ingredient component :**

Liquid Ext. Glycyrrhiza	28.80	ml
Wine of Antimony	15.36	ml
Tr. Camphor Co.	28.80	ml
Spt. Ethyl Nitrite	7.20	ml
add distilled water to	240	ml

**Usage :** To relieve coughing and throat irritation.

**Dosage and Administration :** Sip every 2 - 3 hours for coughing.

**Side Effects :** Rarely found, except in special cases with overdose.

**Contraindication :** Patient allergic to Mist. Tussis.

**Caution :** It only relieves coughing temporarily; it does not treat the cause of disease.

**8. AMPICILLIN (Amcillin, Ampicyn, Amtrex, etc.)**

**Preparation : Capsule : 250 mg, 500 mg**

**Injection : 250 mg, 500 mg, 1 gm**

**Dry Syrup : 125 mg (base)/5 ml**

**Usage :** For infectious diseases and infections

**Dosage and Administration :**

Adult, 250 - 500 mg orally every 6 hrs; in severe case 1 gm every 6 hrs can be given.

Children : Under 1 year, 62.5 - 125 mg every 6 hrs;

1 - 5 years, 125 - 187.5 mg every 6 hrs;

6 - 12 years, 187.5 - 250 mg every 6 hrs.

The drug should be taken ½ - 1 hr before meals for good absorption.

**Injection :** Adult, 500 mg intramuscular or intravenous every 6 hours.

In severe cases 4 - 8 gm can be given daily in divided doses of 0.5 - 2.0 gm every 6 hours.

Children, intramuscular, 25 - 50 mg/kg/day in divided doses of 6 - 12 mg/kg every 6 hours.

**Side Effects** : Rashes, itching, fever, chill. There may be faint, palpitation or shock in some cases.

**Contraindication** : Patient with allergic reaction to this drug.

**Caution** : Drug must be given with caution to patients with past history of allergy to penicillin or kidney disease.

## 9. BENADRYL EXPECTORANT

**Preparation** : Syrup, 5 ml contains Diphenhydramine HCl 14 mg and Ammonium chloride 135 mg. Package, 1 oz-bottle.

**Usage** : Expectorates sputum from lungs, bronchi, and throat. Stops coughing from common cold or allergy.

**Dosage and Administration** :

Adult, 1 - 2 teaspoons 3 - 4 times daily.

Children, over 1 year, ½ teaspoon 3 - 4 times daily.

**Side Effects** : Drowsiness, mental dullness, dry mouth, nausea, vomiting. It may cause restlessness in some cases.

**Caution** : a) Do not drive or control any machine while this drug is being taken.

b) This drug should not be given to children aged under one year.

## 10. SODAMINT

**Preparation** : Each tablet contain 300 mg of Sodium bicarbonate, starch and flavor (oil of Peppermint 0.004 ml).

**Usage** : Reduce acidity in stomach.

**Dosage and Administration** : 2 to 6 tabs. orally, 4 to 6 times a day.

**Side Effect** : Systemic alkalosis

**Contraindication** : Patient allergic to sodamint

## 11. MIST CARMINATIVE (Carminative Mixture)

**Preparation** : Mixture : 15 ml contains Sod. bicarbonate 0.30 gm, Aromatic Spt. Ammonia 0.30 ml, Tr. Cardamon Co. 0.75 ml, Glycerine 1.12 ml, Oil of Anise 0.01 ml, and add distilled water to 15 ml

**Usage** : Gas expectorant, relief of dizziness, stomach fullness, and flatulence.

**Dosage and Administration** :

Adult, 1 tablespoon after meals 3 - 4 times daily or while having gas pains or flatulence.

Children, 6 - 12 years, 1 teaspoon after meals 3 - 4 times daily or while having gas pains.

## 12. MIST STOMACHICA (Stomachic Mixture)

**Preparation :** Mixture : 15 ml contains sodium bicarbonate 0.60 gm, Tr. Rhei. Co. 1.60 gm, Tr. Gent. Co. 1.00 ml, Tr. Nux Vom. 0.30 ml, Tr. Ipecac 0.30 ml, Spt. Peppermint 0.30 ml, Chloroform Water to 15.00 ml.

**Usage :** Tonic for abdominal discomfort, flatus, indigestion.

**Dosage and Administration :**

Adult, 1 tablespoon before meals 3 times daily. Children 6 to 12 years, 1 teaspoon before meals 3 times daily.

**Side Effect :** —

**Contraindication :** Allergy to this drug.

## 13. VERACOLATE

**Preparation :** Tablet : One tablet contains bile salt 70 mg, Cascara dry extract 65 mg, Phenolphthalein 32 mg, and Oleoresin Capsicum 3 mg.

**Usage :** Used in patients with diseases of liver, gall bladder, or biliary tract, or with constipation.

**Dosage and Administration :** 1 tab. after meal 3 times daily. For constipation use 2 tabs. orally before bedtime.

## 14. MAGNESIUM HYDROXIDE AND ALUMINUM HYDROXIDE (Aludrox)

**Preparation :** Tablet : Each tablet contains Aluminum hydroxide 305 mg and Magnesium hydroxide 83.4 mg.

**Suspension :** Each 5 ml contains Aluminum hydroxide 307 mg and Magnesium hydroxide 103 mg.

**Usage :** Used in patients with peptic or gastric ulcer, to reduce abdominal pain, epigastric pain, or indigestion.

**Dosage and Administration :**

Adult, 1 - 2 tabs. chew before swallowing, just before meal (or with meal) and before bedtime.

Children, 1 tablespoon with meals and before bedtime.

**Side Effect :** A dose over 10 - 12 tabs. if not chewed, may cause intestinal obstruction.

## 15. ANTRENYL (Oxyphenonium Bromide)

**Preparation :** Tablet : 5 mg

**Usage :** Smooth muscle relaxant to relieve pain from peptic ulcer, enteritis, or smooth muscle strain of any organ.

**Dosage and Administration :**

Adult, 1 - 2 tabs. every 6 hours.

Children 6 - 12 years, ½ tab. once daily.

Side Effect : Mouth dryness, thirst, palpitation, constipation.

Overdose may cause tachypnea, fever, delirium.

Contraindication : Contraindicated in patient with glaucoma, hypertrophy of prostate gland, heart disease, and flatulence.

Caution : Avoid overdosage. If any side effect is detected, doctor should be consulted.

#### 16. DARICON (Oxyphencyclimine Hydrochloride)

Preparation : Tablet : 5 mg.

Usage : As for antrenyl, number 15 (above).

Dosage and Administration :

Adult, 1 tab. twice daily.

Children, ½ tab. once daily.

Side Effect : As for antrenyl (above)

Contraindication : As for antrenyl (above)

Caution : As for antrenyl (above)

#### 17. BELLADONNA WITH PHENOBARBITAL (Belladonna)

Preparation : Tablet : Each tablet contains total alkaloid of Belladonna leaf 250 mg, and phenobarbital 50 mg.

Usage : To relieve nausea, vomiting, abdominal pain from peptic ulcer.  
To relieve abdominal pain from diarrhea, pain from gall bladder and urinary tract stones, and menstruation pain.

Dosage and Administration :

Adult, 1 tab. 2 - 3 times daily.

Children, ¼ - ½ tab. 2 - 3 times daily.

Side Effect : Dry mouth, blurred vision, tachycardia, rashes on face.

Contraindication : Glaucoma or allergy to the drug.

Caution : Prolonged use may cause addiction.

#### 18. TETRACYCLINES (Tetracycline HC1, Tetrex, Oxytetracycline, Aureomycin, Reverin, etc.)

Preparation : Capsule : 250 mg

Syrup : 125 mg/5 ml

Intramuscular : Terramycin, 250 mg and 500 mg ampule

Intravenous : Bristacin, 350 mg ampule; Reverin, 275 mg ampule

Usage : Respiratory tract infection such as bronchitis, pneumonia; abscess, syphilis, urinary tract infection, salpingitis, or conjunctivitis.

**Dosage and Administration :**

Adult, oral, 2 cap. 4 times daily; intramuscular, 100 - 200 mg once or twice daily; intravenous, 1 ampule (300 mg or 275 mg) dissolved in .10 ml distilled water once or twice daily.

Children, 6 - 12 years, half of adult dose. 2 - 6 years, 50 - 100 mg/day intramuscular in 2 divided doses, or 1 teaspoon 4 times daily in syrup form. Under 2 years, 50 mg/day intramuscular in 2 divided doses. Or ½ teaspoon 4 times daily in syrup form.

**Contraindication :** Allergy to this drug.

**Caution :** Any antibiotics must be given until complete cure, for example for 7 - 10 consecutive days. Antibiotic treatment must not be stopped until the end of the course even if patient's condition is improved. Intravenous injection must be very slow, due to its potential fatal shock.

**19. DEPARON (Diton, Mepropropygin, Nominbar)**

**Preparation :** Tablet : Each contains Dipyrone 300 mg and Meprobamate 200 mg.

**Usage :** a) Analgesic for tension headache, menstruation pain, myalgia.  
b) Antipyretic

**Dosage and Administration :**

Adult, 1 tab. 3 - 4 times daily.

Children, 6 - 12/years, ½ tab. 3 - 4 times daily.

**Side Effect :** Drowsiness; prolonged use may cause leukopenia.

**Contraindication :** Patient allergic to this drug or patient with blood disease.

**Caution :** Do not use for a long period. If it is necessary to use it for a long period, periodic blood examination should be done.

**20. BARALGAN**

**Preparation :** Injection : One ml contains Dipyrone 0.5 gm, Papaverine-like substance 2 mg, and Atropine-like substance 0.02 mg. Contained in 2 ml and 5 ml vials.

**Tablet :** Each contains Dipyrone 500 mg, Papaverine-like substance 5 mg, and Atropine-like substance 0.1 mg.

**Usage :** To relieve pain from stomach, intestine, bile duct, urinary tract contractions, and peptic ulcer.

**Dosage and Administration :**

Adult, 1 - 2 tabs. 3 times daily, or 1 - 2 ml intramuscular, slowly, in severe case.

Children, under 12 years, ½ - 1 tab. 3 times daily. Under 4 years, consult doctor.

**Side Effect :** It may cause flatulence, thirst and burning sensation of throat.

**Contraindication :** When severe side effect occurs.

**Caution :** Consult doctor if an injection form is to be used.

## 21. SPASMOCIBALGIN

**Preparation :** Tablet : Each tablet contains Amidopyrine 0.22 gm, Diallyl-barbituric acid 0.03 gm, and Adiphenine HCl 0.02 gm.

Injection : Each milliliter contains the same amount as one tablet. Available in 1 ml vials.

**Usage :** Relieve spasmodic pain from stomach, intestine, biliary tract, urinary tract, uterus, and menstruation pain.

**Side Effect :** If it is to be used in patient with blood disease, consult doctor first.

**Caution :** Drug addiction can occur.

## 22. E.L.P. Co. (Emulsion Liquid Paraffin)

**Preparation :** Emulsion : 240 ml contains Liquid Paraffin 120 ml, Acacia 32.00 gm, Tragacanth 1.12 gm, Glycerine 32.00 ml, Sodium Benzoate 1.12 gm, Oil of Orange 0.15 ml, Chloroform 0.64 ml, add distilled water add 240.00 ml.

**Usage :** Laxative effect to relieve constipation. Indicated in patient with chronic constipation.

**Dosage and Administration :** 2 tablespoons before bedtime.

**Contraindication :** Allergic to this drug.

**Caution :** It is used for symptomatic treatment, and does not affect the cause of a disease.

## 23. DULCOLAX (Bisacodyl)

**Preparation :** Tablet : 5 mg.

Suppository : Adult form 10 mg, children's form 5 mg.

**Usage :** Cathartic effect, used for constipation.

**Dosage and Administration :** Oral, 1 - 2 tabs. before bedtime; anal suppository used when necessary.

**Side Effect :** Rarely seen

**Contraindication :** Contraindicated in patient with abdominal pain with fever.

**Caution :** Not to be used with antacid. Consult doctor if you see patient with abdominal pain, fever, and constipation.

## 24. PHENYLBUTAZONE (Butazolidine, Butacote, Butadon-1, Butapyraxol)

**Preparation :** Tablet : 100 mg, 200 mg.

Injection : Butazolidine, one ml, intramuscular injection form contains Phenylbutazone 200 mg and Cincocaine 2 mg. Butapyrazol, one ml intramuscular injection form contains Phenylbutazone 200 mg and Lidocaine 10 mg.

Usage : Relieve pain from inflammation (e.g., rheumatoid, rheumatic, gout, muscular pain, and tendinitis).

Side Effect : Nausea, vomiting, abdominal pain, edema, rash. Severe side effect may cause severe abdominal pain, gastritis, peptic ulcer, enteritis or intestinal ulcer, hematemesis, hepatitis, or anemia.

Contraindication : Contraindicated in patient with previous history of gastric or intestinal ulcer, liver disease, kidney disease, heart disease, hypertension or blood disease.

Caution : If any abnormal finding is detected during its usage, consult doctor.

## 25. PREDNISOLONE : (Scherisolone, Hostacortin H.)

Preparation : Tablet : 5 mg.

Usage : Used in severe bronchial asthma, arthritis, myelitis, and tendinitis or severe allergic reaction.

Dosage and Administration :

Adult, 10 - 15 mg orally daily.

Children, 5 - 10 mg orally daily.

Side Effect : Edema; prolonged usage may cause peptic ulcer, diabetes mellitus, or moon face.

Contraindication : Contraindicated in patient with edema or peptic ulcer.

Caution : A 10 - 15 mg P.O. daily dose is given initially. Dosage should tail off before complete discontinuation of the drug. Sudden discontinuation should not be practiced. If any side effect is detected, consult doctor.

## 26. INDOMETHACIN (Indocid)

Preparation : Capsule : 25 mg.

Anal suppository : 100 mg.

Usage : Relieve pain from bone, joint and muscle infections, and gout.

Dosage and Administration : Oral, 1 cap. with meals, 2 - 3 times daily; Anal suppository, 100 mg 1 - 2 times daily.

Side Effect : Headache, dizziness, nausea, vomiting, abdominal pain from gastritis and enteritis, or gastric bleeding. Prolonged use can cause edema, hematuria and rashes.

Contraindication : Patient with previous history of peptic ulcer, kidney disease, epilepsy. Also contraindicated in pregnant women and children under 14 years old.

**Caution :** Consult doctor if side effect is observed.

## 27. DEXAMETHASONE (Dexa-Scheroson, Decadron)

**Preparation :** Tablet : 0.5 mg.

Injection : 4 mg/ml Decadron, 2 ml vial.

5 mg/ml, Dexa-Scherosone, 1 ml vial.

**Usage :**

- a) To relieve severe allergic reaction from drug, or bronchial asthma.
- b) To counteract loss of consciousness or shock after failure of other drugs' usage.
- c) Some skin diseases.

**Dosage and Administration :**

Adult, 1 tab. orally 1 - 3 times daily; 5 mg intramuscular 1 - 3 times daily;  
5 mg. intravenous 1 - 2 times daily.

Children, follow doctor's order.

**Side Effect :** Similar to those of prednisolone (see Item 25).

**Contraindication :** As for prednisolone (see Item 25).

**Caution :** Consult doctor before using this drug.  
Do not use it for a long period of time.

## 28. ATROPINE SULPHATE

**Preparation :** Injection : Each vial contains Atropine sulfate 1/100 gr in 1 ml.

**Usage :**

- a) Relieve spasmodic contraction of intestine or uterus. Use for abdominal pain.
- b) Reduce glandular secretions, especially of salivary gland. Used in preoperative treatment.

**Dosage and Administration :**

Adult, 1/100 gr intramuscular or subcutaneous, 1 - 2 times daily.

Children, over 3 years, use one-half of adult dose.

**Side Effect :** Dry mouth, flushed face, palpitation

**Contraindication :** Glaucoma, heart disease

**Caution :** Stop usage if dry mouth, palpitation, or eye pain is observed, and consult doctor.

## 29. MEPROBAMATE (Meprobar, Miltown)

**Preparation :** Tablet : 400 mg

**Usage :**

- a) Relieve tension, anxiety, and fear.
- b) Reduce excitement from chronic alcoholism.

**Dosage and Administration :**

Adult, 1 tab. 2 - 3 times daily; dose can be adjusted to individual case.

**Side Effect :** Nausea, skin rash, or sometimes constipation

**Contraindication :** Patient allergic to this drug

**Caution :** Stop usage when any side effect is observed; do not use with hypnotic or sedative drugs, or for a drunken patient. Consult doctor before using this drug.

### 30. PROCAINE PENICILLIN G IN OIL (P.A.M. in oil, Wycillin)

**Preparation :** Injection : 300,000 units in 10 ml ampule

**Usage :** For respiratory tract infection such as pharyngitis, bronchitis, pneumonia; middle ear infection; skin and mucosa infection; abscess; and pyoderma. It is also effective in venereal diseases such as gonorrhea and syphilis.

**Dosage and Administration :**

**Adult :** For gonorrhea, 2.4 million units intramuscular single dose for male patient; 4.8 million units intramuscular single dose for female patient. It must be divided into 2 doses and injected deeply at each buttock.

**For other infections :**

**Adult,** 600,000 - 1,200,000 units.

**Children under 2 years,** 300,000 units; **2 - 12 years,** 600,000 units.

**Side Effect :** Rash, itching, chill, fever, or fatal shock.

**Contraindication :** Contraindicated for patient with history of penicillin allergy.

**Caution :** Keep the drug in refrigerator. Use deep muscular injection. Change injection site after each injection to avoid abscess formation. Be sure that the drug is not being injected into the blood stream.

### 31. EPHEDRINE

**Preparation :** Tablet : 30 mg

Injection : 30 mg/ml, intramuscular or subcutaneous.

**Usage :** For bronchial asthma, hay fever

**Dosage and Administration :**

**Adult,** oral 15 - 60 mg 3 - 4 times daily; injection, 30 mg intramuscular or subcutaneous.

**Side Effect :** Headache, nausea, palpitation, insomnia, excitement, tremor, anuria.

**Contraindication :** Contraindicated in patient with history of hypertension, toxic goiter, heart disease, coronary heart disease, neurosis with mania or hypomania, or chronic insomnia.

**Caution :** Consult doctor if it is a pediatric case or a case involving severe palpitations.

### 32. CODEINE PHOSPHATE

Preparation : Tablet : 15 mg  
Syrup : 20 mg/ml  
Injection : 15 mg/ml

Usage : a) To reduce coughing from respiratory infection.  
b) To relieve pain from abdominal infection, etc.

Dosage and Administration :

For coughing : Adult, 1 - 2 tabs. every 4 - 6 hrs or 1 - 2 teaspoons every 4 - 6 hrs, but not over 300 mg per day.

For pain : As prescribed by doctor.

Side Effect : Nausea, vomiting, constipation, dizziness, sleepiness.

Contraindication : Contraindicated for patient with respiratory depression or drug addiction. For use in children or for pain relief, consult doctor.

### 33. CHLORPHENIRAMINE (Chlorpheniramine Maleate, Chlortrimeton, Piriton)

Preparation : Tablet : 4 mg, 8 mg  
Injection : 5 mg/ml (2 ml vial)  
Solution : 2 mg/4 ml

Usage : For allergy, pruritus, contact dermatitis

Dosage and Administration :

Adult, 1 tab. 2 - 4 times daily; 10 mg intramuscular 1 - 2 times daily.

Children, under 2 years, ½ teaspoon 1 - 2 times daily; 2 - 8 years, ½ teaspoon 3 - 4 times daily, 9 - 13 years, 1 teaspoon 3 - 4 times daily.

Side Effect : Sleepiness

Caution : While taking this drug a patient should not drive.

### 34. PENICILLIN G SODIUM (Benzyl Penicillin, PGS)

Preparation : Injection : Powder in 500,000 unit, 1,000,000 unit, or 5,000,000 unit ampule.

Usage : For respiratory infections such as pharyngitis, bronchitis, tonsillitis, pneumonia; middle ear infection; skin or mucous membrane infection; abscesses; pyoderma; gonorrhoea and syphilis.

Dosage and Administration :

Adult, 400,000 units intramuscular 4 times daily, or 10,000,000 units intravenous drip daily.

Children, 100,000 units/kg/day. Below 2 years, 200,000 - 400,000 units intramuscular 4 times daily; 2 - 12 years, 400,000 - 600,000 units intramuscular 4 times daily.

Side Effect : Rash, itching, fever, chill; in severe cases may cause fainting, palpitation, and shock.

Contraindication : Patient allergic to penicillin.

Caution : Effective in infections, but beware of allergic reactions.

**35. AMINOPHYLLINE (Theophylline in combination with ethylenediamine)**

**Preparation :** Tablet : 100 mg

Injection : 25 mg/ml in 10 ml ampule

**Usage :** For bronchial asthma

**Dosage and Administration :**

Adult, 100 - 200 mg (1 - 2 tab.) 3 - 4 times daily; injection 250 mg (amp.) with 50% glucose 50 ml intravenous slowly; or with 5% glucose 500 ml intravenous drip.

**Side Effect :** Chest oppression; headache, nausea, vomiting, palpitation, strong pulse.

**Contraindication :** When side effect or allergic reaction is observed.

**Caution :** Should not be used for patient with heart disease. Consult a doctor before giving intravenously or in pediatric case.

**36. INH (Isoniazid, Isonicotinic acid hydrazide, Nydrazid)**

**Preparation :** Tablet : 50 mg, 100 mg

Syrup : 40 mg/ml

**Usage :** For tuberculosis

**Dosage and Administration :**

Adult, 50 - 200 mg orally 2 - 3 times daily.

Children, 20 mg/kg/day in divided doses, 2 - 3 times daily.

**Side Effect :** Constipation, difficult urination, mental dullness, anemia.

**Contraindication :** Contraindicated in patient with allergic reaction to this drug, steroid treatment, kidney disease, or abnormal urination.

**Caution :** Tuberculous patient must be treated with this drug for 1 to 2 years; side effects must be carefully observed. This drug is usually used in combination with (PAS) Para-Amino-Salicylate Sodium.

**37. PARA-AMINO-SALICYLATE SODIUM (PAS)**

**Preparation :** Tablet : 500 mg, 1 gm

**Usage :** For tuberculosis

**Dosage and Administration :**

Adult, 3 gm orally 3 - 4 times daily.

Children, 300 mg/kg/day, in divided doses, 3 times daily.

**Side Effect :** Nausea, vomiting, rashes

**Contraindication :** -

**Caution :** Used with other antituberculosis drugs (e.g., INH) to prevent drug resistance. PAS should be taken for 1 to 2 years. Definite diagnosis must be assured before treatment.

**38. STREPTOMYCIN, DIHYDROSTREPTOMYCIN (Streptoduocin injection)**

**Preparation :** Injection : powder in 1 gm and 5 gm vial.

**Usage :** For tuberculosis and infections.

**Dosage and Administration :**

Adult, 1 - 2 gm intramuscular daily. Do not inject every day, continuously, longer than 3 to 4 weeks.

Children, for premature or newborn baby give 25 mg/kg/day in divided dose, 2 times daily; give older children 30 mg/kg/day.

**Side Effect :** Observe output of urine; reduce to half-dose if urine output decreases. Dizziness, loss of hearing, loss of equilibrium, depression, fever or rash may be observed also.

**Contraindication :** Patient allergic to this drug.

**Caution :** Overdose must be avoided. Observe patient carefully; if any side effect is detected, consult a doctor.

**39. PENICILLIN V (Potassium Phenoxymethyl Penicillin, Pen V, Penvisil, Phenopen)**

**Preparation :** Tablet : 200,000 units

Dry Syrup : Penvisil 200,000 units/5 ml in 60 ml bottle;

Phenopen 100,000 units/5 ml in 60 ml bottle.

**Usage :** For respiratory tract infections such as pharyngitis, bronchitis, pneumonia; middle ear infection, skin and mucosal infections, gonorrhea and syphilis; and ear, nose, and throat infections.

**Dosage and Administration :**

Adult, 1 - 2 tabs. every 6 - 8 hours for 10 consecutive days.

Children: under 2 years, 125 mg (5 ml) 3 times daily; 2 - 4 years, 125 mg (5 ml) 4 times daily; 4 - 12 years, 250 mg. (1 tab.) 4 times daily.

**Side Effects :** Rashes, chill, fever, nausea, vomiting, diarrhea, or shock.

**Contraindication :** Patient with allergic reaction to penicillin.

**Caution :** Ask about patient's history of penicillin allergy before giving any penicillin drug.

**40. NEOSYNEPHRINE (Phenylephrine)**

**Preparation :** Tablet : Each contains Phenylephrine HCl 5 mg, Acetaminophen 150 mg, Thenyldiamine HCl 7.5 mg, and Caffeine 15 mg.

Nasal Drop : 0.25% in 20 ml bottle with dropper; 1.0% in 15 ml bottle with dropper.

Nasal Spray : 0.5% in 20 ml bottle.

**Usage :** For relief of nasal congestion in common cold, sinusitis, and allergy.

**Dosage and Administration** : 2 - 3 drops in each nostril every 3 - 4 hours, or spray 1 - 2 times every 3 - 4 hours, or 1 - 2 tab. orally 3 times daily.

**Side Effect** : May cause increased blood pressure.

**Contraindication** : Patient with allergy to this drug or hypertension.

**Caution** : Blood pressure must be checked, especially for hypertensive patient; prolonged used may cause drug resistance.

#### 41. METHYLSALICYLATE OINTMENT

**Preparation** : Balm

**Usage** : To relieve muscle or joint pain.

**Dosage and Administration** : Apply to affected part.

**Side Effects** : Allergic reaction (but this is uncommon).

**Contraindication** : Patient with allergy to this drug.

**Caution** : Do not use orally.

#### 42. DIURIL (Chlorothiazide)

**Preparation** : Tablet : 500 mg

**Usage** : To achieve diuretic effect in patient with edema caused by heart disease, cirrhosis of liver, or kidney disease.

**Dosage and Administration** :

Adult, 1 - 2 tabs. single dose in the morning.

Children, under 14 years, ½ - 1 tab. single dose in the morning.

**Side Effects** : Dermatitis, hypotension, loss of potassium

**Contraindication** : Patient with kidney failure

**Caution** : Prolonged usage is not advised, stop treatment and consult a doctor, if weakness or other hypotension side effects observed.

#### 43. RESERPINE (Serpasil)

**Preparation** : Tablet : 0.1 mg and 0.25 mg.

**Dosage and Administration** : 0.25 - 1 mg oral or intramuscular, 1 - 2 times/day initially. When blood pressure is stable, give 0.1 - 0.5 mg/day as maintenance dose.

**Side Effects** : Nasal congestion, increased body weight, stomach upset, depression.

**Contraindication** : Patient with allergic reaction to this drug.

**Caution** : Stop usage when side effect is observed. Consult doctor before using this drug. Definite diagnosis must be assured.

**44. PHENOBARB (Phenobarbital, Luminal)**

Preparation : Tablet : 15, 30, and 60 mg.

Elixir : 4 mg/ml.

Injection : 60 mg/ml.

Usage : Hypnotic and tranquil effects; used to prevent convulsions.

Dosage and Administration :

Adult, 30 mg orally 2 - 3 times daily; 15 - 100 mg intramuscular.

Children : 6 mg/kg/day.

Side Effects : Restlessness, depression, nausea, skin rash, nightmares.

Contraindication : Patient with allergy or side effect. Do not use this drug with other tranquilizers or hypnotics, or on a drunken patient.

Caution : Addiction may occur. Overdose may cause respiratory center depression. Consult doctor if drug is to be used for epileptic patient.

**45. NICLOSAMIDE (Yomesan, Telmetin)**

Preparation : Tablet : 0.5 gm

Usage : Anthelmintic for tapeworm

Dosage and Administration :

Adult and children over 6 years, 4 tabs., single dose.

Children, 2 - 6 years, 2 tabs. single dose; under 2 years, 1 tab. single dose.

Note : Patient must chew tablets thoroughly and take some water.

Side Effects : Stomach upset, flatulence, nausea.

Caution : To prevent cysticercosis in tinea solium infection, a patient should be purged 1-2 hours after taking yomesan.

**46. PIPERAZINE CITRATE (Antepar)**

Preparation : Tablet : 250 mg, 500 mg.

Syrup : 500 mg/4 ml.

Usage : Anthelmintic for ascaris and threadworm.

Dosage and Administration :

Adult, 500 mg 2 times daily for 8 consecutive days.

Children, below 2 years, ½ teaspoon once daily for 8 consecutive days;

2 - 6 years, ½ teaspoon twice daily for 8 consecutive days; 6 - 12 years, 500 mg twice daily for 8 consecutive days.

Side Effects : Nausea, dullness, dizziness

Contraindication : Patient with history of convulsion or renal disease

Caution : The drug must be taken for 8 consecutive days without purgative.

**47. COMBANTRIN (Pyrantel palmoate)**

Preparation : Tablet : 125 mg in 5 tab. bottle.

Suspension : 50 mg/ml in 10 ml and 60 ml bottles.

Usage : Anthelmintic for all roundworms, especially ascaris, threadworm, and hookworm.

Dosage and Administration :

Adult or over 17 years, 5 tabs. or 2½ teaspoons single dose.

Children 9 - 17 years, 4 tabs. or 2 teaspoons single dose; 2 - 9 years, 2 tabs. or 1 teaspoon single dose; under 2 years, 1 tab. or ½ teaspoon single dose.

Side Effects : Headache, mental dullness, nausea, vomiting, abdominal pain, diarrhea.

#### 48. ALCOPAR (Bephenium Hydroxynaphthoate)

Preparation : Granules in 5 gm. packet.

Usage : Anthelmintic for hookworm and roundworm infection.

Dosage and Administration :

Adult, 5 gm (1 packet) single dose.

Children, below 22 kg give half adult dose. Cathartic is not necessary.

Side Effects : Nausea, vomiting.

Note : Dose can be repeated after 2 to 3 days.

#### 49. MINTEZOL (Thiabendazole)

Preparation : Tablet : 500 mg

Usage : Anthelmintic for roundworms, especially ascaris, threadworm, hookworm, and whipworm

Dosage and Administration : 25 mg/kg/day orally after meals for 2 days, The dose must not be over 3 gm/day.

Side Effects : Poor appetite, nausea, vomiting, drowsiness, headache

Contraindication : Contraindicated in pregnant women

Caution : Consult doctor if patient is under 10 or for differential diagnosis.

#### 50. TEDRAL

Preparation : Tablet or Capsule : Each contains Ephedrine 24 mg, Aminophylline 120 mg, and Phenobarbital 8 mg.

Usage : For the treatment of bronchial asthma.

Dosage and Administration :

Adult, 1 tab. (1 cap.) 3 - 4 times daily.

Children, 6 - 12 years, ½ tab 2 - 3 times daily.

Side Effects : Headache, palpitation, fainting

Contraindication : When allergic reaction or side effect is observed.

Caution : If side effect occurs, temporary discontinuation is necessary. Prolonged usage may cause drug resistance or addiction.

**51. LASIX (Furosemide)**

**Preparation : Tablet : 40 mg**

**Injection : 20 mg intramuscular or intravenous, slowly.**

**Usage : To obtain diuretic effect in edema from heart disease, cirrhosis of liver, or renal disease.**

**Dosage and Administration :**

**Adult, 1 tabs daily or 2 ml slow injection intravenously or intramuscularly.**

**Children under 14 years, ¼ - ½ adult dose can be given.**

**Side Effects : Abdominal upset, dermatitis, hypotension, loss of hearing, loss of potassium.**

**Contraindication : Patient with kidney failure.**

**Caution : Besides mental dullness and loss of hearing, the drug may cause gout and weakness. Use it carefully. Prolonged usage is not advised.**

**52. NORMAL SALINE (Isotonic Saline Solution)**

**Preparation : For intravenous drip, contained in 500 ml and 1000 ml bottles.**

**Usage : For body fluid replacement in blood loss or dehydrated patient (e.g., severe diarrhea)**

**Caution : Consult doctor before usage.**

**53. DEXTROSE 5% IN SALINE**

**Preparation : For intravenous drip, contained in 1000 ml bottle.**

**Usage : As for normal saline**

**Caution : As for normal saline**

**54. DEXTROSE 5% IN WATER**

**Preparation : For intravenous drip, contained in 1000 ml bottle.**

**Usage : As for normal saline**

**Caution : As for normal saline**

**55. GLUCOSE 50% (Dextrose 50%)**

**Preparation : For intravenous injection, contained in 50 ml vial.**

**Usage : For patient who cannot eat or drink normally, or for whom oral feeding is contraindicated. Used with other medicines for intravenous injection.**

**Caution : Consult doctor before usage.**

## 56. SULFADIAZINE

Preparation : Tablet : 0.5 gm.

Suspension : 250 mg/4 ml.

Injection : 1 gm (27.2% in 4 ml) contained in 4 ml ampule  
for intravenous

Usage : For infections of skin, urinary tract, respiratory tract, and abscess.

Dosage and Administration :

Adult : 4 tabs. stat. and 2 tabs. 4 times daily

Children : 2 - 4 years : 1 teaspoon  
4 times daily

Side Effects : Nausea, skin and mucosal rashes, hematuria

Contraindication : Patient with allergic reaction to sulfa drug, anuria or renal  
disease.

Caution : Advise patient to drink a large amount of water while taking this  
drug. Observe urine and watch for side effects. Consult doctor  
before using an injection preparation.

## 57. TRI-SULFA

Preparation : Tablet : Each contains Sulfadiazine 167 mg, Sulfamethazine  
167 mg, and Sulfamerazine 167 mg.

Usage : As for sulfadiazine.

Dosage and Administration : As for sulfadiazine

Side Effects : As for sulfadiazine, but less frequently.

Contraindication : Patient with history of allergy to sulfa drugs, anuria, or  
renal disease.

Caution : Side effects are similar to those of sulfadiazine, but less severe.  
Advise patient to drink large amounts of water while taking this  
drug.

## 58. BACTRIM (Septrin)

Preparation : Tablet : Adult form contains Trimethoprim 80 mg and Sulfa-  
methoxazole 400 mg; children's contains Trimetho-  
prim 20 mg and Sulfamethoxazole 100 mg.

Syrup : Each 5 ml contains Trimethoprim 40 mg and Sulfa-  
methoxazole 200 mg, in 100 ml bottle.

Usage : For the treatment of respiratory tract infections such as bronchitis,  
pneumonitis, tonsillitis, sinusitis; urinary tract infections such as  
cystitis, pyelitis, nephritis, urethritis, gonorrhoea; pyoderma, abscesses,  
and septicemia.

Dosage and Administration :

Adult and children over 12 years, 2 tabs. after meals 2 times daily.

Children 6 - 12 years, 4 tabs. children's form, 2 times daily; 2 - 5 years, 2 tabs. children's form, 2 times daily; 6 months - 2 years, 1 teaspoon (or 2 tabs.) children's form, 2 times daily; 6 weeks - 5 months, ½ teaspoon (or 1 tab.) children's form, 2 times daily.

Side Effects : Nausea, vomiting, skin rash, ecchymosis, leukopenia.

Contraindication : Contraindicated in patients with liver disease, renal disease, or history of allergic reaction, and in pregnant women.

Caution : Periodic blood examination should be done if usage is prolonged. Advise patient to drink a large amount of water while taking this drug.

#### 59. MEZURAN

Preparation : Tablet : Each contains Sulfamethazine 0.5 gm and Phenazopyridine 0.05 gm.

Usage : For the treatment of urinary tract infections, cystitis, nephritis, pyelitis, urethritis, and prostaticitis.

Dosage and Administration :

Adult, 2 tabs. 4 times daily.

Children 9 - 12 years, 1 tab 4 times daily; 6 - 9 years, ½ tab 4 times daily.

Side Effects : Drug may accumulate in patients whose liver and kidneys are not fully functioning.

Contraindication : Patient with allergic reaction to this drug.

Caution : Advise patient to drink a large amount of water while taking this drug. Hematuria can occur.

#### 60. PROBENECID (Benemid)

Preparation : Tablet : 0.5 gm

Usage : Decrease blood uric acid level in chronic gout case, and to help to maintain penicillin level (in blood stream) for treatment of gonorrhea and other infections.

Dosage and Administration : For gout, ½ - 1 tab 2 times daily. For blood penicillin level maintenance, 1 tab. 4 times daily, or 2 tabs. 30 minutes before taking ampicillin in treatment of gonorrhea.

Side Effects: Nausea, vomiting, overdose may cause convulsions.

Contraindication : Do not use in combination with aspirin and other salicylates, or in patient with acute gouty arthritis.

Caution : Antagonistic effect to salicylates.

#### 61. KANAMYCIN (Kanoxin, Kantrex)

Preparation : Injection : Intramuscular and venous infusion contained in

1 gm ampule.

**Usage :** For the treatment of infections that are resistant to other antibiotics.

**Dosage and Administration :**

Adult, intramuscular, 15 mg/kg/day in divided doses 2 times daily, but not over 1.5 gm/day.

Young children, 7.5 mg/kg/day in divided doses 2 - 4 times daily.

Small children, 5 - 15 mg/kg/day in divided dose 2 times daily.

Intravenous, as per doctor's prescription.

**Side Effects :** Prolonged usage can cause drug resistance and loss of hearing.

**Contraindication :** Patient allergic to this drug.

**Caution :** Use no longer than 15 days. Drug may cause loss of hearing. Drug cannot be absorbed if taken orally. Consult doctor before usage.

## 62. PYRIDIUM (Phenazopyridine HCl)

**Preparation :** Tablet : 100 and 200 mg.

**Usage :** Antiseptic effect; relieve pain from infection or stone of urinary tract.

**Dosage and Administration :**

Adult, 100 - 200 mg, 3 - 4 times daily.

Children 2 - 4 years, 100 mg twice daily; 4 - 12 years, 100 mg 3 times daily.

**Side Effects :** Nausea, headache. Prolonged usage or overdose may cause kidney failure.

**Contraindication :** Patient with kidney degeneration, severe nephritis, nephritis during pregnancy, or severe hepatitis.

**Caution :** Advise patient that reddish urine will be found while taking this drug.

## 63. INSULIN (Regular Insulin, Isophane Insulin Suspension)

**Preparation :** Injection : 40 units/ml in 10 ml vial; 80 units/ml in 10 ml vial.

**Usage :** For treatment of diabetes mellitus.

**Dosage and Administration :** Subcutaneous injection according to doctor's order.

**Side Effects :** Fainting, dizziness

**Caution :** Use as doctor orders. Accurate dose must be assured.

## 64 NITROFURANTOIN (Furadantin)

**Preparation :** Tablet : 50 mg

**Usage :** For urinary tract infections.

**Dosage and Administration :** 1 - 2 tabs. orally after meals, 3 times daily.

**Side Effects :** Nausea, vomiting, skin rash.

**Contraindication :** Patient with anuria, and children aged under 1 month.

**Caution :** Avoid using in pregnant women.

## 65. VALIUM (Diazepam)

Preparation : Tablet : 2 and 5 mg.

Injection : 5 mg/ml in 2 ml ampule.

Usage : Tranquilizing effect on excitement, or to relieve pain, or to prevent epileptic convulsion.

Dosage and Administration :

Adult, 4 - 40 mg orally in divided doses, 3 - 4 times daily; 5 - 10 mg intravenous, slowly, or intramuscular, for epileptic convulsion.

Children, 2 - 4 mg orally in divided doses, 3 - 4 times daily; 2 - 5 mg intravenous, slowly, for epileptic convulsion.

Side Effects : Drowsiness, mental dullness, weakness, loss of equilibrium, depression. Intravenous route may cause respiratory center depression and heart depression.

Contraindication : Do not use with hypnotic drugs or other tranquilizers. Do not drink alcohol while taking this drug.

Caution : Respiratory resuscitation equipment must be ready while giving intravenously.

## 66. PROPYL THIOURACIL (Propacil)

Preparation : Tablet : 50 mg

Usage : For treatment of toxic goiter.

Dosage and Administration : The usual dosage is between 200 and 600 mg daily in divided doses, preferably at 8 - hourly intervals, until the symptoms have been controlled. The maintenance dose is usually 50 and 200 mg daily. A suggested initial dose for children aged 6 to 10 years is 50 to 150 mg daily in divided doses, and for children over 10 years 150 to 300 mg daily.

Side Effects : Headache, nausea, vomiting, stomach upset, skin rash, joint pain. Prolonged usage may cause leukopenia.

Contraindication : Pregnant women and allergic patients.

Caution : Consult doctor before usage.

## 67. MIST MENOPAUSE

Preparation : Solution : Each 15 ml contains Potassium Bromide 1 gm, Tr. Nux Vomica 0.3 ml, Spirits of Ammonia 1.3 ml, and Tr. Gentian Co. 2.0 ml.

Usage : Tranquilizing effect, relieve mental tension.

Dosage and Administration :

Adult, oral, 1 - 2 tablespoons after meals, 3 times daily.

Side Effects : Depression, headache, vertigo  
Contraindication : Driver or worker who uses machinery.  
Caution : Do not drive when taking this drug.

68. GAMMA GLOBULIN (Globuman, Human Gamma Globulin)

Preparation : Intramuscular, 160 mg/ml in 2 ml ampule.  
Usage : Prevention of bacterial or viral infection by producing immunity.  
Dosage and Administration : Intramuscular, 2 - 10 ml.  
Contraindication : Patient with poliomyelitis  
Caution : Intravenous route is prohibited.

69. DRAMAMINE (Dimenhydrinate)

Preparation : Tablet : 50 mg  
Injection : 50 mg/ml in 5 ml vial  
Usage : Relieve nausea, vomiting or morning sickness, motion sickness.  
Dosage and Administration :  
Adult, 50 - 100 mg every 4 - 6 hours, orally or intramuscularly.  
Children, 50 mg/kg/day in 4 divided doses.  
Side Effects : Drowsiness, and in some cases restlessness may occur.  
Contraindication : Patient with vomiting from poisons.  
Caution : Do not use with sedative or tranquilizer, due to synergistic action.

70. LOMOTIL

Preparation : Solution : Each 5 ml contains Diphenoxylate HCl 2.5 mg and  
Atropine Sulfate 0.025 mg.  
Tablet : Composition as for solution.  
Usage : To stop diarrhea.  
Dosage and Administration :  
Adult, 4 tabs. initially and 2 tabs. every 6 hours.  
Children, 1 - 2 tabs. or 1 - 2 teaspoons 3 times daily.  
Side Effects : Flatulence can occur after diarrhea is relieved.  
Contraindication : Patient with cirrhosis of liver or other liver disease.  
Caution : Should not be used in children under 6 months.

71. ALUMIN (Aluminium Hydroxide Gel)

Preparation : 4% aluminium hydroxide suspension.  
Usage : Patient with peptic ulcer or indigestion.  
Dosage and Administration : 1 tablespoon 3 - 4 times daily, before meals and  
before bedtime.

**Side Effects :** Rarely found

**Caution :** Prolonged usage may cause constipation.

**72. KAOMYCIN (Kaolin with Neomycin)**

**Preparation : Suspension :** Each 30 ml contains Neomycin 300 mg, Kaolin 5.832 g, and Pectin 0.13 g.

**Usage :** Relieve diarrhea.

**Dosage and Administration :**

Adult, 1 - 2 tablespoons every 4 hours.

Children under 2 years, 1 teaspoon every 2 - 4 hours; 2 - 4 years, 2 teaspoons every 4 hours; 4 - 6 years, 3 teaspoons every 4 hours.

**Contraindication :** Patient allergic to this drug.

**73. KAOPECTATE (Kaopectal, Kaolin with Pectin)**

**Preparation : Suspension :** Each 30 ml contains Kaolin 4.67 g and Pectin 0.26 g.

**Usage :** To relieve diarrhea.

**Dosage and Administration :**

Adult, 1 - 2 tablespoons 3 - 6 times daily.

Children 3 - 6 years, ½ tablespoon 3 - 6 times daily; 6 - 12 years, ½ - 1 tablespoon 3 - 6 times daily; 12 years, 1 tablespoon 3 - 6 times daily.

**Side Effects :** Constipation

**Contraindication :** Patient with severe abdominal pain and fever or abdominal guarding.

**Caution :** The drug should not be administered for longer than 2 days. Consult doctor if patient has abdominal guarding, fever, severe abdominal pain, dehydration, or bloody mucous stool. Soft diet should be given after diarrhea has ceased.

**74. DIODOQUIN (Diiodohydroxyquin, Dysetrin)**

**Preparation : Tablet :** 650 mg

**Usage :** For treatment of amoebic dysentery.

**Dosage and Administration :**

Adult, 1 tab. 3 times daily for 20 consecutive days.

Children 6 - 12 years, ½ tab. 3 times daily for 20 consecutive days.

**Side Effects :** Anorexia, nausea

**Contraindication :** Patient with allergic reaction, liver disease, or iodine allergy.

**Caution :** The drug should be taken for 20 consecutive days for effective treatment.

**75. METROL (Metronidazole, Flagyl)**

Preparation : Tablet : 200 mg  
Capsule : 250 mg

Usage : For the treatment of trichomoniasis and amoebic dysentery.

Dosage and Administration :

For trichomoniasis, 250 mg 3 times daily for 10 days in female; 250 mg 2 times daily for 10 days in male. Or 2 gm as a single dose for 1 day.

For amebiasis, adult, 200 - 500 mg 3 times daily for 5 days.

For amebiasis, children, 2 - 8 years, ½ tab. 3 times daily for 5 days; 9 - 13 years, 1 tab. 3 times daily for 5 days.

Side Effects : Nausea, bitter taste in mouth, headache, dullness, anorexia.

Contraindication : Pregnancy in first trimester, or patient with blood disease or neurological disorder.

Caution : Alcoholic drink is not allowed, as it may cause abdominal pain or vomiting.

**76. EMETINE HYDROCHLORIDE**

Preparation : Injection : 30 mg (or ½ gr)/ml and 60 mg (or 1 gr)/ml

Usage : For treatment of amoebic dysentery or amoebic liver abscess.

Dosage and Administration :

Adult, 1 mg/kg/day not exceeding 60 mg daily, intramuscularly for 7 days.

Children, 1 mg/kg/day intramuscular for 7 days.

Side Effects : Syncope, dizziness, hypotension.

Contraindication : Allergic to this drug.

Caution : Used with other amoebicidals. Measure blood pressure before and after usage. Blood pressure should be measured every 30 minutes for a few times after Emetine administration. Deep intramuscular injection should be performed to decrease pain and prevent abscess.

**77. TINCTURE OF CAMPHORATED OPIUM**

Usage : To relieve abdominal pain and diarrhea.

Dosage and Administration : Adult, 2 teaspoons with some water.

Contraindication : Children below 6 years, and old people.

**78. FERSOLATE (Fergon, Ferrous Gluconate)**

Preparation : Tablet : 320 mg

Dosage and Administration :

Adult, 1 - 2 tabs. after meals 3 times daily.

Children, 1 tab. after meals 3 times daily.

## 79. FOLIC ACID

Preparation : Tablet : 5 mg

Usage : For folic acid deficiency anemia

Dosage and Administration : 5 - 20 mg/day or as doctor orders; ½ - 1 tab. daily for pregnant women to prevent megaloblastic anemia.

## 80. MULTIVITAMIN (Abdex, Vidaylin, Vitatone, Vipenta, Multivitin, etc.)

Preparation : Tablet : For adults and older children.

Injection : When oral administration is not possible.

Drops : For young infant.

Usage ; For vitamin deficiencies or as a tonic

Dosage and Administration :

Adult, 1 tab. 3 times daily; injection, 1 - 2 ml. intramuscular daily.

Children, 0.6 ml orally once daily; 0.3 - 0.6 ml intramuscular daily.

Infant, 0.3 ml/day.

Contraindication : Allergic reaction

## 81. CHLORPROMAZINE (Largactil)

Preparation : Tablet : 10 mg, and 25 mg

Injection : 50 mg/ml, intramuscular or intravenous

Usage : For mental disorder or to relieve vomiting.

Dosage and Administration : For mental disorder, 1 - 2 tabs. 3 - 4 times daily; for vomiting : 1 - 2 tabs. or 1 - 2 ml intramuscular or intravenous.

Side Effects : Dizziness, fainting; it may cause Parkinsonism if the dose is over 800 mg/day.

Contraindication : If patient is unconscious because of hypnotics, tranquilizers, or alcohol.

Caution : Consult doctor if prolonged usage or overdose is indicated.

## 82. THIAMINE HYDROCHLORIDE (Vitamin B<sub>1</sub>)

Preparation : Injection : 50 mg/ml in 2 ml ampule.

Tablet : 10, 50, and 100 mg.

Usage : For the treatment of beri-beri, weakness, anorexia, or pain in the calf of the leg.

Dosage and Administration :

Adult, 100 mg intramuscular daily; 50 - 100 mg orally 3 times daily; after meals for 7 - 14 consecutive days.

Children below 12 years, 10 - 50 mg 3 times daily.

Contraindication : Allergic to this drug.

Caution : Vit. B<sub>1</sub> in the diet is easily destroyed by heat and alkalosis. Vit. B<sub>1</sub> deficiency is usually associated with other vitamin deficiencies; therefore multivitamins should also be given to patients with B<sub>1</sub> deficiency. Vitamin deficiency is commonly found in patients with fever, high calorie intake, chronic alcoholism, or toxic goiter.

#### 83. THALAZOLE (Phthalylsulfathiazole, Enterazole)

Preparation : Tablet : 0.5 gm

Usage : For treatment of bacillary dysentery and diarrhea.

Dosage and Administration : Oral, 2 tabs. every 4 - 6 hours.

Side Effects : Nausea, vomiting, rashes.

Contraindication : Patient with allergic reaction to sulfa drugs.

Caution : Advise patient to drink large amounts of water while taking this drug.

#### 84. LUGOL'S SOLUTION

Preparation : Solution contains Iodine 5% and Potassium Iodide 10%.

Usage : For goiter treatment.

Dosage and Administration : 1 - 3 drops in 1 glass of water 3 times after meals daily for 2 - 3 weeks for thyroidectomy. Lugol's solution is not recommended for simple goiter treatment.

Side Effects : Infection of salivary gland in some cases.

Contraindication : Patient with tuberculosis, laryngeal edema, parotitis, or iodine allergy.

Caution : Consult doctor before usage.

#### 85. THYROID EXTRACT

Preparation : Tablet : 60 mg

Usage : For treatment of simple goiter or hypothyroidism.

Dosage and Administration : 1 tab. daily.

Side Effects: Palpitation, excitement.

#### 86. SULFACETAMIDE EYE DROP (Albucid)

Preparation : Eye drop contains Sulfacetamide sodium 10% or 20%, in 15 ml bottle.

Usage : For conjunctivitis.

**Dosage and Administration :** 1 - 2 drops 2 - 4 times daily.

**Contraindication :** Patient allergic to sulfa drugs.

**87. OCULENT – T (Tetracycline HCl eye ointment)**

**Preparation :** Eye ointment contains tetracycline HCl 1%, in 3.5 gm tube.

**Usage :** For conjunctivitis

**Dosage and Administration :** Apply to the affected eye 2 - 4 times daily.

**Contraindication :** Allergic to this drug.

**88. BORIC ACID 3% SOLUTION**

**Preparation :** Eye wash.

**Usage :** Used for eye washing in conjunctivitis.

**Dosage and Administration :** Put Boric acid 3% solution in eyeglass; open and close the affected eye in the eyeglass many times. It also helps to flush foreign bodies out of the eye.

**Caution :** This is an eye wash solution with mild antiseptic action. It is not recommended for treatment of severe eye infections.

**89. LOZENGES (Cepacol, Dequadin, Detoch, Formitrol, Sentril, Strepsil, Tyrozet)**

**Usage :** To relieve coughing or respiratory tract irritation.

**Dosage and Administration :** Keep lozenge in the mouth until it is dissolved, 1 lozenge every 2 - 3 hours.

**Caution :** This drug is used for symptomatic treatment only.

**90. CARBOLIC ACID (Metacresylacetate, Cresatin)**

**Preparation :** Solution 5%

**Usage :** Antiseptic agent for ear, throat and nose

**Dosage and Administration :** Washing or applying to the areas or parts for antiseptic action.

**Caution :** Do not use orally. Overconcentrated solution can cause irritation to skin or mucous membranes.

**7.2 DRUGS USED IN COMMON SKIN DISEASES**

**91. CALAMINE LOTION**

**Preparation :** Plain lotion (calamine only) or lotion with phenol (calamine and phenol 1%)

**Usage :** Relieve itching from allergy, contact dermatitis, measles, or chicken pox.

**Administration :** Apply to affected area.

**Side Effects :** Allergic reaction (rarely found, however)

**Contraindication :** Allergic reaction to this drug.

**Caution :** It relieves itching but does not affect the cause of disease.

## **92. TRIPLE ANTIBIOTIC OINTMENT (Neosporin, Mycitracin)**

**Preparation :** Ointment : 20 gm tube contains Bacitracin, Polymyxin, and Neomycin.

**Usage :** Apply to the affected part (e.g., abscess, wound).

**Administration :** Clean the affected part with boiled water and apply the ointment 3 times daily.

## **93. SELSUN (Selenium sulfide)**

**Preparation :** Shampoo : Contains Selenium sulfide 2.5%

**Usage :** For antiseptic action and cleansing of scalp or skin.

**Administration :** Used as hair shampoo

**Contraindication :** Allergic reaction to this drug.

## **94. CORTISPORIN**

**Preparation :** Ointment contains Hydrocortisone, Neomycin, Bacitracin, and Polymyxin B.

**Usage :** For bacterial skin infections.

**Dosage and Administration :** Thinly apply to the affected part 2 - 4 times daily.

**Side Effects :** Itching rash may occur in patients with allergic reaction to neomycin.

**Contraindication :** Patient with allergic reaction or infected wound with much purulent discharge.

**Caution :** If the condition of the wound or affected part is not improved, the drug must be discontinued and doctor should be consulted.

## **95. WHITFIELD'S OINTMENT**

**Preparation :** Ointment contains Benzoic Acid 6% and Salicylic Acid 3%.

**Usage :** For treatment of fungal infection (e.g., ringworm)

**Administration :** Apply to the affected part 2 - 3 times daily.

**Contraindication :** Allergic reaction to this drug.

**Caution :** Do not apply this drug to the eyes.

**-96. GRISEOFULVIN (Fulvin Forte, Grisovin F.P.)**

**Preparation :** Tablet : 125 mg

**Usage :** For the treatment of fungal infection of skin, nails, and hair.

**Dosage and Administration :** Oral 1 - 2 tabs. 4 times daily.

**Side Effects :** Headache, skin rash, leukopenia; in severe cases, blurred vision and photophobia may occur.

**Contraindication :** Pregnant women.

**Caution :** Do not drink alcohol, because of its synergetic effect. The drug must be taken for some time before it is effective.

**97. SODIUM THIOSULPHATE**

**Preparation :** Solution 20%

**Usage :** Treatment of ringworm.

**Administration :** Apply to the affected part 1 - 2 times daily.

**Contraindication :** Allergic reaction to this drug.

**Caution :** The drug must be used continuously for at least 7 - 10 days.

**98. BENZYL BENZOATE (Topocide, Ascabiol, Scabicide Emulsion)**

**Preparation :** Lotion : 2.5%, 10%, and 25%, in 1 pint bottles.

**Usage :** For treatment of scabiasis, pediculosis.

**Administration :** After taking a bath with soap, apply the lotion to the body; apply the lotion again 15 - 20 minutes after the first application. Repeat this procedure again the following week.

**Side Effects :** It may irritate skin and eyes.

**Contraindication :** —

**Caution :** Boil bedclothes and clothing. Treat every member of the family at the same time.

**99. EURAX (Crotamiton)**

**Preparation :** Cream : Each tube contains N-Crotonyl-N-Ethyl-O-Toluidine 10% (Crotamiton) and Hydroxyquinoline Sulfate 0.05%.

**Lotion :** Same as cream

**Usage :** Relieve itching from skin diseases (e.g., scabiasis, pediculosis, pubic pediculosis).

**Dosage and Administration :** Apply to the affected part 1 - 3 times daily.

**Side Effects :** Burning sensation.

**Contraindication :** Infants or young children.

**Caution :** Keep away from children.

## 7.3 DRUGS USED IN GYNAECOLOGICAL PROBLEMS

### 100. VAGINAL SUPPOSITORIES (Sultrin, Floraquin, Nystatin)

**Preparation :** Vaginal suppository.

**Usage :** For treatment of leukorrhea.

**Dosage and Administration :** Insert into vaginal canal once or twice daily and let it dissolve in the canal.

**Side Effects :** Itching, burning sensation, or edema of the vaginal canal.

**Contraindication :** Patient with allergic reaction to this drug. Consult doctor before using any vaginal suppository for leukorrhea.

### 101. ANAL SUPPOSITORY (Anusol, Proctosedyl, Scheriproct)

**Preparation :** Anal suppository

**Usage :** For treatment of hemorrhoids.

**Dosage and Administration :** Insert into the anal canal before bedtime and let it dissolve.

**Side Effects .** Itching or rashes around the anus.

**Contraindication :** Patient with allergic reaction, tuberculosis, or one who has just had a vaccination.

**Caution :** It relieves symptoms (e.g., stops bleeding temporarily), but does not treat the cause.

### 102. PODOPHYLLIN

**Preparation :** Suspension contains Podophylline 25% in Tincture of Benzoin.

**Usage :** For treatment of condyloma acuminata.

**Administration :** Apply to the condyloma 2 - 3 times daily or as doctor orders

**Side Effects :** Allergic reaction.

**Contraindication :** Patient with allergic reaction.

### 103. ESTROGEN

**Preparation :** Tablet and injection, with various components as produced by commercial companies.

**Usage :** To prevent contraception, supplement estrogen, or treat menopausal symptoms.

**Dosage and Administration :** Follow doctor's prescription.

**Side Effect :** Nausea, vomiting, breast engorgement.

**Contraindication :** Patient with thrombosis or venous occlusion.

**Caution :** Consult doctor before using this drug.

## 7.4 DRUGS FOR SNAKEBITES AND TETANUS

### 104. ANTIVENINE SERUM

**Preparation :** Injection : Each set consists of dry antivenine serum, 1 vial, and 10 ml of distilled water. Specific antivenine sera are as follow : Cobra, King Cobra, Banded Krait, Russell's Viper, Pit Viper, and Green Pit Viper.

**Usage :** Specific antivenine effect.

**Dosage and Administration :** Usually 1 - 2 vial, but dose also depends on type of poisonous snake and severity of poisoning. Dissolve dry antivenine serum (1 vial) in 10 ml distilled water and give intramuscularly, intravenously, or subcutaneously, as indicated by patient's condition when skin test is negative. If skin test is positive, desensitize patient with small amount of diluted serum; gradually increase dosage every 15 minutes until full dose is obtained.

**Side Effects :** Strong allergic reaction or anaphylactic shock.

**Contraindication :** Patient with allergic reaction to the serum.

**Caution :** Dry antivenine serum can be kept at room temperature for a long time without losing any potency. However, if it is kept in a refrigerator, the potency may last longer than 5 years. If an anaphylactic reaction is observed, refer patient to hospital immediately after giving necessary aid.

### 105. TETANUS ANTITOXIN (T.A.T.)

**Preparation :** Injec . Each ampule contains either 300,500,1,500,10,000, 20,000 or 40,000 units.

**Usage :** For treatment and prevention of tetanus.

**Dosage and Administration :**

For prevention, give 1,500 - 3,000 units subcutaneously or intramuscularly.

It will be effective within 6 - 10 days after injection; therefore, Tetanus toxoid should be given at the same time.

For treatment, 10,000 - 40,000 units of T.A.T. must be given immediately around the wound, intramuscularly or intravenously.

**Side Effects :** Allergy or anaphylactic reaction.

**Contraindication :** Patient with anaphylactic reaction.

**Caution :** The drug should always be kept in a refrigerator. Use it before the expiration date. Ask patient's past history of any allergy. A skin test must be made. If the skin test is positive, refer patient to hospital or doctor.

## 106. TETANUS TOXOID (Absorbed Tetanus Vaccine, Tetanol)

**Preparation :** Injection : Each ml contains 150 units of purified tetanus toxoid.

**Usage :** For prevention of tetanus for everyone, including newborn infant, pregnant women, and post partum mothers.

**Dosage and Administration :**

For tetanus prevention, 0.5 ml intramuscular or subcutaneous, 2 doses, 6 - 12 weeks apart. A third dose of 0.5 ml is given 1 year after the second dose. Booster dose of 0.5 ml is given every 5 years thereafter.

For infected wounds. For those who have had complete prophylactic vaccination within the past year, tetanus toxoid is not necessary. If vaccination was longer than 1 year, 0.5 ml of tetanus toxoid is given. For patients who have had no tetanus vaccination, give heterologous tetanus antitoxin at least 3,000 i.u. and tetanus toxoid 0.5 ml separately; then, 2 weeks later give 0.5 ml of tetanus antitoxin, and again 1 year later. For pregnant women, two 0.5 ml doses of T.A.T., 6 weeks apart, are given in the last trimester for women without previous vaccination. If patient has received complete vaccination within 1 year, 0.5 ml of T.A.T. (one dose) is given.

**Side Effects :** Skin reaction such as wheals may be observed.

**Contraindication :** Convalescent patient.

**Caution :** Tetanus toxoid should be kept at temperatures under 15°C and should be used before expiration date.

**MODULE 8**  
**SKIN PROBLEMS**

**WANNARAT CHANNUKUL, M.D., M.P H.**

## MODULE 8

### SKIN PROBLEMS

#### 1. INSTRUCTIONAL OBJECTIVES

Upon completion of the module the wechakorn will be able to :

- (1) Briefly explain the anatomy and physiology of the skin.
- (2) Perform examinations, give diagnoses and treatment for the following skin problems : contact dermatitis, diaper rash, eczema, atopic dermatitis, seborrheic dermatitis, tinea capitis, tinea corporis, tinea unguim, tinea cruris, tinea pedis, tinea versicolor, urticaria, scabiasis, and pediculosis.
- (3) Perform examination, make presumptive diagnosis of leprosy, and refer suspect leprosy cases to a doctor.

#### 2. ANATOMY AND PHYSIOLOGY OF THE SKIN

The skin is composed of 3 layers. From outermost inward they are the epidermis, the dermis, and the subcutaneous tissue.

The regions where the skin is toughest are the scalp, palms and soles. The skin is thinnest at the eyelids, anterior part of the neck, intertriginous areas of both upper and lower extremities, and the genital area.

##### 2.1 Epidermis

This is the outermost part of the skin, with a thickness of 0.5 - 1.5 mm. The epidermis has no lymphatic, no blood vessels and no connective tissue. It is nourished by the capillary plexuses in the dermis. The epidermis consists of 5 layers. From the surface inward these are : the stratum corneum, the stratum lucidum, the stratum granulosum, the stratum malpighii, and the stratum germinativum.

2.1.1 Stratum Corneum. This is the superficial layer of the epidermis. It consists of dead epithelial cells. This layer is the body's major barrier preventing internal fluid, electrolyte and heat loss.

2.1.2 Stratum Lucidum. This is formed of several layers of flattened, closely compact cells. It is an even, thin, colorless, shining layer and made up of one or more rows of somewhat irregular cells.

2.1.3 Stratum Granulosum. This layer consists of three to five layers of flattened cells containing conspicuous granules of irregular shape. They were formerly believed to be associated with the process of keratinization of epidermis and nails.

2.1.4 Stratum Malpighii. This is the thickest layer of the epidermis. Recent studies have shown that wound healing takes place throughout this cell layer.

2.1.5 Stratum Germinativum. This is the innermost layer of the epidermis adjacent to the dermis. It usually consists of a single layer of cells. Among

these cells, in an interrupted pattern, are melanocytes. Melanocytes are cells that possess the ability to synthesize melanin for the pigmentation of the skin.

## 2.2 Dermis

The dermis, upon which the epidermis rests, plays a major role in stability and elasticity of the skin. It is composed of blood, lymphatic vessels, sebaceous glands, sweat glands, hair follicles, arrector pili muscles, fat appendages, nerves, sensory nerve endings and connective tissue elements. The dermis, thus, is the source of nutrition of the epidermis, affecting the growth and the maintenance of the epidermis.

The subcutaneous tissue stores fatty tissue to support blood vessels and nerves that penetrate the lower tissues upwards. The deeper parts of hair follicles and sebaceous glands originate in this layer of the skin.

## 2.3 Epidermal Appendages

The epidermal appendages include : sweat glands, hairs, nails, and sebaceous glands.

### 2.3.1 Sweat Glands. There are two kinds of sweat glands.

(1) Eccrine Sweat Glands. Eccrine sweat glands are ordinary sweat glands that are distributed over almost the entire integument. They are abundant at the palms, soles and forehead; but the margins of the lips, the glans penis and the nail bed contain no eccrine sweat glands. These glands are small. The secretory portion of the glands is a simple tubule convoluted in several unequal twists into a ball. The duct is narrow, unbranched, twisted and curved and enters the epidermis with its opening directly at the skin. These glands together with the blood vessels maintain the body's temperature regardless of the external changing temperature. Heat is the major stimulus of the glands. Heat stimulates the glands to secrete sweat.

(2) Apocrine Sweat Glands. Apocrine sweat glands are larger and more deeply located in the subcutaneous layer than eccrine sweat glands. These glands develop and begin to function at puberty. The secretory portions are twisted and are ten times larger than the eccrine glands. The apical end is connected with the hair follicle. The apocrine glands are numerous in the arm pits, genital area, areolar, external ears and eye lids. If the glands are stimulated e.g., by nervous strain, they will secrete viscous fluid, which in contamination with bacteria on the skin, will induce a chemical reaction that results in an unpleasant smell.

2.3.2 Hairs. The hair is composed of hairs arising in a tubular invagination of the epidermis called the hair follicle. One or more sebaceous glands are associated with each hair follicle. They release their secretory product through a short duct into the upper portion of the follicular canal. From the hair follicle emerges the hair root. At the base of the hair follicle beneath the sebaceous glands is hair muscle or arrector pili muscle. When this muscle contracts in response to fear or cold it moves the hair into a more vertical position, creating the so called 'goose flesh' in man. Each hair follicle is supplied with blood

vessels and nerves. Most of the nerves are responsible for touch, pain and temperature sensation.

**2.3.3 Nails.** The nails consist of nail plates lying on the dorsal surfaces of the terminal phalanges of the fingers and toes. The nail plate is composed of keratinized material extending from the nail root which is the proximal edge of the nail plate.

**2.3.4 Sebaceous Glands.** The sebaceous glands are scattered entirely over the surface of the skin except in the palms and soles. They consist of small sacs to form a mass and all of them open into a short duct at necks of hair follicles to excrete the holocrine product. The sebaceous glands vary in size. They are largest about the nose, the scrotum and the mammary papillae. The sebaceous glands on the lips and mammary papilla are independent of hairs and open directly onto the surface of the skin.

## 2.4 Functions of the Skin

The functions of the skin are :

(1) To protect the tissues underneath from external hazards e.g., trauma, heat, cold, irradiation, the penetrance of foreign bodies and organisms.

(2) To stabilize the body temperature. When the external temperature is very cold, the subcutaneous blood vessels will constrict and the secretion of sweat glands is suppressed to prevent heat loss; but when the weather is very hot, the skin will facilitate the heat loss by the vasodilation and the increased secretion of sweat glands. The volatility of the sweat promotes heat loss from the body.

(3) To maintain fluids, electrolytes and the acid-base balance of the body. Water, sodium chloride and some components of urea are excreted together with sweat.

(4) To synthesize and store vitamin D which plays a major role in bone formation.

(5) To perceive various senses, e.g., temperature, touch sensations etc. through the sensory nerve endings. This makes the body aware of changing surroundings.

## 3. ECZEMA

The word "eczema" has a broad meaning. It is used to describe several abnormal conditions of the skin, especially the inflammation of the epidermis which reacts to stimuli. The stimuli may be external or internal, or both. Eczema may be acute or chronic. Eczema consists of diverse types that can simply be classified into 2 types according to their causes.

**Exogenous Types:**

(1) **Contact Dermatitis.** This occurs frequently in persons who are sensitive to soaps, acids, bases, dyes, cosmetics, watch straps, ear rings, certain drugs, etc.

(2) Infective Dermatitis. The skin may be sensitized to bacteria, fungi and parasites e.g., furunculosis, scabiasis, pediculosis.

#### Endogenous Types

(1) Atopic Dermatitis. Infantile eczema is a type of atopic dermatitis.

(2) Seborrheic Dermatitis. "Cradle cap", is a yellowish, greasy scale on vertex of scalp or behind the ears in infants.

#### 3.1 Contact Dermatitis

This type of dermatitis is caused by substances coming into contact with the skin. In allergic contact dermatitis, the allergenic substance must come into contact with previously sensitized skin. The allergenic substances are usually exogenous and are often materials that we are in daily contact with either at home or the office e.g., shoes, watch straps, bracelets, ear rings, lipsticks, cosmetics, certain metals, detergents, soaps, dyes, skin lotions, leather, nail polishes, toothpaste, cements, etc. Contact dermatitis may also result from direct exposure to irritating substances e.g., acids, alkalis or other chemicals.

Allergy is the body's reaction in response to an allergen. Individuals may not share the same exposure or response to allergens, and it is hard to predict the severity of reactions or when an individual's reactions will occur. The process of developing an allergy may begin from the first exposure to an allergen, or it may be delayed until there have been numerous exposures. This lag period cannot be predicted. An allergy may spontaneously disappear, but when this will take place is not yet known. In some patients an allergy is life-long.

Lesions on the skin develop at the site coming into contact with the allergen. Most are found at exposed areas. The skin acutely becomes swollen and red. It develops blisters that will later rupture and exude inducing local puritus. In chronic contact dermatitis the skin is thickened and leathery. Locations of the lesions are helpful in establishing the diagnosis. Allergy to detergents causes the lesions on hands; allergy to shoes causes lesions on the feet; watch straps cause lesions at the wrists; and ear rings cause lesions at ear lobules, etc. The diagnosis depends mainly on the patient's history and the sites of the lesions, but sometimes skin tests can be performed to establish certain allergens.

#### Treatment:

(1) Avoid reexposure to allergen or irritant. Remove the irritant from the environment of the individual.

(2) Apply Calmine lotion or Prednisolone cream 2 - 3 times daily until the lesions disappear.

(3) Take Chlorpheniramine maleate (4 mg) 3 times daily or in lower dosages as appropriate.

#### Diaper Rash

This dermatitis occurs in the diaper region. It may result from direct irritation, or from the wet diaper soaked with urine. It is a kind of contact dermatitis. The dermatitis may also result from incompletely rinsed soap or

detergent, or the infants may directly come into contact with rubber or plastic sheaths. Lesions of diaper rash are similar to other types of contact dermatitis. The skin appears erythematous and then develops macular rashes, vesicles and bullae. It causes pruritus and discomfort.

Treatment:

- (1) Change the diaper once it is wet.
- (2) Wash the diapers with weak soap. Do not use soap which is too alkaline. Soak the diaper several times until the soap is thoroughly rinsed off the diapers.
- (3) Do not scrub lesions with soap and water.
- (4) Apply soothing solutions or steroid cream.

### 3.2 Impetigo Contagiosa

This is a staphylococcal or streptococcal inflammation of the skin. It is contagious especially among children and infants in a poorly hygienic environment.

Dermatologic Manifestations

The primary lesion is a red macule which rapidly becomes a flaccid vesicle. Following central rupture and peripheral extension it soon becomes a pustule. There is copious seropurulent weeping, leading to piling up of thick, dirty, honey colored crusts. On removal of the crust a superficial ulcer is disclosed which is smooth, red and moist with thin edges of epidermis. The lesions involve face, ears, neck, hands, and nail folds. Satellite lesions may develop by autoinoculations. These may coalesce and assume annular and circinate shapes. Untreated, the disease increases in extent and the crusts may become very thick. Neglect leads to ulceration and, sometimes, vegetative changes. With adequate treatment healing occurs without scarring. Common sources of infection are pets e.g., dogs and cats, autoinoculation by dirty finger nails, direct or indirect contact with the infection at, barber shops, beauty saloons, Turkish baths, swimming pools or schools.

Treatment:

- (1) Keep finger nails short and clean.
- (2) Remove all crusts and wash the involved areas with soap and water daily.
- (3) Systemic antibiotic administration. E.g., Pen. V. (125 mg) 2 tablets 3 times one to one half hour before each meal and bed-time for 10 days.

### 3.3 Atopic Dermatitis

Atopic dermatitis is relapsing pruritic dermatitis in people with a genetic predisposition. All ages may be affected. The allergens may get into the body via oral, nasal or parenteral route e.g., egg white, wheat, milk, orange, corn, fur from dogs, cats or sheeps, pollens, silk, wool, penicillin drugs, etc. Physical or mental exertion, infection of any part of the body, the changing of temperature or weather and a primary irritant are possible causes.

The disease is commonly associated with a family history of allergy. It is related with asthma, allergic rhinitis, urticaria and migraines.

### Type of Lesion:

In infants it is called "infantile eczema". The first stage of the disease often begins soon after birth as a pruritus that is followed soon by an acute or subacute erythematous or weeping pruritic dermatitis on the face which may become more or less generalized.

After the second year the eruption tends to disappear, but it may recur later in childhood before puberty. Few patients have the first episode of the skin manifestation at puberty or adulthood. The characteristic pattern of the dermatitis is remissions and exacerbations. Lesions are ordinarily delayed until after the 5<sup>th</sup> week of life and in most of the cases the disease subsides at about the age of two years. Even if it may again recur during childhood it causes no difficulty. The disease, then, exacerbates in characteristic adult distribution of lesions. It may persist in varying degrees for several years and tends to subside by the age of twenty-five, either completely or in the form of restricted involvement.

### Complications:

Of importance is the intervention of herpes simplex virus and the virus from smallpox vaccinations. Immunization must, thus, be withheld during the exacerbation of atopic dermatitis and the patient should avoid contact with anyone who has herpes simplex.

### Treatment:

- (1) Discuss with patients the natural course of the disease and therapeutic problems in an effort to spare them undue concern and worry about the disease.
- (2) Avoid immunization injections during the exacerbation of the disease.
- (3) Avoid certain allergens or suspected allergens.
- (4) The home environment should be as spare and dust free as possible and avoid the provoking causes.
- (5) Attempt to maintain the patient's good health. If the child scratches or rubs eczematous areas, restraints should be ordered.
- (6) Prevent itch stimulation from the environment.

### 3.4 Seborrheic Dermatitis

Seborrheic dermatitis is a chronic inflammatory disease of the skin that usually begins in hairy areas rich in sebaceous glands. It is influenced by relative amounts of androgens and estrogens in the body. The cause is sometimes the infection.

Apparently there is a deficiency of vitamin B in some cases. Many patients have low B.M.R. and eat excessive sweets, starches or fat. It is made worse by conditions that increase perspiration. Familial inheritance may be involved in the disorder.

### Dermatologic Manifestations

The typical lesions usually begins on the scalp as ordinary dandruff often with increased oiliness. The lesions spread to contiguous areas by extension

and then may involve eyebrows, eyelids, nasolabial folds, ears, hairlines, pre-ternal, interscapular, public, genital, perianal, and intertriginous regions. The typical lesions are yellowish-orange, oval or round, in ill-defined patches. They are superficial at the beginning but become inflammatory and infiltrated at a later stage. Untreated lesions are covered with nonadherent scales or crusts. There is slight itching on the nonhairy areas. Seborrheic dermatitis tends to be chronic and periodic. In the acute stage the inflammation may be intense with profuse swelling of the eyelids and face. Secondary infection may ensue. On the extremities, the cubital and popliteal regions often become lichenified from scratching and friction of clothing.

**Treatment:**

- (1) Adults should avoid alcohol, butter, pork product, salad oil, and fried foods.
- (2) The scalp should be frequently shampooed.
- (3) Local therapy. Apply sulfur-salicylic acid ointment nightly.

#### 4. FUNGUS INFECTIONS

Fungus infection or mycoses is classified into 3 groups according to etiologies and the organs involved. They are superficial mycoses, deep mycoses, and systemic mycoses.

(1) Superficial Mycoses. The fungi are confined only in the corneum including hairs, and nails. It produces a diversity of clinical lesions depending on the etiogenic fungus.

(2) Deep Mycoses. The fungi may be confined to the skin or deeply into the bones. The lesions begin at the site of penetration and later they extend to adjacent tissue but do not invade the blood vessels or spread to any internal organs. Here the fungi are different from that causing superficial mycoses. They are chromoblastomycoses, mycetoma, basidiomycosis, etc.

(3) Systemic Mycoses. The systemic fungi produce a variable spectrum of disease. These fungi cause more diseases than superficial and deep mycoses as they are able to synthesize a substance that can damage tissues. In addition, their proliferations are rapid and can easily get into the circulation. These increase the severity of the disease especially when important organs are involved e.g., the brain and heart which may lead to death. Cryptococcosis and histoplasmosis are two examples of systemic mycoses.

Since superficial fungal diseases form a large percentage of mycoses, the following will include only common superficial mycoses.

##### 4.1 Dermatophytosis or Tinea

The cause of dermatophytosis is dermatophytes. It is the most common fungal infection. Clinical manifestations can be detected at skin, hairs and nails. The lesions vary depending on locations and causative fungi and they are named in accordance with the sites they involve.

4.1.1 Tinea Capitis. Ringworm of the scalp may be caused by *Microsporum canis*, *M. audouini* and *Trichophyton schoenleini*.

It occurs principally among children. It may be contracted from direct contact or it may spread from diseased domestic animals (cats and dogs) to individuals who like to play with them.

After one week of infection the lesions begin to appear as scaly patches and small dots. Then, a round, oval or irregular inflammatory yellowish, dirty gray to brown patch develops. The border of the lesion is sharply defined. The patch is studded with short hair stumps that have a nibbled appearance. The affected hairs soon become brittle, dull, loosened and thickened from infiltration with fungi; each hair has a sheath composed of spores. These spores can be passed from one person to another by direct contact e.g., playing together or sharing the same pillow. There may be focal loss of hair and as the infection persists, varying degrees of inflammation may develop. The latter may progress to a boggy inflammatory mass with exudation. This causes local itching, stretching and pain but usually does not lead to shaking-chill fever. If a secondary infection is superimposed a scar will persist after the wound heals.

4.1.2 Tinea Corporis (Tinea Circinata). In children the most common causative fungi are *Microsporum lanosum* (*M. canis*) and *M. audouini*. In adults the most common are *Trichophyton rubrum*, *T. mentagrophyte* and *T. violaceum*. This is a fungal infection of the nonhairy parts of the body. The lesions may, thus, vary with sites of infection. Areas of predilection for *tinea circinata* are localized at the trunk. The forearms and the legs may be involved. It begins as one or more red papules which then enlarge to form circular circumscribed, slightly erythematous, dry, scaly patches. These may be slightly elevated, particularly at the border. The lesion enlarges by peripheral extension with central healing to form rings. In some cases, a more tissue reaction to the fungus causes vesiculation and exudation. As this inflammation spreads peripherally, circular crusted patches are gradually formed. The raised erythematous border causes severe pruritus and because it has annular appearance this leads to the term "ring worm". The rings are one-baht coin to one-palm breadth in size. They may form upon one another, making various patterns depending upon severity and duration of the disease.

Treatment:

(1) Apply Whitfield's ointment twice daily.

(2) If no involution occurs within a week, Griseofulvin is indicated. The dose for infections caused by *M. canis* and *M. mentagrophyte* is 1 gm daily for four to six weeks. For infections with *T. rubrum* the drug should be continued for eight to twelve weeks.

4.1.3 Tinea Unguium. Ringworms of the nails are usually caused by *T. mentagrophyte*, *T. rubrum* and *T. schoenleini*. Since the nails are composed of strong keratin, the fungal infection spreads slowly. But when they are involved, the disease is notoriously stubborn to treatment. The spread of the infection

may take place in several ways : by direct spread from ringworm of hands or feet to the nails, by autoinoculation through scratches, by sharing the same nail polishing instruments or by contamination of the fungi from soil.

After the fungi get their way to the nail, they remain localized to a portion of the nail for a while. The invasion of nails by fungi begins as a cloudy patch along the lateral nail grooves. Infection then spreads slowly under the lateral borders of the nail into the keratin of the nail bed. It may become static at this point or may extend upward into the nail plate. The distal end becomes thinned out, leaving a reedy frame. However, the entire nail is rarely destroyed. The nail plate appears to be wormeaten or squamous and is brownish or black. This differs from onychomycosis due to *Candida albicans* which is yeast. *C. albicans* can multiply very rapidly but cannot digest the keratinized nail plate. The nail plate does not become friable, yellow or white as in trichophyton infections. There is usually definite paronychia. A small amount of pus may be expressed from the lateral nail fold. The adjacent cuticle is pink, swollen and tender on pressure. This disease is most common in housewives, and others who put their hands in water for a great deal, e.g., fish salers and preserved-fruit salers.

Treatment:

(1) The defective nails may be loosened by forcing a pledget of cotton soaked in tincture of mercuriolate behind the cuticle. This is done daily, gradually increasing the size of the pledget.

(2) Apply Whitfield's ointment two to three times daily.

(3) Griseofulvin therapy. Administer Griseofulvin (125 mg), two tablets two times daily for six to eight months for the fingernail infection and 18 to 24 months for the toenail infection.

4.1.4 Tinea Cruris. Tinea cruris is a very common type of fungal infection in males – especially in active adolescent males. The causative fungi are *Epidermophyton floccosum*, *Trichophyton rubrum* and *T. mentagrophyte*. The infected parts usually are sweaty crural or perineal folds. The acute type begins as single or multiple patches of bright-red dermatitis and scaling, or vesicular and crusted patch causing local pruritus. It spreads peripherally and partly clears in the center and the eruption may become eczematoid, macerated or pustular. Later it usually involves bilateral sites of the perineal region. In chronic cases the lesion becomes lichenified and pigmented in a light-brown shade color.

Treatment:

(1) The infected areas should be always thoroughly dried and free from any friction.

(2) Apply Whitfield's ointment two to three times daily until the lesions completely disappear.

4.1.5 Tinea Pedis. Several names are applied to dermatophytosis of the feet: tinea pedis, ringworm of the feet, athlete's foot and Hong Kong foot. The common causative fungi are *Trichophyton rubrum*, *T. mentagrophyte*, *T. interdigitale*, *Epidermophyton flocculosum* and *Candida albicans*. The disease is

common among persons who keep their feet in shoes for a long time, or who have tight, poorly fitting shoes, or who have poor hygiene, or whose feet are frequently soaked in water. The infection usually involves the sole and interdigital webs. The primary lesion is a vesicle. The vesicular eruption tends to spread by extension and may involve the entire sole. The vesicles sometimes coalesce to form bullae of various sizes. They do not rupture spontaneously but dry up as the acute stage subsides leaving yellowish brown crusts and fissures.

Treatment:

- (1) Always keep the feet dry and clean.
- (2) Apply Whitfield's ointment two to three times daily until the lesions are completely healed.
- (3) In case of severe local pruritus, administer Chlorpheniramine (4 mg) one tablet two to three times daily after meals.
- (4) For subacute exacerbations and itching, administer Griseofulvin (125 mg) two tablets two times daily for four weeks.

4.1.6 Tinea Versicolor. Tinea versicolor involves only the superficial layer of the skin. The causative fungus is *Malassezia furfur*. It is common in young adults particularly those who perspire freely or who put on thick clothes. Sites of predilection are the upper part of the chest, the back and the shoulders, the abdomen and the pubis, proximal portions of the extremities and the intertriginous areas especially the enclosed areas. Topical lesions are multiple macular rashes of all sizes and shapes, varying in color from whitish to fawn-colored to brown. The individual patches gradually increase in size and coalesce to form extensive, delicately scaling lesions. The fungus interferes with the process of pigmentation of the skin. As a result the patches of the lesions are hypopigmented or depigmented. The loss of pigment may persist for a year or more after the disease is cured. The disease causes no inflammation and, as a rule, there is no symptom. However, slight itching is present in acute cases or when the patient sweats. It does cause hypopigmented skin and is extremely chronic in spite of treatment.

Treatment:

- (1) Underwear and pajamas should be sterilized by boiling and changed daily.
- (2) After washing, the affected areas are painted two to three times daily with 20% sodium thiosulfate, and in resistant cases 1% selenium sulfide may be applied for ten minutes and then wash off. This should be done every other day until the lesions are cured.

## 5. URTICARIA

Urticaria is a common skin disease. It is a troublesome disease that may occur to anybody of any age. The lesions develop as a sudden attack of small pruritic pink macules on face, body, extremities or particular regions. Later these lesions rapidly develop into wheals of various sizes. The border of

the wheal is well demarcated which may be smooth or irregular. The center of the lesion is sometimes somewhat paler than the border. The itching is usually too severe that one cannot help scratching it and the scratching will stimulate the itching even more. The lesions usually last for 2-3 hours and then spontaneously pale and disappear together with the itching. Following the disappearance the skin regains its normal texture, leaving no noticeable mark. However, new crops may appear in the same day or next. In chronic case irregular attacks occur on and off for long periods of time.

The pathogenesis of urticaria, despite many attempts, is still obscure. The pathophysiology is that there is dilatation of subcutaneous capillary plexuses causing erythematous skin and an increased permeability of the blood vessels with a consequence of sudden outpouring of plasma and proteins into the skin or other structures that produce local skin swelling. Histamine and bradykinin are supposed to take part in the initiation of urticaria in certain cases. Urticaria is classified into two types according to the duration of the attacks.

(1) Acute urticaria attacks on and off not longer than six weeks.

(2) Chronic urticaria attacks longer than six weeks; it may persist for months or years.

### 5.1 Causes of Urticaria

The causes of urticaria are numerous but for acute urticaria the cause is usually more easily detected. Most important causative factors are classified into 5 types as follows:

5.1.1 As a reaction of the body against allergy. Allergy, in medical term, is the body's reaction against a certain substances that get entry into the body. In reacting against the foreign substance the body produces certain proteins called "antibodies". An antibody antagonizes the allergen. This antigen-antibody reaction results in various manifestations and may involve any system depending on the causative factor. Urticaria is one sample of this reaction.

Urticaria in this category may be caused by various substances. It may be associated with anaphylaxis e.g., hypersensitivity to penicillin. Fifteen minutes after Penicillin ingestion or injection general pruritic erythematous rashes develop. The patient rapidly progresses into dyspnea, experiences respiratory distress and becomes comatose. This serious manifestation, if untreated in time, easily leads to death.

It results from a complex reaction with multisystematic involvements e.g., hypersensitivity to snake antivenom, tetanus antitoxin, antirabies vaccine, etc.

It is accompanied with sneezing, running nose due to allergy to pollens, fur, etc. This is classified into a type called "atopy." Which has a familial-inherent relationship.

It results from foods or drugs. This is the most common cause of urticaria especially in acute urticaria. Urticaria may develop within 12 to 48 hours after the food is consumed or the drug is administered.

It is, thus, of prime importance to ask the patient what drugs or food he has taken. The allergen is usually what he has taken sometime before. Some patients sometimes deny that they have taken unfamiliar substances because they misunderstand that only unfamiliar substances can cause allergy. The fact is that what we are allergic to is what we have taken before, perhaps once or several times. Allergy develops after sensitization. The drugs that frequently cause fulminant urticaria are Penicillin, Aspirin and other antipyretic agents.

Food is another important cause of both acute and chronic urticaria. The foods causing acute urticaria are what we only occasionally take e.g., crabs, crawfish, "durian", liquor, wine, beer, etc. and the foods that cause chronic urticaria are what we regularly eat e.g., meat, eggs, Thai noodle, certain fruits, etc.

5.1.2 As a manifestation of an anaphylactoid reaction. The urticaria in this condition is found to be associated with hereditary disorders or certain allergens. The urticaria develops together with buccal and bronchial mucosal swelling. This may lead to difficulty in respiration and in severe case it leads to respiratory distress syndrome.

5.1.3 As a result of environment or physical means. Exposure to cold temperature, cold baths, intense heat, sunlight or friction may produce urticaria. The patient's history discloses the cause. Some individuals develop urticaria when they take cold baths or take ice.

5.1.4 As a result of or in association with certain diseases. Urticaria may be a manifestation of such conditions as malignancy, dental caries or intestinal parasitism. Urticaria occurring with these entities is usually chronic.

5.1.5 Psychogenic reaction. It is well known that a patient's psychiatric status has a close relationship with somatic disorders. Urticaria is considered one among them. The most common cause of chronic urticaria is psychogenic. It is more frequent in too-active persons. High tension, chronic worries and excessive self-centeredness with a hypochondriacal personality may, at the extreme manifest as urticaria.

#### Treatment:

(1) Causes of urticaria are numerous. Success in the management of this disorder requires the patient's cooperation. Recognition of the cause depends upon a clear and reliable patient's history. Some patients are bored when they are repeatedly asked questions and we are sometimes tired asking questions which can result in a failure of history-taking. Without a proper diagnosis, sometimes only antipruritic or antihistaminic agents are prescribed. But symptomatic treatment will never solve the basic problem. On the contrary, if the patient cooperates well and the cause of urticaria is determined this troublesome disorder can readily be managed by the eradication or avoidance of the etiologic factor.

(2) It must be emphasized that antihistaminics are only a suppressive and not a curative measure.

Chlorpheniramine maleate (4 mg), one to three tablets may be administered daily during the urticarial attack.

(3) Apply Calamine lotion two to three times daily.

## 6. SCABIASIS (SCABIES)

Scabies is caused by *Sarcoptes scabiei*. The organisms live in the epidermis by burrowing the outermost layer of the skin deeply down to stratum granulosum making tunnels each of 1 cm in length. After copulation, the male mite dies and the female lays two to three eggs per day in the burrow. (The female can live for two months). The eggs hatch in about three to four days and the young parasites ingest debris around the hair follicles. The young parasites cast off their sloughs three times before they reach the adult stage. One life cycle is completed in 10 to 14 days and only ten per cent of the eggs are capable of completing their life cycle.

Scabies is transmitted by skin to skin contact, or fomites. Even bedsheets and underclothing are important sources of contagion particularly in closed areas, e.g., military camps, prisons, boarding schools and monasteries.

The common sites of scabies are interdigital spaces, the flex or surface of the wrists and elbows, the anterior axillary folds, the breast around the nipple area, the waistline, the rim of the navel, the penis and the lower half of the buttocks.

The incubation period varies from two to six weeks. The eruption soon follows the initial itching. This consists of red follicular papules, vesicles, burrows and scratch marks. This disease is characterized by generalized itching which is worse at night because the mites are more active at night. From scratching the parasites eventually cause inflammation under the nail.

Scratching and rubbing may result in secondary bacterial infection, impetigo, ecthyma and boils modifying the whole picture so that it becomes different from typical lesions and mimics other diseases.

### Treatment:

(1) After a bath and scrubbing, 25% Benzyl benzoate emulsion is applied carefully to the entire cutaneous surface. The patient is instructed not to bathe for 24 hours. After 24 hours the emulsion is reapplied. Then treatment should be discontinued for at least a week. If the disease still persists a second similar application is necessary.

Eurax may also be used alternately with 25% Benzyl benzoate emulsion. This requires two applications 24 hours apart.

## 7. PEDICULOSIS

Pediculus is a parasite that may infest anybody. There are three distinct species. *Pediculus humanus corporis* causes pediculosis of the body (pediculosis

corporis) and *Pediculus humanus pubis* (*Phthirus pubis*) causes pediculosis of public region (pediculosis pubis). The infestation which is most encountered is pediculosis capitis. The following is concerned only with this type of infection.

The *Pediculus humanus capitis* has the peculiar characteristic of confining its activities to the scalp. The common sites of the scalp that are involved are the temporal and occipital regions. There is a higher incidence in females than males because long hair is an optimal environment. The parasite uses its proboscis to suck blood from the skin and it lays eggs (nits) at the base of the hair. The eggs are small, oval, whitish, transparent objects, about 0.5 mm in length. They are firmly attached to one side of the hair by a chitinous sheath which completely encases the shaft. When the eggs hatch, the sheath will adhere to the hair shaft for a period of time. The sheaths, thus, do not always represent the parasites. Usually the eggs hatch in seven days and reach the adult stage in about three weeks. The adult females lay two to three eggs daily and they can live for one to two months.

While the larvae and adults are taking blood from the scalp they also release a mildly toxic substance, inducing local irritation and small red papules. With repeated exposure, the host develops an inflammatory hypersensitivity reaction causing troublesome pruritus. Pruritus results in scratching, a weeping dermatitis, and secondary infection.

Treatment:

(1) 25% Benzyl benzoate emulsion or 1% Gamma benzene hexachloride should be applied thoroughly to the scalp at bedtime and the hair should be vigorously shampooed in the next morning. The hair should then be rinsed, dried and combed with a fine-tooth comb to remove the nits. In a very marked infestation, a similar treatment should be repeated a week later.

(2) 5% DDT emulsion may also be used alternately by applying the same procedure.

(3) Secondary infections should be treated with Tetracycline (250 mg) one to two capsules three times daily until the infection is cured.

## 8. LEPROSY

Leprosy is a chronic inflammatory disease of man caused by *Mycobacterium leprae*, which, in its various clinical forms, attacks skin, peripheral nerves and nasal mucosa. Leprosy is classified into four types:

Lepromatous leprosy, Tuberculoid leprosy, Intermediate leprosy and Dimorphous (borderline) leprosy. The first two types are more frequently encountered. They have certain manifestations. The latter two types are unstable and may change into the first two types. The incidence of lepromatous type is more frequent in males than females with the ratio of 2:1. It has been assumed that males have a greater chance to contract the disease and

are more susceptible to the disease than females. Anyhow, there is no different sex incidence in the tuberculoid type.

From retrospective studies it has been found that leprosy begins in childhood. The youngest patient ever found was seven months old. Time of onset of the disease is proportional with the degree of prevalence of the disease in the community. Any community with high prevalence of the disease has more chance to spread the infection.

A meticulous epidemiologic study shows that the incubation of leprosy is three to five years with the average of 3.5 years. Formerly it was misunderstood that the incubation was as long as 10-30 years. This is due to the fact that at early onset only hypopigmented ring-shape lesions develop and they are usually ignored until many years later when clinical features take place and that is the time they are first recognized as leprosy.

### 8.1 Pathogenesis and Epidemiology

Leprosy infects only man. Animals do not carry it nor are they the source of the infection. The patients in whom the bacilli are found in the skin or nasal mucosa are considered "infective" cases and these are lepromatous and dimorphous types that contribute to 20 to 30 per cent of the leprosy in Thailand. They are considered "non-infective" cases if no lepromatous bacilli are found in the skin or nasal mucosa and these are indeterminate and tuberculoid types that make 70 to 80 per cent of the remaining leprosy in Thailand.

In the infective stage, the skin appears erythematous or with plaques and later may develop ulceration and exudation. The exudate from the ulcer of the skin or nasal mucosa is full of lepromatous bacilli and is, therefore, quite infectious. These bacilli are viable long enough to be responsible for the spread of leprosy to low-immune individuals who make close and prolonged contact with the patients, particularly when they have predisposing wounds or denuded skin and poor personal hygiene. In high-immune individuals their bodies can get rid of bacilli and the disease does not develop.

There is no evidence to support that the disease is hereditary or contagious via sexual relationships or insects or air or inhalation, but it has been found that children are more easily infected than adults. Individuals who closely contact with infective patients have an infection ratio of 8:1000 per year; while those who are in close contact with non-infective cases have an infection ratio of 2:1000 per year. The spread of the infection between a married couple is 5 per cent if either one of them is infected.

The four types as mentioned above may be classified into two main types.

(1) Stable type. The clinical features in this type are rather stable. They are tuberculoid patients who possess high immunity and lepromatous patients who possess low or no resistance against the disease.

(2) Intermediate type. The features of this type vary and immunity against the disease is not certain.

## **8.2 Clinical Manifestations**

**8.2.1 Indeterminate type.** This type is found at an early stage of the disease. The features here are variable. It may progress toward dimorphous, tuberculoid or lepromatous type or spontaneous remission without any treatment.

The lesion is hypopigmented and annular, 25 Satang to one baht coin in diameter. Usually it consists of only one ring and not more than three rings. The border is smooth and not well demarcated. Some rings are reddish. Neurological involvement is rare or mild, if present. The central area of the lesion may be hypoesthetic. The nerve is not enlarged. No bacillus is detected at the hypopigmented area. A lepromin test is unreliable as it may be positive or negative. There is no definite pathologic change from the skin biopsy. Lepromatous bacilli detected from nerves are most helpful for the definitive diagnosis.

**8.2.2 Tuberculoid type.** In the early stage the lesions are hypopigmented rings, one-baht coin to half-palm size. The central area of the lesion is hypoesthetic and at the border there may be mild hypoesthesia. Usually no bacillus is detected. A lepromin test will be strongly positive because of the high immune response in this type. The skin is dry, hairless and sometimes scaly, with loss of sweating and marked anesthesia. Later the border of the lesion becomes thickened with irregular macules. This annular lesion progressively increases in size with a sharply raised outer edge and a thin erythematous rim which slopes gradually to a hypopigmented flattened center, and frequently running to it may be a palpated thickened cutaneous sensory nerve in which caseation may be seen. Motor nerves may also be affected and there may be muscle weakness, atrophy, deformities and paralysis.

Usually no bacillus is detected at the annular lesion, but when it is markedly indurated few bacilli may be found. The lesion is usually single, two or three lesions may be present on the same side of the body. The predilection of the lesions are the buttocks, the posterior and anterior aspects of the legs, the face and the back.

The healing of the lesions begins centrally. The normal pigmentation is regained. The skin is shrunken, the more induration results in more shrinkage of the skin after healing, but sensation may never recover even after cure.

In low-immune patients, the disease may exacerbate by extending the size of the lesions. They become indurated with the development of small hypopigmented annular lesions or plaques surrounding the initial lesion. Severity of nerve impairment is also aggravated.

Sometimes the hypopigmented lesions are not raised but with well demarcated. They develop all over the body and some of them may be erythematous in which few lepromatous bacilli may be detected.

**8.2.3 Dimorphous (Borderline) type.** The main feature of this type is that it is unstable. It consists of flattened hypopigmented, erythematous indu-

rated and plaque annular lesions as a mixing of lepromatous and tuberculoid types. The pattern of the distribution of the lesions is not as generalized as that found in lepromatous. The erythematous plaque may be centrally indurated and the outer edge is often flattish and irregular. They may be unilateral induration of the ear lobe; or, hands and feet may become edematous. Lesions are moderately wide spread, though asymmetrical. Enlargement of the nerve may occur, with or without associated muscle weakness, wasting or deformity of extremities.

Usually numerous lepromatous bacilli can be detected in the lesions but the lepromin test is negative. If treated, the patients improve faster than patients who have the lepromatous type.

**8.2.4 Lepromatous.** This type of leprosy affects individuals who have low or no immunity against the disease. When the bacilli gain their entry through the skin they are able to spread widely in subcutaneous tissue. Early cases, usually found in children or young adults, may have numerous reddish annular lesions with a diameter of 1 cm. The border is not indurated nor well demarcated. In the presence of light, the lesions appear shiny all over the body, except the inguinal area, the buttocks, scalp, intermammary area, interscapular region, axillae and the back. In these regions the lesions are not encountered. The lesions later progress to induration and coalescence to form papules or small nodules. They are initially mobile but later more nodular and fixed to the skin. With time, they ulcerate and are full of lepromatous bacilli. The ear lobes enlarge and the lines of the face coarsen and deepen, mimicking a lion's face (leonine facies).

Lepromatous bacilli can be easily detected both in the indurated areas or areas around the lesions.

### **8.3 Neurological Manifestations**

Neurological manifestations are observed in all types of leprosy. If only nerves are affected without skin involvement, it is called "pure neural type" which is classified under tuberculoid leprosy. When nerve involvement follows the skin manifestation it is considered a "secondary neural manifestation."

Common neurological functions are impaired such as touch and pain sensations. Nerves supplying the extremities and the neck are enlarged and palpable. Muscles of fingers and feet are weak, atrophic and paralyzed.

Hypoesthesia or anesthesia may be found in all types of leprosy but enlarged nerves and other neurological manifestations are more frequently seen in the early tuberculoid type than in the lepromatous type. Sometimes neuritis may be associated. This results in neuralgia or may cause nerve abscess and rapidly progress to paralysis. Neuritis is frequently encountered in reactional phase. The infection usually tends to damage ulnar nerve and common peroneal nerve. The latter results in weakness or even paralysis of the leg. The interosseous muscles and the thenar eminent muscle become atrophic and the fingers are gradually not extendable. Wrist drop and foot drop are not uncommon. In addition, there may be lagophthalmos and low facial paralysis.

Trophic changes usually occur late in all types of leprosy. They are trophic plantar ulcers. Fingers and toes become shortened due to bone resorption. In the event that patient cannot perceive touch or pain due to sensory loss, his feet may easily be injured. This favors secondary bacterial infection that may involve the deeply seated bone and amputations of fingers and toes are common.

In the course of the disease a reactional phase frequently occurs. This represents the development of an allergy to the disease itself. The reaction may be triggered by various stimuli e.g., physical and mental stress, superimposed infection, imbalanced hormones, treatment with some sulfone drugs that interfere with the balance of body immunity and the presence of lepromatous bacilli.

A reactional response occurring in lepromatous leprosy is called "lepra reaction" and major clinical manifestations include:

- (1) Generalized malaise e.g., fever, myalgia, arthralgia, etc.
- (2) Exacerbation of underlying skin lesions e.g., edema, erythema, pain, and ulceration.
- (3) Newly developed lesions e.g., tender erythematous papules called "erythema nodosum leprosy" on the face, arms, legs and body. The papules last for two to three days to one week and gradually subside. In severe cases the papules may form pustules, ulcers or subcutaneous nodules.
- (4) Enlarged tender nerves, bone pain, iritis, inflamed phalanges, and ribs may also occur.

Some lepromatous patients may also develop "acute lepromatous exacerbation". This signifies the running down of the disease. More bacilli proliferate in the skin. The lesions are more indurated and more widely spread.

#### 8.4 Principles of Diagnosis of Leprosy

It is essential to consider leprosy in all patients with skin or peripheral lesions who have resided in endemic areas. The three most helpful findings are:

Positivity of acid-fast bacilli in skin smears, anesthetic skin lesions, and the biopsy of the lesion which is histologically suggestive of leprosy.

#### 8.5 Evaluation of the Treatment

Patients who are being treated should be re-checked every three months to see whether they are improved or are having any reactions. Before the institution of therapy every patient must be checked for lepromatous bacilli from at least three sites on his body. If the bacilli are detected the patient should be rechecked for the bacilli every 6 months until he is cured and discharged. A decreasing number of bacilli and an improvement in the clinical features are promising indicators of effective therapy. With regular and effective measures the patients are gradually improved and bacilli-free in 2 years for tuberculoid leprosy and 3-5 years for lepromatous leprosy.

## 8.6 Discharge of the Patient

Discharge of patient from treatment depends on the patient's progress and result of the treatment because the response to treatment varies individually and different types of leprosy respond to the treatment differently. The disease must evolve from the active stage to the inactive stage and the disease must be stabilized in the inactive stage for a reasonable length of time before the patient is discharged.

### Criteria of inactive Stage of Leprosy:

- (1) No change in the number and size of the lesions.
- (2) No new-lesion development.
- (3) No lepromatous bacilli detected.
- (4) No induration of the skin.
- (5) No erythematous skin.
- (6) No tender nerves.

### Criteria for Discharge:

After the inactive stage the patient should be observed for sometime and he may be discharged or the treatment may be discontinued if the inactive stage is prolonged for five years in lepromatous cases, three years in indeterminant cases and one and a half years in tuberculoid cases.

In order to avoid the recurrence of the disease after discharge the patient should be examined every six months for two years. If the disease recurs he must be re-treated.

## 8.7 Control of Leprosy

Leprosy is one of the important national health and socioeconomic problems. The purposes of the leprosy control for the high-risked populations are: to decrease the spread of leprosy, to lesson the exacerbation of leprosy, to avoid morbidity of the patients, and to prevent those in a high-risk population from getting leprosy.

The principles of leprosy control are :

Search for, treat, and follow-up all patients with leprosy:

- (1) Early detection and treatment of the disease.
- (2) Regular treatment and follow-up, and attempt to eradicate the source of infection.

Prevention of high-risk population from contact with the disease :

- (1) Closely observe the individuals who contact leprosy, e.g., family members of a leper.
- (2) Perform physical examinations of school children perhaps annually.
- (3) Immunize children with BCG.
- (4) Apply chemoprophylaxis.

Health education :

- (1) Correct the public's misunderstanding about the nature of leprosy.
- (2) Promote the understanding, sympathy and patronage for the patients and their families.

(3) Educate the patients and their families on courses of the disease and treatment, and the need for their cooperation.

## 8.8 Rehabilitation

8.8.1 Physical rehabilitation. This includes prevention of disability, physiotherapy, surgical correction of deformities, and occupational therapy.

8.8.2 Mental rehabilitation. Leprosy is still a feared, social disease, and requires a strong program of health education for the patient, the family and the community.

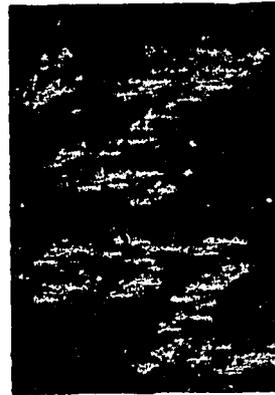
8.8.3 Socioeconomic rehabilitation. The disabled may require occupational assistance or employment.

## 8.9 Education and Research

Education and research programs relevant to current leprosy problems should be carried out.



**Tinea Corporis**



**Scabies**



**Tinea Versicolor**



**Leprosy**



**Direct contact dermatitis**



**Drug allergy**



**Direct chemical contact dermatitis**

**MODULE 9**

**EYE, EAR, NOSE AND THROAT PROBLEMS**

**WANNARAT CHANNUKUL, M.D., M.P.H.**

**Previous Page Blank**



## MODULE 9

### EYE, EAR, NOSE AND THROAT PROBLEMS

#### 1. INSTRUCTIONAL OBJECTIVES

On completion of this course the wechakorn will be able to :

(1) Examine, diagnose and treat common, simple eye, ear, nose, and throat diseases.

(2) Examine, diagnose and give first aid treatment for common, serious eye, ear, nose, and throat problems and refer the patient to the doctor, if necessary, Specifically, wechakorn will be able to :

(1) Diagnose and treat the following problems :

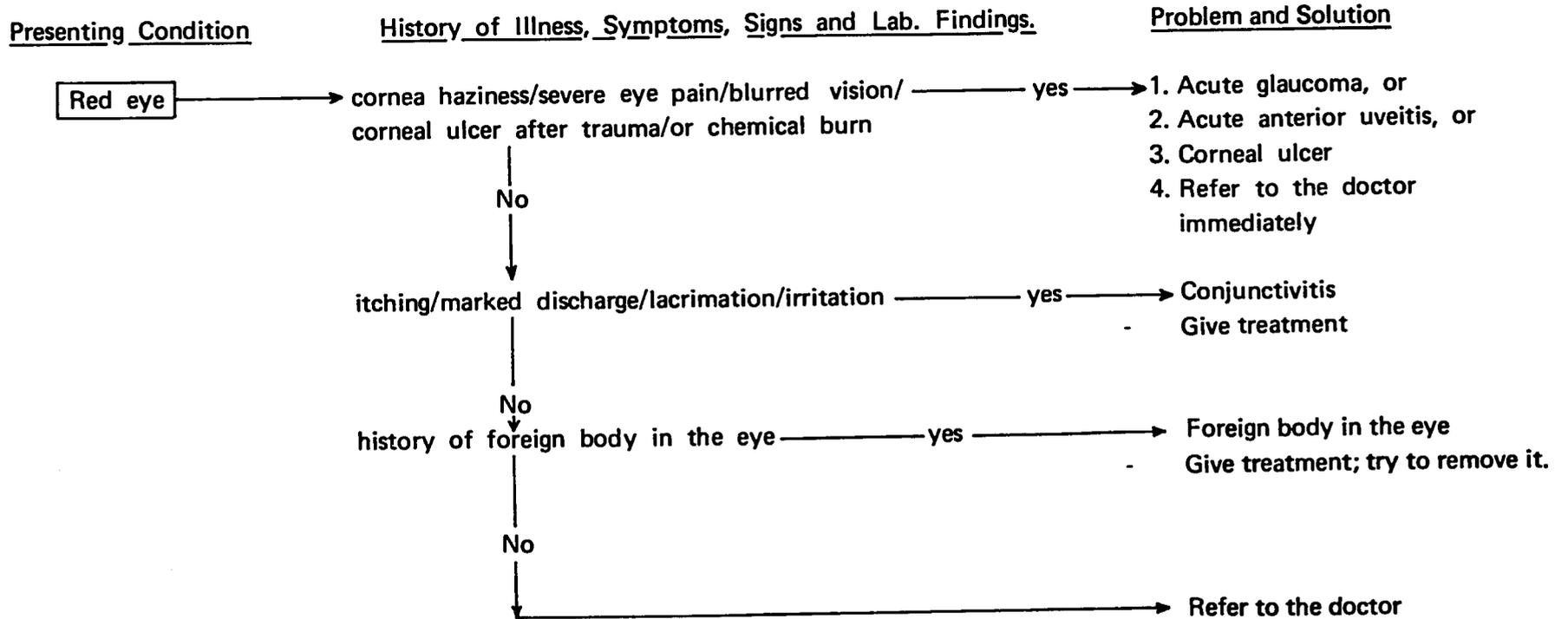
- Conjunctivitis
- Foreign body in the eye
- Hordeolum
- Blepharitis
- Otitis media
- Foreign body in the ear
- Tonsilitis
- Pharyngitis
- Laryngitis
- Foreign body in the nose
- Rhinitis
- Epistaxis
- Hypertension

(2) Differentiate the following problems, determine the seriousness and severity of the problem, and refer the patient to the doctor when indicated:

- Glaucoma
- Cataract
- Pterygium
- Anterior uveitis
- Corneal ulcer
- Mastoiditis
- Diphtheria
- Nasal tumor
- Sinusitis

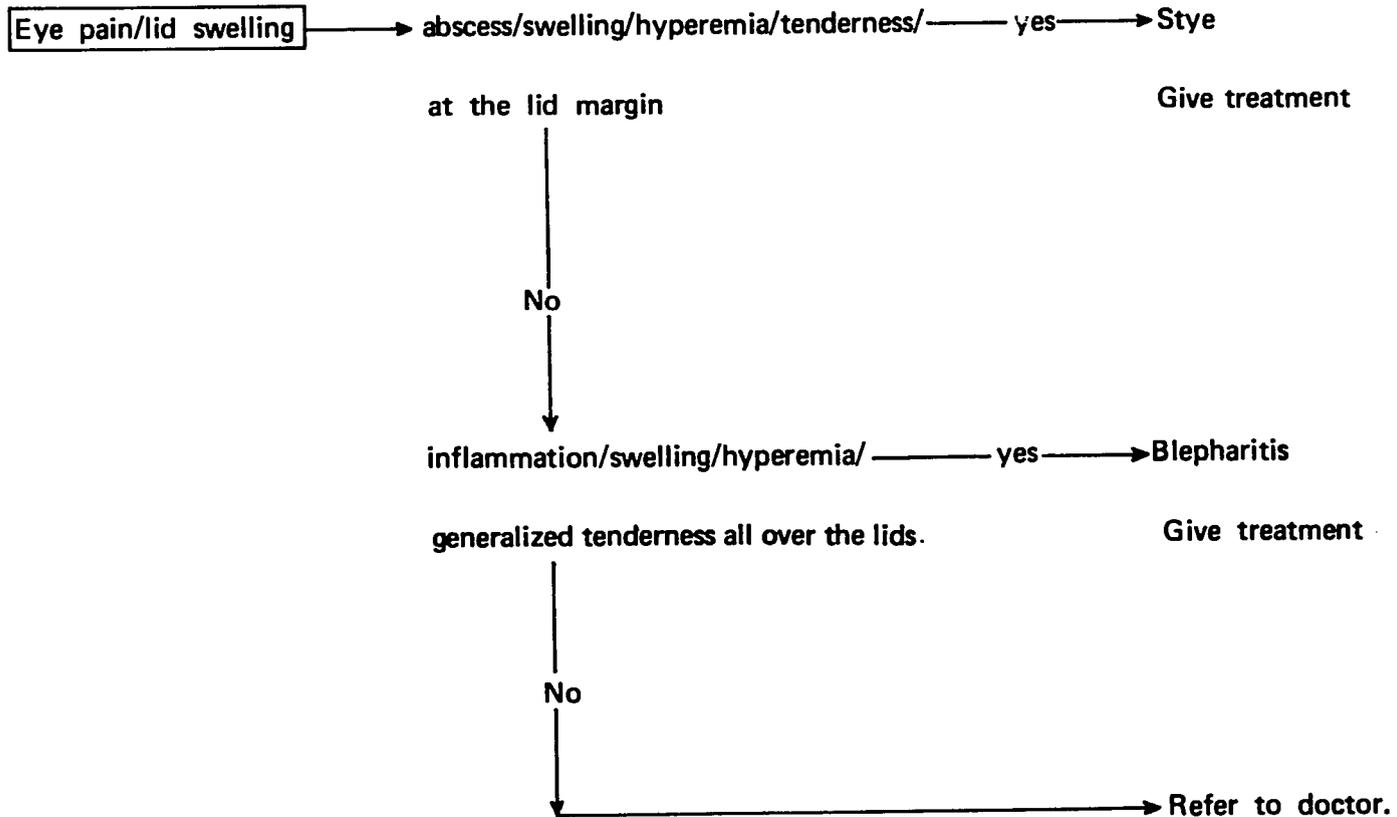
**Previous Pages Blank**

## Protocol 9.1 Red Eye

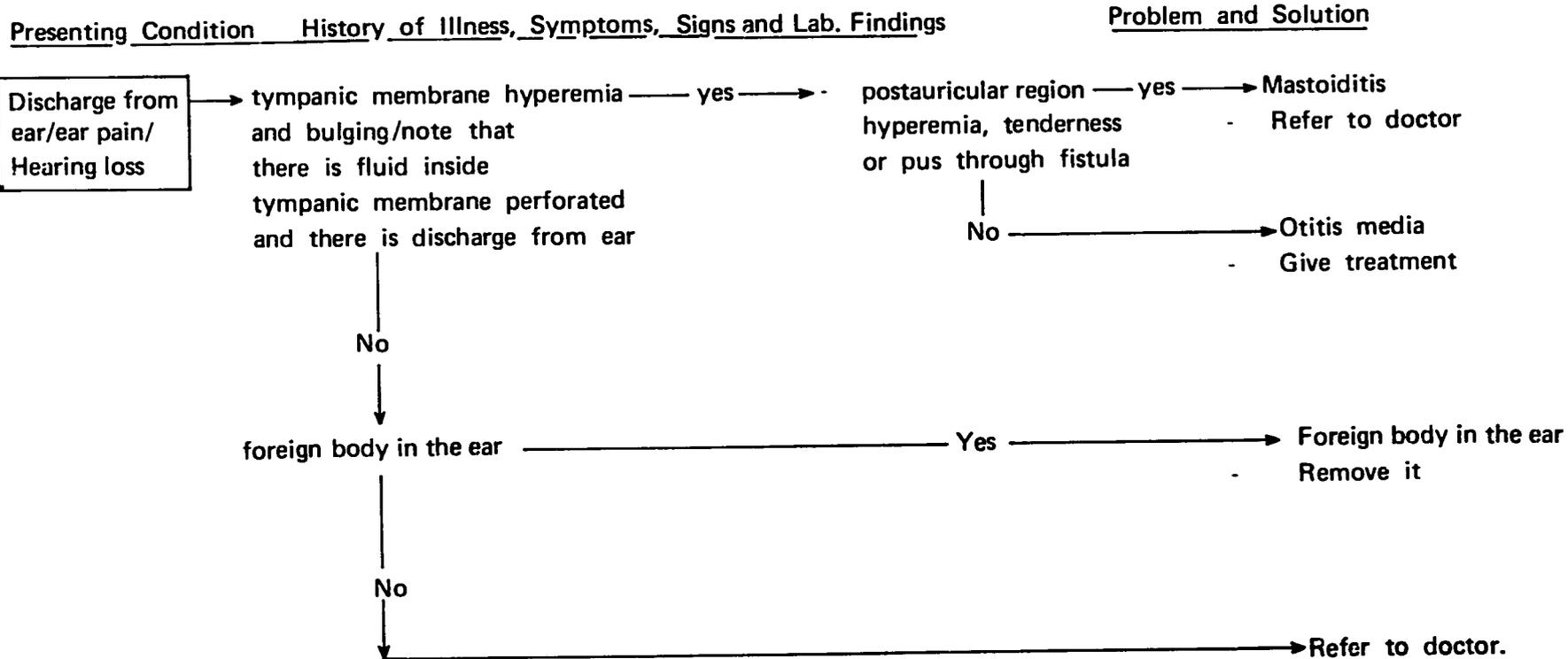


**Protocol 9.2 Eye Pain/Lid Swelling**

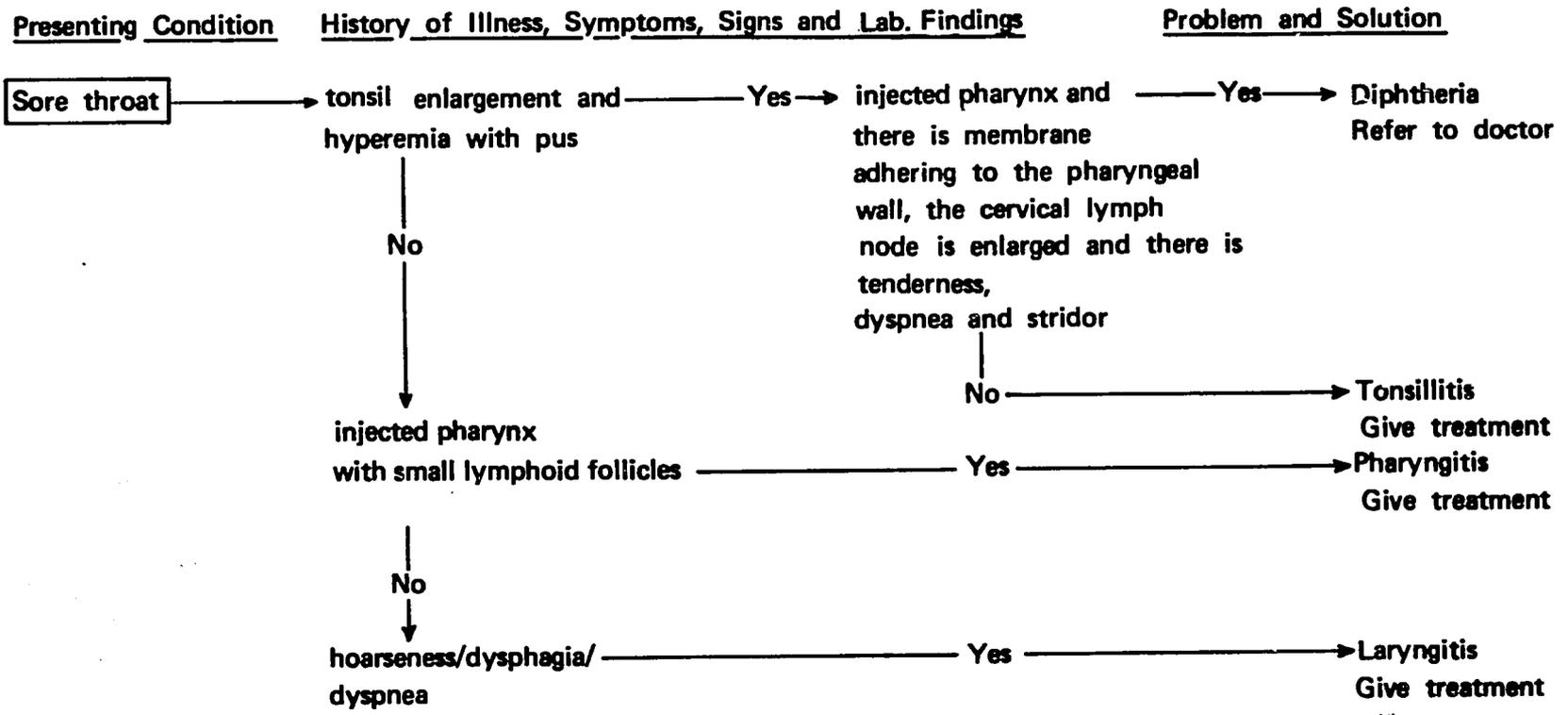
**Presenting Condition    History of Illness, Symptoms, Signs, and Lab. Findings.    Problem and Solution**



Protocol 9.3 Discharge from Ear/Ear Pain/Hearing Loss.



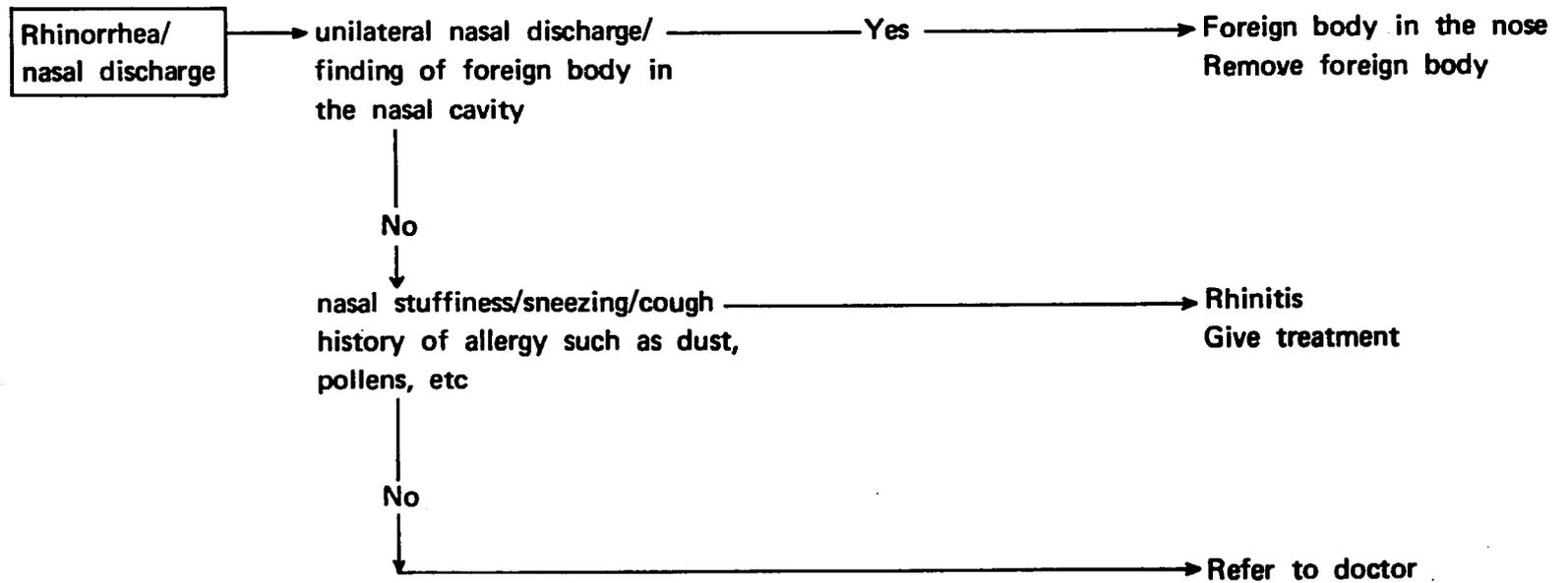
**Protocol 9.4 Sore Throat**



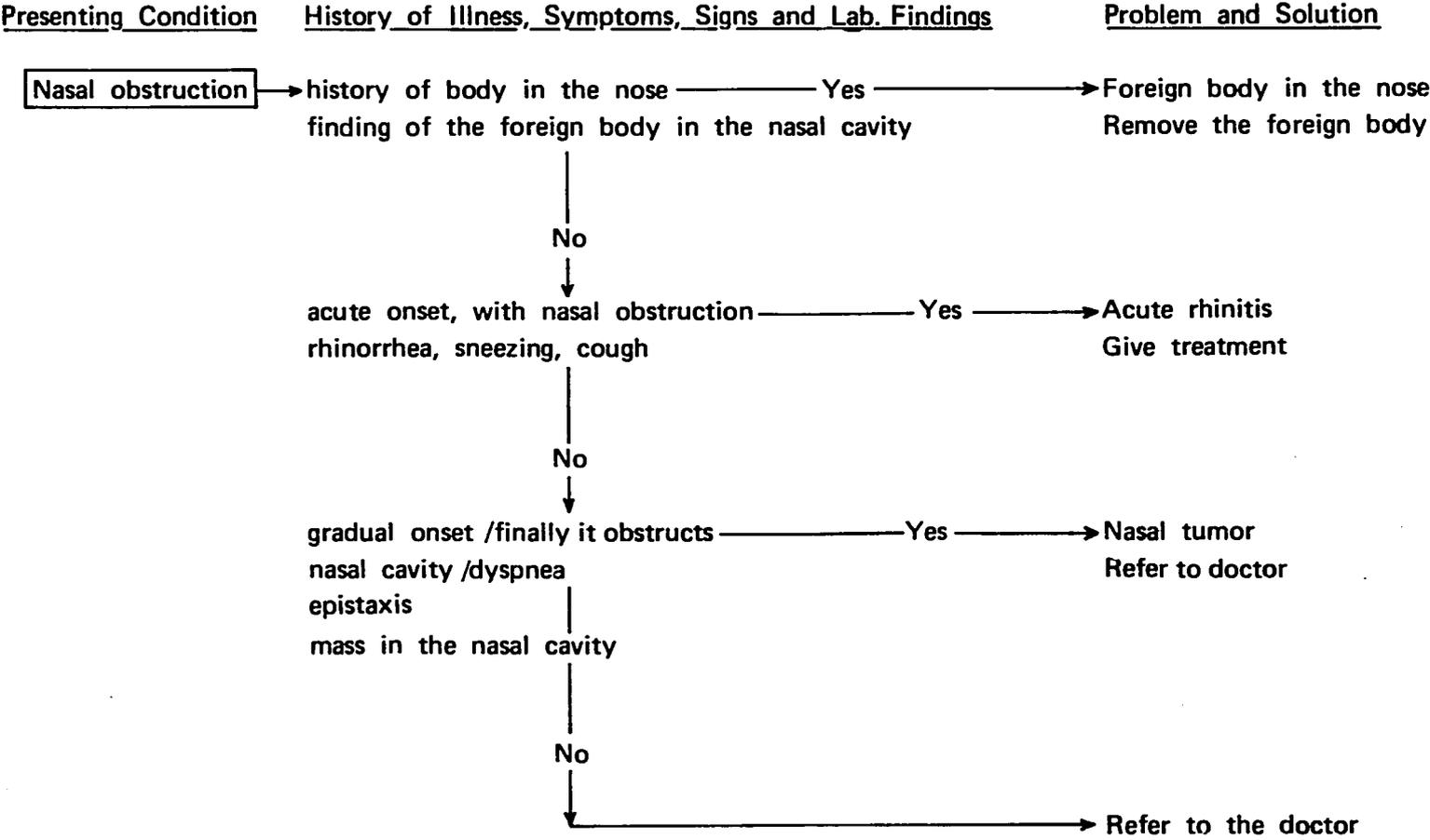
**Protocol 9.5 Rhinorrhea/Nasal Discharge**

**Presenting Condition   History of Illness, Symptoms, Signs and Lab. Findings**

**Problem and Solution**



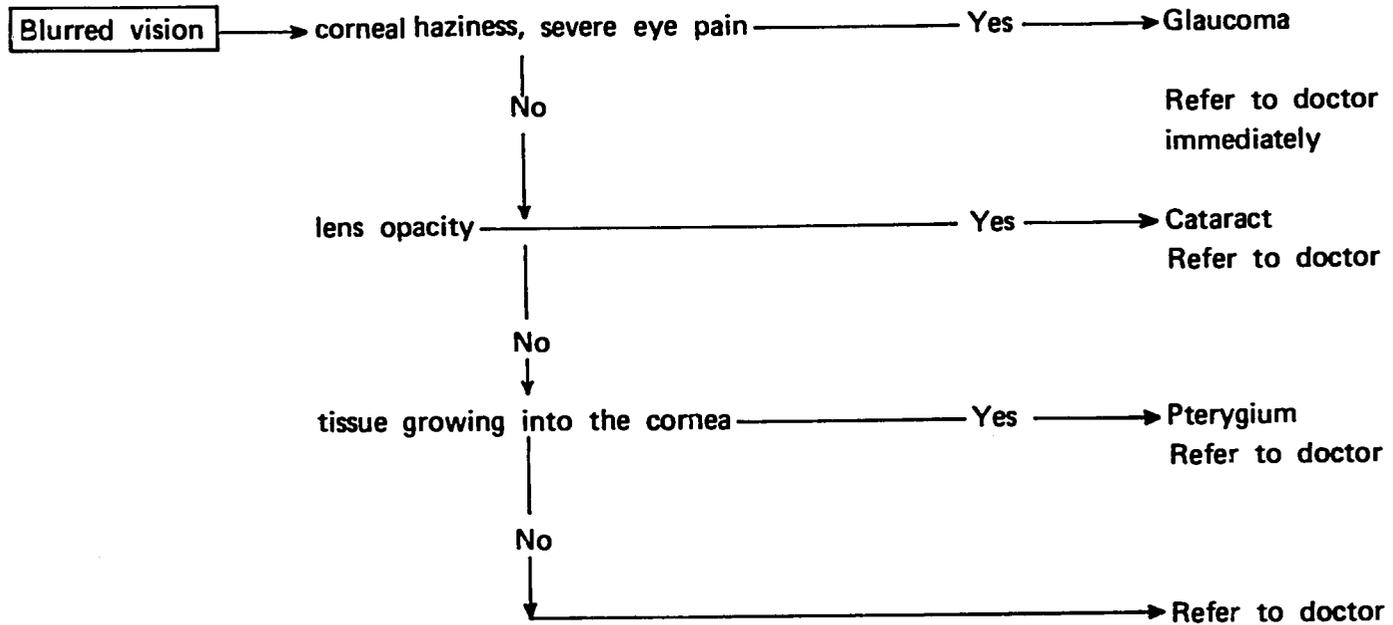
**Protocol 9.6 Nasal Obstruction**





**Protocol 9.8 Blurred Vision**

Presenting Condition    History of Illness, Symptoms, Signs and Lab. Findings    Problem and Solution



## 2. TREATMENT OF SPECIFIC COMMON PROBLEMS OF THE EYE

### 2.1 Conjunctivitis

- (1) Sulfacetamide eye drops instilled 3 - 4 times daily.
- (2) If the symptom is more severe, combine with Oculent-T eye ointment applied before bedtime, and/or
- (3) Give Tetracycline orally, 1 - 2 capsules, 3 - 4 times daily, after meals and before bedtime until it subsides.
- (4) If there is severe eye pain, give 1 - 2 tablets of Aspirin every 4 hours as required for pain.
- (5) If there is copious discharge in the morning, use 3% Boric acid eye wash every morning.

#### Caution

If the symptom does not improve within 1 week after treatment, refer to the doctor.

### 2.2 Foreign Body in the Eye

- (1) Remove the foreign body with a cotton bud or tip of a needle carefully, or irrigate with 3% Boric acid. If treatment is not successful, refer to doctor.
- (2) If there is eye pain or it is suspected that there is an inflammation, give analgesic and antibiotic.

### 2.3 Stye

- (1) Tetracycline orally, 1 - 2 capsules 3 times a day after meals for 5 days.
- (2) If there is severe eye pain, give 1 - 2 tablets of Aspirin every 4 hours as required for pain, or compress with warm water for 10 - 15 minutes.

Caution : If the symptom does not improve within one week, refer to doctor.

### 2.4 Pterygium

- (1) Consult the doctor for excision of the pterygium.
- (2) After excision, the pterygium may recur so the nature of the disease should be explained to the patient.
- (3) If no treatment is given, the pterygium may become advanced and interfere with vision.

### 2.5 Cataract

- (1) Consult doctor. Usually, the doctor will perform an operation when the cataract is mature in both eyes. After cataract extraction, prescribed glasses will improve the patient's vision.
- (2) Do not permit the patient to receive the treatment from anyone except the doctor, because there will be complication that may cause blindness.

## 3. TREATMENT OF SPECIFIC COMMON PROBLEMS OF THE EAR

### 3.1 Otitis Media

- (1) Procaine penicillin G. in oil, 600,000 - 1,200,000 units, intramuscularly 2 times a day. Followed by

(2) Pen V (400,000 units) orally, 1 - 2 tablets, 3 times a day before meals for 10 days.

(3) Aspirin, 1 - 2 tablets orally, every 4 hours as required for pain.

(4) Neosynephrine, 1 - 2 tablets orally, 3 times a day after meals.

(5) Ear drops applied 3 - 4 times a day.

(6) If there is discharge from ear, clean the ear canal 2 - 3 times a day with cotton bud.

#### Caution

If the symptom does not improve within 10 days, refer to the doctor. Otherwise it will cause deafness or the disease may spread to the brain.

### 3.2 Foreign Body in the Ear

(1) If the foreign body is a live insect, use olive oil instilled the ear for half an hour to kill the insect.

(2) Use ear forceps or a hook to remove the foreign body with care.

(3) If the foreign body cannot be seen, use warm water or distilled water to irrigate the ear.

#### Caution

If the foreign body cannot be removed easily, or it is suspected that it will be traumatic to the patient, refer to doctor.

## 4. TREATMENT OF SPECIFIC COMMON PROBLEMS OF THE THROAT

### 4.1 Acute Tonsillitis

(1) If there is fever or headache, give 1 - 2 tablets Aspirin orally every 4 hours.

(2) Tetracycline or Pen V (400,000 units) orally, 1 - 2 tablets 3 times a day until it subsides.

(3) If the patient has a cough, give M. Tussis.

(4) If there is nasal discharge, give Chlorpheniramine maleate orally, ½ - 1 tablet, 2 - 3 times a day.

#### Caution

If the patient has recurrent attacks, tonsillectomy is suggested.

### 4.2 Pharyngitis

(1) If the patient has fever or headache, give 1 - 2 tablets Aspirin orally every 4 hours.

(2) if there is nasal discharge, give Chlorpheniramine maleate (or other antihistamine) orally, ½ - 1 tablet, 2 - 3 times a day.

(3) Give Pen V (400,000 units) orally, 1 - 2 tablets, 3 times a day before meals.

(4) If the patient has a cough, give M. Tussis as required.

### 4.3 Laryngitis

(1) Tell patient to reduce the usage of voice.

(2) Give Pen V (400,000 units) 1-2 tablets orally 3 times a day before meal until the patient is cured.

- (3) Give M. Tussis, if the patient has a cough.
- (4) If there is fever or headache, give 1-2 tablets of Aspirin orally every 4 hours.

## 5. TREATMENT FOR SPECIFIC COMMON PROBLEMS OF THE NOSE

### 5.1 Foreign Body in the Nose

- (1) Use nasal hook to remove foreign body.
- (2) If there is an inflammation, give Pen V (400,000 units) orally, 1-2 tablets 3 times a day before meals until it is cured.
- (3) If there is nasal discharge, give Chlorpheniramine maleate orally,  $\frac{1}{2}$ -1 tablet, 2-3 times a day.

Caution.

If it cannot be removed, refer to doctor.

### 5.2 Rhinitis

- (1) Give Chlorpheniramine maleate orally,  $\frac{1}{2}$ -1 tablet, 2-3 times a day.
- (2) If there is fever or headache, give 1-2 tablets of Aspirin orally every 4 hours.
- (3) Give Pen V (400,000 units), 1-2 tablets, orally, 3 times a day before meals if there is an inflammation.

### 5.3 Epistaxis

- (1) Treat the cause of epistaxis.
- (2) If there is severe bleeding, anterior nasal packing is suggested.
- (3) Use posterior nasal packing if the bleeding does not stop.

## 6. ANATOMY AND PHYSIOLOGY OF THE EYE

The eye is a special sense organ for vision which has 2 components:

- (1) Visual sensation includes the eyeball, optic nerve, visual pathway, and visual cortex.
- (2) Associated organs include orbit, extraocular muscles, eyelids, lacrimal apparatus, and conjunctiva.

### 6.1 Eyeball

The eyeball has a spherical shape. The posterior two-thirds is embedded in the orbit, and the anterior one-third is exposed. The eye ball is composed of the cornea, pupil, iris, lens, retina, ciliary body, and sclera.

### 6.2 Optic Nerve

The optic nerve consists of a trunk of axon arising from the ganglion cells of the retina and passing through the visual cortex.

### 6.3 Orbit

The bony orbits are the sockets which contain the eyeball and associated structures. The anterior opening, called the base is covered by the eyelids. The apex points posteriorly and contains the opening through which the optic nerve and blood vessels pass from the brain to the eyeball.

#### 6.4 Extraocular Muscles

There are six extraocular muscles controlling the movement of each eye.

#### 6.5 Eyelids

The eyelids are movable folds of tissue which serve to protect the eye. They consist of skin, connective tissue, muscle, tarsal plate, and conjunctiva.

The skin of the eyelids is loose and elastic, permitting extreme swelling when there is an inflammation. The muscles of the eyelids are composed of 2 groups, orbicularis muscles for lid closure and levator muscle for lid opening. The tarsal plate is a wide, fibrous tissue containing 30-40 meibomian glands, large sebaceous glands which secrete an oily layer of tear film. They are oriented perpendicular to the lid margin, with the ostia of the glands lying in a single row on the margin.

At the lid margin there are cilia or eyelashes. The base of each cilium is surrounded by sebaceous glands (gland of Zeis) which open into the hair follicle by short ducts.

#### 6.6 Lacrimal Apparatus

The lacrimal apparatus consists of the lacrimal gland, canaliculi, tear sac, and nasolacrimal duct. The lacrimal gland is a tear-secreting gland located in the antero-superior temporal portion of the orbit. The tears pass down over the cornea and bulbar and palpebral conjunctivae, moistening the surface of these structures. They are drained into the lacrimal canaliculi through the lacrimal puncta and pass through the lacrimal sac, the nasolacrimal duct, and drain into the inferior meatus of the nasal cavity.

#### 6.7 Conjunctiva

The conjunctiva is a thin, transparent mucous membrane which lines the anterior surface of the eyeball up to the limbus and the posterior surface of the lids. The palpebral portion lines the lids and the bulbar portion lines the eyeball. The conjunctiva contains a mucous gland; the mucinous substance produced assists the eyes in keeping the conjunctiva and cornea moist and antibacterial function.

### 7. ANATOMY AND PHYSIOLOGY OF THE EAR

The ear is the special sense organ of hearing and equilibrium. The ear is enclosed in the temporal bone and divided into 3 parts:

(1) The external ear consists of the auricle, the external acoustic meatus, and the tympanic membrane. The auricle is composed of cartilage, which is covered with perichondrium. Its function is to direct sound waves into the external acoustic meatus. The external cartilaginous meatus contains hair follicles and glands which secrete ear wax which helps to guard the ear against the entrance of foreign bodies.

(2) The middle ear or tympanic cavity is composed of 3 ossicles that bridge the tympanic cavity from the tympanic membrane to the inner ear. The posterior wall of the tympanic cavity has a large opening which leads into a large air space, the mastoid antrum. This in turn communicates with the mastoid air cells. Anteriorly, the Eustachian tube connects the tympanic cavity with the nasopharynx.

(3) The internal ear is the organ of hearing and equilibrium. It consists of an osseous and a membranous labyrinth. The parts of the osseous labyrinth are the vestibule, the semicircular canals and the cochlea. The membranous labyrinth lies within the osseous labyrinth.

## 8. ANATOMY AND PHYSIOLOGY OF MOUTH AND NECK

### 8.1 Mouth

The mouth is an organ for eating, breathing, speaking, digestion, and tasting. The mouth is divided into 2 parts:

(1) The vestibule, which is the narrow interval between the lips and cheeks externally, and the gums and teeth internally.

(2) The oral cavity lies centrally to the gums and teeth. It is limited superiorly by the hard and soft palates; inferiorly by the tongue, the lower jaw, and the intermediate mucous membranes; and posteriorly by the glossopalatine arch.

### 8.2 Neck

The neck is the junction between the head and thorax. It is composed of cervical spines and muscles. The esophagus, trachea, blood vessels and nerves pass through it anteriorly. The larynx is situated anteriorly in the middle of the neck, lying in front of the lower part of the pharynx with which it communicates. Below, it is continuous with the trachea.

## 9. ANATOMY AND PHYSIOLOGY OF THE NOSE

The chief functions of the nose are olfaction, filtration, and humidification and warming of the air passing to the lungs. The nasal cavity is divided into right and left halves by the median nasal septum. Each cavity extends from the nares anteriorly to the posterior nasal apertures posteriorly, where it communicates with the nasopharynx.

## 10. DISEASES OF THE EYE

### 10.1 Acute Glaucoma

This disease requires emergency treatment; otherwise the patient will be blind in a short period. The pathophysiology of the disease is that there is an abnormal increase in intraocular pressure due to obstruction of the trabecular and canal of Schlemm relating to the mechanism of outflow in the angle

of the anterior chamber. The high intraocular pressure will damage the nerve cell of the retina. The patient will have severe eye pain and rapid failure of sight. Examination reveals a great increase in intraocular pressure. The conjunctiva is ciliary injection. The cornea appears foggy or steamy and the pupil is dilated and does not react to light. Glaucoma occurs most commonly in persons over 40 years of age.

As previously mentioned, acute glaucoma is a serious disease which, without proper treatment, will cause blindness in a few hours or days. If the patient is suspected to have acute glaucoma, refer him to the doctor immediately.

#### 10.2 Acute Anterior Uveitis

This disease is an inflammation of the iris and ciliary body. The symptoms include photophobia, pain, lacrimation, and interference with vision. Examination reveals a circumcorneal injection; the cornea appears "foggy" or "steamy" (opaque). The pupil is constricted and reacts sluggishly to light. In most cases, the etiology is unknown. It may be caused by tuberculosis or syphilis, or may be the result of hypersensitivity of the uvea. The treatment depends on the etiologic factors.

#### 10.3 Corneal Ulcer

Ulcer of the cornea may be due to corneal abrasion, chemical burns such as alkali or acid burn, or infection of the cornea by bacteria, virus, or fungus. A corneal abrasion is the common result of a minor trauma. The clinical picture consists of acute pain, photophobia, and circumcorneal injection.

In a chemical burn, the patient will have a definite history of contact with chemical agents. The treatment of alkali and acid burns is the same, but the prognosis is different. Initially, an alkali burn may appear innocuous, but alkali penetrates and softens the tissue, and the further release of hydroxyl ions causes the injury to progress. Only after 3 or 4 days, or even longer does its true extent become apparent. Acid, on the other hand, is neutralized quickly by the tissues, which permits the extent of the injury to be determined immediately. The important treatment in chemical burns is first aid. Regardless of the nature of the chemical, immediate and copious irrigation of the eye is of the utmost importance.

An infected corneal ulcer may be caused by bacteria, fungus, or virus. Examination reveals white spots on cornea, circumcorneal injection or generalized conjunctival injection in severe cases, and copious mucopurulent discharge. If the infection is serious, there will be a hypopyon, or pus in the anterior chamber. The treatment depends on the causative agent.

#### 10.4 Conjunctivitis ("Red Eye")

Conjunctivitis is the most common contagious eye disease. There are many causes – bacteria, virus, chlamydia, and other agents including allergies, chemical substance, parasites, and fungus. The most frequent types of conjunctivitis are viral conjunctivitis and trachoma.

10.4.1 Viral Conjunctivitis. This is the most common form of conjunctivitis and is highly contagious. The clinical picture includes generalized injected conjunctiva, tearing, and photophobia. There are many follicles in the palpebral conjunctiva, and there may be tenderness of the preauricular lymph nodes. The disease is self-limiting in 2 - 3 weeks. There is no specific treatment, but anti-bacterial eyedrops should be prescribed to prevent secondary bacterial infection.

10.4.2 Trachoma. Trachoma is a specific, communicable keratoconjunctivitis, usually of chronic evolution, caused by an agent which at present is classified as *Chlamydozoon trachomatis*.

**Clinical Findings of Trachoma.** The incubation period is about one week. At first, the patient may have itching, irritation, lacrimation, and photophobia. Some cases may have only mild ptosis. It is characterized by the formation of follicles, papillary hyperplasia, and pannus. It typically leads to scar formation and the lids become deformed. The progress of the disease can be divided into four stages:

Stage 1. Immature follicles are present, particularly in the upper tarsal conjunctiva, and the conjunctiva is inflamed.

Stage 2. The follicles enlarge and become surrounded by inflammatory tissue so that they form hard, densely packed papillae.

Stage 3. This stage is characterized by early conjunctival scarring, visible clinically as fine white lines in the subepithelial areas of the conjunctiva, and an increase of the corneal pannus.

Stage 4. This represents healed trachoma. The lids become deformed. Entropion of the upper and lower lids occurs due to the scarred tarsi. This causes continual corneal irritation. Secondary bacterial infection is usually present.

**Epidemiology of Trachoma.** Spreading is by direct contact. The organism lives in the conjunctival and corneal epithelia. It is most contagious during the early stages (1 and 2). It is transmitted by contaminated fingers, towels, handkerchiefs, etc., used by many persons. The disease occurs at all ages but is more common in children.

**Prevention and Control of Trachoma:**

(1) **Prevention.** Survey the epidemic area and give treatment. Educate people about personal hygiene, spreading of the disease, and good care of the eyes.

(2) **Control.** Isolate patients to give treatment until the disease is cured, otherwise it will spread because the disease is highly contagious.

10.4.3 Bacterial Conjunctivitis. The causative organisms include Koch-Weeks bacillus, pneumococcus, staphylococcus, streptococcus, hemophilus influenzae, gonococcus. They produce severe conjunctival injection, irritation, and purulent discharge, with consequent sticking together of the lids upon awakening.

Ophthalmia neonatorum is an acute purulent gonorrhoeal conjunctivitis occurring in the newborn. Infection usually occurs from contamination of the

conjunctiva during passage through the infected cervix of the mother. The incubation period may vary from 12 hours to 5 days. The symptoms are great swelling, hyperemia and tenseness of the lids so that the lids can be opened only with difficulty. A profuse purulent discharge escapes continually from between the lids. In adult gonorrhoeal ophthalmia, the disease is always acquired through infection from gonorrhoeal secretion, either directly by the fingers of the patient transferring the bacteria from the genitals, or by means of contaminated towels, etc. In suspected cases, refer to a doctor for specific treatment.

**10.4.4 Allergic Conjunctivitis.** Allergic conjunctivitis is one of the common disease of the eye. There are many allergens, such as dust, pollens, hay fever, etc. Clinical findings include severe itching, conjunctival injection lacrimation, clear cornea, and maybe chemosis. The symptoms are similar to trachoma, so the disease must be differentiated from trachoma because the treatment is different.

Summary:

Differential diagnosis of red eye may be divided into 2 groups:

Group 1. Immediately refer to doctor cases such as acute glaucoma, acute anterior uveitis, corneal ulcer.

Group 2. The wechakorn can give treatment in cases such as conjunctivitis.

In group 1, the cornea is cloudy, the patient has severe eye pain and no discharge, and there is circumcorneal injection. In group 2, the cornea is clear, pain is minimal, there is considerable discharge and generalized conjunctival injection. There will be itching in trachoma and allergic conjunctivitis.

## **10.5 External or Internal Hordeolum**

**10.5.1 External hordeolum (stye).** A stye is an acute inflammation at the edge of the lids, caused by staphylococcus infection of the glands of Zeis or of Moll. A red swelling appears in the lashline of the margin of the lid, accompanied by pain and tenderness. Initial treatment is with warm compresses for 10 - 15 minutes, and incision and drainage of the purulent material if the matter does not begin to resolve within 48 hours. An antibiotic instilled into the conjunctival sac is beneficial.

**10.5.2 Internal hordeolum.** This is an inflammation of the Meibomian gland of the tarsal plate of both upper and lower lids. The infection usually drains through the conjunctival surface of the lids. Treatment is the same as the external hordeolum.

**10.5.3 Chalazion or Meibomian cyst.** This is a chronic granulomatous enlargement of one of the Meibomian glands. This causes stoppages of the duct, accompanied by involvement of the surrounding tissues. When small, chalazions need not be removed. Occasionally they disappear after applications of antibacterial ointments, followed by massage and hot compresses. When larger, they must be removed by incision and drainage.

## 10.6 Blepharitis

Inflammation of the lids is caused primarily by *Staphylococcus aureus* infection. There are both acute and chronic forms. The predisposing factors include poor hygiene of eyelids, previous illness such as measles, small-pox, or chicken pox, irritation from dust, smoke, cosmetics, etc., and seborrhea of the scalp, brows, or ear.

There are two main types—ulcerative and nonulcerative. Ulcerative blepharitis is characterized by a small ulcerated area along the lid margin, multiple suppurative lesions, and the loss of eyelashes. At times the hair follicles are disturbed so that the lashes are misdirected, sometimes rubbing and causing injury to the cornea. In chronic cases, the lashes may be totally lost. In nonulcerative blepharitis, the skin of the lid margin is covered with small white or grey scales. This can be associated with chronic conjunctivitis. Complications include loss of lashes, hypertrophy of the lid margins, trichiasis, and ectropion.

## 10.7 Pterygium

Pterygium is the encroachment of the conjunctiva onto the cornea. It is a triangular fold of membrane whose base spreads out and merges with the conjunctiva; the apex is united to the cornea. Pterygium may extend from the inner or outer part of the bulbar conjunctiva to the cornea.

The cause of pterygium is uncertain. It is believed to be a degenerative process, because of the long continued irritation and because vascularized connective tissue grows forward beneath the corneal epithelium.

It usually occurs in persons who are exposed to wind, light, and dust especially in persons who spend a large part of their lives out of doors.

**Symptoms and Findings:**

In its early form, the patient may have no symptom except a small growth at the conjunctiva. Later, it grows slowly toward the center of the cornea, giving rise to moderate symptoms of conjunctival irritation and disfigurement, and when it encroaches upon the pupillary area it interferes with vision.

**Principle of Treatment:**

Treatment is surgical excision before the growth interferes with vision. However, the condition may recur. Prevention involves the promotion of the health of the cornea by giving vitamins A, B<sub>2</sub>, C and protein, and by wearing glasses to prevent wind, light and dust from entering the eye.

## 10.8 Cataracts

A cataract is a lens opacity. The human lens is usually transparent. The opacity may be total or may occur only in some parts of the lens. There are two types of cataract, congenital and acquired.

The etiology of lens opacity is still obscure, but it is believed to be caused by defects in metabolism of the lens. It is believed that the congenital cataract is caused by intrauterine infection or is associated with developmental defects. The acquired type is caused by the aging process, hereditary factors,

physical trauma, drug idiosyncrasy, or endocrine gland malfunctions. In addition cataracts can be associated with other eye diseases such as chronic anterior uveitis, direct trauma, and glaucoma, and can be associated with other systemic diseases such as diabetes mellitus, myopathy, mental retardation, and some skin diseases.

#### Symptoms and Findings:

The patient's vision becomes progressively deteriorated, as if there is a dense fog in front of him. Color perception is impaired. The patient becomes blind when the opacity involves the whole of the lens cortex. In a traumatic cataract, vision deterioration is rapid after trauma.

#### Principle of Treatment:

Surgical removal of the cataract and augmenting the aphakic vision with convex lens is suggested. In the congenital type, surgical intervention can only be applied when the lens is totally opaque. The causes of the cataract must be considered also in the treatment.

## 11. DISEASES OF THE EAR

### 11.1 Otitis Media

Otitis media is an inflammation of the middle ear. It is more common in children than in adults. It generally occurs following an inflammation of the upper respiratory tract such as acute tonsillitis, influenza, URI, measles, whooping cough, etc. The microorganisms extend through the Eustachian tube to the middle ear. The causative agents are hemolytic streptococcus, pneumococcus, and staphylococcus. In the early stage, the mucosa and the tympanic membrane are inflamed, and there is a serous discharge which later becomes purulent. The lumen of the Eustachian tube becomes edematous and obstructed. The purulent discharge accumulates and causes increased pressure in the middle ear. The drumhead bulges outward and ruptures. There will be otorrhea until the inflammation has subsided.

The symptoms include ear pain, tinnitus, fever, tenderness around the ear, and otorrhea which is mucopurulent.

In some cases, it turns to chronic otitis media, whose precipitating factors include:

1. Lack of appropriate treatment in the early stage.
2. Inadequate dose of antibiotics.
3. Inadequate duration of antibiotic treatment.
4. Infection of nasal and oral cavities.
5. Low resistance of the patient.
6. High virulence of the microorganism.

In chronic cases, the middle ear is more damaged and the loss of hearing is severe.

### **Principles of Treatment:**

The treatment is according to the stage of the disease. If the tympanic membrane perforates and cannot be healed by medical treatment, surgery is indicated.

### **Complications:**

- (1) Acute mastoiditis.
- (2) Meningitis.
- (3) Extradural abscess.
- (4) Petrositis.
- (5) Facial paralysis.
- (6) Labyrinthitis.
- (7) Brain abscess, etc.

### **11.2 Acute Mastoiditis**

In an acute suppuration in the middle ear, a certain amount of inflammatory reaction is bound to develop in the mucosa of the mastoid process adjacent to the mucosa of the middle ear. The severity of the disease depends on the virulence of the infecting organism, the ability of the host to limit the infection, the type of middle ear mucosa, and the mastoid structure.

### **Symptoms and Signs:**

Tension pain is felt within the infected mastoid. Purulent secretion is usually more profuse. Pain and tenderness of the postauricular region are common manifestations; fever is high. Postaural edema indicates that the inflammation process has extended through the cortex of the mastoid process to cause inflammation in the soft tissue over the mastoid.

### **Principle of Treatment:**

- (1) Appropriate antibiotics after culture of discharge.
- (2) Surgical drainage.

When the patient has chronic otitis media which does not improve after medical treatment, or is suspected to have mastoiditis, refer the patient to a doctor.

## **12. DISEASES OF THE THROAT**

### **12.1 Acute Pharyngitis**

The causes of acute pharyngitis include hemolytic streptococcus, staphylococcus, pneumococcus, and viruses. At the onset, the patient often complains about a dry and scratchy throat. Malaise and headaches are common. In severe cases, there may be dysphagia as the result of pain. Children usually have higher fevers than adults.

### **Principle of Treatment:**

- (1) Rest.
- (2) Antipyretics.
- (3) Antibiotics.
- (4) Throat lozenges.

## 12.2 Acute Tonsillitis

Acute tonsillitis is very common in children. It is caused primarily by beta hemolytic streptococcus, which is an air-borne infection. The symptoms include sore throat, fever with chills, headache, malaise, and dysphagia which is acute at the onset. The tonsil is edematous and infected, and is sometimes covered with exudate. The cervical lymph node may be enlarged.

Principles of Treatment:

- (1) Rest .
- (2) Soft diet .
- (3) Improved hygiene of oral cavity .
- (4) Antipyretics and antibiotics .

Complications:

Complications that may follow a severe case of acute tonsillitis include chronic tonsillitis, acute otitis media, acute rhinitis, sinusitis, peritonsillar abscess, cervical lymph nodes abscess, nephritis, osteomyelitis, rheumatic fever, pneumonia, etc.

## 12.3 Chronic Tonsillitis

Chronic tonsillitis usually follows inadequate treatment of acute tonsillitis. The acute infection may be exacerbated when resistance is lowered by fatigue or chilling. The usual symptom of a chronic tonsil infection is a recurrent sore throat.

Examination of the throat often shows enlargement of the tonsils, but the increase in size alone does not indicate infection. The mucosa of the anterior pillar may be inflamed. Enlargement and tenderness of the anterior cervical lymph nodes are common. Surgical removal is the only effective treatment.

## 12.4 Acute Laryngitis

Acute laryngitis is usually associated with upper respiratory tract infections such as acute rhinitis or acute pharyngitis. It is often part of a general upper respiratory infection that involves the pharynx, larynx, and trachea, or it may occur as an isolated infection in which only the vocal cords are inflamed. A vocal abscess may also produce acute laryngitis.

The chief symptoms are hoarseness, sore throat, dyspnea (especially in children), coughs, dysphagia and fever.

There is often hyperemia, swelling of the vocal cords and mucosa of the larynx. There is a yellow-green, mucopurulent discharge.

Most patients with acute laryngitis require no specific treatment if the disease is not severe and the patient has good resistance. But if the case is severe, it requires proper treatment to keep it from turning into a chronic case.

Principle of Treatment:

- (1) Rest the voice .
- (2) Avoid smoke, drinking, hot food .
- (3) Use anticough .
- (4) Use antipyretics and antibiotics .

## 12.5 Diphtheria

Diphtheria is a contagious disease, most commonly found in children between 2 and 5 years of age and least common in the children under 6 months or over 10 years of age. The causative agent is *Corynebacterium diphtheriae*. The incubation period is 2-3 days. The pathogenesis involves many areas, such as the oropharynx, laryngopharynx, trachea, nasopharynx, and skin, but most commonly the oropharynx, laryngopharynx and trachea. Characteristically there will be inflammation and necrosis of the mucosa epithelium of the oropharynx and throat. The predominant feature is a pseudomembrane composed of white blood cells and necrotic tissue and microorganisms. It adheres to the underlying submucosa tissue. An attempt to remove the membrane reveals a bleeding base. The disease will spread to the adjacent lymph nodes and can cause lymphadenopathy. The myocardium and kidney may be involved also.

The patient will have a high fever, pharyngitis, tonsil enlargement with white patches, dysphagia, and sore throat. In severe cases there will be bleeding from the nose, mouth, and throat. The patient can die from myocarditis or bronchopneumonia. In cases that involve the larynx and trachea, the patient will have dysphonia, a dry cough, and stridor because of respiratory tract obstruction. If the airway is threatened by the advancing membrane, tracheotomy may be necessary to prevent death from asphyxiation.

### Complications:

Complications of diphtheria include bronchopneumonia, atelectasis, myocarditis, nephritis, peripheral neuritis, and generalized paralysis.

### Principles of Treatment:

- (1) Rest.
- (2) Diphtheria antitoxin injection.
- (3) Antibiotics.
- (4) Treat the complications.

### Prevention:

Early prevention can be achieved by DPT immunization which can prevent diphtheria, whooping cough, and tetanus. The first dose should be started at 2-3 months of age and the vaccination course should be completed.

## 13. DISEASES OF THE NOSE

### 13.1 Acute Rhinitis

Acute inflammation of the nasal cavity, or acute rhinitis, is a body reaction to nasal disease. The mucosa of the nasal cavity is irritated by an external agent such as dust or smoke. After stimulation by the allergens, the patient will have obstruction of the nose, itching, sneezing, and rhinorrhea. The symptom is spontaneously cured if the allergen is eliminated; otherwise, it may become a chronic condition.

### 13.2 Allergic Rhinitis

Allergic rhinitis is a very common disease. It is caused by allergies, such as to weather (cold, hot, warm, etc.), dust, pollens, smells, food, bacterial toxins, and so forth. There are many predisposing factors, such as hereditary factors, anxiety, or low resistance.

The early symptom is nasal obstruction, rhinorrhea, or sneezing in the morning. Later the symptom is more severe; the nasal obstruction occurs all the time, and the patient has to breathe through the mouth because the nasal mucosa is edematous and obstructed. The nasal discharge will cause posterior nasal dripping and sore throat and cough. The nasal mucosa exhibits edema and pallor or blue.

Principles of Treatment:

- (1) Eliminate allergens.
- (2) Exercise.
- (3) Rest and relief from anxiety.
- (4) Antihistamines.
- (5) Desensitization.

### 13.3 Hypertrophic Rhinitis

The combination of long-standing allergic rhinitis and low-grade inflammation may produce permanent enlargement of the turbinates, particularly the inferior turbinate. When this occurs, the turbinate loses most of its normal ability to expand and shrink. The result is a continuous nasal obstruction.

Principles of Treatment:

Eliminate or avoid the causative agent and improve the obstructive lesion by:

- (1) Injection of a sclerosing solution beneath the mucosa of the turbinate.
- (2) Submucosal electrocoagulation or application of carbolic acid.
- (3) Turbinate bone resection.

### 13.4 Nasal Obstruction

Nasal obstructions occur in all age groups, and children are apparently affected as frequently as adults. It may be unilateral or bilateral; and there may be partial or complete obstruction. There are three types of nasal obstruction:

(1) Acute nasal obstruction. This is characterized by suddenness of attack and inability of the nasal chamber to compensate for the congestion within a short period of time such as the obstruction produced by acute allergic rhinitis.

(2) Intermittent nasal obstruction. The obstruction is intermittent as in chronic hypertrophic rhinitis.

(3) Chronic nasal obstruction. The onset of the obstruction is gradual until it obstructs the nasal passages, as with nasal polyps.

Obstruction of the nasal passages produces physiological changes and interferes with the normal functions of the nose. The main effects are related to respiratory function, olfactory and gustatory function, phonatory function, and ventilation of the paranasal sinuses and the Eustachian tubes.

Nasal obstructions may be due to a great variety of causes, but there are three main groups of causes:

(1) Anatomical or developmental abnormality in the nose. The conditions included in this group are deviations and injuries to the nasal septum, congenital narrowing of the nares, or complete atresia of one or both choanae.

(2) The effects of such abnormalities cause pathological changes in the mucous membrane. This group includes such conditions as hypertrophy of the mucous membrane due to repeated rhinitis, the formation of polyps, and the accumulation of pathologic secretions.

(3) Hypersensitivity of the nervous mechanism of the nasal mucous membrane which causes swelling and obstruction.

### 13.5 Nasal Tumors

Nasal tumors are either benign or malignant. Benign tumors are commonly found in young adults, while malignant ones are generally found in older people. The most common benign tumor is a nasal polyp.

13.5.1 Nasal polyps. A nasal polyp forms gradually from recurrent localized swellings of the sinus mucosa or from the nasal mucosa. At first the polyp is small. With each succeeding increase in submucosa edema, it becomes larger until, when fully developed, it appears as a smooth, pale tumor. The base is pedunculated but is not seen. In most instances nasal polyps are multiple. Polyps cause symptoms because they protrude into the airway. They may be large or numerous enough to occlude the nose completely. If untreated for years, they may cause gradual spreading of the nasal bones and widening of the nasal bridge.

For the most part, nasal polyps require operative removal.

### 13.6 Foreign Body in the Nose

A foreign body in the nose is commonly found in children who accidentally put objects in the nostrils. The vegetable form includes many kinds of seeds (such as legumes, peas, beans). The nonvegetative form includes metals, plastic, paper, beads, buttons, rubber, etc.

The cardinal symptom of the foreign body problem is a unilateral purulent nasal discharge. The possibility of a foreign body should be investigated in every case of suppurative or bloody discharge from the nose.

Principles of Treatment:

- (1) Remove the foreign body.
- (2) Treat the infection of the nasal cavity with antibiotics.

In removing the foreign body, one must have the proper instruments and be able to get a good view of the object. Often, a child patient must be restrained. General anesthesia may be necessary at times. After shrinking of the

nose with a vasoconstrictor, the foreign body is removed with a grasping forceps or nasal hook.

### 13.7 Epistaxis

Epistaxis means bleeding from the nasal cavity. Local disorders include the presence of prominent unsupported vessels, especially in Little's area, ulceration, tumors, and trauma. Pressure changes at high altitude may provoke bleeding. Systemic causes include hypertension, arteriosclerosis, cardiovascular, renal, and blood diseases such as leukemia, hemophilia, scurvy, and anemia, etc. The symptoms vary from mild to severe. If there is severe bleeding, the patient may have anemia, or shock. A blood clot in the nose may cause nasal obstruction. If the patient swallows the blood into his stomach, it will cause melena or hematemesis.

Principles of Treatment:

- (1) Remove or treat the epistaxis.
- (2) Stop bleeding by anterior nasal packing, posterior nasal packing, electric cautery, or surgery.
- (3) Give blood transfusion if necessary.

### 13.8 Sinusitis

Sinuses are air spaces in the bone of the skull which are connected with the nasal cavity. Sinusitis means an inflammatory change in the mucosa of a sinus.

The inflammation of the lining membrane of the sinuses is due, in most instances, to an extension of infection from the nasal cavity, pharynx, tonsil, teeth or orbit. Other causes of sinusitis may be injury to facial bones, allergy to dust or weather, or tumors in the nasal cavity or sinus itself.

When there is an inflammation of a sinus, the mucosa will be edematous. In recurrent attacks, it will be thickened and there will be pus in the sinus.

The patient will have headaches and malaise. In the acute stage, the temperature is high and the discharge is purulent and copious. In some cases, there is localized pain and tenderness over the involved sinus. The nose becomes more blocked and the throat may become inflamed and sore on one side as a result of the purulent postnasal discharge.

Principles of Treatment:

- (1) Medical treatment by nose drops, nasal spray, oral, etc.
- (2) Surgical treatment, which is reserved for those patients in whom improvement is not obtained after medical treatment.



Acute conjunctivitis



Acute purulent conjunctivitis



Corneal ulcer



Hyphema



Blepharitis



Pterygium



Senile cataract



Trachoma



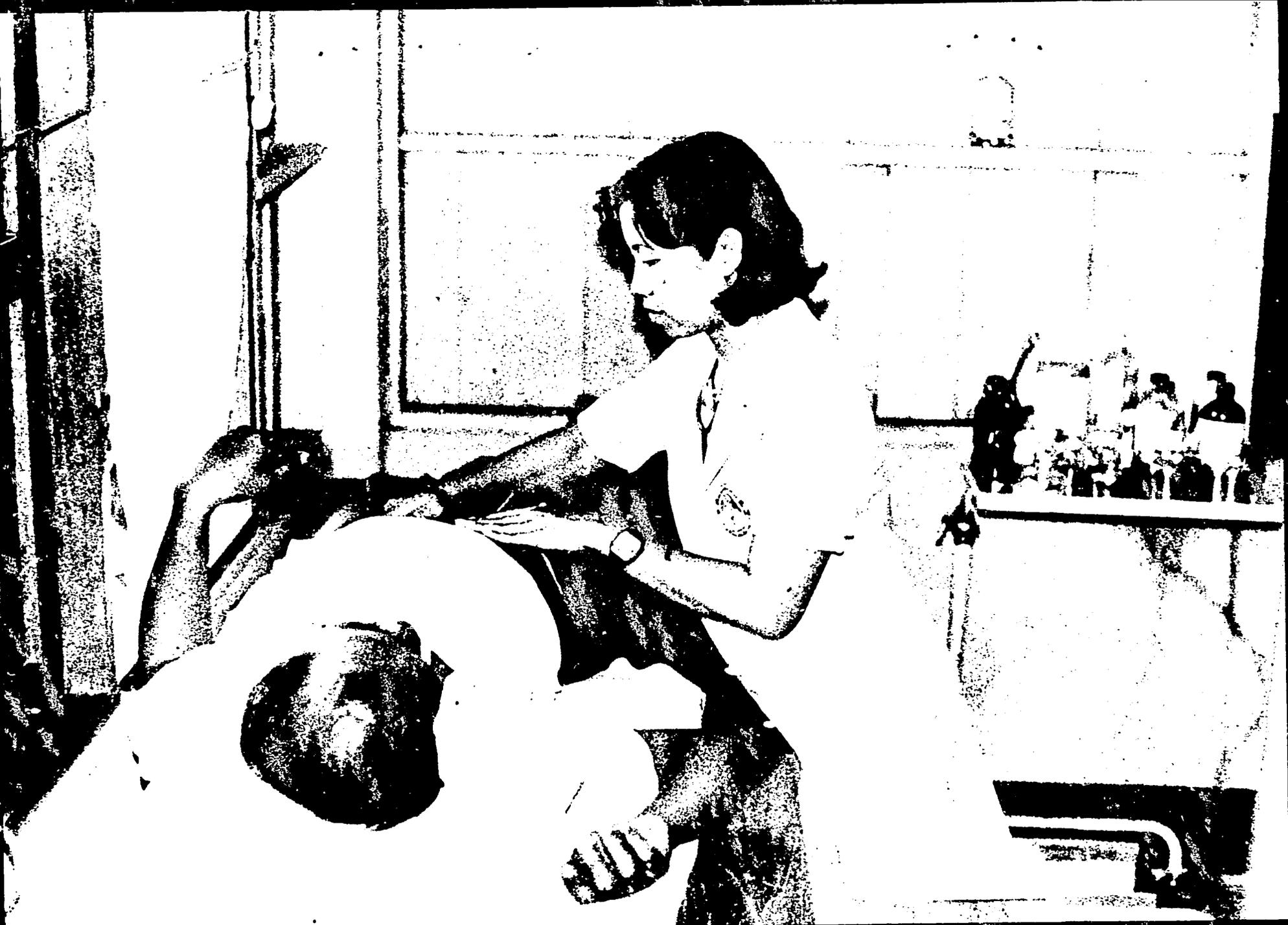
Trachoma

**Previous Page Blank**

**MODULE 10**  
**MEDICAL PROBLEMS**

**JIT JIRARATSATIT, M.D., Cert. of Proficiency in Intern. Med., Dr. med.**

**Previous Page Blank**



## **MEDICAL PROBLEMS**

### **INSTRUCTIONAL OBJECTIVES**

**At the end of the course the wechakorn will be able to:**

- (1) Provide primary medical care for patients suffering from fever, abdominal pain, coughing, headache, parasites in the feces, dyspnea, painful or bloody urination, palpitations, jaundice, edema, diarrhea, pallor or weakness, vomiting, enlarged thyroid gland, nutritional problems, and numbness.**
- (2) Provide necessary care for patients suffering from serious illnesses before refer them to a hospital or doctors.**
- (3) Provide continuing care for patients those who are referred by a doctor.**
- (4) Recognise serious illnesses and refer the patients to hospital or doctor.**
- (5) Give patient education.**

**Previous Pages Blank**

Protocol 10.1 FeverChief complaint

Fever --- yes

History, symptoms, signs and investigation

Chill/high fever/severe headache/paroxysmal sweating/enlarged liver/pallor/delirium, coma/malarial parasites in peripheral blood

yes

Problems and solutions

- Malaria

- Treat

no

History of malaise for several days/headache/pharyngitis/constipation or diarrhea/high fever/relative bradycardia/abdominal pain

yes

- Typhoid fever

- Treat

no

Abrupt high fever/chill/malaise/coryza/myalgia/ these symptoms are severe but with minimal nasal discharge

yes

- Influenza

- Treat

no

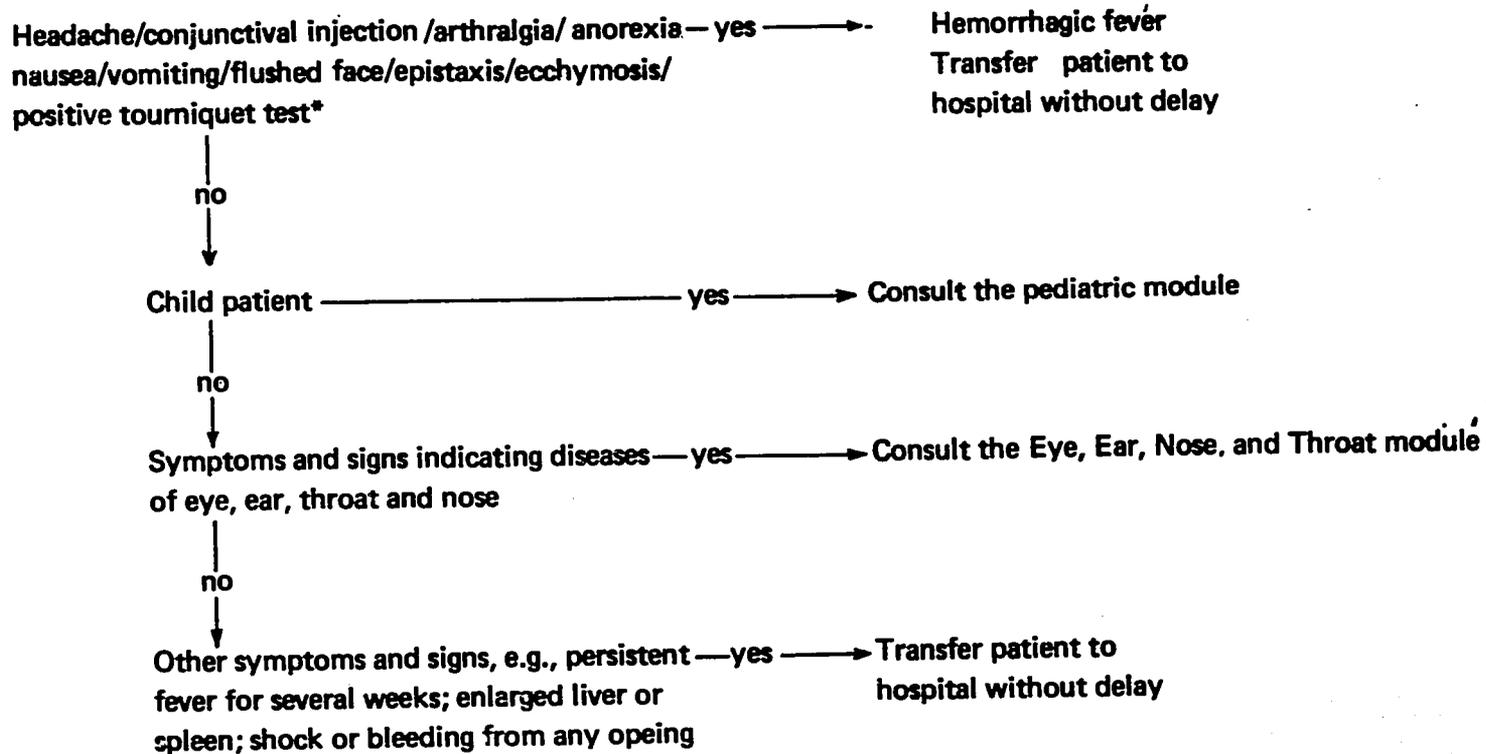
Headache/malaise/nausea/vomiting/stupor/seizure or coma/stiff neck/ paralysis of extremities

yes

- Encephalitis

- Transfer patient to hospital without delay

no



\* To perform tourniquet test  
see HEMORRHAGIC FEVER

## 1.1 Management Of Fevers

### 1.1.1 Malaria

**Specific Treatment:** Administer Chloroquine phosphate 4 tablets as a stat dose, 2 tablets six hours later and then 2 tablets daily for the next 2 days, (10 tablets altogether); or administer Fansidar 3 tablets as a single dose.

### 1.1.2 Typhoid

**General Treatment:** Soft and high calorie diets should be given, with adequate bed rest. If patient has abdominal pain, he must be transferred to hospital.

**Specific Treatment:** Chloramphenicol 1 g (4 capsules) every 6 hours until afebrile (usually in 2-5 days after treatment with Chloramphenicol), then 2 capsules every 6 hours. The treatment should be continued for 2 weeks.

### 1.1.3 Influenza

There is no specific treatment.

**General Treatment:** Aspirin, Decolgen, or Paracetamol 2 tablets every 4-6 hours as needed for high fever and pain. M. Tussis orally for severe cough. Adequate bed rest and drinking warm water are recommended.

### 1.1.4 Encephalitis or Meningitis

Give general symptomatic and supportive treatment and then transfer patient to hospital without delay.

### 1.1.5 Hemorrhagic Fever

There is no specific treatment.

**General Treatment :** Administer appropriate fluid, treat shock and so on. Then immediately transfer patient to hospital.

## 1.2 Specifics of Fever or Pyrexia

Introduction:

Normally the average body temperature is  $37^{\circ}\text{C}$  ( $36.9^{\circ}\text{C}$  -  $37.2^{\circ}\text{C}$  or  $98.6^{\circ}\text{F}$  -  $99.3^{\circ}\text{F}$ ). The rectal or vaginal temperature is usually  $0.5^{\circ}\text{F}$  to  $1.0^{\circ}\text{F}$  higher than the oral temperature. The axillary temperature is  $0.5^{\circ}\text{F}$  to  $1.5^{\circ}\text{F}$  lower than the oral temperature. Temperature, therefore, should be properly measured.

A severe and prolonged body temperature higher than  $41^{\circ}\text{C}$  ( $105^{\circ}\text{F}$ ) can produce permanent brain damage; if the rectal temperature is higher than  $43^{\circ}\text{C}$  ( $109^{\circ}\text{F}$ ), it may lead to heat stroke and often to death. In a patient with shock the body temperature is lower than normal.

The control of body temperature is a function of the brain located in the hypothalamus. When the center is stimulated by any pyrogen, the body temperature is increased. The pyrogens may be exogenous (organism) or endogenous (body tissues) in origin.

The body temperature varies according to the individual physiology, exercise, digestion, excitement, and environmental temperature.

**Signs and Symptoms Accompanying Fever :**

Since fever frequently indicates the presence of a microorganism or its toxin, it is considered as a manifestation of infection. Signs and symptoms that

profession is, his home is, etc.

Causes of certain diseases that may be encountered included:

- (1) Infection. Common infections in Thailand are malaria, typhoid fever, influenza, common colds, tuberculosis, dysentery, hepatitis, pyelonephritis, bronchitis, pneumonia, hemorrhagic fever, encephalitis, whooping cough, diphtheria, poliomyelitis, otitis media, meningitis, mumps, chickenpox, carbuncles, appendicitis, gonorrhoea, pelvic inflammatory disease, and septicemia.
- (2) Connective tissue diseases. Rheumatic fever and systemic lupus erythematosus.
- (3) Diseases of central nervous system. Head injury, cerebrovascular accident.
- (4) Malignancies. Malignancies of certain organs e.g., carcinoma of lungs, liver, cervix, uterus, ovary, breast, and skin.
- (5) Hematological diseases. Lymphomas, leukemia, hemolytic anemia, thalassemia.
- (6) Cardiovascular diseases. Myocardial infarction, congestive heart failure.
- (7) Gastrointestinal diseases. Peptic ulcer and cirrhosis of liver.
- (8) Endocrine diseases. Thyrotoxicosis, diabetes mellitus.
- (9) Physical causes. Heat stroke, trauma.
- (10) Chemicals and drugs. Drug reaction, allergies, drug abuse.
- (11) Electrolyte imbalance. Dehydration, alkalosis, acidosis.
- (12) Psychiatric disorders. Insomnia, palpitation, weakness.
- (13) Factitious fever.
- (14) Nutrition. Protein-calorie malnutrition (PCM), goiter, beri-beri.
- (15) Unknown cause.

#### 1.2.1 Malaria

Malaria is a protozoan disease of the blood. The parasite invades and destroys red blood cells. The infected person is pale and anemic. Headache and myalgia are also common. The unique features of the disease consist of chills and high fever, followed by sweating and defervescence. This typical paroxysm may recur regularly every day or every 2 or 3 days depending on the causative malarial parasite. The attacks are usually abrupt. In some cases the patients also have cerebral symptoms and they may have convulsions, paralysis, or coma; they may even die from cerebral malaria.

Physical Examination:

The patient is pale, anemic, and icteric with hepatosplenomegaly and fever at the onset of each attack.

Diagnosis:

A typical paroxysmal attack begins abruptly with rigor and high fever then diaphoresis and defervescence occurring every day or every 2 or 3 days. There is a history of residence in an endemic area.

Malarial parasites are found in blood smear examination. Blood smears should be examined at frequent intervals.

may accompany fever are:

- (1) Shaking chill is usually encountered in acute and abrupt-onset infections such as pneumonia, pyelonephritis, ascending cholangitis, and malaria.
- (2) Tachycardia is commonly observed. In general, when the body temperature is 1°C higher than normal, the pulse rate is increased 8 beats per minute in adults or 15 beats in children, but in typhoid fever or disorders of the brain the pulse rate is not accordingly increased.
- (3) The general appearance changes, for example, the face is flushed and warm, the skin is warm and dry.
- (4) Delirium or coma is frequent.
- (5) Appetite is lost, but the patient is hungry, with a dry and cracked tongue.
- (6) Urine changes occur. Decreased urination, probably of a dark color, and constipation may be observed.
- (7) Respiratory rate is somewhat increased with any fever; but, in the case of respiratory tract infection the rate may increase 2 per minute above normal for every 1° increase of body temperature.

Diagnosis:

In certain diseases, fever is of prime importance. The study of the pattern of fever is helpful in establishing a correct diagnosis, e.g., in malaria, typhoid fever, and measles. The history of the pattern of fever, environment, symptoms, and local signs detected must always be taken.

Symptoms and local signs which must be thoroughly investigated and examined are:

- (1) Skin—rashes, purpura, abscess,
- (2) Face—eyes, parotid glands, general appearance,
- (3) Mouth/throat—tongue, tonsils, pharynx,
- (4) Nose/ears—rhinorrhea, sinusitis, otitis (externa or media),
- (5) Respiratory system—respiration, respiratory sounds,
- (6) Cardiovascular system—heart sounds, heart beat,
- (7) Digestive system—tumor mass, bowel movement, liver and spleen palpation, any tenderness, characteristics of feces,
- (8) Hematological system—liver, spleen, lymph node,
- (9) Genitourinary system—urination, characteristics of urine, costovertebral pain with referred pain, leukorrhea or bleeding from the vagina; amenorrhea, history of passing urinary stones, and
- (10) Neuro-musculoskeletal system—headache, vomiting, impaired vision, stiff neck; gait, muscle tone, and integrity of joints; hyperesthesia, hypoesthesia, paralysis, arthralgia, arthritis, or articular effusion.

Management:

After proper history taking of past illnesses, familial and social history, environment, and present illness, a general physical examination should be done as mentioned above. At the same time, one must think what the cause may be and, with regard to the particular country, what disease should be considered first, in which season it is usually encountered, how old the patient is, what his

#### Treatment:

(1) Treatment of acute attack can be accomplished with Chloroquine 1 g (0.6 g base) or 4 tablets followed by 2 tablets (0.3 g) 6 hours later, and then 2 tablets (0.3 g) daily for 2 days (10 tablets total).

(2) In chloroquine-resistant falciparum, the patient should be treated with Quinine sulfate 0.6 g orally every 8 hours for 7-10 days or with 3 tablets of Fansidar in a single dose.

(3) If it is Plasmodium ovale or P. malariae, Chloroquine is given as in item 1, and Primaquine 15 mg by mouth, daily for 14 days, is added to eradicate the exoerythrocytic parasites.

(4) If the patient is comatose because of cerebral malaria, or if his urine is dark-brown or black, or if the urinary volume is less than 600 ml per day, he should be treated in a well-equipped hospital without delay.

#### Prevention:

(1) Eradicate anopheles mosquitoes that are vectors of malarial parasites by spraying DDT or insecticide to destroy young anopheles.

(2) Mosquito contact should be minimized by using mosquito netting.

(3) Chemoprophylaxis.

For individuals who have to travel to endemic areas, it is possible to suppress the symptoms by the administration of 2 tablets of Chloroquine weekly or 1 tablet (250 mg) weekly for children 8-12 years old, 200 mg weekly for children 1-3 years old, or 75 mg weekly for children under 1 year old. The medication should be taken once weekly for 1-2 weeks before leaving for endemic areas, and should be continued for 6 weeks after leaving the areas. Recently the use of 2-3 tablets of Fansidar for adults every 4 weeks in endemic areas, and once more after leaving the area for 4 weeks has been recommended.

(4) Any patient infected with malaria should be reported to the local authorities who are responsible for the eradication of the disease.

(5) In suspected cases, the peripheral blood should be examined for malarial parasites and, the persons should be advised to go to the hospital for further investigation.

#### 1.2.2 Typhoid Fever

In Thailand, typhoid fever is encountered all year round, with frequent complications. Typhoid fever is an acute systemic disease resulting from Salmonella typhi which gains access to the body by an oral route. The organism is excreted in feces and urine. The disease is therefore rather common among persons whose hygienic and sanitary conditions are poor. Typhoid fever is a filthy disease.

#### Symptoms and Signs:

The onset is insidious, with headaches, malaise, anorexia and fever. Frequently there is a chilly sensation. Constipation is also common. A dry cough is sometimes observed. Nose bleeds may occur during the early phase of the illness. The temperature gradually increases for 5 to 7 days, then plateaus as a continuous fever for 2 or 3 weeks. In some patients, in spite of the high fever,

there is a relative bradycardia. The prolonged persistent fever leads to general debility; patients are weak and anorectic. Abdominal pain and marked distention are usual. Constipation (commonly found during the early phase of the illness) may give way to diarrhea later in the course of the disease. After the third week or beginning of the fourth week, the symptoms slowly abate and the temperature returns to normal over a period of days if no complication intervenes.

#### Physical Examination:

The liver and spleen are frequently enlarged and palpable by the end of the first week of illness. Abdominal tenderness is frequent, and distention occurs in the majority of cases. Marked abdominal pain with rigidity suggests peritonitis due to perforation of the bowel. This is an emergency and the patient must be rapidly transferred to hospital for proper care.

#### Common Complications :

(1) Intestinal hemorrhage may be mild or so severe that it results in shock. Gross blood may be present in feces or melenas.

(2) Intestinal perforation is common in the distal ileum, leading to peritonitis.

(3) Some patients have persistent Salmonellae in the gallbladder, and the organisms are excreted in feces for years, often for life. These carriers are responsible for spread of the infection.

#### Treatment :

(1) Chloramphenicol is the drug of choice for the treatment of typhoid fever. The dose should be 50 mg per kilogram of body weight per day, divided into three or four equal doses at intervals of 6 to 8 hours. After the patient has become afebrile, 2 to 5 days after treatment, the dose may be reduced to 30 mg/kg per day. If Chloramphenicol cannot be given orally comparable doses should be given parenterally. Therapy should be continued for 2 weeks.

(2) If chloramphenicol resistance is encountered or its use is contraindicated, Ampicillin is recommended. Ampicillin in doses of 80 mg/kg per day or 6 g per day for adults divided into four or six doses given parenterally or orally, is also effective in the treatment of typhoid

#### Advice:

(1) Adequate bed rest

(2) Soft, low-fiber diet

(3) Avoid laxatives and enemas, despite constipation, because of the danger of precipitating intestinal hemorrhages or perforation.

(4) Salicylates should not be used, because, in addition to their effects on blood platelets and irritative action on the bowel, these compounds can induce wide swings in temperature with very uncomfortable chills and sweats.

(5) The patients' feces and urine should be properly disinfected using routine sanitary techniques.

#### Prevention:

(1) Adults should receive 2 doses of 0.5 ml of typhoid vaccine intramuscularly, 1 or 2 weeks apart, before traveling to endemic areas. A yearly booster is required to maintain immunity.

(2) Cooking materials and water should always be clean. Avoid using food contaminated by flies or cockroaches.

(3) Housing sanitation, water supplies, and waste disposal should be inspected and checked by health personnel.

#### 1.2.3 Influenza

Influenza is an acute respiratory infection. It is highly contagious and is epidemic almost every year due to various types of influenza viruses.

#### Symptoms and Signs:

Influenza may begin with a cough, malaise, and chilly sensation, but more often this is preceded by generalized or frontal headache and diffuse myalgia, particularly in the legs and over the lumbosacral area. Pain and spasm of the abdominal muscles are also marked. Body temperature rises abruptly with chilliness, severe malaise, flushed face, nausea, anorexia, sneezing, watery rhinorrhea, nasal congestion, conjunctival suffusion and burning, dry throat, and cough with tenacious mucoid sputum. If there is no complication, patients will spontaneously recover in 2 to 3 days, or occasionally, in a week.

#### Treatment:

(1) There is no specific treatment.

(2) Supportive treatment includes the following.

Aspirin or Paracetamol for headache, myalgia and fever.

Decolgen or Pacidin, 2 tablets orally three times daily, for running nose and nasal congestion.

Benadryl expectorant or M. Tussis for cough.

Patients should drink a lot of water and have adequate rest.

#### Prevention:

If practical, patients should be temporarily isolated, to avoid the spread of infection.

#### 1.2.4 Encephalitis

The encephalitis encountered in Thailand is usually caused by Japanese B. encephalitis virus. Outbreaks may occur in any season, but more frequently in the rainy season.

#### Symptoms and Signs:

Patients often have abrupt fever and a generalized or occipital headache. There may be stiff neck, nausea and vomiting. Child patients are irritable and may have seizures and rapidly lapse into coma. Adult patient often have dizziness, stupor, and amnesia. Myalgia may also be present. The fever persists for 3 to 10 days or, in adults, for perhaps 3 weeks, and then gradually recedes. The fatality rate in the acute phase may be 33% or higher. In those who sur-

vive the sequelae may lead to neurological abnormalities or paralysis of extremities.

Treatment:

(1) Symptomatic and supportive therapy includes adequate fluids electrolytes, calories, and vitamin replacement and supplement.

(2) Patients should be transferred to hospital without delay.

Prevention:

Control mosquito (*Culex tritaeniorhynchus*), vector of the disease.

#### 1.2.5 Meningitis

The causative organism of meningitis may be bacteria, fungi, or a virus. Symptoms and signs of meningitis are briefly described here.

The patients have high fever with severe headache. There may be generalized convulsion, stupor or coma. The unique sign which can be detected is stiffness of the neck. When the examiner attempts flexion of the neck, resistance will be experienced.

Treatment:

Any patient with meningitis must be transferred without delay, to a well-equipped hospital for proper care. He must be treated with appropriate and adequate antibiotics after the examination and culture of cerebrospinal fluid.

#### 1.2.6 Hemorrhagic Fever

Hemorrhagic fever is usually a disease of children, but adults may also contract the disease. Both sexes are equally affected. Outbreaks are confined to the rainy season during which the mosquitoes (*Aedes aegypti*) are numerous. It tends to break out in July and August. In Thailand, epidemics often take place every other year.

Symptoms and Signs:

The illness begins abruptly with a cough, pharyngitis, headache, anorexia, nausea, vomiting and abdominal pain. This continues for 2 to 4 days. Petechiae, most frequently located on the forehead and distal extremities, are seen in half of the cases on the second or third day of the illness. On patients with no petechiae, if the tourniquet test is performed the result of the test is usually positive. The patients may vomit material that looks like coffee-grounds because of gastrointestinal hemorrhage; in severe bleeding cases, shock can eventually develop. In this critical period, the body temperature is subnormal; the extremities are cold and clammy and patients become restless and dyspneic. If patients survive the shock, they will rapidly recover. The whole course of the illness usually takes 5-10 days. In mild cases with no bleeding, the course of the disease is shorter and patients may have only the fever manifestation.

Tourniquet Test:

(1) Measure the blood pressure at the antecubital fossa, e.g., BP = 120/80 mmHg.

(2) Determine whether there is any ecchymoses of the antecubital areas before measuring the pressure.

(3) If no ecchymosis is observed, perform step 1 and keep the blood pressure at midpoint of systolic and diastolic pressures, e.g., 100 mmHg, for 5 minutes.

(4) Release the pressure to zero, then take the arm cuff off.

(5) Count any bleeding spots induced. If there are more than 10 spots in one square inch, it is considered a positive tourniquet test.

**Treatment:**

There is no specific treatment for hemorrhagic fever, but appropriate and adequate fluids, e.g., electrolytes or plasma intravenously in severe cases, are helpful. This measure requires skilled personnel and practical equipment.

**Prevention:**

Eradicate or control the vector of the disease (*Aedes aegypti*) and also the breeding places of mosquitoes.

Avoid mosquito bites. Always sleep under a mosquito net.

Isolate patients.

**Advice:**

Consult doctor if any child has persistent fever for several days. Never abuse antipyretics.

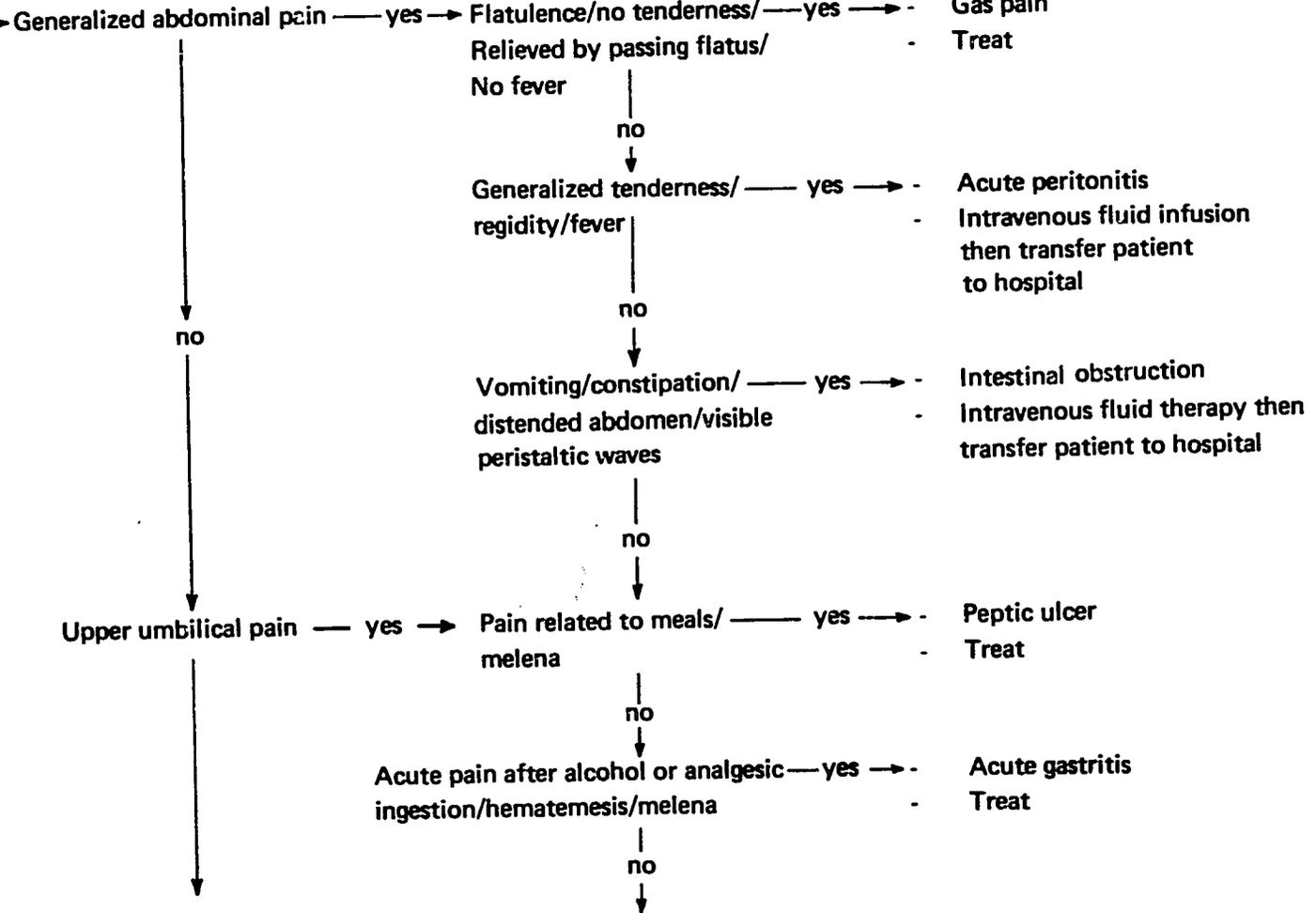
**Protocol 10.2 Abdominal Pain**

**Chief complaint**

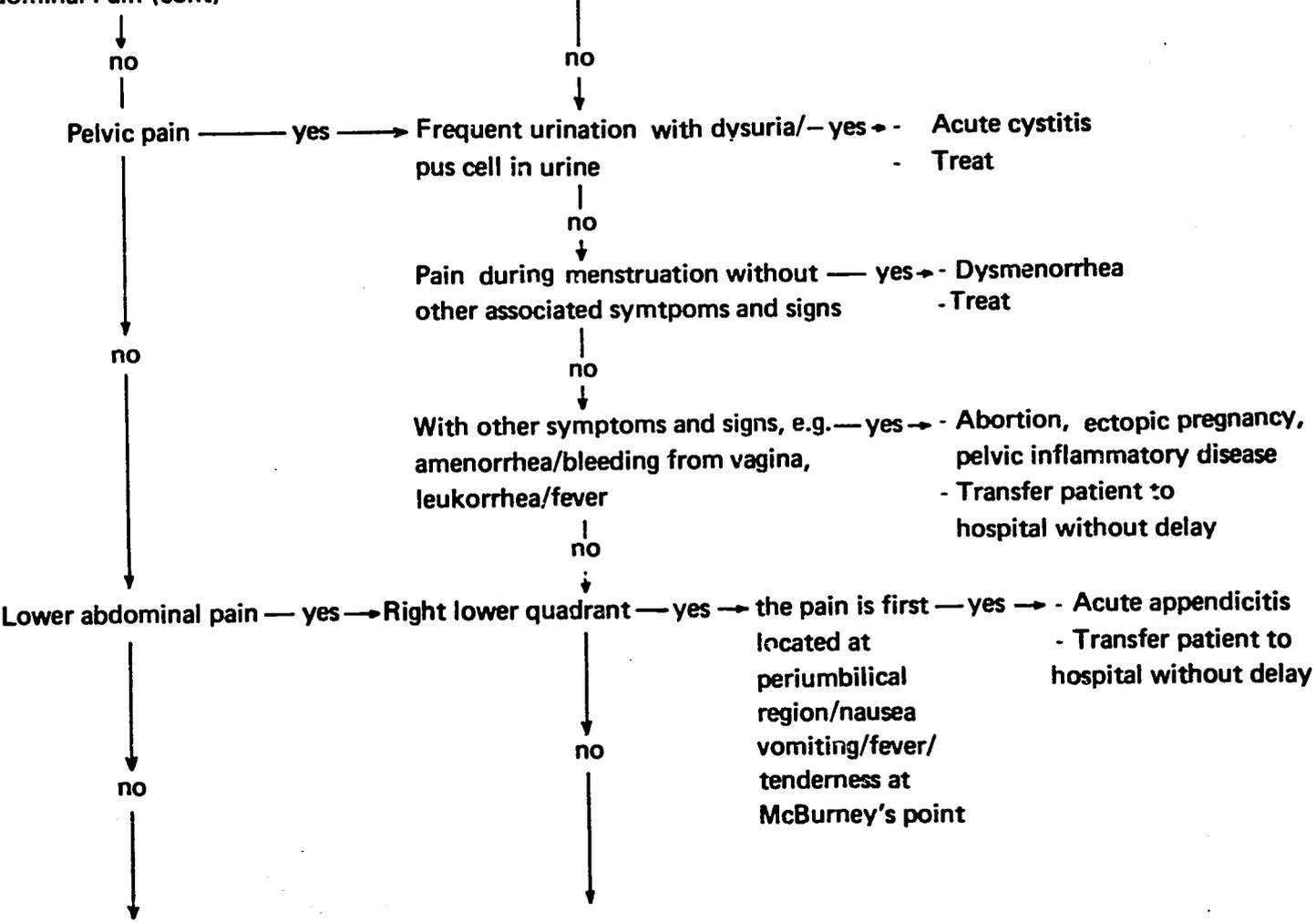
Abdominal pain

**History, symptoms, signs and investigation**

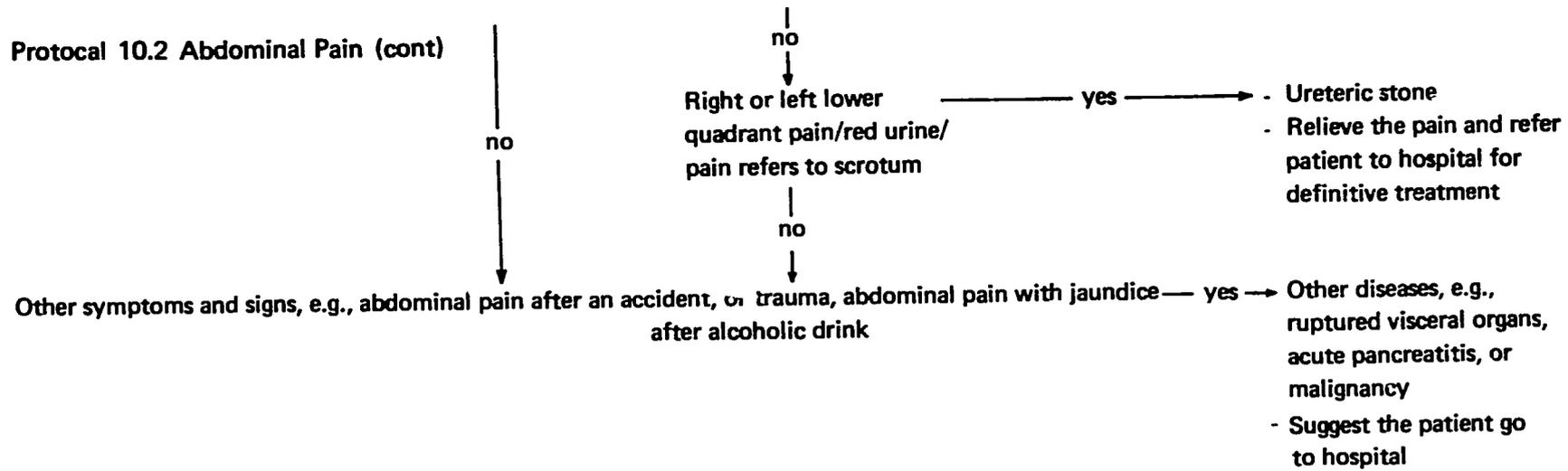
**Problems and solutions**



**Protocol 10.2 Abdominal Pain (cont)**



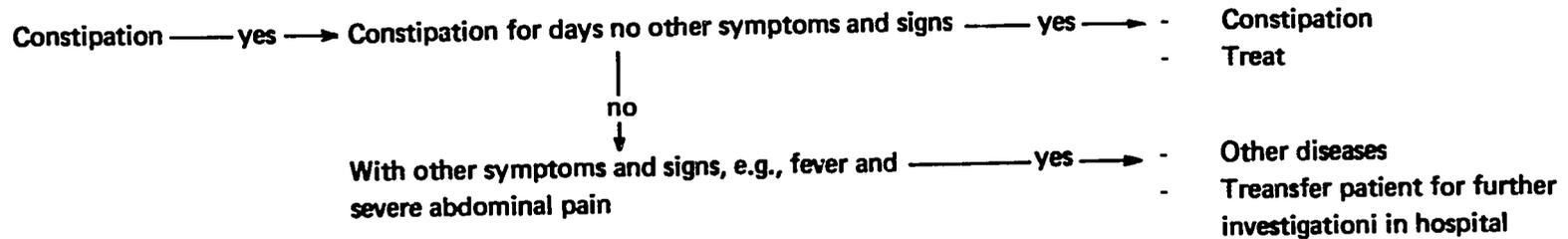
**Protocol 10.2 Abdominal Pain (cont)**



Chief complaint

History, symptoms, signs and investigations

Problems and solution



## 2.1 Management of Abdominal Pain

### 2.1.1 Intestinal Flatulence or Gas Pain

#### Antiflatulants:

Sodamint, 1-2 tablets 3 times a day after meals, or  
M. Carminative, 1-2 tablespoons 3 times a day after meals.

#### Digestive Enzymes:

M. Stomachica 1-2 tablespoons 3 time a day before meals, or  
Veracolate 1 tablet 3 times a day after meals.

Advice. Patient should be urged to chew food thoroughly before swallowing, to use false teeth if necessary, and avoid eating gas-producing foods such as beans.

### 2.1.2 Peptic Ulcer

#### Antacids :

Magnesium hydroxide or aluminum hydroxide, 2 tablespoons every 2 hours (except when asleep), and 10 tablespoons at bedtime when the pain is severe, then 2 tablespoons 1 hour after meals and at bedtime after the pain improves.

#### Anticholinergic Drugs:

Antrenyl, 1 tablet, 3-4 times daily, Daricon, 1 tablet, 2 times daily, or Belladonna with phenobarbital (Belladenal), 1 tablet, 2-3 times daily.

#### Advice:

- (1) Avoid spicy foods, alcohol, cigarettes, coffee, and analgesics.
- (2) Soft and easily digestible foods are suggested.
- (3) Avoid anxiety and worry.
- (4) If hematemesis or melena occurs, suggest the patient have emergency care in hospital.

### 2.1.3 Acute Gastritis

Advise patient to take nothing orally until the abdominal pain improves, and then to take liquids or a soft diet. Prescribe tranquilizers, e.g., Meprobamate 1 tablet 2-3 times daily. Administer antacids as for peptic ulcer.

### 2.1.4 Acute Cystitis

For detailed treatment, consult the protocol for dysuria. Treat infection with appropriate antibiotics, for example Tetracycline 2 capsules every 6 hours for 4 days, or Ampicillin (250 mg) 2 capsules every 6 hours for 4 days.

### 2.1.5 Dysmenorrhea

See details in the Gynecological Problems Module. General treatment includes analgesics, for example, Deparon, 2 tablets every 4-6 hours for pain.

### 2.1.6 Abortion and Ectopic Pregnancy

Treatment. The diagnosis must be confirmed by a doctor, and the specific treatment must be provided in a well-equipped hospital.

Supportive Measures. Infuse 5% D/S 500-1000 ml intravenously and transfer patient to hospital without delay.

### 2.1.7 Pelvic Inflammatory Disease

Symptomatic Measures and Treatment. Relieve the pain by placing a warm bag on the abdomen, or administer 2 tablets of aspirin as needed. Transfer patient for definitive treatment in hospital.

### 2.1.8 Acute Appendicitis

Treatment: Emergency operation is required. Transfer patient to hospital without delay.

Contraindication. Antispasmodics, e.g., Baralgin and cathartics are contraindicated.

### 2.1.9 Stone in Ureter

Symptomatic Measures. Administer analgesics and antispasmodics, e.g., Baralgin 1-2 tablets 3 times daily, or Spasmocibalgin 1-2 tablets 3 times daily.

Treatment: Refer patient to hospital for urological operation.

### 2.1.10 Constipation

Treatment. Administer cathartics or laxatives, e.g., E.L.P. Co., 2 tablespoons at bedtime, Dulcolax 1-2 tablets at bedtime, or rectal suppository inserted at bedtime.

Advice: Suggest patient drink large quantities of water, eat food rich in fiber, cereals, and fruits, and take regular exercise.

## 2.2 Specifics Of Abdominal Pain

The correct interpretation of acute abdominal pain is not easy, since the causes of the pain are diverse and often the pattern of the pain is nonspecific. History-taking and physical evaluation are of importance in establishing an accurate diagnosis.

Evaluate whether it is an acute or chronic abdominal pain. Certain substances such as alcohol may cause acute abdominal pain while peptic ulcer is often a cause of chronic abdominal pain. Ask whether there is vomiting and constipation, and what the characteristic of feces is. Vomiting plus constipation suggests gastrointestinal obstruction; chronic abdominal pain and melena suggest peptic ulcer, but malignancy should be also borne in mind, particularly in cases that do not respond to adequate treatment.

The onset of the pain is of importance. For example, an abdominal pain when the stomach is empty or after eating suggests peptic ulcer. The relationship between pain and vomiting may give a clue. In acute appendicitis, abdominal pain develops before vomiting. Also, medications such as aspirin, phenylbutazone, and prednisolone can induce peptic ulcers.

Physical Examination:

Fever. Abdominal pain with fever suggests inflammatory diseases, e.g., pelvic inflammatory disease, peritonitis, acute appendicitis.

Site of Pain. Pain in the right lower quadrant of the abdomen may be due to appendicitis, ureteric stone, salpingitis, or oophoritis. Generalized abdominal pain with guarding and rigidity suggests peritonitis.

**Referred Pain.** An abdominal pain due to ureteric stone often refers to the scrotum, pain from pancreatitis tends to refer to the back, and so forth. Knowledge of the characteristics of leukorrhea, feces, and urine is of enormous value in the assessment of patients with abdominal pain.

### 2.2.1 Intestinal Flatulence or Gas Pain

The patient may have intestinal flatulence because of aerophagia or eating too much gas-producing food. (e.g., beans, cabbage, popcorn, watermelon), gastric hypochlorhydria or achlorhydria, pancreatic insufficiency, yeast, certain intestinal parasites (e.g., *Giardia lamblia*), and unfamiliar food can also cause flatulence. In addition to the flatulence, gurgling sounds may also be clearly heard; there is no tenderness; the pain is not severe and the patient feels better when he belches or passes gas.

**Treatment :**

Have the patient avoid eating gas-producing foods tell him to thoroughly chew the food before swallowing and not to eat too much at a time. Administer gas absorbents. Whenever gas-producing food is ingested, Sodamint 1-2 tablets, M. Carminative 1-2 tablespoons, or 1 tablet of Veracholate 3 times a day after meals, are recommended. M. Stomachica, 1 tablespoon 3 times daily before meals is also helpful.

### 2.2.2 Acute Peritonitis

Acute peritonitis may result from conditions such as pancreatic enzymes during acute pancreatitis or microorganisms from the gastrointestinal tract. The most common preceding causes are peptic ulcers with perforation, ruptured appendix, and small bowel perforations complicating typhoid fever.

**Symptoms and Signs :**

The symptoms usually consist of increasing abdominal pain, distention, nausea and vomiting, inability to pass feces or flatus, fever, hypotension, tachycardia, thirst and oliguria. The abdomen is usually acutely tender and rigid. Bowel sounds gradually decrease and disappear as the illness progresses.

**Treatment :**

Rapid and adequate fluid intake and electrolyte therapy are necessary. Sometimes plasma should also be replaced. Appropriate and adequate antibiotics are also of prime importance. If it is a surgical case and operable, an emergency operation is required. If the patient's general condition is not suitable for an operation, it should be postponed until the condition is restored and optimal for surgery. In that case, antibiotics and supportive measures are essential. Peritonitis must, in any case, be treated in hospital without delay.

### 2.2.3 Intestinal Obstruction

Mechanical intestinal obstruction may be caused by adhesions, internal or external hernia, gallstone, intussusception, prolonged intestinal contraction, or ascaris. The cause may be non-mechanical in origin.

**Symptoms and Signs:**

Acute mechanical obstruction is characterized by cramping abdominal

pain, nausea, vomiting, abdominal distention, and constipation. In upper bowel obstruction, the vomiting is more profuse and the onset is rather rapid. In lower gut obstruction, vomiting usually comes later, after the development of constipation and abdominal distention. Pain may occur in the midabdomen or lower abdomen, according to whether it is a small or large intestinal obstruction. Profuse vomiting may lead to electrolyte and fluid loss that may result in shock. If the site of the obstruction becomes necrosed, rupture of the bowel is very common, and this can lead to peritonitis.

Treatment:

Infuse 5% dextrose in physiological saline intravenously, at an adequate rate, and transfer patient to hospital for further investigation, definite diagnosis, and proper treatment.

#### 2.2.4 Peptic Ulcer

Peptic ulcer implies an ulcer in the lower end of the esophagus, in the stomach, or in the first part of small intestine, which may result from hypersecretion of gastric hydrochloric acid and pepsin. The incidence is higher in cigarette smokers than in noncigarette smokers. Various drugs may induce the ulcer, e.g., salicylate (Aspirin), Indomethacine, Phenylbutazone, and glucocorticoids (e.g., Prednisolone).

Symptoms and Signs:

In general, abdominal pain develops when the stomach is empty; it is relieved after ingestion of food, but 2-3 hours later the pain reappears. The pain may begin after meals or around midnight. The pain is located at the epigastrium, around the umbilicus or its right side, and it is usually above the umbilical level. It is also tender; if there is melena this signifies that the ulcer is bleeding. If the bleeding is massive, the feces will contain fresh blood and there may also be some bloody vomiting. In addition, the ulcer may be perforated, leading to peritonitis. The ulcer itself may also obstruct the gastrointestinal tract.

Treatment:

**Antacid Therapy.** For example, magnesium hydroxide or aluminium hydroxide may be used. Magnesium is usually not used alone, but together with aluminium hydroxide, to minimize the constipation effect of the latter. For severe pain, aluminium hydroxide gel, 2 tablespoons, may be administered every 2 hours except when the patient is sleeping, and as much as 150 ml may be ingested at bedtime. When the pain is relieved, the antacid is administered 1 hour after meals and at bedtime.

**Anticholinergic Drugs.** The agents reduce the output of gastric acid. Prolonged use of anticholinergic agents probably diminishes the incidence of exacerbations of duodenal ulcer. Usually they are administered before meals and at bedtime. Their side effects are dryness of mouth, constipation, and blurred vision. Anticholinergic agents should not be used in patients with glaucoma, or prostatic hypertrophy, or when pyloric obstruction is present or imminent. Commonly used anticholinergics are Antrenyl (1 tablet) 30 minutes before meals and at bedtime, Daricon (1 tablet) 2 times daily; belladonna with pheno-

barbital may be used alternatively.

Ingestion of alcohol, coffee, and irritating foods, and cigarette smoking should be restricted. Reassurance, support, and psychotherapy, as well as adequate rest, are important recommendations. If no improvement is observed 5-6 days after such measures, suggest patient go to the hospital for definite diagnosis and treatment.

Note: Do not use anticholinergics in gastric ulcer cases, because they prolong the emptying time of the stomach. This facilitates the release of gastric acid and pepsin that aggravate the ulcer.

Prevention:

Never abuse the use of analgesics. In the case of peptic ulcers, if analgesics are necessary, acetaminophen after meals is recommended. Avoid consuming alcohol, and stop smoking. Maintaining mental tranquillity is also helpful.

### 2.2.5 Acute Gastritis

One very common disorder of the gastrointestinal system is acute gastritis, which strikes all age groups. The causative agents may be erosive or irritative substances such as alcohol, salicylates, microorganisms or bacterial toxins, viruses, and food idiosyncracies (e.g., shellfish).

Symptoms and Signs :

Anorexia is usually associated with acute gastritis. Common symptoms and signs are epigastric discomfort, nausea and vomiting. In addition, there may be hematemesis, melena, or frank blood in feces, diarrhea, fever, and myalgia, which often develops 1 hour after the ingestion of certain agents.

Treatment :

Prescribe bed rest and nothing ingested by mouth until condition is improved. Patient is gradually permitted to ingest fluid, then fluid diet, then soft food, then normal diet. If the patient is anxious, tranquilizer may be administered, e.g., Meproamate (1 tablet) 2-3 times daily. Salicylate, alcohol, and spicy foods are to be avoided. In general, the patient recovers within 2-3 days.

### 2.2.6 Pelvic Inflammatory Disease (PID)

Inflammation of the pelvic cavity, in which are the uterus, salphinxes, and ovaries, commonly creates pain in the lower abdomen. The causative factors are almost always bacteria.

Symptoms and Signs :

The pain is located in the lower abdomen. It may be unilateral or bilateral, depending on the affected organ. Usually the fever is high and the patient has chills and shaking. The leukorrhea has a bad odor. The uterus may be swollen and tender, and bowel movements may be decreased.

Treatment :

Specific treatment requires appropriate and adequate antibiotics. For general treatment, the patient should be put in bed in Fowler's position with a warm bag on the lower abdomen, or Aspirin should be taken orally every 4 hours for abdominal pain.

### 2.2.7 Abortion

Abortion may occur spontaneously because of pregnancy disorders, or it may be criminally induced.

#### Symptoms and Signs:

The patient may have a threatened, a complete, or an incomplete abortion. This can be diagnosed by pelvic examination. All patients have bleeding from the vagina. Massive blood loss can lead to shock. Some patients have lower abdominal pains; if generalized lower abdominal pain and fever develop, this signifies the presence of the intervening infection.

#### Treatment :

The patient must be treated in hospital without any delay. After diagnosing, 5% D/S is intravenously infused (this is not necessary if vaginal bleeding is mild), and the patient is then referred to hospital.

### 2.2.8 Ectopic Pregnancy

Ectopic pregnancy occurs once in 150-200 pregnancies. It tends to take place at the uterine tubes. During the reproductive period, ectopic pregnancy may be encountered at any time but most often during the ages of 20-40.

#### Symptoms and Signs:

Any pregnant woman who has amenorrhea for 7-8 weeks, with vaginal bleeding, should be expected to abort. The pain may refer to the back, and a lump may be palpable in the lower abdomen. When the site of the pregnancy is ruptured and bleeding is profuse, the patient usually experiences severe abdominal pain and shock; if untreated the patient will eventually die.

#### Treatment :

Rapidly perfuse 5% D/S intravenously and transfer patient immediately to hospital for emergency operation to stop the bleeding and remove the fetus and placenta.

### 2.2.9 Acute Appendicitis

Inflammation of appendix is one of the most common cause of acute abdominal pain. The disease occurs in all age groups. If it is not treated promptly, in its extreme form the patient may die.

#### Symptoms and Signs :

Usually the first symptom is acute periumbilical pain, but in young children the abdominal pain tends to be generalized. Pain varies from mild to severe and is followed by anorexia, nausea and vomiting. Low-grade fever may develop. Two to three hours later the pain shifts to the right lower quadrant of the abdomen, and tenderness, spasm and rebound tenderness become increasingly prominent. Diarrhea may appear due to irritation of the bowel, but generally constipation occurs. Sudden cessation of abdominal pain some hours after its onset signifies perforation of a distended appendix, infarction of the appendix, or accumulation of enough peritoneal fluid to lubricate the moving inflamed surface. If the appendix is in the retrocecal position, the anterior

abdominal signs may be negative. Evidence of the inflammation of a retrocecal appendix may be obtained by raising the straight leg forwards and backwards. This provokes the pain at the site of inflamed appendix.

Treatment:

(1) Cathartics are absolutely contraindicated, or the appendix will be ruptured. Antispasmodics, such as Baralgin are not good either, because they will mask the critical symptoms and signs in later evaluation.

(2) Initiate parenteral administration of fluid and electrolytes and transfer the patient immediately to hospital for emergency removal of the appendix.

(3) Patients generally recover promptly from an uncomplicated appendicitis attack. If it is complicated by abscesses, or peritonitis with ileus, surgical drainage is required, as well as energetic treatment with gastrointestinal intubation, antibiotics, and careful control of fluid and electrolyte balance.

#### 2.2.10 Constipation

Constipation may result from a large bowel obstruction, e.g., carcinoma of the colon or from inactive small intestinal movement or severe contraction of the large intestine. Most commonly, however, constipation results from habits established in childhood.

Symptoms and Signs:

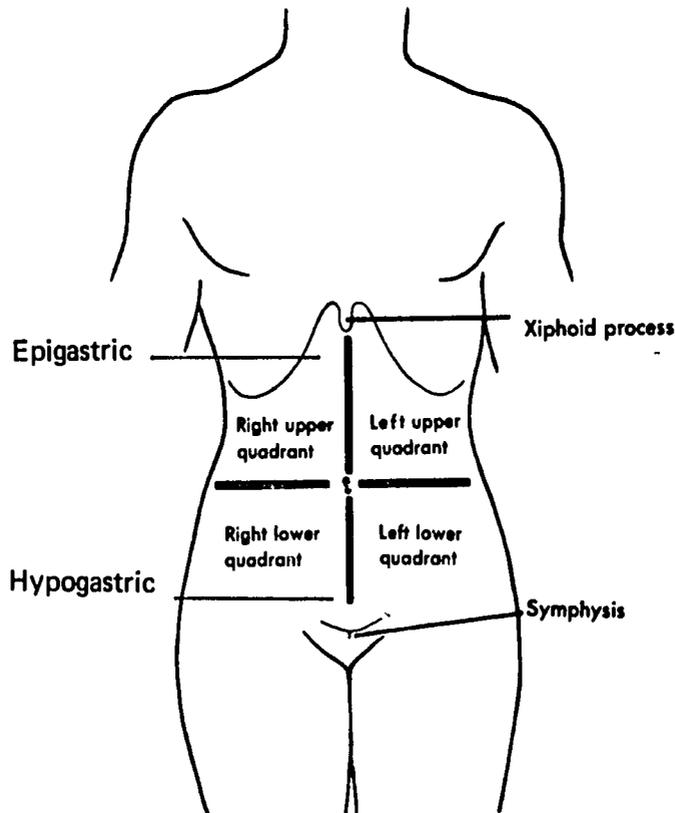
The longer the feces in the distal large bowel, the more impacted it becomes. There may be lower abdominal pain and diarrhea alternating with the constipation. Anorexia, abdominal discomfort, belching, flatus, headache and fatigue may also develop. These may be due to the dysfunction of the bowels and partially due to anxiety about the constipation.

Treatment:

It is necessary to establish the cause of constipation whenever confronted with such a problem. General principles of treatment of constipation are to encourage the patient to defecate regularly and naturally, without interrupting the normal small bowel function. For bedridden patients, laxatives and enemas may be necessary. At times the fecaliths must be evacuated before a rectal suppository or soap and enema are applied.

In general foods rich in fiber are recommended. In most individuals the call to stool occurs in the morning after breakfast. Patients are instructed to try not to use rectal suppositories. Mild cathartics with abundant water at bedtime may be used temporarily, in some cases. If the full regimen is ineffective, the patient should be evaluated by a doctor as soon as possible, for a definite diagnosis.

## Superficial Abdominal Areas Related to Abdominal Pain



**Fig. 12-1.** Division of the abdomen into quadrants.

Causes of abdominal pain are diverse. They include inflammation, obstruction, and trauma. They may originate in the intraabdominal organs, peritoneum, or extraabdominal organs, or they may be psychological. Some common important causes of abdominal pain are:

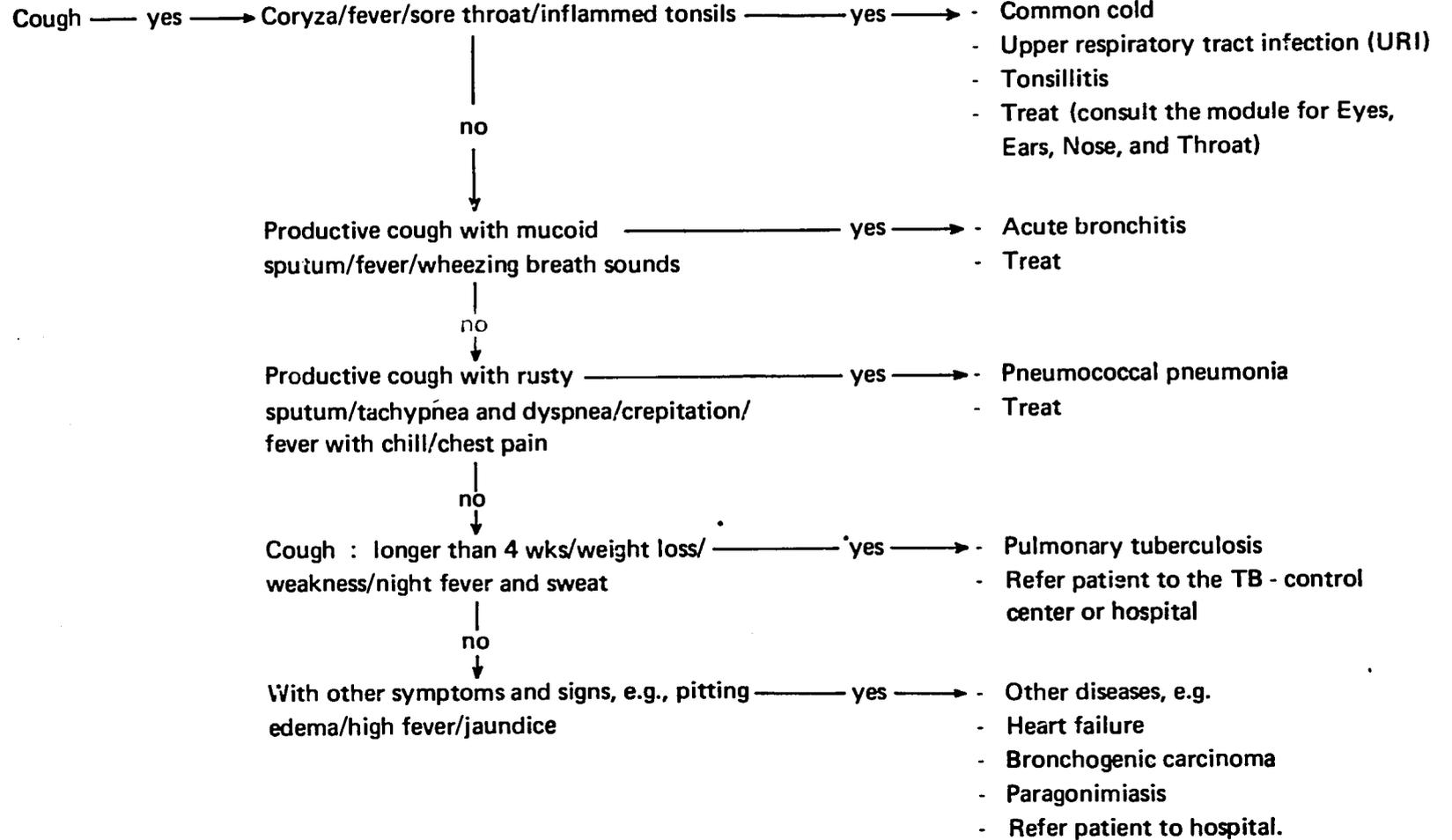
- (1) Epigastric pain. This pain may indicate a gastric ulcer, duodenal ulcer, early appendicitis, or gastritis.
- (2) Umbilical pain. This pain may indicate appendicitis, peritonitis, obstruction of stomach or intestine, or enteritis (inflammation of small intestine).
- (3) Hypogastric pain. The pain may indicate cystitis or dysmenorrhea.
- (4) Lateral abdominal pain. The pain may indicate hepatitis, liver abscess, gallbladder stone, renal stone, colitis, or pleurisy.

**Protocol 10.3 Cough**

Chief complaint

History, symptoms, signs, and investigation

Problems and solutions



### **3.1 Management of Cough**

#### **3.1.1 Acute Bronchitis**

##### **Specific Treatment :**

- (1) Antibiotics, e.g., Tetracycline 1-2 capsules (250-500 mg) 4 times daily; or Ampicillin 1-2 capsules (250-500 mg) 4 times daily (½-1 hour before meals).
- (2) Bronchodilator, e.g., Aminophyllin 1 tablet 4 times daily.
- (3) Antipyretic 2 tablets as necessary.

##### **General Treatment:**

Rest, avoid cigarette smoking, have adequate calories and fluid intake.

#### **3.1.2 Chronic Bronchitis**

##### **Specific Treatment:**

Treat the cause of chronic cough, e.g., bronchial asthma, carcinoma of bronchus.

- (1) Antibiotics, cough suppressant (for dry cough), e.g., Codeine sulphate 15-50 mg every 3-4 hours; expectorant (for productive cough), e.g., Ammon carb et chloride 2 teaspoons 4 times daily.
- (2) Bronchodilator, e.g., Aminophylline 1 tablet 4 times daily.
- (3) Antihistaminic, e.g., Chlorpheniramine (4 mg), 1 tablet in the morning and at bedtime.

##### **General Treatment:**

Avoid airway-irritating substances such as dust, allergens, smoke.

#### **3.1.3 Pneumococcal Pneumonia**

##### **Specific Treatment:**

Penicillin-G (Benzyl penicillin) 100,000 units intramuscularly every 6 hours until afebrile for 48-72 hrs; or procaine penicillin 600,000 units intramuscularly every 12 hours for mild to moderate pneumococcal pneumonia.

##### **General Treatment:**

- (1) Soft digestible, high protein and high caloric diet.
- (2) For a severe cough that disturbs sleep, codeine phosphate 15-50 mg every 3-4 hours is of help.

### **3.2 Specifics of Cough and Related Problems**

#### **Cough:**

A cough is a cardinal symptom of respiratory tract problems from the oropharynx to terminal bronchioles. A cough may also accompany heart and other diseases. Coughing is initiated by reflex, the center of which is located in medulla. It provides a means of clearing out tracheobronchial secretions and foreign bodies. It may be a dry or a productive cough. A sudden explosion of coughing is usually a result of obstruction of the trachea. Coughing may result from the presence of foreign bodies in the respiratory tract. In addition to coughing there may also be vomiting, e.g., in pertussis.

### Dyspnea:

Dyspnea is often associated with increased respiratory rate. Shortness of breath and difficulty in breathing at rest are more commonly encountered in congestive heart failure than in chronic lung disease. Dyspnea may also be observed in pneumonia, spontaneous pneumothorax, bronchial asthma, and massive atelectasis. Another symptom that may be encountered is orthopnea (dyspnea upon assuming the supine posture), which is commonly seen in congestive heart failure and bronchial asthma.

### Sputum:

In bronchitis or bronchial asthma, the sputum is usually mucoid– yellow-green with a foul smell in cases of bacterial infection, frothy sputum in pulmonary congestion, and rusty sputum in pneumococcal pneumonia.

### Wheezing:

Wheezing is the result of the narrowing of bronchioles. It is heard during respiration, and is usually found in cases of bronchial asthma or bronchitis.

### Chest Pain:

Chest pain may result from inflammation of the pleurae or chest wall. Chest pain in angina pectoris or acute myocardial infarction is often substernal, radiating to the neck, jaw, left shoulder, or arm; this usually develops after severe exercise. This is due to myocardial ischemia but chest pains may also result from disease of the diaphragm.

### Hemoptysis:

Hemoptysis is commonly encountered in bronchitis, pulmonary tuberculosis, bronchogenic carcinoma or carcinoma of the lungs, and in other certain diseases of the bronchial trees and lungs.

#### 3.2.1 Bronchitis

Acute bronchitis due to virus infection is a common disease of the upper respiratory tract. In healthy adults, the symptoms and signs are usually not severe, but in small children it may produce airway obstruction.

#### Symptoms and Signs:

The patient usually has a severe productive cough with thick sputum and fever. Wheezing and crepitation can be detected both in inspiratory and expiratory phases.

#### Treatment:

Avoid cigarette smoking. Inhale warm, moist steam or administer Potassium iodide solution, 2 teaspoons every 6 hours, to promote the expectoration of sputum. Give Aminophyllin, 1 tablet, 3-4 times daily as a bronchodilator. or a severe cough, M. Tussis and Codeine sulfate may be given. Use an antipyretic such as Aspirin

To prevent complications from bacterial infection in small children and patients with chronic lung and heart disease, Penicillin V or Tetracycline is given every 6 hours but the doctor should be consulted first.

Treatment of chronic bronchitis is time-consuming. It is necessary to establish the causative factor. When the sputum becomes thick and purulent-like,

Penicillin or Tetracycline is given. For a dry cough, cough suppressant and a bronchodilator are recommended. In certain cases, antihistamine is helpful in lessening bronchial inflammation.

### **3.2.2 Pneumonia**

Pneumonia is an inflammation of the lung tissue which is usually caused by bacterial or viral organisms.

**Symptoms and Signs:**

Approximately 80% of all pneumonia is caused by pneumococci. This pneumonia is often preceded for a few days by coryza or some other form of common respiratory disease. There is a sudden shaking chill, with a rapid rise in temperature and corresponding tachycardia, and an increase in respiratory rate. The patient commonly develops severe pleuritic pain, a productive cough of rusty mucoid sputum, rapid and shallow respiration, and may have abdominal distention. In the untreated disease, after 7-10 days diaphoresis, abrupt defervescence and dramatic improvement occur if there are no complications. In severe inflammation of the lung, the manifestations mimic congestive heart failure and the patient may die because of empyema, meningitis or pericarditis.

**Complications:**

In the course of pneumococcal pneumonia, complications may develop, such as atelectasis, delayed resolution, empyema, pericarditis, or meningitis.

**Treatment:**

The antibiotic of choice in the treatment of pneumococcal pneumonia is Penicillin G (Benzyl penicillin) 100,000 units intramuscularly every 6 hours until afebrile for 48-72 hours. Then the antibiotic is stopped.

**Prevention:**

Pneumococcal pneumonia is not a common contagious disease, but the earlier the antibiotic treatment is started, the better the result is. Prevention of the disease usually causes no significant problem.

Patients with pneumonia should avoid contacting patients with congestive heart failure, pulmonary edema, or other chronic diseases. If the latter develop pneumonia, their conditions usually get worse rapidly.

**Recommendation:**

In case there is no satisfactory response after a 3-day course of therapy to antibiotics administered, it should be assumed that complications may develop, e.g., empyema, penicillin-resistant bacteria, misdiagnosis; the patient should be transferred to a hospital for further investigation and proper treatment without delay.

### **3.2.3 Pulmonary Tuberculosis**

It is rather easy to find people with tuberculosis in Thailand. In our daily life, we may unknowingly contact such people.

**Symptoms and Signs:**

An initial uncomplicated tuberculous infection often produces no significant clinical illness. It is diagnosed only by x-ray films of the chest and by

the culture of sputum. The patient may have pyrexia of unknown cause with night sweat, cough with bloody sputum, anorexia, progressive weight loss, and fatigue. Pleuritic pain may also develop. Cervical lymph nodes may be enlarged and palpable. Usually the enlarged lymph nodes are matted and may be suppurative.

Treatment :

Treatment of tuberculosis usually takes 18 to 24 months. At present, there are special centers for such treatment, for instance in Chiang Mai and Nontaburi. In addition to antituberculous drugs, patients require nutritious foods and essential vitamins. The drugs used at present include INH, PAS, Streptomycin and Ethambutal.

Prevention:

(1) A Person who has close contact with an infectious case of tuberculosis should put on a mask whenever on duty, and he should have routine x-ray films of the chest. If the finding is questionable, the x-ray should be repeated 2 to 6 months later.

(2) Infants and newborns should be immunized with BCG vaccine to induce specific immunity against tuberculosis.

(3) Routine physical check up and chest film are suggested.

#### 3.2.4 Heart Failure

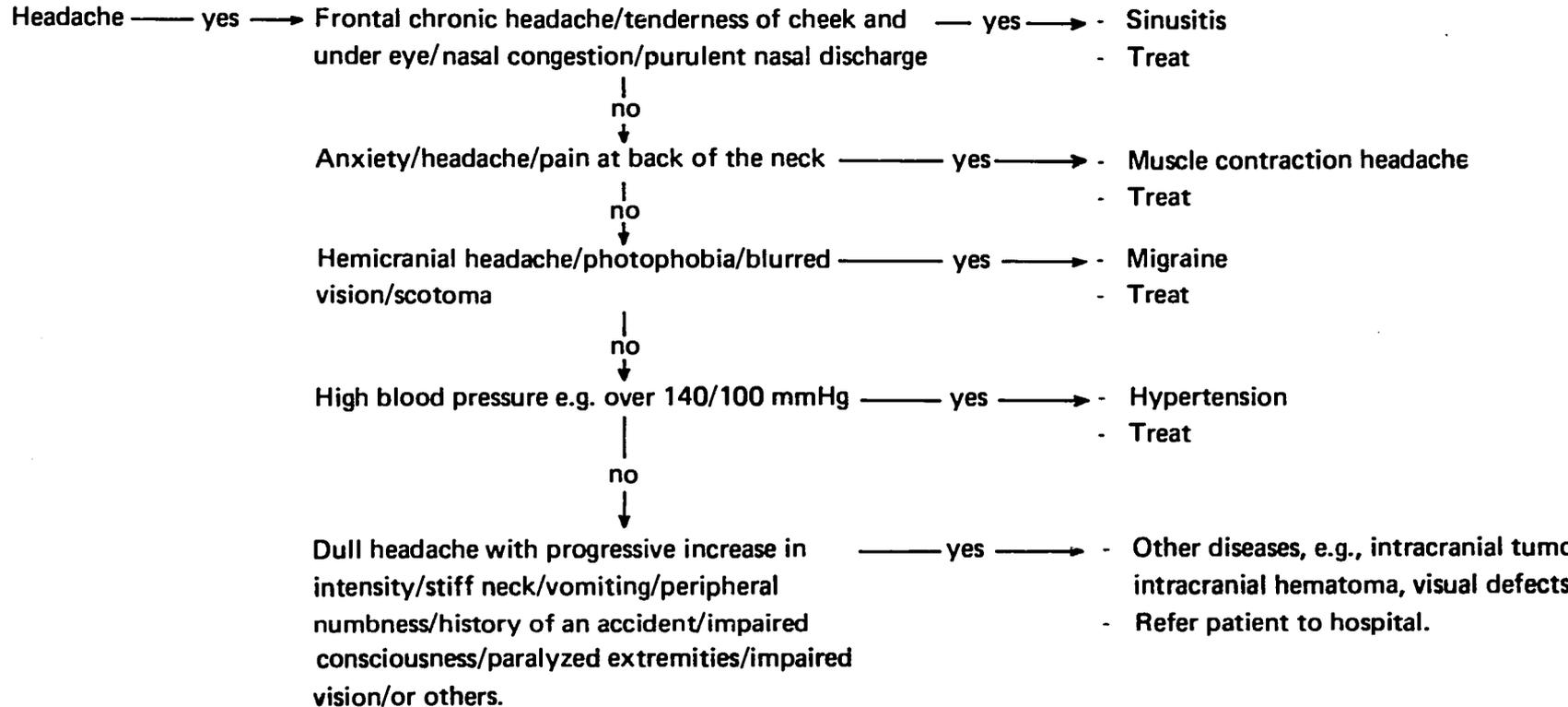
Heart failure may be caused by various factors. If the heart does not function normally, it cannot pump blood from the ventricles; this eventually leads to pulmonary congestion. The patient becomes orthopneic. Moist rales are detected over chest area, and the liver is enlarged. There is also pitting edema. Under these circumstances, the patient should be transferred to a hospital.

#### 3.2.5 Carcinoma of Bronchus

Bronchogenic carcinoma is more commonly encountered in cigarette smokers than nonsmokers, in the over-40 age group. The cough is usually of the chronic type. Progressive weight loss is common. A tumor mass is evident from x-rays of the chest. In early cases, the tumor mass is surgically removed as the specific treatment.

#### 3.2.6 Pulmonary Parasites

Disease of the lung caused by lung parasite (paragonimiasis) is encountered in the central part of Thailand, in the Maechan District in Chiang-rai Province. Cough and hematemesis are common. Chest x-ray findings mimic pulmonary tuberculosis. The diagnosis is confirmed by finding paragonimus eggs in the sputum. The disease is treated with bithionol.

Protocol 10.4 HeadacheChief complaintHistory, symptoms, signs and investigationProblems and Solutions

## **4.1 Management of Headaches**

### **4.1.1 Sinusitis**

(1) Appropriate antibiotics, e.g., Pen. V, 2 tablets ½ hour before meals and at bedtime.

(2) Decongestant, e.g., temporarily apply Neosynephrine nasal spray.

(3) Antihistamines, e.g., Chlorpheniramine, 1 tablet twice daily.

(4) Analgesics, e.g., Aspirin or Paracetamol, 2 tablets every 4-6 hours as needed

### **4.1.2 Muscle Contraction or Tension Headache**

(1) Muscle relaxants and tranquilizers, e.g., Diazepam (2 mg) or Meprobamate (400 mg), 1-3 tablets daily.

(2) Analgesics, e.g., Aspirin or Paracetamol, 2 tablets every 4-6 hours as needed.

(3) Local ointment application, e.g., Unguentum methyl salicylate.

### **4.1.3 Hypertensive Headache**

(1) The patient is transferred to a hospital if his diastolic pressure is higher than 140 mmHg.

(2) In mild cases, the following regimen may be tried: diuretics, e.g., Diuril (250 mg), 1-2 tablets daily; antihypertensive agents, e.g., Reserpine (0.1 mg), 1 tablet once daily in the morning; or sedatives for severe anxiety, e.g., Phenobarb (15 mg), 1 tablet 2-3 times daily. If the regimen fails to normalize blood pressure in 2-4 weeks, the patient should be referred to a doctor or hospital.

### **4.1.4 Migraine**

(1) Analgesics, e.g., Aspirin or Paracetamol, 2 tablets every 4-6 hours as needed

(2) Patients with severe migraine should be referred to a hospital.

## **4.2 Specifics of Headaches**

Headache represents man's most frequent discomfort. It involves almost all systems of the body, even the teeth. Those who are dealing with it should, therefore, elicit the patient's complete history and perform a thorough physical examination. Headaches from certain serious diseases should be managed by doctors.

### **Helpful History:**

History taking should include the following:

(1) History of head injuries.

(2) Onset of headache-acute or gradual or with precipitating cause.

(3) Location of headache-frontal, occipital, bitemporal, or hemicranial.

(4) Characteristics of headache-dull, throbbing, temporary, or persistent, or developing at a particular time, e.g., when reading.

(5) Associated symptoms and signs such as nasal congestion, running nose or purulent rhinorrhea, lateralization of eye, otitis media, convulsion,

vomiting or peripheral numbness.

(6) Important physical examinations-blood pressure, stiff neck, paralysis, focal seizure, aural, nasal and oral cavities. Patient with a headache associated with vomiting, stiff neck, convulsion, paralysis, peripheral numbness, dizziness, or stupor should be immediately transferred to hospital.

#### 4.2.1 Muscle-Contraction or Tension Headache

The headache is initiated by the contraction of muscles of the face, head, and neck.

Symptoms and Signs:

Usually it is a bilateral headache and frequently it includes pain in the vertex. The occiput and neck may also be involved. It is a persistent headache, with the same intensity of pain as if there were a rubber band around the head. The headache may persist for weeks, months, or years. Patients frequently have stress and anxiety, and some of them are depressed.

Treatment:

Reassure and educate the patient about the cause of the headache. Frequently apply unguentum methyl salicylate to the contracted muscles. Administer Aspirin or Paracetamol, 2 tablets; the dose may be repeated every 4-6 hours as necessary. Tranquilizers may be used as an adjunct to the analgesics to release the muscle tension; e.g., Meprobamate 1 tablet or Diazepam (2 mg) 1 tablet orally 1-3 times daily.

If the patient is very anxious, Phenobarbital sodium (30 mg) may be administered 2-3 times daily.

#### 4.2.2 Hypertensive Headache

The common complaint that brings patients with hypertension to visit a doctor is headache. Almost every patient has headaches when his diastolic pressure is higher than 100 mmHg. When the pressure decreases, the headache subsides. The patient often has an occipital headache when awaking. Sometimes some degree of stiff neck may be experienced. The occipital headache which develops when awaking usually disappears 2-3 hours later.

Treatment:

In severe hypertension, with the diastolic pressure higher than 140 mmHg, or if it is complicated by encephalopathy or congestive heart failure, the disease requires emergency treatment in a hospital.

Headache as a result of mild hypertension may be relieved by the administration of chlorothiazide (Diuril), 250-500 mg, 1-2 times daily or in a single morning dose of 0.1-0.25 mg of Reserpine. The dose of the latter may be gradually increased from 0.1 to 0.25 mg in 1 to 2 weeks. Phenobarb, in a dose of 15 mg, or Meprobamate (400 mg) in a dose of 200 mg twice daily may also be used. If the regimen fails to normalize the blood pressure in 2 to 3 weeks, the patient should be referred to a doctor.

Advice:

- (1) Every patient with headache should have his blood pressure checked.

(2) In general, hypertension is a disease that requires life long treatment except in certain diseases for which the causes of the hypertension are curable. It is wise to have hypertension treated by the same doctor from the beginning, because adjustment and evaluation of treatment with certain antihypertensive agents can more readily be made.

#### 4.2.3 Migraine

It is estimated that approximately 8 per cent of the general population is affected with migraine. The disease involves female more than male. The attack of migraine may begin since childhood with on and off pattern. Most of the patients have background in their childhood periods. The headache in migraine is assumed to be a result of vascular alteration of the brain.

##### Symptoms and Signs:

The patient may feel uneasy before an attack of migraine. Soon there after a dull headache develops. It is a persistent and usually a hemicranial type. Nausea and vomiting may be also occur. The veins on the forehead or temporal region may be congested and prominent. Photophobia, blurred vision, scotoma or hemianopsia, and hypersensitivity to smell and sound may develop, and the patient wants to keep himself closed in a dark room.

##### Treatment:

During a migraine attack, if the headache is not severe, 2 tablets of Aspirin may be taken orally every 4-6 hours needed, but if the symptom is critical, the patient should be transferred to hospital.

#### 4.2.4 Sinusitis

Sinusitis is one of the common causes of headache. Predisposing factors in sinusitis may be allergens or viral infection of the upper respiratory tract, which may lead to obstruction of drainage of the paranasal sinuses, later bacterial infection intervenes.

##### Symptoms and Signs :

Frontal headache developing in the early morning is common, due to accumulation of exudate in the frontal sinus at night. After getting the patient into an upright position, drainage of the exudate is facilitated and the intensity of the headache is decreased. Pressure applied over the inflamed sinuses produces pain, and the overlying site may be swollen. The headache is usually dull without any nausea or vomiting.

##### Treatment:

- (1) Relieve the headache with analgesics, e.g., Aspirin or Paracetamol.
- (2) Relieve paranasal obstruction with decongestant.
- (3) Antihistaminic, e.g., Chlorpheniramine, may be of some help in certain allergies as a symptomatic measure.
- (4) Administer appropriate antibiotics, e.g., Penicillin or Ampicillin.

##### Note:

See further details in the module for Eyes, Ear, Nose and Throat.

#### **4.2.5 Headache Associated With Intracranial Tumor**

Headache associated with intracranial tumor tends to be a deep-seated pain in the brain. It is a dull, persistent headache with increased intensity in the early morning. It is aggravated by head movement, coughing, and defecation. The pain is relieved by resting in bed. Unexpected projectile vomiting may punctuate the illness in later stages. If the tumor suppresses the nerves, visual field defects, lateralization of the eyes, blurred vision, limited eye movements, and blindness may be produced.

In addition, there may be stiffness of neck, numbness of extremities, or paralysis, depending upon which nerves are involved. The headaches become more frequent and severe as the tumor grows.

Treatment:

Refer patient to a hospital for further investigation and proper management. Do not delay, or morbidity or even mortality may ensue.

#### **4.2.6 Headache Due To Visual Defect**

Headache may result from prolonged use of eyesight, e.g., too much eye concentration during close work. Any patient who has a headache related to his vision should see an ophthalmologist for measurement of visual acuity, and proper eyeglasses should be used if necessary. This will help in solving the problem. Headaches have diverse causes, and many of these should be managed by doctors.

**Protocol 10.5 Parasites in the Feces**

**Chief complaint**

Feces containing parasites — yes —>

**History, symptoms, signs and investigation**

Abdominal discomfort/proglottids in feces/  
taenia ova in feces — yes —>

**Problems and solution**

- Taeniasis  
- Treat

no  
↓

Abdominal pain/anorexia/ascaris in feces or  
vomitus/ascaris ova in feces. — yes —>

- Ascariasis  
- Treat

no  
↓

Perianal pruritus at night/threadworm ova in feces. — yes —>

- Enterobiasis  
- Treat

no  
↓

Pallor/pitting edema/fatigue/hookworm ova  
in feces. — yes —>

- Hookworm  
- Treat

no  
↓

Other symptoms and signs or other parasitic ova  
such as liver fluke or lung fluke ova — yes —>

- Liver fluke infection, lung fluke  
infection or other diseases.  
- Refer patient to hospital.

## 5.1 Management of Parasitic Infections

### 5.1.1 Taeniasis

Yomessan: 4 tablets for adult or child over 6 years old in a single dose with breakfast; 2 tablets for child 2-6 years old; 1 tablet for child 1 year old.

### 5.1.2 Ascariasis and Enterobiasis

Piperazine citrate or Antepar, 250 or 500 mg per tablet or 500 mg per teaspoon; for adults, 500 mg twice daily for 8 days; child younger than 2 years old, ½ teaspoon once daily for 8 days; child 2-6 years old, ½ teaspoon twice daily for 8 days; child 6-8 years old, 500 mg twice daily for 8 days. Note: The course of the treatment for ascariasis is usually shorter.

### 5.1.3 Hookworm Infection

Alcopar: For adult and child of more than 22 kg, 5 g of Alcopar is dispersed in 1 glass of water, taken orally on an empty stomach for 3 successive days; for a child of less than 22 kg, 2.5 g is dispersed in 1 glass of water taken on empty stomach for 3 successive days.

Combantrin: 10 mg per kg body weight for child in a single dose, one tablet is 125 mg; for adults 6 tablets orally in a single dose.

### 5.1.4 Other Parasitic Infections

Refer to hospital or doctor.

## 5.2 Specifics of Parasitic Infections

### 5.2.1 Taeniasis

Man becomes infected with *Taenia solium* following ingestion of undercooked pork containing cysticerci, or with *Taenia saginata* after ingestion of the cysts of *Taenia saginata* in raw or undercooked beef. Its scolex is freed and attaches itself to the intestinal mucosa, and development to adult stage begins at this time. In probably the majority of cases the disease is asymptomatic. Epigastric discomfort, diarrhea, hunger sensations, weight loss, irritability, and nausea have been reported in association with taeniasis. The clinical picture is entirely different when man serves as the intermediate host. This form of the disease can occur after ingestion of eggs. The released embryos bore into the intestinal wall and are disseminated by vascular channels to various parts of the body. Cysticerci develop in the subcutaneous tissues, in muscles, in viscera, and of most significance in the eye and brain. Symptoms are related to heavy active larval encystments. Convulsions may be produced by the involvement in the brain. The encysted larvae in the brain or the soft tissue may require surgical removal.

#### Diagnosis:

Infection by the adult worm can be detected by finding eggs or proglottids in the feces. To differentiate *T. solium* from *T. saginata* infection, proglottids or scolex must be examined. It is rather difficult to make the differentiation from the eggs.

**Treatment:**

For removal of the worm in the adult stage Niclosamide (Yomesan) (one tablet weighs 0.5 g) is used; 4 tablets as a single dose for an adult, chewed with breakfast, is highly effective. The stool examination should be repeated 3-6 months after such treatment. Some investigators claim that Yomesan does not destroy the eggs of *T. solium*. They recommend Atabrine (quinacrine) for *T. solium*, but administration of the latter agent requires special attention.

**Prevention:**

The only practical means of preventing the infection is thorough cooking. Proper use of cesspools or sanitary toilets and personal hygiene (e.g., washing hands before eating and after using a toilet) should be recommended.

**5.2.2 Enterobiasis**

Several terms are applied to enterobiasis pinworm, seatworm, or threadworm infection, and oxyuriasis. It is an intestinal infection of man caused by *Enterobius vermicularis*.

**Clinical Manifestations:**

The infection is characterized by perianal pruritus, which is most troublesome at night. Within a few hours following ingestion of the egg, it develops into the infective larva and is released in the small intestine. In less than 1 month from the time of ingestion, newly developed gravid females begin to discharge eggs.

Searching for eggs in the feces is rarely helpful; effective examination for ova can be done using a Scotch tape swab of material obtained from the perianal skin.

**Treatment:**

Give Piperazine citrate 75 mg per kg body weight (but not more than 2.5 g for a total daily dose) as a single dose before breakfast for 8 days. If severely infected, the course of treatment may be repeated once more 2 weeks after the first course. All infected individuals in a family or communal group should be treated simultaneously.

An alternative treatment is Thiabendazole (Mintezole) 25 mg per kg of body weight in a divided dose for 1 day. The dose may be repeated 7 days later.

**Prevention:**

Antihistaminic and symptomatic treatment of pruritus should be instituted to control the infection. Some suggested preventive measures are good personal and environmental hygiene, and sanitary waste disposal.

**5.2.3 Ascariasis**

Ascariasis is an infection caused by ingestion of eggs of *Ascaris lumbricoides*; the larva is liberated in the small intestine. The larvae migrate through the wall and ultimately reach the lungs. They are swallowed again and then develop into male or female adults in the small intestine. Heavy infections may cause abdominal pain, abdominal discomfort, or partial or com-

plete intestinal obstruction. The diagnosis is usually made by finding the ova in the feces.

Treatment:

Piperazine citrate, 75 mg per kg body weight (total dose not more than 4 g), is administered in a single dose after breakfast on 2 successive days. or Thiabendazole (Mintezole), 25 mg per kg body weight, is administered twice a day for 2 or 3 days. Also, Alopax can be given, as for hookworm disease.

Prevention:

Personal hygiene, sanitary disposal of wastes and excreta, and food sanitation are important factors in preventing the disease.

#### 5.2.4 Hookworm

See Hookworm Disease under Pallor/weakness

#### 5.2.5 Hepatic Fluke Infection

This infection is common in the northeastern part of Thailand. Surveys have revealed that 70% to 100% of the population may be affected. The disease is increasing also in the northern part of this country.

Liver flukes include *Fasciola hepatica*, *Clonorchis sinensis*, and *Opisthorchis viverrini*. Adult liver flukes inhabit the bile duct of the definitive host, and the females discharge their eggs in the feces. The eggs hatch in snails; they go through several developments before the young parasites get into fresh water fish. If man eats the infected fish without thorough cooking, the parasites develop to a mature form and inhabit the bile duct. A fully mature liver fluke in man may survive for 20 to 25 years long.

Treatment:

There is no satisfactory treatment.

Prevention:

Dispose of feces properly, destroy snails, and eat only well-cooked fish.

#### 5.2.6 Pulmonary Fluke Infection

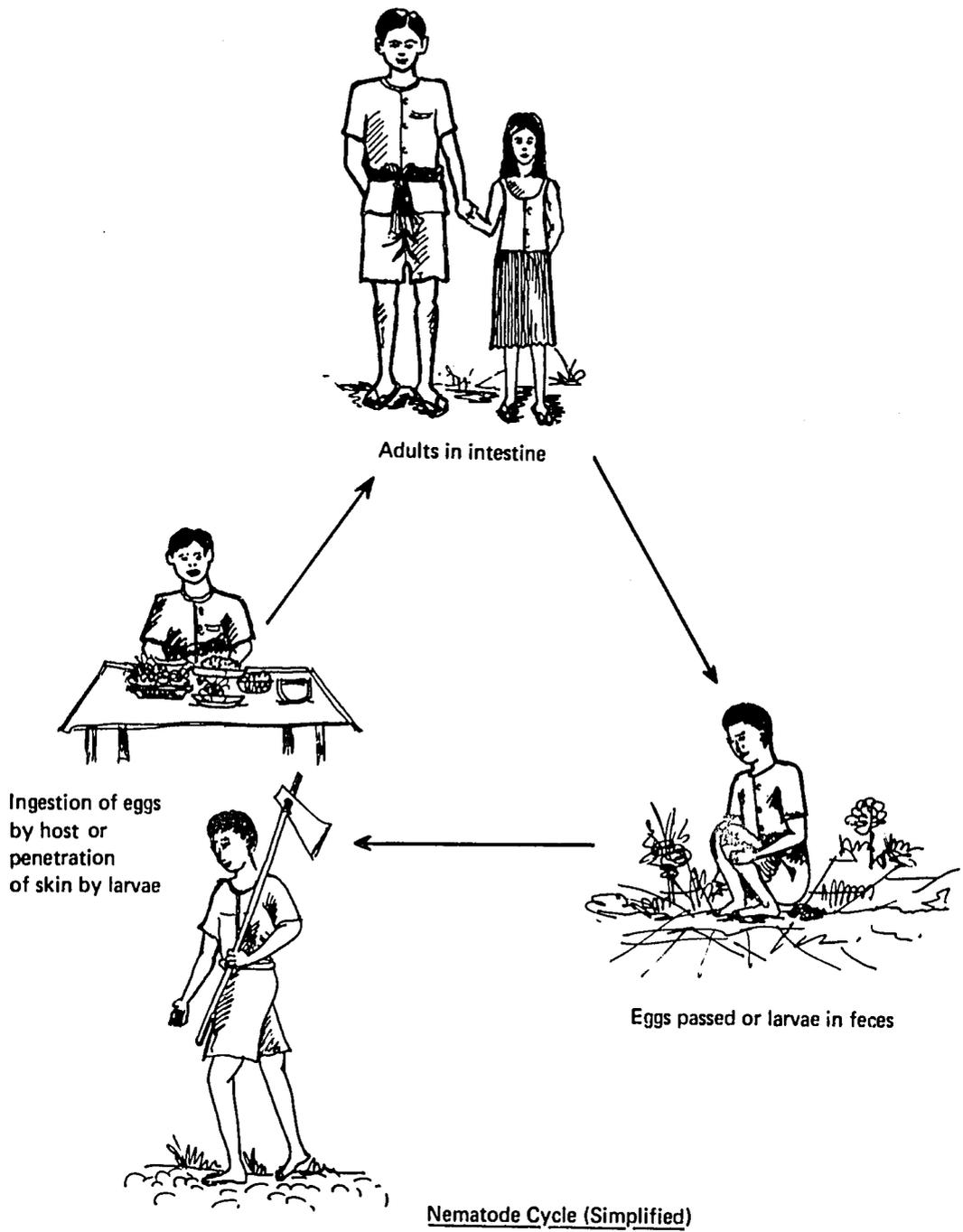
Lung fluke infection is encountered in Saraburi Province and now also in the Maechan District, Chiang Rai Province. The parasite is *Paragonimus westermani*. Mature parasites live in the lung, and the females discharge eggs in sputum or feces. The larvae hatch and then are ingested by snails; and there they have several developmental stages. The young parasites are next ingested by freshwater crabs and develop further as infective larvae. When man eats raw crabs, the young parasites penetrate the intestinal wall and the diaphragm to gain entry into the lung and become mature lung flukes.

Treatment:

3ithionol is given orally in a dose of 30 mg per kg of body weight on alternate days for 20 days.

Prevention:

Prevention is not easy. It is best to use sanitary toilets and eat only well-cooked crabs.



### Protocol 10.6 Shortness of Breath (Dyspnea)

<u>Chief complaint</u>	<u>History, symptoms, signs and investigation</u>	<u>Problems and Solution</u>
Dyspnea — yes —>	Abrupt fever with chill/productive cough/ crepitation on chest auscultation	yes —> - Pneumonia - Treat
	no ↓	
	Sudden and episodic dyspnea without fever/ sensitive to certain substance/expiratory wheezing	yes —> - Bronchial asthma - Treat
	no ↓	
	Orthopnea/frothy sputum/pitting edema/may be associated with hypertension/rales on chest auscultation	yes —> - Cardiac asthma - Give initial treatment, then transfer patient to hospital.
	no ↓	
	Increased rate and depth of respiration/ clear breath sounds/calpopedal spasm	yes —> - Hyperventilation syndrome. - Refer patient to hospital.
	no ↓	
	With other symptoms and signs e.g., diabetes mellitus	yes —> - Transfer patient to hospital

## **6.1 Management of Shortness of Breath (Dyspnea)**

### **Management :**

#### **6.1.1 Pneumonia**

See details in the section on the cough. Antibiotics can be given— e.g., Penicillin G, 100,000 units, intramuscularly every 6 hours until afebrile for 48-72 hours. If the fever still persists in spite of 3-day course of the antibiotic treatment, the patient should be transferred to a hospital.

Expectorant and mucolytic agents can also be used—e.g., M.KI or M.A. mon carb et chlor. 2 tablespoons every 4-6 hours.

#### **6.1.2 Bronchial Asthma**

Bronchodilators, e.g., Aminophyllin 250 mg in 50% glucose/ 50 ml, intravenously and slowly. In mild cases 1 tablet of Tedral orally every 4-6 hours is usually effective.

#### **6.1.3 Cardiac Asthma**

For initial treatment, the pop-up position and oxygen inhalation are used, and furosemide is given parenterally. The patient is then transferred to the hospital.

#### **6.1.4 Hyperventilation Syndrome and Dyspnea due to Other Causes**

Patients should be referred to the hospital for further investigation and proper management.

## **6.2 Specifics of Dyspnea**

Dyspnea may be pulmonary, bronchial, bronchiolar, cardiac, kidney, or psychological in origin. Dyspnea associated with fever signifies pulmonary inflammatory diseases. Dyspnea on exertion signifies chronic lung or cardiac diseases. Dyspnea related to allergy suggests bronchial asthma, and sudden dyspnea may be an airway obstruction or psychological disorder.

#### **6.2.1 Bronchial Asthma**

Bronchial asthma may attack episodically. The attack may persist for minutes, hours, days. Allergy to certain substances may be the cause of bronchial asthma in certain individuals. Respiratory tract infection and altered emotions are frequent precipitating causes of asthmatic attacks.

#### **Symptom and Signs :**

Because of bronchospasm, patients usually have difficult or prolonged expiration. Wheezing and rales are prominent upon chest auscultation. Coughing is also frequent.

#### **Treatment :**

If a specific allergen is identified and the patient can eliminate the causative agent(s) from the environment, this will be the most successful means available for treating this condition. Desensitization with extracts of suspected allergens has enjoyed widespread favor and may be effective in some cases.

Several routes of bronchodilator administration are possible, e.g., by inhalation, injection or ingestion. Ingestion is probably safer but has a slower response than inhalation or injection. The most commonly used drug is aminophylline. Aminophylline one ampule (250 mg) must be diluted with 50%

glucose 40-50 ml and slowly (in 20 minutes) infused intravenously. Too concentrated aminophylline and too-rapid infusion may lead to palpitations, hypotension, shock, or death. An oral form of aminophylline is also available. If the patient is anxious, mild tranquilizers may be administered. Cigarettes should be avoided. Morphine has no place in the treatment of bronchial asthma; respiratory arrest and death may rapidly ensue from this abuse.

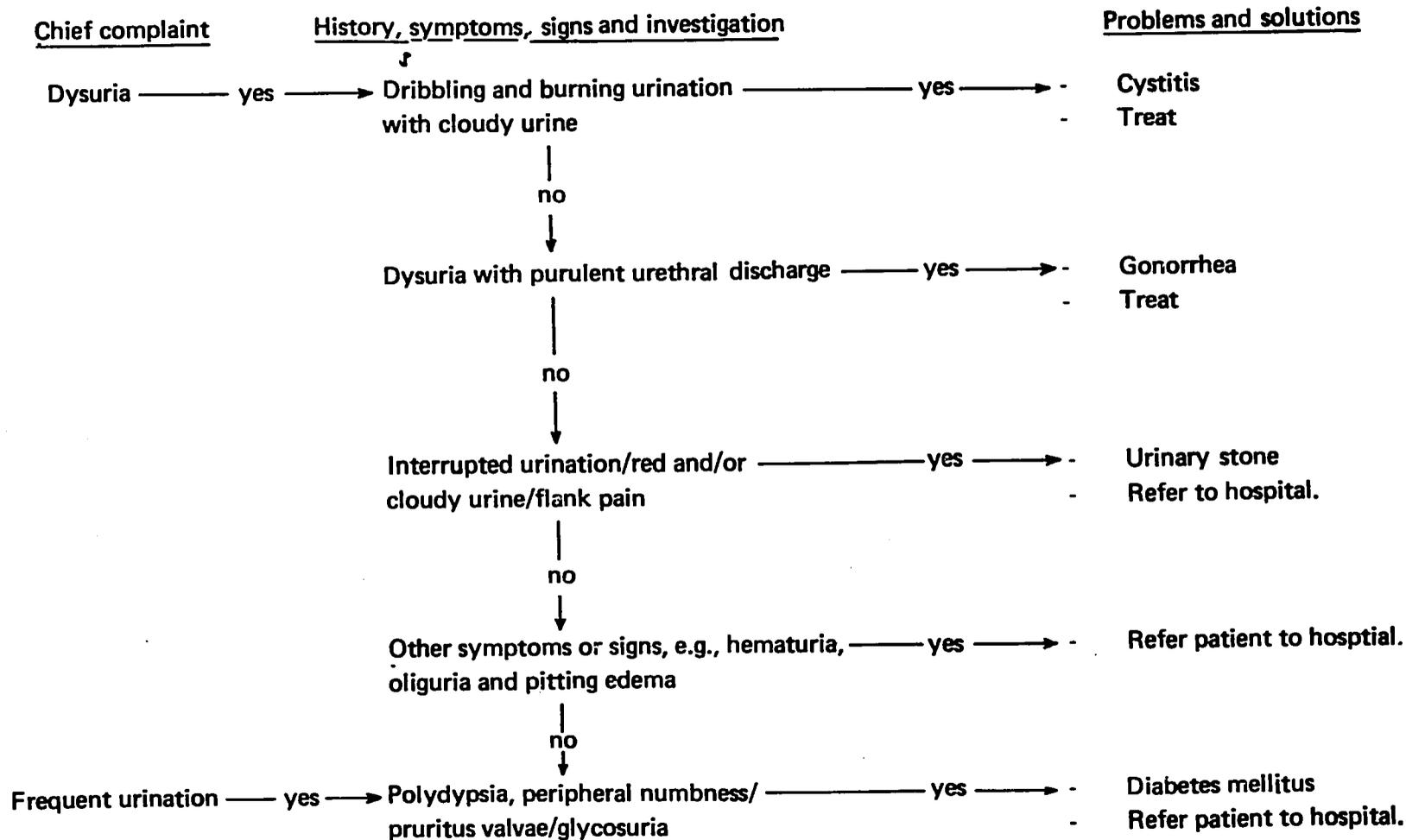
### 6.2.2 Cardiac Asthma

Dyspnea in bronchial asthma must be differentiated from that in cardiac asthma due to congestive heart failure or pulmonary edema. The management of the latter is more complicated and should be closely observed by a doctor. In cardiac asthma, besides wheezing and crepitation the patient also has frothy sputum, pitting edema of the feet, enlarged liver due to venous congestion, and frequently, hypertension and cardiac arrhythmia.

Treatment:

The initial treatment is to put the patient in a pop-up position. Administer oxygen by nasal catheter if available. A mild tranquilizer may be of some help in cases of severe anxiety. A parenteral diuretic such as furosemide is given and then the patient is transferred to a hospital.

**Protocol 10.7 Painful, Frequent or Bloody Urination**



## **7.1 Management of Painful Bloody Urination**

### **7.1.1 Cystitis**

Specific treatment with antibiotics:

- (1) Tetracycline (250 mg), 2 capsules every 6 hours for 7-10 days;
- (2) Ampicillin (250 mg), 2 capsules every 6 hours for 7-10 days; or
- (3) Sulfonamide, e.g., Mezuran, 2 tablets every 6 hours for 7-10 days, with adequate hydration.

### **7.1.2 Gonorrhea**

Specific treatment with antibiotics:

- (1) Procaine penicillin, 2.4 million units intramuscularly on each buttock ½ hour after 1 g (2 tablets) of probenecid orally;
- (2) Ampicillin 3.5 g, oral single dose, together with 1 g of probenecid; or
- (3) Tetracycline, 0.5 g orally every 6 hours for 5 days. In penicillin-allergic case, Kanamycin 2 g intramuscular in a single dose may be worth a trial.

Note: If the disease fails to respond to any regimen mentioned, the patient should be referred to a doctor or venereal diseases control center for proper management.

### **7.1.3 Urinary Stone**

Specific treatment:

Transfer patient to hospital for operation.

Symptomatic treatment:

Antibiotics to combat infection, e.g., Ampicillin, 2 capsules every 6 hours for 5 days; Baragan 1-2 tablets every 6 hours as needed for pain. Pyridium, as an alkalizing agent or a urinary tract antiseptic may also be given to adult patients.

### **7.1.4 Diabetes Mellitus**

Treatment:

A hypoglycemic agent such as insulin of injection or oral tablets (sulfonylurea) can be used, depending on the type of diabetes. This should be evaluated first by the doctor. For general treatment, give advice concerning the diabetic diet, appropriate daily activity, hypoglycemic reactions and how to correct them.

## **7.2 Specifics of Frequent or Painful Urination**

The medical history should focus on past as well as present urinary problems. Microscopic examination of urinary sediments is also of prime importance.

Symptoms and Signs Associated with Urination:

The manifestations of infection, inflammation and obstruction are interrelated in a vicious cycle. Common symptoms of urinary tract diseases are discussed below.

(1) Frequent urination, urinary urgency and nocturia are frequently encountered in severe case of urinary retention. Due to the inflammation, the bladder cannot contract normally at each voiding. This leads to abnormal urinary retention, frequent urination, and nocturia.

(2) Dysuria and painful urination are commonly associated with the bladder or prostatic inflammation.

(3) Incontinence in adults should always call for an investigation. Usually it is psychological in origin, but it may be caused by nervous or organic disorders.

**Characteristics of Urine:**

(1) In the case of stones of the urinary tract, the urine is frequently red because it contains numerous red blood cells. In infections of the urinary tract the urine is usually cloudy because of numerous white blood cells.

(2) Red urine due to numerous red blood cells may occur with stones, carcinoma, infection, and tuberculosis of the urinary tract.

(3) Cloudy urine may be due to infection of the urinary tract or to increased phosphate in the urine.

**Urinary Tract Inflammation:**

The present-illness history taking should include sexual intercourse, passing of urinary stones, and characteristics of the urine (whether it is red, cloudy, or purulent). In urethritis, urine is usually red at the beginning of each voiding. Terminal hematuria suggests inflammation or a disease causing bleeding in the bladder, and, if the urine is homogeneously red throughout the urination, more often it suggests a renal stone.

### 7.2.1 Acute Cystitis

Acute cystitis is more common in females because the infection can ascend from the genital area. It may develop 36-72 hours postcoitus. In the male, acute cystitis may be due to a urinary tract obstruction because of a hypertrophic prostate gland or urethral stone.

**Symptoms and Signs:**

A burning sensation upon urination is a usual symptom. Urinary urgency and decreased size of urinary stream, and dribbling at the end of urination are common. The urine is red or cloudy. There is no fever, but there may be some low-grade fever. If high fever is present, this signifies pyelonephritis or infective prostatitis. Urinary retention due to urethral obstruction leads to a palpable cystic mass in the suprapubic region. This is the bladder which is dilated and distended because of urinary retention.

**Treatment:**

Use of appropriate antibiotics should be assured, e.g., Tetracycline and Ampicillin or Sulfonamide drugs, for example Merzuran, 2 capsules or 2 tablets, 4 times daily for 7-10 days. For married women who frequently have acute cystitis after sexual intercourse, Sulfadiazine (0.5 gm) 2 tablets plus Penicillin V (200,000 units), 2 tablets, immediately after completing sexual relationship, and one more dose the next morning, with adequate hydration, are effective. Nitrofurantoin or Furadantin may be added to the regimen, if available.

In cases associated with urinary stones or prostatic hypertrophy, the patient should be referred to hospital.

For pain, analgesics plus antispasmodics such as Baralgin or Spasmocibalgin 1-2 tablets are administered every 4-6 hours as necessary.

### 7.2.2 Gonorrhea

Gonorrhea is a common venereal disease. The infection may lead to many complications, such as urethral constricture, epididymitis, pyogenic arthritis, and pelvic inflammatory disease.

**Symptoms and Signs :**

Symptoms include a purulent urethral discharge which usually occurs 4-10 days postcoitus. Burning and itching in the urethra during voiding are common. The urethral discharge is yellow or brown. The meatus is inflamed. If the Gram's stain of the discharge is microscopically examined, numerous gonococci are observed.

**Treatment :**

Inject Procaine penicillin, 2.4 million units, intramuscularly in each buttock. In order to enhance the efficacy of penicillin probenecid 1 g should be taken 30-60 minutes before the penicillin injection.

For alternate therapy a single dose of Ampicillin, 3.5 g, can be given orally with probenecid (1 g) with nearly equal efficacy and less toxicity.

or Tetracycline 0.5 g can be given orally, 4 times a day for 5 days (total dosage 10.0 g) in cases of uncomplicated gonorrhea, both sexes are treated similarly.

Two to three hours before and after sexual intercourse, Penicillin (1 million units orally or 300,000 units intramuscularly) or tetracycline(1 g orally) or Streptomycin (1g intramuscularly) is administered. The use of condoms can prevent transmission of the disease.

### 7.2.3 Nonspecific Urethritis

Usually the source of bacteria is outside the urinary tract and they gain entry by direct ascending spread. However, the source of infection may be the inflamed prostate gland.

**Symptoms and Signs :**

Common manifestations are urethral discharge with urethral burning and itchy sensations. There may also be burning upon urination. The discharge may be sticky or mucoid, with numerous pus cells and bacteria. The urethral meatus is inflamed.

**Treatment :**

Give Tetracycline (0.5 g or 2 capsules) every 6 hours for 7 days.

### 7.2.4 Urinary Stones

**Etiology :**

Disorders may contribute to the formation of stones in the urinary tract such as metabolic disease, infection, etc. Urinary stone is more common in males than females. In Thailand it is encountered more in patients living in the

northern and northeastern regions. Vesicular stone is more common in children and renal stone is more common in adults. A low protein diet and inadequate hydration have been assumed to be major causes of vesicular stone in this country.

**Symptoms and Signs :**

**Renal Stone.** A renal stone may be an asymptomatic condition or costo-vertebral angle pain may develop. There may be nausea, vomiting, abdominal discomfort, red urine, and fever with chills and shaking.

**Ureteric Stone.** In this case a patient may have a flank pain referring to the scrotum or thigh of the same side, nausea or vomiting, hematuria, and symptoms and signs of infection.

**Vesicular Stone.** A patient with vesicular stone experiences dysuria, frequent and incontinent urination, obstructed urination, red urine, and pyuria.

**Definite Diagnosis:**

The final diagnosis can be established by an x-ray film or pyelogram of the KUB system.

**Treatment:**

The treatment requires surgical removal of the stone. Small stones may be pushed downwards by a big flow of urine, which is accomplished by large amounts of water and by diuretic administration. The colicky pain may be relieved by analgesics plus antispasmodics such as Baralgin or Spasmocibalgin.

**Advice :**

Refer patients with urinary stones to the hospital. People should be encouraged to drink adequate water daily, and children should be supplied with adequate daily protein intake.

**7.2.5 Other Diseases Causing Painful/Frequent Urination**

Other diseases that may be encountered include tuberculosis, benign and malignant tumors, neurological diseases, and malformations.

**Important Notes:**

Patients with manifestations not described in this protocol should be referred to doctor or hospital for further investigation and proper management.

Tuberculosis of the urinary tract may be encountered. It commonly leads to hematuria. Pulmonary tuberculosis and symptoms and signs of the infection in the urinary tract may also be observed. It is treated like pulmonary tuberculosis.

Carcinoma of the urinary bladder is not uncommon. Hematuria is the sole presenting complaint in nearly all cases and in far advanced cases, suprapubic pain is usually present. Early bladder carcinoma is treated with cystectomy, usually in combination with local radiotherapy.

**7.2.6 Hematuria**

Hematuria signifies urine which contains blood. It may be microscopic or gross hematuria depending on causes and severity. The bleeding may come from any site along the urinary tract system, e.g., the kidney, ureters, bladder, or urethra. If the bleeding site is in the kidney, bleeding occurs

throughout the urinary stream and the color of urine is dark-brown. If the bleeding site is in the bladder or urethra, the urine and the blood may be separated from each other and the blood is grossly fresh. Blood in the first voided urine is usually associated with lesions in the urethra and the terminal urine is grossly clear of blood. In contrast, terminal bleeding signifies lesions in the bladder; and the initial stream is free of blood. Severe hemorrhage from the bladder, however, it will present as total hematuria.

Hematuria may result from many causes, including trauma, inflammatory diseases, and benign or malignant tumors of the urinary tract. The severity of bleeding directly relates these causes. Common causes of hematuria are:

Kidney — trauma of the kidney, renal stones, renal infarction, acute and chronic nephritis, tuberculosis, and carcinoma of the kidney.

Ureter — trauma, vesicular stones, cystitis tuberculosis, tumor and carcinomas of the bladder or prostate gland.

Urethra — trauma, urethral infection, urethral stricture and tumors of the urethra.

Others — disorder of blood clotting, certain toxic agents, e.g., mercury and sulfonamides.

In addition to diseases of the urinary system, hematuria may be due to genital disorders such as infections or infections extending from adjacent tissues or organs. Frequently, menstrual flow is misunderstood as hematuria.

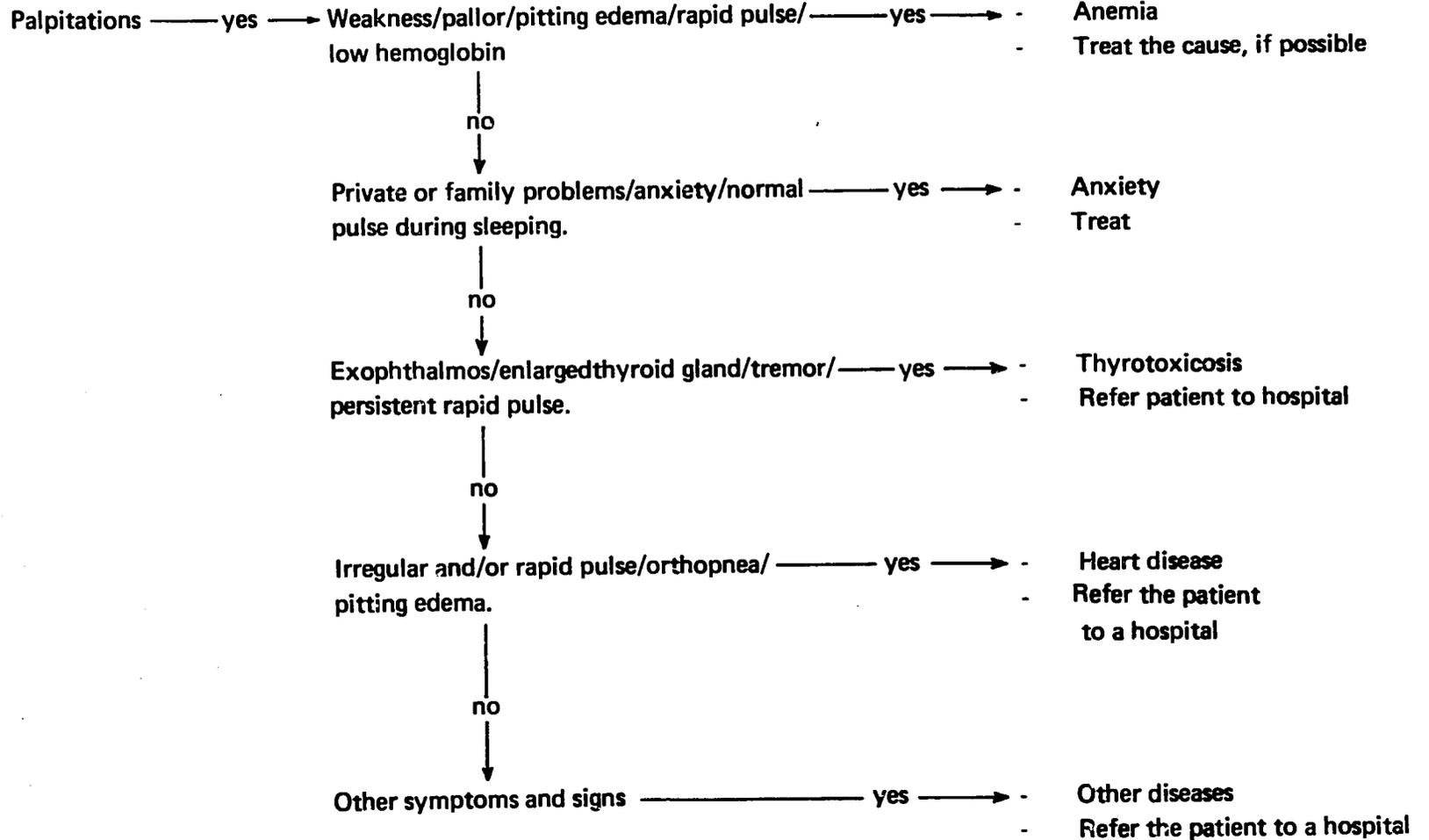
Because some causes of hematuria are serious and some are not, if a patient with hematuria is encountered, the patient should be referred to a hospital for further investigation and proper treatment.

**Protocol 10.8 Palpitations**

Chief complaint

History, symptoms, signs and investigation

Problems and solution



## 8.1 Management of Palpitations

### 8.1.1 Anemia

Treat the cause of anemia, if possible. See the details in the Protocol for Anemia.

### 8.1.2 Anxiety

Give tranquilizers Valium (2 mg) 1 tablet 1-3 times daily, or Meprobamate (400 mg) 1 tablet 1-3 times daily. Provide health education on causes of palpitations.

### 8.1.3 Thyrotoxicosis

Initial treatment for thyrotoxicosis should be under a doctor's care. The dose of antithyroid drugs varies with response of the disease. Patients are encouraged to continue the medication as prescribed. They should not fail to make follow-up visits.

### 8.1.4 Heart Disease

Refer or transfer the patient to hospital for further investigation and proper management.

### 8.1.5 Menopausal Syndrome

Give tranquilizers – Valium (2 mg) or Meprobamate (400 mg), 1 tablet 1-3 times daily, or M. Menopause 1 tablespoon 3 times daily. Educate the patient about the physiological changes in the aging process.

## 8.2 Specifics of Palpitations

Palpitations may result from various disorders, e.g., anemia, thyrotoxicosis, anxiety, heart disease and menopausal syndrome.

### 8.2.1 Anemia

Because of anemia, cardiac contraction is increased to pump blood out to supply tissues with oxygen. The increased rate and force of cardiac contraction frequently result in palpitations. The degree of anemia may be approximately determined through the conjunctivae and nails that appear pale. In severe anemia, pitting edema is usually found.

Treatment :

Causes of anemia are diverse and the treatment of anemia depends on its cause.

### 8.2.2 Thyrotoxicosis

Thyrotoxicosis is a common disease in Thailand occurring more in females than in males. The common findings are progressive weight loss in spite of excessive eating, heat intolerance, oligomenorrhea, loose feces, bilateral exophthalmos, enlarged thyroid gland, tremor, warm and sweaty skin, and tachycardia. If untreated or inadequately treated, the condition usually leads to congestive heart failure and death.

Treatment :

Usually medical treatment is initiated, but it may be treated with subtotal thyroidectomy or <sup>131</sup>I radioisotope.

### **8.2.3 Anxiety**

Individuals who have private, family, and economic problems commonly suffer from anxiety, which is one common cause of palpitations. Signs suggestive of this etiology are weight loss due to inadequate food intake, and a pulse which is normal during sleeping and rapid when awake. In thyrotoxicosis, the pulse is always rapid and weight loss develops in spite of excessive ingestion.

Treatment :

Tranquilizers – e.g. Valium and Meprobamate – may be effective. Inform the patients of the cause of their palpitations.

### **8.2.4 Heart Disease**

An irregular or very rapid pulse can be due to heart disease, e.g., valvular disease, coronary heart disease, or myocarditis. If pitting edema and orthopnea are evident, serious involvement of the heart (e.g. heart failure) is already established.

Treatment :

Refer patient to hospital for proper management.

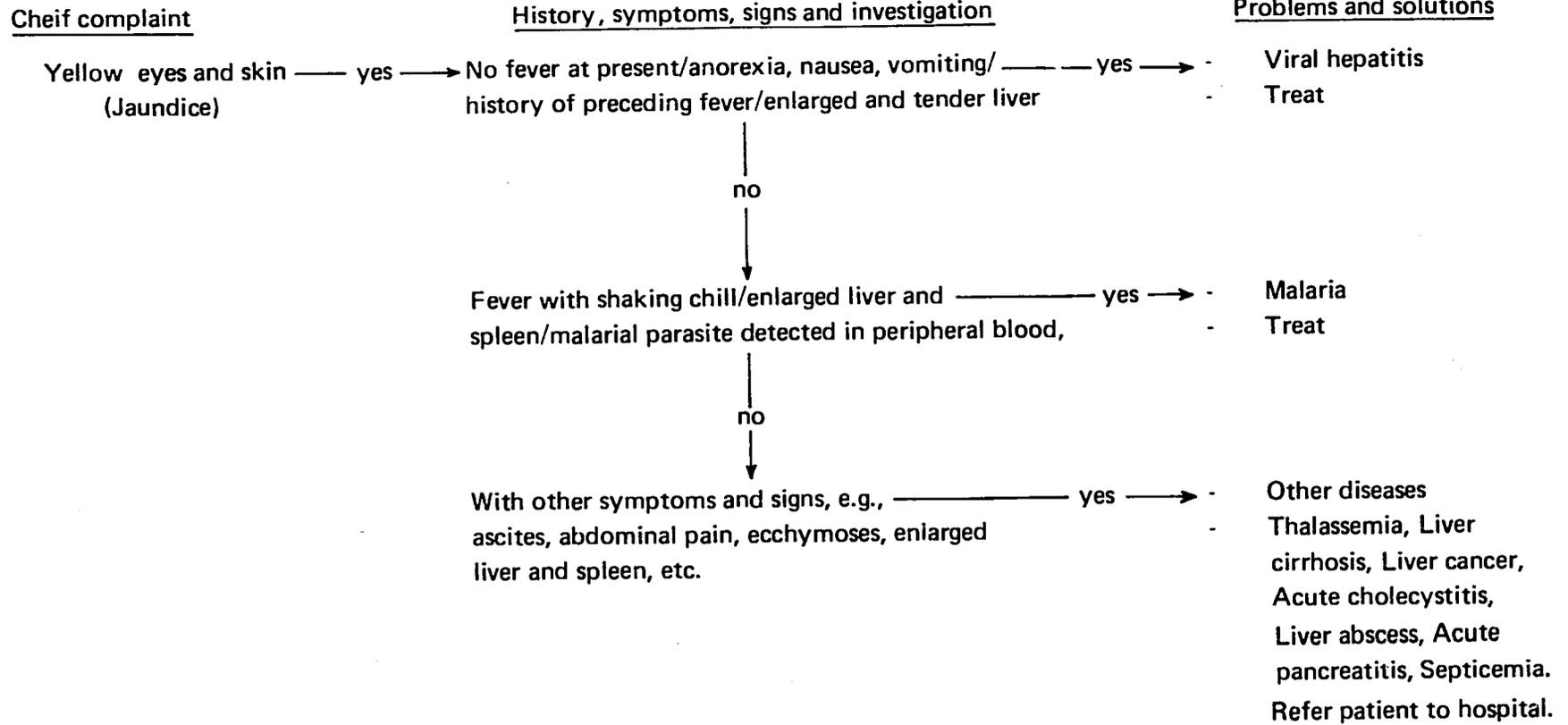
### **8.2.5 Menopausal Syndrome**

Usually this syndrome occurs in females 40 to 50 years old, owing to disturbances of the sex hormones. Cardinal manifestations are irregular menstruation, menopause or oligomenorrhea, hot flushes, behavioral changes, dizziness, palpitations, and altered sexual desire. Physical examinations hardly ever reveal any abnormal findings.

Treatment :

Symptomatic measures include the administration of tranquilizers, e.g., Valium (2 mg) or Meprobamate, 1 tablet, 2-3 times daily, or 1 tablespoon of M. Menopause 3 times daily. Educate the patients concerning the physiological changes of the aging process, and reassure them. Multivitamins may be given. In general the treatment is time-consuming, and in case of failure the patients should be referred to a hospital. Sex hormones should not be administered because they may have disadvantages.

**Protocol 10.9 Yellow Eyes and Skin (Jaundice)**



## **9.1 Management of Jaundice**

### **9.1.1 Viral Hepatitis**

In the acute phase, adequate bed rest is necessary. After recovery, daily activities should be gradually increased. Calorie intake should be adequate. If abdominal flatulence occurs, fat should be minimized. In case of severe nausea and vomiting, parenteral glucose and vitamins should be given.

### **9.1.2 Malaria**

See details in section on Malaria.

## **9.2 Specifics of Jaundice**

Jaundice or icterus signifies yellow skin or mucous membrane resulting from increased bilirubin. Common causes of jaundice are hemolysis, as in malaria, septicemia, and thalassemia; hepatitis, viral or drug-induced; and biliary tract obstruction due to gallstones.

Approach to Patients with Jaundice:

Onset:

A case of jaundice since childhood, when the relatives also have had jaundice since childhood, most commonly suggests thalassemia.

Progress:

Progressive jaundice may be due to extensive hemolysis in infective process or progressively obstructed biliary tract.

Helpful Symptoms and Signs:

Pruritus:

Generalized pruritus is frequently encountered in obstructive jaundice.

Color of Urine:

Deep yellow urine may precede apparent jaundice in viral hepatitis.

Stool:

Gray feces signifies complete obstructive jaundice.

Fever:

In viral hepatitis, fever usually occurs before the development of jaundice, when jaundice appears, the fever subsides. In septicemia or malaria, there are both fever and jaundice, but in thalassemia there is usually only jaundice.

Liver and spleen:

Any enlargement of the liver and spleen must be examined. The tenderness of the organs is of importance. In thalassemia, in spite of hepatosplenomegaly, there is no tenderness in general. In malaria, only the spleen may be palpated. Hepatomegaly with irregularly firm surface commonly occurs with carcinoma of the liver. In cholangitis, the liver is enlarged and tender and the surface is usually smooth.

Referred Pain:

Pain in acute cholecystitis frequently refers to the right shoulder.

### History of Alcoholism or Certain Drug Ingestion:

Contraceptive agents may lead to cholestasis and jaundice. Atabrine (use in the treatment of malaria) may lead to yellow staining of the skin and urine, but the conjunctivæ are less affected. Chronic alcoholic ingestion supports the diagnosis of liver cirrhosis and alcoholic hepatitis.

#### 9.2.1 Viral Hepatitis

##### Symptoms and Signs:

The incubation period is 2-6 weeks for infectious hepatitis and 6 weeks to 6 months for serum hepatitis. Later symptoms and signs of upper respiratory tract infection occur. Malaise, generalized weakness, and myalgia are common, and the disease is characterized by severe anorexia, nausea, vomiting and fever. It may be accompanied by right upper quadrant tenderness. The urine becomes deeply yellow for 5-10 days before the fever subsides. As it becomes afebrile, jaundice appears and reaches its peak in the first or second week. The jaundice then gradually decreases and disappears, the usually jaundice does not persist longer than 8 weeks. In the icteric stage the liver is usually palpable and tender.

Patients may experience prolonged fatigue for weeks after disappearance of the jaundice. In general, complete recovery occurs within 3-4 months.

Some cases of viral hepatitis do not have clinical jaundice, and the general manifestations described are mild. The diagnosis in these patients can be established through a liver function test. On the other hand, some patients have prolonged jaundice together with generalized pruritus, and some have shrinkage of the liver which may rapidly lead to coma and death.

##### Treatment:

There is no specific treatment. Severe cases should be managed in a hospital. Bed rest and adequate intake of fluids are of prime importance. Parenteral glucose solution may be necessary in cases of severe nausea or vomiting. Abdominal discomfort is symptomatically treated.

Gradually increased daily activity is necessary after recovery. If any symptoms and signs previously described should occur during the convalescent stage, the patient must immediately stop his work and be reevaluated by the doctor.

##### Prevention:

Close contacts should always have their hands clean. During the incubation period, gamma globulin injection in an appropriate dose may protect a contact from symptoms and jaundice. Pregnant women, aged people, and debilitated patients should be immunized with gamma globulin after exposure, because the disease is particularly severe in these individuals. The syringes and needle used should be discarded.

#### 9.2.2 Jaundice Associated with other Disease that should be Managed in a Hospital.

##### (1) Acute cholecystitis

Acute cholecystitis is commonly associated with gallstones. Severe

pain is usually located in the right upper quadrant, and frequently it refers to the right shoulder. High fever with chill and shaking, nausea and vomiting are common features. Jaundice is usually mild. The clinical picture may be complicated by empyema. Acute cholecystitis requires both appropriate antibiotics and surgical treatment.

#### (2) Liver Abscess

This abscess may be caused by bacteria; fever is usually high, with abrupt chills and shaking. The liver is swollen and tender and jaundice usually develops. *Entamoeba histolytica*, a parasite, may also cause liver abscess, but the symptoms are usually not so abrupt. The abscess may rupture into the peritoneal, pleural, or pericardial cavities. Liver abscess requires medical treatment with or without surgical treatment.

#### (3) Acute Pancreatitis

Jaundice may develop in the course of acute pancreatitis. The pain may be located in the upper abdomen or the left upper quadrant. Nausea and vomiting are common. The abdominal pain frequently refers to the adjacent back and is relieved by sitting with the trunk flexed and knees drawn up. At the onset, there may be no fever, but it may develop later. The disease may be complicated by suppurative pancreatitis. Acute pancreatitis is mostly medically treated.

#### (4) Carcinoma of the Liver

Primary carcinoma of the liver and metastatic carcinoma of the liver may produce bile flow obstruction, resulting in jaundice. The prognosis for carcinoma of the liver is usually poor.

#### (5) Cirrhosis of the Liver

Cirrhosis resulting from excessive and prolonged alcoholic ingestion may rapidly make the liver deteriorate and become inflamed. Alcoholic hepatitis is usually associated with fever, jaundice, nausea, and vomiting. Both liver and spleen are usually enlarged. Ascites frequently develops. Superficial abdominal veins are dilated and drain upwards.

The management of liver cirrhosis is not easy, and the prognosis is rather poor.

#### (6) Septicemia

Excessive hemolysis in the septic process leads to jaundice. High fevers with chills and shaking are common. The liver and spleen are usually palpable. There may be ecchymoses on the skin, under the nails, and in conjunctivae, and shock may occur. The bacteria that gain entry into the blood may be from the skin, urinary tract, lungs, intestines, etc. If not properly treated, the patient will eventually die.

### Protocol 10.10 Swelling of Legs (Edema)

<u>Chief complaint</u>	<u>History, symptoms, signs and investigation</u>	<u>Problems and solutions</u>
Swelling of legs (Edema)	Dependent pitting pedal edema when standing a long time — yes —> - which progresses to more or generalized edema/ orthopnea/frequently with irregular heart rhythm/enlarged liver	Congestive heart failure Give necessary aid then transfer patient to hospital.
	Cloudy urine due to massive protein/ generalized — yes —> - edema/liver and spleen are not enlarged	Nephrotic syndrome Refer patient to hospital.
	Chronic excessive alcoholic ingestion/dilated — yes —> - superficial abdominal veins/enlarged liver and spleen/ascites	Liver cirrhosis Refer patient to hospital.
	Other symptoms and signs, e.g., undernourishment/ — yes —> - dermatitis/trauma or injuries	Refer the patient to hospital

## 10.1 Management of Edema

### 10.1.1 Congestive Heart Failure

For emergency management, place patient in pop-up position. Administer oxygen inhalation by nasal catheter if available. Give diuretics, e.g., Furosemide or Lasix, 1 ampule or 20 mg intramuscularly.

Transfer patient to hospital immediately after the emergency management.

### 10.1.2 Nephrotic Syndrome, Liver Cirrhosis, and Edema Due to Other Causes

Refer patient to hospital for further investigation and proper management.

## 10.2 Specifics of Edema

### 10.2.1 Nephrotic Syndrome

This syndrome is characterized by generalized pitting edema and heavy protein loss in urine. It is a syndrome resulting from certain renal diseases in which the plasma protein is lost through the kidney. When the plasma protein is low there is no pressure strong enough to hold water in the vascular space; the water leaks into tissues outside the blood vessels, and pitting edema therefore develops.

### 10.2.2 Liver Cirrhosis

In Thailand, liver cirrhosis is commonly due to chronic excessive alcoholic drinking. The stigmata of liver cirrhosis are dilated superficial abdominal veins that drain upwards. The liver and spleen are enlarged. Ascites is very common, and may be accompanied by pitting edema of lower extremities. In the terminal stage, hematemesis usually occurs.

Patients with either nephrotic syndrome or liver cirrhosis should be referred to a hospital for further investigation and management.

### 10.2.3 Congestive Heart Failure

When the heart cannot pump blood from the ventricles, the venous blood also cannot flow into the heart chambers. Prolonged venous congestion or stasis induces pressure in the veins and this phenomenon leads to leakage of fluid from the vascular space into extravascular tissues, producing pitting edema. This is a dependent edema that appears first at both lower extremities upon long standing. When the heart failure gets worse, generalized pitting edema develops as well as orthopnea.

The patient with congestive heart failure should be put in a pop-up position. Oxygen inhalation through a nasal catheter should be done if the equipment is available, and diuretics (Furosemide or Lasix) should be parenterally administered before transferring the patient to hospital.

### 10.2.4 Malnutrition

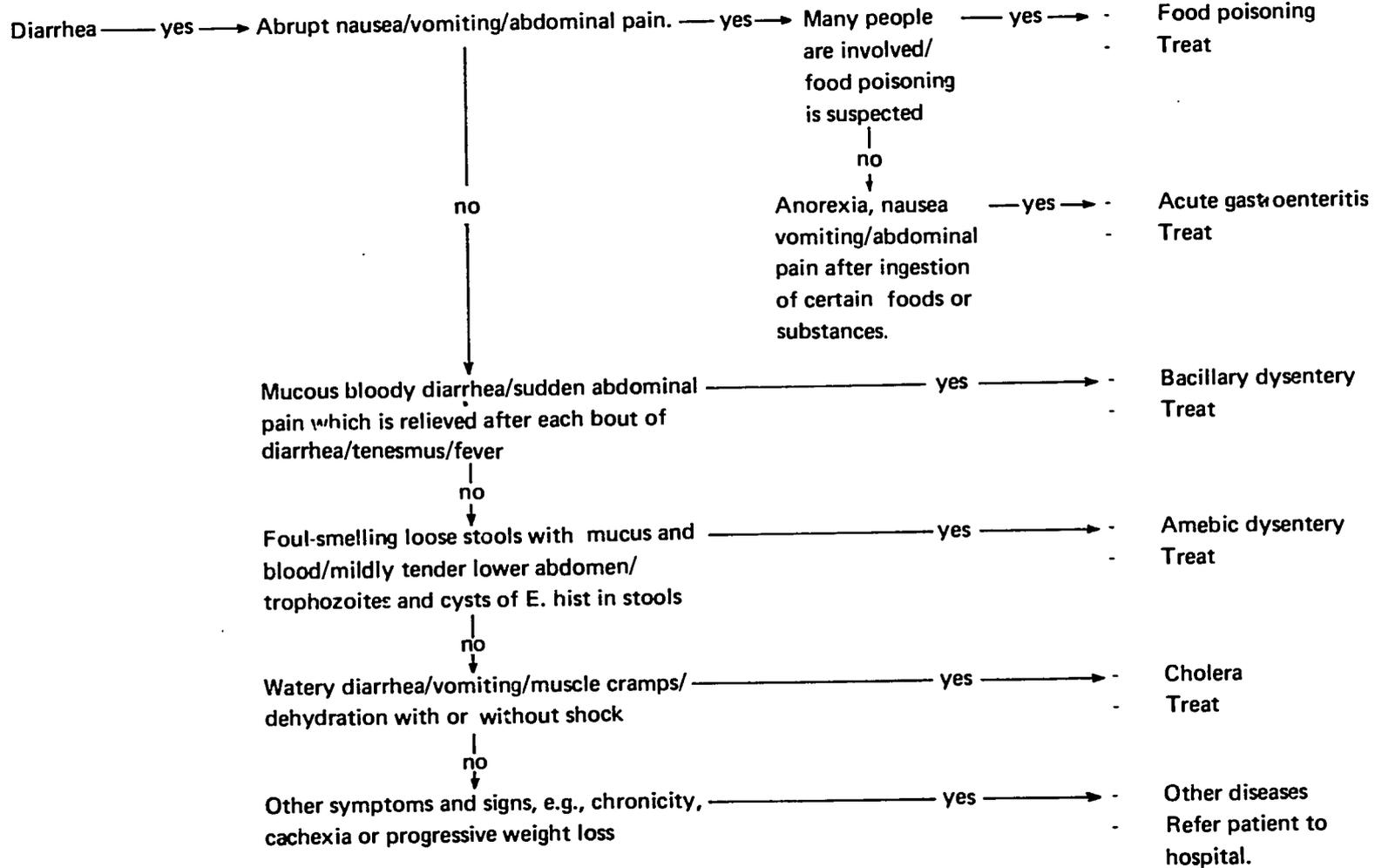
Protein-calorie malnutrition or kwashiorkor, usually encountered in preschool-age children, also contributes to pitting edema due to low plasma protein. The patient with this disorder should be transferred to hospital.

Protocol 10.11 Diarrhea

Chief complaint

History, symptoms, signs and investigation

Problems and solutions



## 11.1 Management of Diarrheas

### 11.1.1 Food Poisoning

If dehydrated, infuse intravenous 5% D/S. Antibiotics are not necessary. For vomiting, Dramamine, 1 tablet orally or 1 ml intramuscularly, may be given every 4-6 hours.

### 11.1.2 Acute Gastroenteritis

For severe diarrhea Lomotil, 1-2 tablets, may be given every 8 hours. Intestinal emollients may be given, for example. Alumin 1 tablespoon orally every 8 hours; Kaopectate 1-2 tablespoons every 4-8 hours; or Kaomycin 1-2 tablespoons every 4 hours.

For general treatment, give nothing orally. In case of severe vomiting, 1 tablet orally or 1 ml intramuscularly of Dramamine is given every 4-6 hours. If vomiting is mild or after vomiting subsides, warm fluid is allowed. For adequate rest, phenobarbital 30 mg may be given twice daily. For severe vomiting and diarrhea, 5% D/S is intravenously infused.

### 11.1.3 Bacillary Dysentery

Ampicillin (250 mg), 2 capsules every 6 hours for 5 days; or Tetracycline (250 mg) or Chloramphenicol (250 mg), 2 capsules every 6 hours for 5 days. For severe dehydration, 5% D/S is intravenously infused.

### 11.1.4 Amebic Dysentery

Amebicides include: Diodoquin (gr. 10), tablet 3 times after meals for 21 days; or Metron or Flagyl (200 mg), 4 tablets 3 times daily after meals for 5-10 days. In the acute stage, if the diarrhea is severe, and in the absence of hypotension, Emetine or Dehydroemetine, 1 mg per kg per day (not more than 65 mg), is intramuscularly injected for 2-3 days in combination with Diodoquin or Tetracycline, or Tetracycline (250 mg), 2 capsules 4 times daily, for 5-10 days.

### 11.1.5 Cholera

5% D/S is rapidly (50-100 drops per minute) infused. Tetracycline (250 mg), 2 capsules orally are given every 6 hours for 2 days.

## 11.2 Specifics of Diarrheas

### 11.2.1 Food Poisoning

Food poisoning results from the ingestion of bacteria that produce toxins, or from toxic substances, e.g., mercury, arsenic, zinc, certain vegetables, mushrooms, certain animals, and insects.

Staphylococcal Food Poisoning (Staphylococcal Gastroenteritis). Food poisoning is caused by certain staphylococci that rapidly multiply in food before it is ingested by man. It is rather easy to get the infection because 50% of the general population have the bacteria on their hands, and this plays a great role in outbreaks of acute gastroenteritis. Milk is also a major source of the infection, but generally speaking, the bacteria can multiply in any foods. Once the toxin is produced by the bacteria, an ordinary cooking temperature does

not destroy it because the toxin is heat-stable. This toxin induces diarrhea and vomiting. A history of the same illness in others who also ingest the same food is common.

#### Symptoms and Signs:

Symptoms typically appear 1 to 6 hours after ingestions of enterotoxin-contaminated food. Onset is usually abrupt, with severe nausea, vomiting, cramping, abdominal pain, diarrhea, and prostration. The abdominal pain may be severe, moderate, or absent. Although the manifestations are severe, the course is brief and spontaneous recovery within 6-24 hours is the rule. However, in old or debilitated patients severe fluid and electrolyte loss may lead to death.

#### Diagnosis:

The diagnosis is clinically based on the short incubation period, the epidemic nature of the disease, the short duration of symptoms, and the lack of fever.

#### Treatment:

In severe nausea and vomiting, antiemetics, e.g., Diphenhydramate (Dramamine) 1 tablet orally or 1 ml intramuscularly, may be administered every 4-6 hours. No antibiotic is necessary. When the blood pressure is too low or the patient goes into shock, 5% D/S 500-1000 ml should be infused intravenously and the patient should be transferred to hospital without delay.

#### Prevention:

Properly refrigerate foods, because the endotoxin is not produced in such temperatures. Ingest food when it is still warm.

### 11.2.2 Acute Gastroenteritis

Acute gastroenteritis may be due to excessive alcoholic ingestion, certain viruses, hypersensitivity to certain foods or beverages, food poisoning, certain drugs, or certain metals, e.g., lead, mercury and arsenic. Acute gastroenteritis may accompany typhoid fever, dysentery and cholera.

#### Symptoms and Signs:

Severity of symptoms depends on the causative agent and the quantity and duration of its action, as well as on the individual immunity and the status of the gastrointestinal tract.

The onset is abrupt, with malaise, anorexia, nausea, vomiting, abdominal pain and diarrhea. When the diarrhea is severe and massive, tenesmus is common, and bloody mucus may be associated with it. If it is infectious in origin, fever frequently develops. Severe loss of fluid and electrolytes leads to shock.

Signs include abdominal distention with lower abdominal tenderness. The bowel sounds are increased and in some cases abdominal cramps are encountered.

#### Diagnosis:

Usually a history of ingestion of certain foods or beverages is clear. If the

illness does not improve in 48 hours after the onset, the stool should be examined or cultured and a proctoscopic examination should be performed.  
General Treatment:

Rest and, if the vomiting is severe, nothing by mouth is permitted; fluid and electrolytes should be intravenously infused. Antiemetics such as Diphenhydramine (Dramamine) or sedatives such as Phenobarb may be administered. A warm liquid diet should be started as soon as the patient can eat.

Emollients such as Kaolin, Kaopectate, or Alumin may be given. For severe diarrhea Diphenoxylate (Lomotil), 1-2 tablets every 8 hours, may be administered.

Specific Treatment:

See Bacillary, Cholera and Typhoid Fever.

#### 11.2.3 Nonbacterial Gastroenteritis (Viral Enteritis)

This is an acute illness caused by enterovirus. It is epidemic among children and is transmitted by ingestion of foods or water contaminated with infected feces.

Symptoms and Signs:

Fever may be present or absent. The onset of diarrhea is abrupt. The watery diarrhea is associated with anorexia and nausea or vomiting. Dizziness and headache may accompany the illness. If there is any fever, it is usually low grade. Abdominal pain and distention before the diarrhea are common. These abrupt symptoms last only for 1-2 days, but loose stools may persist for a week.

Treatment:

In the acute stage, bed rest and adequate fluid intake of electrolyte-containing beverages are necessary. Antibiotics have no place in the treatment. If the diarrhea is severe, Kaopectate or Diphenoxylate (Lomotil) or Tincture of Camphorated Opium may be used, and parenteral 5% D/S is necessary.

Prevention:

Avoid contamination with the patient's feces. Dispose of the feces properly

#### 11.2.4 Allergic Gastroenteritis

Some individuals are allergic to certain foods, among them milk, eggs, meat, crab, sea food, and vegetables, and gastroenteritis results after such ingestion. In severe cases, in addition to abdominal pain, nausea and vomiting, there may be gastrointestinal bleeding, protein loss due to poor absorption, and in certain patients, bronchial asthma or asthmatic attacks and urticaria may develop.

Treatment:

It is best to avoid eating the allergen. Prolonged use of glucocorticoids may be necessary for some patients. These patients should be under a doctor's supervision. Active gastrointestinal bleeding may require emergency surgery to stop the bleeding.

### 11.2.5 Bacillary Dysentery

Bacillary dysentery is caused by *Shigella* bacilli. There are 4 pathogenic species in man. Sometimes the term "shigellosis" is used. The illness usually spontaneously subsides. Spread of the infection is via drinking water, foods, and vessels contaminated with infected feces.

Symptoms and Signs:

The incubation period after ingestion of the bacteria is 48 hours. In time, abdominal pain develops abruptly. The pain is relieved after each bout of diarrhea or defecation. Tenesmus is common. The stool consists of mucus and fresh blood. The fever may be higher than 40°C. In 2-3 days, the illness spontaneously subsides, but some species are of high virulence, hypotension may be produced, and the illness may be complicated with peripheral neuritis, conjunctivitis and arthritis.

Diagnosis:

Culture of feces will establish the final diagnosis.

Treatment:

Antibiotics used include: Ampicillin (250 mg) 2 capsules every 6 hours (½ - 1 hr. before meals) for 5 days, or Tetracycline or Chloramphenicol in the same doses and duration of treatment. Fluid and electrolyte replacement is mandatory in cases of shock or severe diarrhea.

Prevention:

Avoid uncooked foods and unclean water. Eliminate the feces properly and clean hands before cooking. Keep foods and vessels in clean places without the contamination of flies, ants or cockroaches.

### 11.2.6 Amebic Dysentery

The causative agent of amebic dysentery is *Entamoeba histolytica*. This parasite may harbor in the large intestine, and sometimes it is asymptomatic.

Symptoms and Signs:

In some patients, there is intermittent diarrhea consisting of one to four foul-smelling, loose or watery stools daily. The stools sometimes contain mucus and blood. Loose stools alternate with periods of relative normality; this may persist for months or years. Flatulence and abdominal cramping are frequent. The only physical findings are occasional tender hepatomegaly and slight pain when the cecum and ascending colon are palpated. Sigmoidoscopy sometimes reveals typical ulcerations. The diagnosis depends upon finding the organism in the feces or in ulcers. In some cases, the onset is abrupt, with high fever, severe abdominal cramps, and profuse, bloody diarrhea with tenesmus. There may be extensive destruction of the wall of the intestine, massive hemorrhage, or perforation of the bowel wall, with resultant peritonitis. Penetration of trophozoites through the muscle wall of the bowel may result in the development of large masses, with obstruction.

**Diagnosis:**

Usually trophozoites or cysts of *E. hist* are detected in stools or in the ulcers of the large bowel.

**Treatment:**

Fluid and electrolyte replacement in case of severe fluid and electrolyte loss is necessary, and fresh blood is transfused if the bleeding is severe. Amebicides used include: Diodoquin (gr 10), 1 tablet 3 times daily after meals for 21 days; Metronidazole (Metron, Flagyl), 200 mg, 4 tablets 3 times daily after meals for 5-10 days; or Emetine or Dehydroemetine, 1 mg per kg of body weight, with a maximum of 65 mg per day, given intramuscularly, is highly effective in destroying trophozoites. This agent is usually administered only in the first 2-3 days of the acute illness. Emetine is rather toxic. It may produce hypotension; if the blood pressure is low, or in pregnant woman or in children, this agent is contraindicated. Emetine is usually combined with Diodoquin or Tetracycline in the treatment of amebic dysentery.

Tetracycline, when given in a dosage of 1-2 g daily for 5-10 days, is effective against amebas that reside in the intestinal wall as well as in the lumen. It probably has a direct amebicidal action as well as acting indirectly by altering the bacterial flora of the intestine.

**Important Note:**

The amebicides must be completed, in both dosages and duration.

**Prevention:**

The human is infected through the ingestion of cysts. It is wise to ingest only well-cooked foods and boiled water. Dispose of feces properly. Do not use feces as fertilizers.

**11.2.7 Cholera**

Cholera is an acute illness which results from the colonization of the small intestine by *Vibrio cholerae*. The disease is characterized by its epidemic occurrence and in the more severe cases by massive diarrhea with rapid depletion of body fluid and electrolytes. Most major epidemics have clearly been water-borne or caused by direct contamination of food by infected feces. Poor sanitation contributes to cholera spread during major outbreaks.

**Symptoms and Signs:**

The incubation period is generally 6 to 48 hours. This is followed by the abrupt onset of watery diarrhea. With severe loss of fluid and salinity, muscle cramps may occur and rapidly lead to profound shock. Vomiting generally follows, but occasionally precedes, the onset of diarrhea in the absence of nausea or abdominal pain.

With prompt and adequate electrolyte replacement the disease runs its course in 2 to 7 days. On the other hand, if inadequately treated the mortality rate is high, due to hypovolemic shock, acidosis and renal failure.

**Diagnosis:**

The most reliable technique for identification of *V. cholerae* consists of direct plating of a sample of cholera stool on appropriate agar. The organisms

appear as typical colonies within 24 hours. Rapid diagnosis is possible either by direct observation of vibrios by antiserum, using microscopy, or identifying the organisms by immunofluorescent methods.

**Treatment:**

Successful therapy requires only prompt and adequate replacement of the gastrointestinal loss of saline and alkali. If sodium bicarbonate or acetate or lactate is not available, rapid intravenous infusion (50-100 drops/minute) of 5% D/S until the pulse becomes strong is of much help, and the patient can then be transferred to hospital with safety.

Although adequate intravenous saline and alkali replacement alone results in rapid recovery, a dramatic reduction in volume of the diarrhea and early eradication of vibrio from the stool may be effected by giving oral Tetracycline, 500 mg, every 6 hours for the first 48 hours of treatment.

**Prevention:**

- (1) Ingest only well-prepared foods and boiled water.
- (2) Foods and vessels should always be kept clean, without the contamination of flies, ants and cockroaches.
- (3) Immunization by standard commercial vaccine provides significant protection for 4 to 6 months.
- (4) Eliminate and dispose of feces properly.
- (5) Provide clean water for the population. Environmental and personal hygiene are extremely important in cholera control.

**11.2.8 Other Diseases**

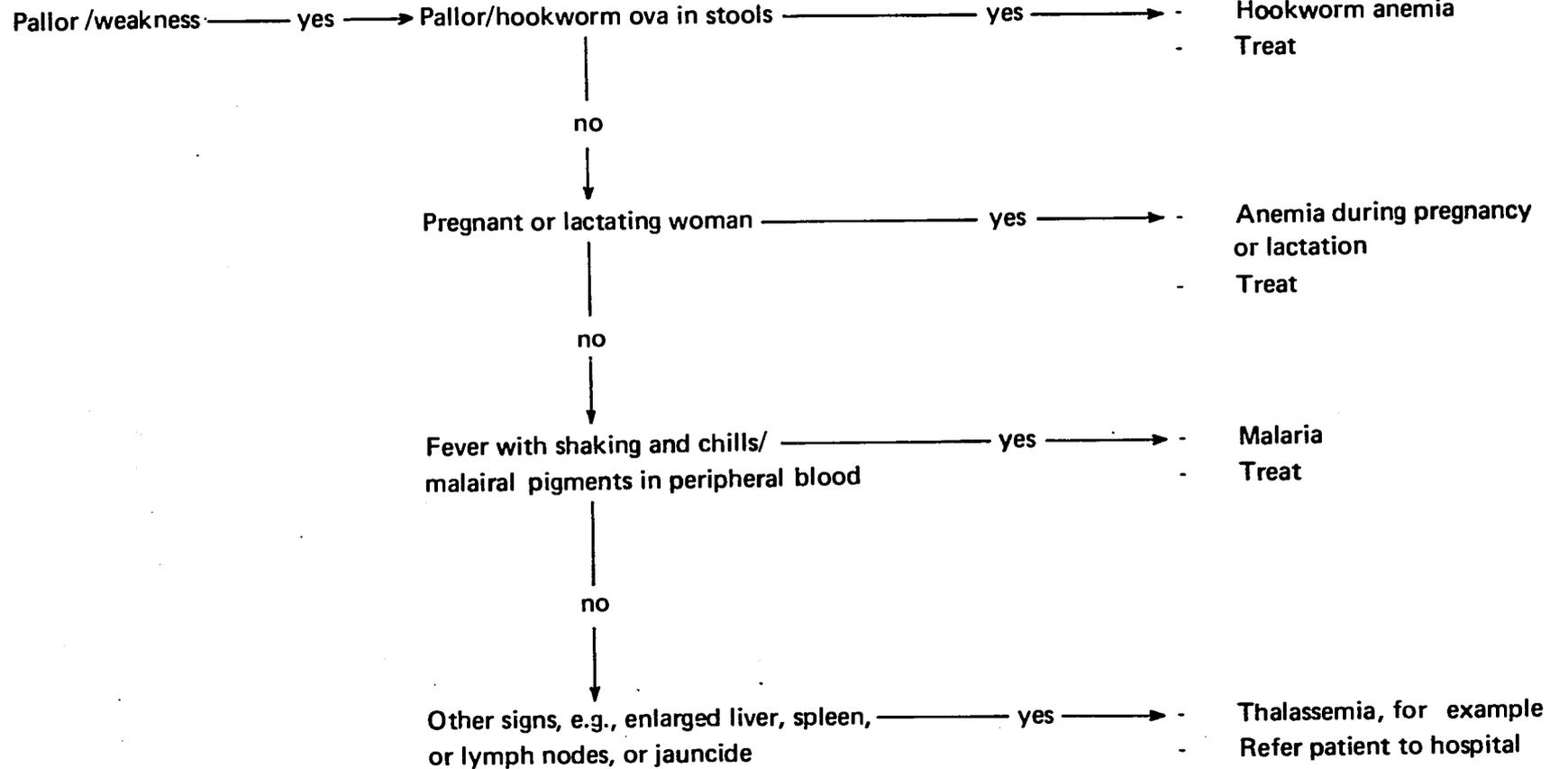
Diarrhea may be due to tuberculosis or carcinoma of the gastrointestinal tract, thyrotoxicosis, malabsorption syndrome, or certain other infectious disorders. If such cases are encountered, the patients should be referred to a hospital for further investigation and proper treatment.

**Protocol 10.12 Pallor/Weakness**

**Chief complaint**

**History, symptoms, signs and investigation**

**Problems and solutions**



### 12.1.1 Hookworm Disease

Anthelmintics, e.g., Alcoper, 5 g in water orally in the morning on an empty stomach; no food is permitted for 2 hours after the ingestion. The treatment should be repeated for 3 consecutive days; Mintezol (500 mg), 25 mg per 1 kg of body weight per day, divided into morning and evening doses after meals for 2-3 days; or Combantrin (125 mg), 10 mg per 1 kg body weight per day, in single dose orally.

Iron replacement is indicated – e.g., Fersolate, 1 tablet 3 times daily after meals until the anemia is normalized.

In cases of severe pallor and marked edema, refer patient to hospital.

### 12.1.2 During Pregnancy and Lactation, and Aging

Pregnancy & Lactation:

- (1) Fersolate, 1 tablet 3 times daily after meals;
- (2) Folic acid, 1 tablet 3 times daily after meals.
- (3) Multivit 1 tablet 3 times daily after meals.

Aging and General:

- (1) Fersolate, 1 tablet 3 times daily, and
- (2) Multivit 1 tablet 3 times daily.

### 12.1.3 Thalassemia

Folic acid, 1 tablet, once daily may be given. If it is a case of severe anemia, refer the patient to hospital for proper management, e.g., for fresh blood transfusion or splenectomy in certain cases. Usually Fersolate is not needed.

### 12.1.4 Malaria

For details of treatment, see section on Malaria. Chloroquine phosphate, 4 tablets orally for initial dose, 2 tablets 6 hours later, and then 1 tablet twice daily for 2 days (10 tablets in one course), can be given.

## 12.2 Specifics of Pallor/Weakness

Pallor is physical finding most commonly associated with anemia. By definition, patients with anemia have a significant reduction in red cell mass and a corresponding decrease in the oxygen carrying capacity of the blood. Common types of anemia encountered are hookworm anemia, anemia during pregnancy, thalassemia, malaria, and malnutrition.

### 12.2.1 Hookworm Disease

Hookworm disease is an infection caused by *Ancylostoma duodenale* or *Necator americanus*. They live in the upper small intestine. Each adult hookworm extracts approximately 0.20 ml of blood daily. If not eradicated, they may survive in the human intestine for as long as 15 years.

Symptoms and Signs:

The infective larvae penetrate human skin, especially between the toes. During the invasion, there may be an erythematous macular skin rash and edema with severe pruritus. From the skin, they enter vessels which carry them to the lungs. Then they ascend the respiratory tree, enter the pharynx, and are

swallowed. They reach the intestine about 1 week after penetration of the skin, and mature within 5 weeks.

There are various gastrointestinal symptoms, ranging from vague abdominal distress to typical ulcer pain. The major clinical manifestations of hookworm disease are those of iron-deficiency anemia and hypoalbuminemia that, if uncorrected, lead to extreme anemia with cardiac insufficiency, anasarca, and retarded physical and mental development in young children. Milder degrees of the disease are characterized by lassitude, dyspnea, palpitation, tachycardia, constipation and pallor of the skin and mucous membranes. Some individuals have asymptomatic infections; they are called "carriers of hookworm disease." Laboratory Findings:

A quantitative egg count allows an estimation of the intensity of infection. Only fresh stool is examined. If a stool specimen is allowed to stand for several hours before examination, the eggs may hatch; releasing larvae which are easily confused with those of strongyloides. Tests for occult blood in the feces are usually positive. A peripheral blood smear reveals characteristic hypochromic microcytic anemia.

Treatment:

If the anemia is not severe and there is no edema, antehelminthics may be administered immediately. A number of satisfactory antehelminthics are available. They are as follows:

Biphenium hydroxynaphthoate (Alcopar). A dose of 5 g Biphenium hydroxynaphthoate is dispersed in water and ingested in the morning on an empty stomach. No food is permitted for 2 hours, and no purgation is recommended. The treatment should be repeated for 3 consecutive days. The dose for children is the same for adults.

Thiabendazole (Mintezol) (500 mg/tab). The dose is 25 mg per 1 kg of body weight divided into morning and evening doses after meals. The dose is continued for 2-3 days.

Bitoscanate (Jonit) (50 mg/tab.). Three tablets of Jonit are administered orally as a single dose or 1 tablet every 12 hours for three doses. This drug is contraindicated for pregnant women and children younger than 5 years.

Pyrantel palmoate (Combantrin). (125 mg/tab.). The dose for Combantrin is 10 mg per kg of body weight. It is administered orally as a single dose.

Note: When anemia is severe and there is malnutrition with anasarca, a blood transfusion and a high-protein diet should be given before drug treatment is instituted.

In addition to antehelminthics, iron preparations such as Fersolate and a protein-rich diet are recommended.

Prevention:

Properly dispose of feces. Put on shoes to prevent penetration of the larvae.

Summary Note: The most common blood disease is iron deficiency anemia, which is frequently encountered in pregnant and lactating women, old people,

or patients with hookworm disease. Common symptoms and signs are pallor, fatigue, and pitting edema. Thalassemia is also frequently seen in the North. The disease is hereditary and characterized by pallor, flattened nasal bridge, prominent zygomatic bones, and hepatosplenomegaly. All patients with blood diseases, except iron deficiency due to hookworm disease or in pregnant and lactating mothers, should be referred to a hospital.

#### 12.2.2 Pregnancy Anemia

During pregnancy, iron and certain substances are particularly required for the formation of red blood cells. If the supply is inadequate, this leads to anemia. The third trimester is particularly susceptible to anemia. Every pregnant woman, however, should receive supplemental iron preparations and folate from the beginning, in addition to multivitamins and minerals. These supplements are necessary for the fetal growth and to replace maternal blood that may be lost at delivery.

Anemia during pregnancy often leads to fatigue, palpitation, abdominal distention or diarrhea, angular stomatitis, glossitis, stomal ulcers, sore throat, dysphagia, edema, and heart failure in severe anemia.

Treatment:

Iron preparations are administered orally, e.g., Fersolate 1 tablet 3 times after meals together with folic acid, 1 tablet 3 times after meals. In addition, multivitamins and minerals are administered. If the expectant mother is severely anemic and does not respond to treatment, she should be referred to a doctor or hospital.

#### 12.2.3 Anemia in the Aging and General Population

Besides pregnancy anemia, individuals including mothers during the lactation period may be undernourished and short of iron. They should therefore be encouraged to take adequate protein and iron-rich foods, e.g., liver, eggs, meat, beans, and vegetables. Fersolate, 1 tablet 3 times daily after meals, should also be added. If these fail to improve the anemia in a certain period of time, the patient should be referred to a doctor or hospital.

#### 12.2.4 Thalassemia

The term thalassemia refers to a group of genetically determined blood diseases which are caused by interference in the synthesis of hemoglobin, the major component of red blood cells, resulting in shorter survival of the red blood cells. Anemia is a usual sign of this disease. It may be mild, moderate or severe anemia, together with other manifestations, depending on the type of thalassemia. Certain types of thalassemia may produce serious clinical manifestations and the patient may die in early infancy. In thalassemia major, anemia manifests after birth and then it runs a course of progressive anemia. The excessive destruction of red cells causes pronounced jaundice. The liver and spleen are markedly enlarged. The zygomatic bones are prominent, with nasal flattening, and growth is retarded. Severe anemia leads to fatigue and cardiac enlargement and failure.

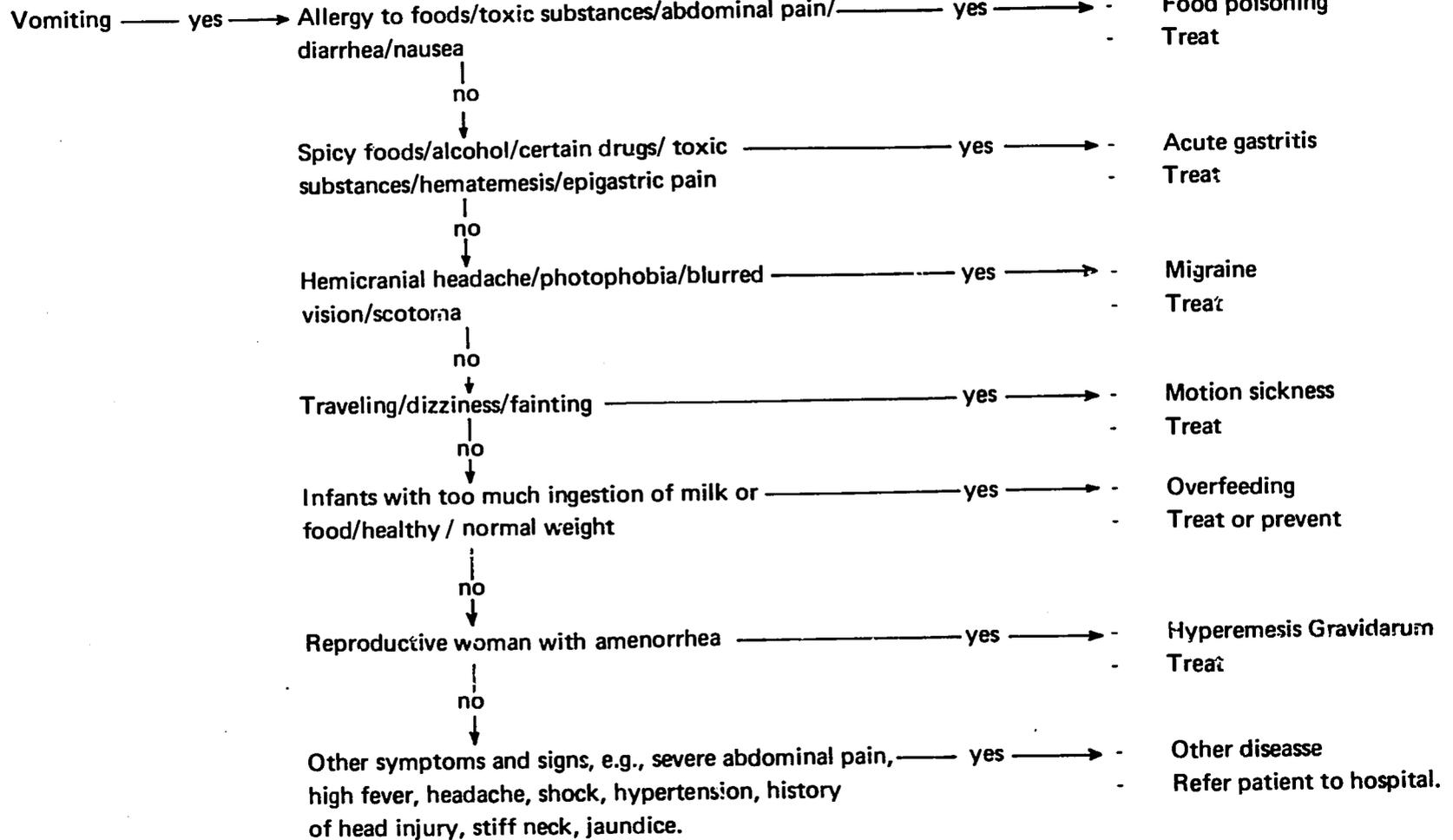
**Treatment :**

Repeated blood transfusions have been advocated for thalassemia major to improve the patient's health and activity, but repeated blood transfusions have the risks of hepatitis and iron overload. The deposition of iron in the cardiac muscle can contribute to heart failure. When a superimposed acquired hemolytic anemia develops as the result of repeated transfusions, a splenectomy is performed, but this makes the patient susceptible to certain infections. In some cases there may be folic acid deficiency, oral folic acid (0.5 mg daily) should be administered.

In thalassemia minor, the anemia is usually milder and the patients do not have marked symptoms. Some patients may have jaundice and enlarged spleen, however.

The diagnosis in general is made from the history. Usually other members of the family are also affected with the same illness. The anemia starts at birth or in early childhood. Physical examination reveals pallor, icterus, enlarged liver and spleen. All of these support the diagnosis, but diagnosis of the type of thalassemia can be made only after special laboratory investigations.

When thalassemia is suspected, the patient should be referred to a hospital. If the diagnosis is proved, the relatives should be also investigated and genetic counseling, as for family planning, should be given.

**Protocol 10.13 Vomiting**Chief complaintHistory, symptoms, signs and investigationProblems and solution

### 13.1 Management of Vomiting

#### 13.1.1 Food Poisoning, Acute Gastroenteritis, Migraine, Hyperemesis Gravidarum

The treatments are described under each item.

#### 13.1.2 Motion Sickness

The antiemetics should be taken at least half an hour before traveling, as follows- Dramamine, 1 tablet orally every 4-6 hrs; or Phenobarbital (gr 1), 1 tablet orally every 6-8 hours. The agents are less effective if they are ingested after vomiting begins.

#### 13.1.3 Overfeeding of Infants

It is wise to prevent vomiting. This can be done by frequent and small feedings. After feeding, belching is easily produced to release gas from the esophagus and stomach by mildly compressing the body's abdomen with the mother's shoulder.

#### 13.1.4 General Treatment for Vomiting

If the patient has severe vomiting and cannot eat or has signs of dehydration, an intravenous fluid with 5-10% D in normal saline should be administered. Fluids and a nonspicy diet should be started gradually as soon as the patient improves, until the patient can eat normally. Tranquilizers such as Phenobarbital and Chlorpromazine can be given, and psychotherapy (e.g., sympathy, encouragement and assurance) will help.

### 3.2 Specifics of Vomiting

Vomiting is a common symptom accompanying various disorders. If a patient has vomiting, he should be asked whether any dysphagia is associated with it. The two symptoms may be present in pharyngitis, tonsillitis, esophagitis or psychogenic upset. If vomiting is associated with abdominal pain or with headache, consult the sections on "Abdominal Pain" and "Headache" respectively. Vomiting is a common chief complaint. It is necessary to elicit other associated symptoms and signs as clues to the real disease.

The development of vomiting may result from the pathology of the esophagus, stomach, intestines, or other intraabdominal organs, or from metabolic diseases, toxic substances, the central nervous system, and psychological disturbances.

Common diseases in which vomiting appears as a symptom are:

#### 13.2.1 Obstruction of Food Passages

Carcinoma of the esophagus, pyloric obstruction due to peptic ulcer, and bowel obstructions can produce vomiting, visible peristalsis and increased bowel sounds. Inflammatory diseases of intraabdominal organs may also initiate vomiting.

#### 13.2.2 Hypertension

Usually headache is more common than vomiting in hypertension. The blood pressure should therefore be measured whenever vomiting is encountered.

### **13.2.3 Shock**

Shock may induce nausea and vomiting. The pulse and blood pressure should always be recorded.

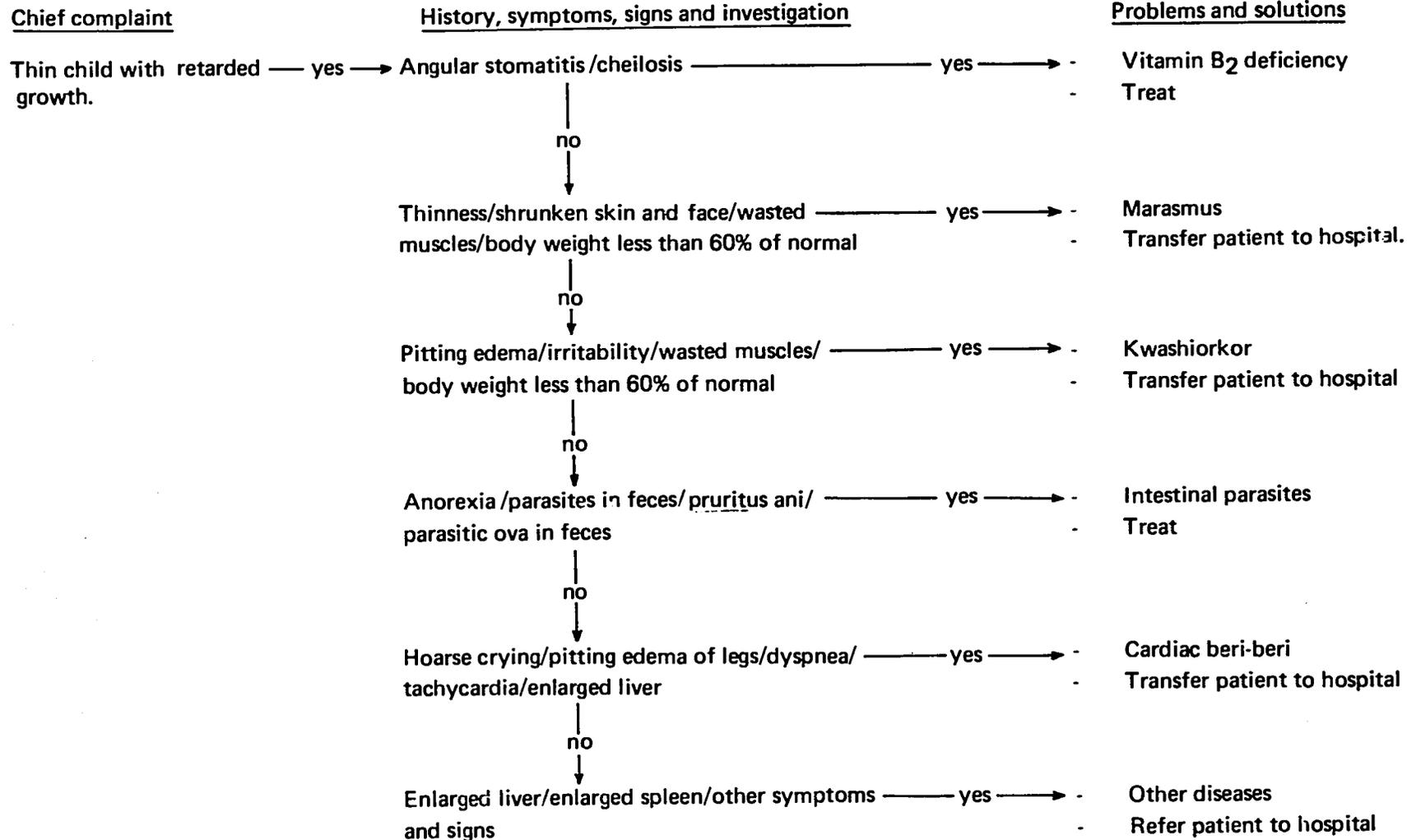
### **13.2.4 Diseases of the Brain and the Meninges**

A head injury with intracranial bleeding or a brain tumor can produce headaches and vomiting. In cases of inflammation of the brain or meninges, stiffness of the neck, high fever, paralysis and coma usually develop.

### **13.2.5 Psychogenic Vomiting**

This type of vomiting may occur as part of any emotional upset on transitory basis, or more persistently as part of a psychological disturbance.

**Protocol 10.14 Nutritional Problems**



## **14.1 Specifics of Nutrition Problems In Thailand**

(1) Protein-calorie malnutrition. This disease, especially in mild degree, is common among children from poor families.

(2) Beri-beri. Beri-beri is a common disease of any age, particularly of pregnant and lactating woman in rural areas, and of alcoholics.

(3) Simple goiter. The disease is common in the North and the North-east but the incidence is now decreasing.

(4) Anemia. Iron deficiency anemia due to undernutrition is common.

(5) Vitamin B<sub>2</sub> Deficiency. This is common among school-age children.

(6) Vitamin A Deficiency. General nutritional surveys reveal a very low incidence of vitamin A deficiency. The symptoms and signs are follicular hyperkeratosis, night blindness and keratomalacia. It is usually associated with protein-calorie malnutrition, treated in hospitals.

(7) Vitamin C Deficiency. The disease is not common. Bleeding gums are mostly due to gingivitis or periodontitis because of poor mouth hygiene.

(8) Calcium Deficiency. The deficiency is rare.

(9) Urinary Tract Stone. Certain stone formations have a relationship to protein deficiency. Such stones are common in the North and the Northeast.

(10) Obesity. Obesity is mainly due to excessive food intake with minimal exercise. In general, the disease is encountered among the rich of middle age. Associated diseases are cardiovascular disease and diabetes mellitus.

### **14.1.1 Protein-Calorie Malnutrition**

**Marasmus:**

The child with marasmus is characterized by retarded growth, emaciation due to a loss of subcutaneous fat, and extreme muscle wasting. His weight is usually only 60% of normal weight. He is skinny and bony with shrunken skin, like an old man. In addition, there may be angular stomatitis, hypopigmented hair, and dehydration.

**Kwashiorkor:**

Clinically, the syndrome of kwashiorkor is characterized by pitting edema (of feet, legs, dorsal surfaces of hands and face). Growth is retarded, with a body weight about 60% of normal. Muscles are wasted, but adequate subcutaneous fat is still present. The patient is usually extremely apathetic, with a weak, monotonous cry if disturbed. The hair becomes dry, fine brittle, and pale. His face becomes round. Anemia and diarrhea are common. Dermatitis, hepatomegaly, signs of vitamin deficiencies, and infectious diseases sometimes accompany the disease.

It is common in children 1-3 years old of poor families with poor education and many siblings.

**Cause:**

The marasmus type results from both protein and calorie deficiency, kwashiorkor results from a deficiency of protein relative to calories. Growing children need more daily protein than any other ages. If the protein intake is inadequate, the disease develops. Chronic infection and diarrhea may also lead to

malnutrition.

**Treatment :**

When a patient with malnutrition is encountered, transfer him to the hospital. The correction of dehydration and associated electrolyte imbalance and the treatment of infections are the immediate demands in the management. The basic requirement, however, is a diet providing all essential nutrients, e.g., high protein and calories and iron preparations.

**Prevention:**

Protein and calorie malnutrition is an important problem in Thailand and underdeveloped countries. The disorder makes a major contribution to the high mortality rate in childhood because of malnutrition, diarrhea, measles, other infectious diseases, and mental retardation. Prevention of the disease may be accomplished by various approaches as suggested below:

- (1) Educate mothers about nutrition during the weaning process. Encourage them to feed the infants with breast milk for at least 1½ to 2 years, or until they have another gestation. Supplementary foods should be started at the age of 4-6 months. After the weaning, a protein-rich diet, particularly animal protein, should be provided. The weight of the children should be regularly recorded and if any abnormality should occur, mothers should consult health personnel.
- (2) Increase the production of animal and vegetable protein to meet the needs of the population.
- (3) Provide infants with protein-rich foods, e.g., milk and soybean milk, or vegetable protein, in mother and child clinic.
- (4) Demonstrate the process of nutritional supplement for preschool age, e.g., establish child nutrition centers.
- (5) Encourage the population to consume more beans, pork and other meat in place of only rice.
- (6) Educate pregnant and lactating mothers about nutritional needs of particular importance at specific periods.
- (7) Improve sanitation to prevent gastrointestinal and parasitic diseases.
- (8) Provide health service clinics for under 5 years, particularly with nutrition surveillance programs.
- (9) Frequently conduct a nutrition survey of the community, especially of young children.
- (10) Unhealthy food habits and taboos should be discussed, followed by planning of an appropriate and a definite nutrition program.
- (11) Promote nutrition and health education programs.
- (12) Develop or participate in a community development program.

**Management of Protein-Calorie Malnutrition :**

- (1) Transfer kwashiorkor cases to hospital for proper management.
- (2) Transfer marasmus cases with weights less than 60% of normal to hospital for proper management.

(3) Marasmus cases with weights more than 60% of normal are managed as follows.

a. Administer appropriate antibiotics for particular infections, e.g., pneumonia, bronchitis, diarrhea. Antibiotics commonly used are penicillin, chloramphenicol, thalazole.

b. Provide high protein calorie diets. The diets should be digestible and palatable, e.g., skimmed milk, soybean milk, bean curd.

c. Add vitamins— vitamin A, vitamin B complex, vitamin C, and iron preparation.

d. Administer anti-intestinal parasitic agents such as Alcopar for hook-worm disease. However, this should be given only after the patients have improved from the malnourished state.

e. Educate mothers about child rearing, nutrition, family planning, and more love and care for their children.

f. Closely follow up the progress of the disease. After recovery, educate the mothers about proper nutrition for their children. Immunize children with certain vaccines. Their weight should be regularly recorded, and a follow-up series at the mother-and-child or feeding station or CNC is suggested.

#### 14.2.2 Angular Stomatitis

**Manifestations :**

Angular fissures are clearly seen on slight opening of the mouth. Soreness and burning of the lips and swelling of the lips may also develop.

**Incidence :**

The disease appears mostly among school age children both thin and normally built.

**Cause :**

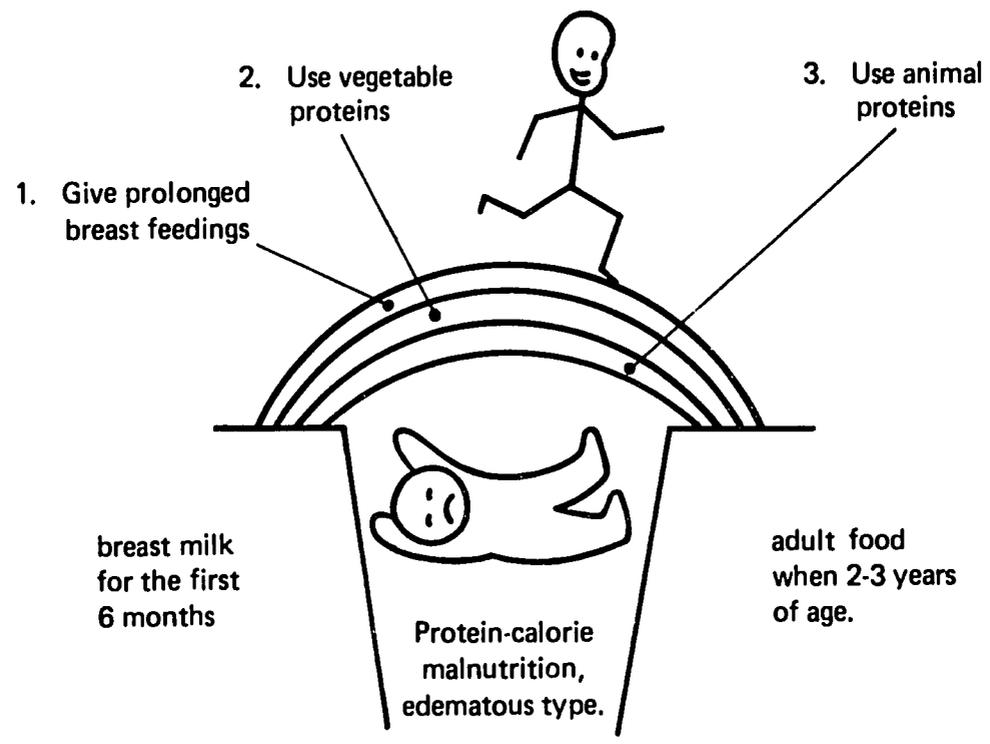
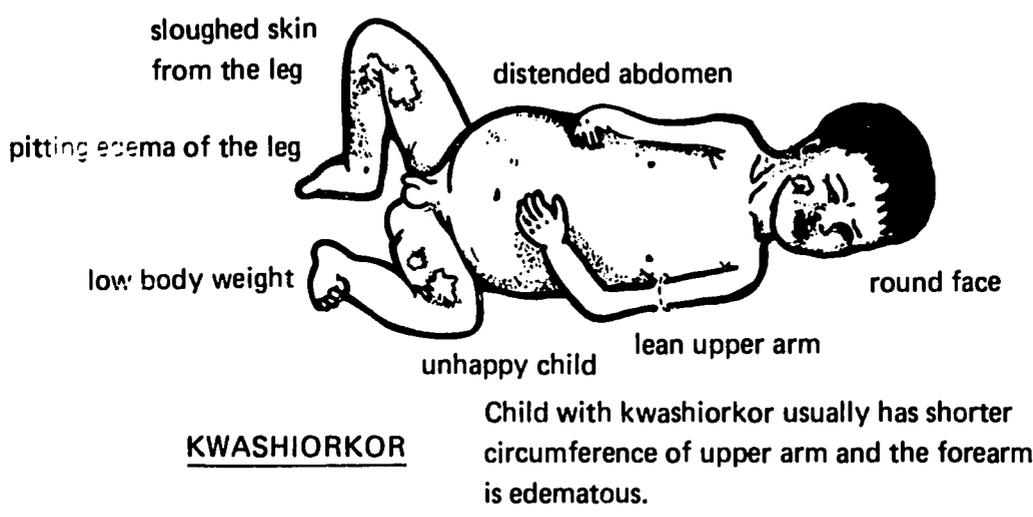
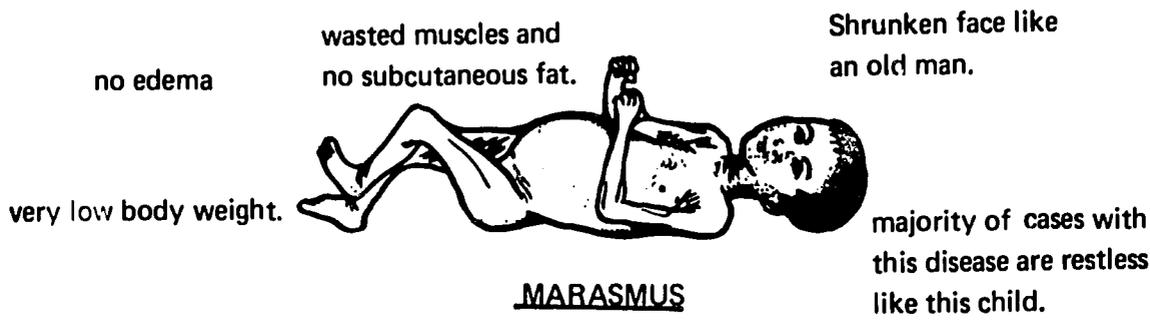
Usually it is caused by a vitamin B<sub>2</sub> deficiency, and in this condition the symptom is not severe. The disease frequently accompanies other undernourishment, e.g., protein or vitamin A deficiency.

**Treatment :**

Vitamin B<sub>2</sub> in doses of 40-50 mg daily is given orally until symptoms disappear.

**Prevention :**

This requires a diet rich in vitamin B<sub>2</sub> e.g., milk, liver, meats, eggs, green and yellow vegetable.



**Prevention of Protein-Calorie Malnutrition**

**Protocol 10.15 Numbness****Chief complaint**

Numbness

yes

**History, symptoms, signs and investigation**Peripheral numbness/difficulty in getting up  
after prolonged sitting/calf tenderness

yes

**Problems and solution**- Beri-beri  
- Treat

no

Paralysis/wasted muscles/manifestations  
suggestive of leprosy/other symptoms and signs

yes

- Other diseases  
- Transfer to hospital

### 15.1 Infantile Beri-Beri

Manifestations may be classified into 3 types:

(1) Acute cardiac insufficiency. This type is more common in infants 2-4 months of age. The infants appear healthy, but the symptom begins with vomiting, restlessness, pallor, anorexia, and insomnia. Then they develop cyanosis, dyspnea, and running pulse with enlarged liver and pitting edema.

(2) Aponia. This is a subacute form commonly found among infants 5-7 months of age. It runs a slow, gradual course beginning with low-grade fever, cough, difficulty in breathing, and hoarseness or aponia.

(3) Meningism. This form of beri-beri is common in infants 8-10 months of age. They look apathetic and drowsy. The manifestations simulate those of meningitis.

Incidence :

The mortality rate of infants in Thailand is high, and one of the leading causes is beri-beri.

Cause :

Inadequacy of B<sub>1</sub> intake of pregnant and lactating mothers results in inadequate B<sub>1</sub> in breast milk, or the infant does not receive supplementary diet.

Treatment :

When an infant with cardiac beri-beri is encountered, transfer the patient to a doctor immediately. Beri-beri during pregnancy may be treated with intravenous thiamine hydrochloride, 5 mg, continuing the therapy with intramuscular or oral form. Rest is necessary at this period.

Prevention:

During pregnant and lactating periods, mothers require adequate nutrients. Providing vitamin B complex and Fersolate during periods of pregnancy and lactation is of prime importance.

### 15.2 Adult Beri-Beri

Manifestations:

The great majority of cases have malaise and heavy, easily fatigued edematous legs, particularly in the evening. Peripheral numbness is also prominent. After prolonged sitting, patients can hardly get up. Some cases have atrophic muscles with impaired gait, foot drop, tender calves, or pedal pitting edema.

Beri-beri is a common disease of adults, especially among the elderly, pregnant and lactating mothers, active individuals and alcoholics.

Causes:

The disease is caused by a deficiency of vitamin B<sub>1</sub> mainly due to the consumption of over-milled rice. Vitamin B<sub>1</sub> is removed during the milling process.

Treatment:

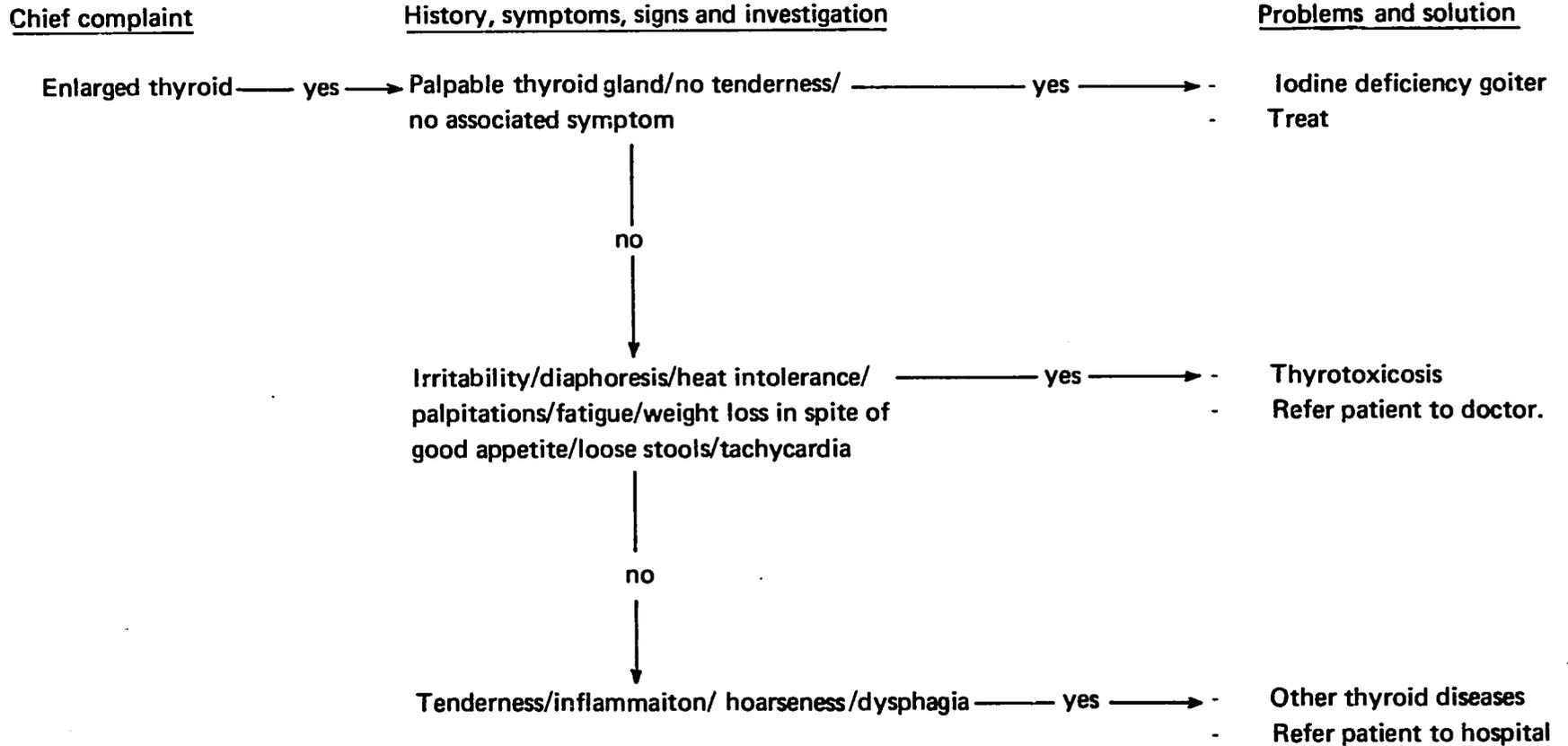
The treatment of beri-beri consists of a balanced diet plus the administration of 10 mg of vitamin B<sub>1</sub> orally daily. When any deformity of extremities

is observed , e.g., paralysis or food drop, the patient should be referred to a hospital.

**Prevention:**

This requires an increase in intake of vitamin B1 for persons on rice diets. They are encouraged to consume parboiled, homepounded or under-milled rice. A balanced diet contains foods which are rich in vitamin B<sub>1</sub>. Vitamin B<sub>1</sub> is heat unstable and dissolves in water. Advice on cooking should be given.

**Protocol 10.16 Swelling in Neck (Enlarged Thyroid)**



## **16.1 Simple Goiter**

### **Manifestations:**

There is enlargement of the thyroid gland, which is best examined when the neck is in a mild extension position. Often this enlarged thyroid is obvious. In practice, the normal size of the thyroid is as big as the patient's thumb. During puberty and pregnancy, the thyroid may be slightly enlarged, and the preexisting simple goiter may be more enlarged during pregnancy. Owing to the slow enlargement of the thyroid, usually patients ignore it. In rare cases, it may produce hoarseness and dysphagia.

### **Incidence:**

Simple goiter is more common in areas far away from the sea. Usually these are isolated regions and the population drinks hard water. In Thailand simple goiter is prevalent in the North and the Northeast.

### **Causes:**

Simple goiter here is mainly due to iodine deficiency. Certain foods, e.g., cabbage, contain goitrogenic substances. Certain drinking well-water has a low iodine content.

### **Treatment:**

Diffuse simple goiter in children requires a few drops of Lugol's solution mixed with one glass of water daily, or, simply, it can be replaced by iodated salt. The treatment should be continued until disappearance of the enlarged thyroid. In addition, Thyroid extract (gr. 1), 1 tablet daily, enhances regression of the goiter. If the goiter is huge or there is evidence suggesting carcinoma, surgical removal of the mass is indicated.

### **Prevention:**

Everybody should regularly consume seafoods. An effective prevention is to consume iodated salt routinely. The iodized or iodated salt has similar properties to normal salt, but it can turn blue when cooked with vegetables. Effective mass prevention of simple goiter requires a law that only iodized or iodated salt be sold for consumption, and that regular surveys be made for goiter cases in endemic areas, such as the North and the Northeast.

## **13.2 Thyrotoxicosis**

### **Manifestations:**

The disease is characterized by progressive weight loss in spite of good appetite, irritability, palpitations, heat intolerance, tachycardia, warm and moist skin, tremors, enlarged thyroid, and probably exophthalmos.

### **Incidence:**

It is more common among females 20-40 years of age.

### **Causes:**

Generally speaking, it is due to hyperfunction of the thyroid gland.

### **Treatment:**

The patient with thyrotoxicosis should be referred to a doctor. Treatment includes antithyroid drugs, surgery, or radioisotope therapy.

**Prevention:**

Thyrotoxicosis must be treated until remission occurs. Medical treatment is time-consuming and it requires regular follow-up.

Prevention of simple goiter is probably a way to prevent multinodular toxic goiter.

**16.3 Carcinoma and Inflammatory Diseases of Thyroid Gland**

In carcinoma of the thyroid gland, the gland is rapidly and progressively enlarged. The gland is not suppressible with iodized salt, and in the early stage it is not tender. In inflammatory diseases of the thyroid gland, the thyroid gland is swollen and tender. Temporary hoarseness and dysphagia may be caused by the inflammatory process. When the disease is suspected, the patient should be referred to a hospital.

**MODULE 11**  
**PEDIATRIC PROBLEMS**

**WANNARAT CHANNUKUL, M.D., M.P.H.**

**Previous Page Blank**



## MODULE 11

### PEDIATRIC PROBLEMS

#### 1. INSTRUCTIONAL OBJECTIVES

Upon completion of the module the wechakorn will be able to:

- (1) Examine, diagnose, and treat common problems of the pediatric age group, if not serious.
- (2) Examine, diagnose, and give first aid for common pediatric problems that are serious, and then refer them to a doctor.
- (3) Organize health promotive and disease preventive services for children.

Specifically, the wechakorn will be able to:

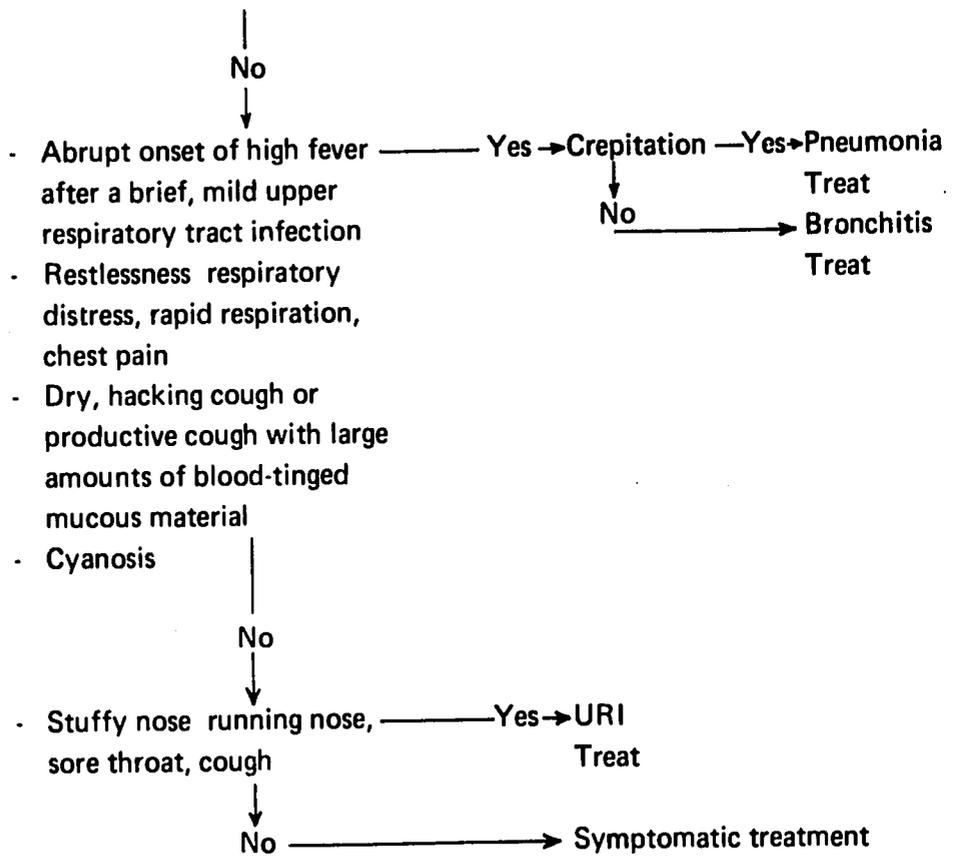
- (1) Examine, diagnose, treat and/or give advice to prevent the following diseases: whooping cough, Thai hemorrhagic fever, mumps, pneumonia, bronchitis, upper respiratory tract infections, measles, exanthem subitum, chickenpox, bronchial asthma, febrile convulsion, and physiologic jaundice.
- (2) Examine and diagnose the following diseases or problems, then refer patient to doctor: encephalitis, meningitis, poliomyelitis, tetanus, imperforated anus, gastrointestinal obstruction, dyspnea, respiratory distress, convulsion, and pathologic jaundice.
- (3) Give first aid treatment to the patient who has epileptic convulsions or general convulsions.
- (4) Do physical examinations and immunize children according to schedule.

## 2. PROTOCOLS AND TREATMENT FOR SPECIFIC COMMON PROBLEMS

### Protocol 11.1 - Fever/Headache

<u>Presenting Condition</u>	<u>History, Symptom/Sign and Lab. Findings</u>	<u>Problems &amp; Solution</u>
Fever/Headache →	<ul style="list-style-type: none"> <li>- Intensive cough, characteristically, repetitive series of 5 to 10 forceful coughs during a single expiration followed by a sudden massive inspiratory effort which produces the "Whoop". Facial redness or cyanosis, bulging eyes, protrusion of the tongue, lacrimation salivation, and distension of neck veins are noted during the attack. Conjunctival hemorrhages, petichiae, and hemorrhages over the head and neck may be noted.</li> </ul>	<ul style="list-style-type: none"> <li>- Yes → Whooping cough Treat</li> </ul>
	No	
	<ul style="list-style-type: none"> <li>- Palpable liver with or without tenderness.</li> <li>- Scattered petichiae on the forehead and extremities, spontaneous ecchymoses may appear.</li> <li>- Epistaxis, hematemesis, melena,</li> <li>- Shock, unconscious.</li> </ul>	<ul style="list-style-type: none"> <li>- Yes → Thai hemorrhagic fever. Treat</li> </ul>
	No	
	<ul style="list-style-type: none"> <li>- Painful enlargement of the salivary gland (parotid), unilateral or bilateral.</li> </ul>	<ul style="list-style-type: none"> <li>- Yes → Mumps Treat</li> </ul>
	No	
	↓	

**Protocol 1 - Fever/Headache (Cont.)**



Transfer to hospital if patient is not improved.

**2.1 Whooping Cough**

- (1) Avoidance of factors that provoke attacks of coughing.
- (2) Maintenance of hydration and nutrition; frequent feeding with small amount at each time.
- (3) Erythromycin.
- (4) Cough medicine.
- (5) Diazepam.

**2.2 Thai Hemorrhagic Fever**

- No specific treatment.
- Symptomatic treatment to prevent complications during the first three days includes:

- (1) Soft and liquid diet orally to prevent dehydration.
  - (2) Tepid sponge for high fever. Acetaminophen may be given if necessary. Aspirin and A.P.C. are contraindicated.
  - (3) Immediately transfer patient to hospital when the patient is: vomiting, dehydrated, in severe abdominal pain, delirious, semiconscious, unconscious, thirsty, or restless. Or when the patient has: hematemesis, melena, or a progressively dropping blood pressure.
- Start intravenous fluid by using 5% D/NSS with the rate of 10 ml/Kg body weight/hour before transferring.

### 2.3 Mumps

- No specific treatment.
- Symptomatic treatment is:
  - (1) Soft diet.
  - (2) Aspirin for pain, fever, and headache.
  - (3) Transfer to hospital when there are complications.

### 2.4 Pneumonia

- (1) Adequate rest.
- (2) Liberal oral intake of fluids and proper nutrition.
- (3) Aspirin for high fever.
- (4) Cough medicine.
- (5) Penicillin G. sodium intramuscularly.
- (6) Transfer patient to hospital if not improved within three days of treatments.

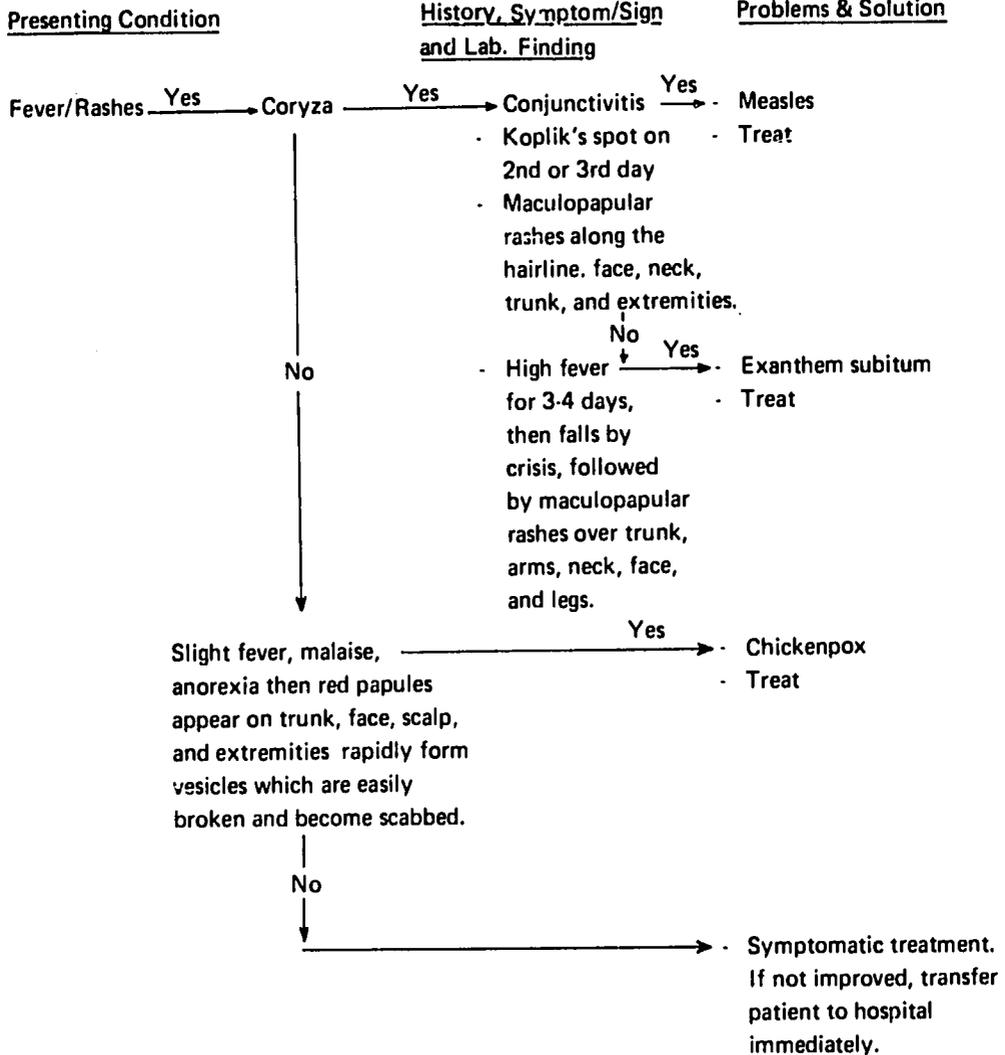
### 2.5 Bronchitis

- (1) Adequate rest and proper nutrition.
- (2) Aspirin.
- (3) Chlorpheniramine maleate.
- (4) Cough medicine.
- (5) Pen V.

### 2.6 Upper Respiratory Treat Infections (URI)

- (1) Adequate rest and proper nutrition.
- (2) Aspirin.
- (3) Chlorpheniramine maleate.
- (4) Cough medicine.
- (5) Pen V.

Protocol 11.2 - Fever/Rashes



**2.7 Measles**

- No specific treatment.
- Symptomatic treatment is:
  - (1) Aspirin for fever.
  - (2) Calamine lotion, apply on rashes.
  - (3) Cough medicine.
  - (4) Phenobarbital, if the patient is restless.
  - (5) Pen V. for complications.

## 2.8 Exanthem Subitum

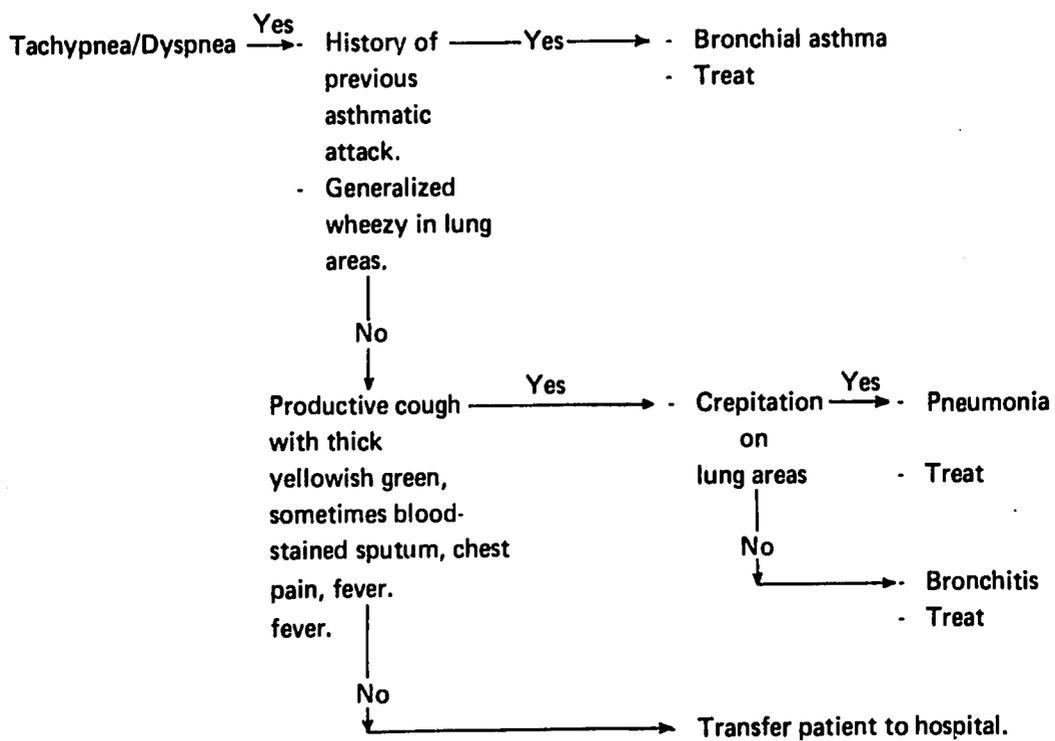
- No specific treatment.
- Symptomatic treatment is:
  - (1) Aspirin for fever.
  - (2) Diazepam for convulsion.

## 2.9 Chickenpox

- No specific treatment.
- Symptomatic treatment is:
  - (1) Calamine lotion, apply on rashes. Advise patient not to scratch.
  - (2) Aspirin for fever.
  - (3) Tetracycline for complications.

### Protocol 11.3 - Tachypnea/Dyspnea

<u>Presenting Condition</u>	<u>History, Symptom/Sign and Lab. Findings</u>	<u>Problem &amp; Solution</u>
-----------------------------	------------------------------------------------	-------------------------------



## 2.10 Bronchial Asthma

### Treatment

- (1) Try to find the cause, then avoid or get rid of the allergen.
- (2) Adrenaline subcutaneously, may be repeated every 15 to 30

minutes, but not more than 3 injections should be given. If there is no improvement, give Aminophylline in 50% glucose intravenously or mix in 5% D/W 500 ml intravenous drip.

(3) Administer Diazepam orally or intramuscularly for restlessness.

(4) Treat URI or bronchitis, if present.

(5) In status asthmaticus, transfer patient to the hospital as soon as possible.

### 2.11 Pneumonia

(1) Absolute rest, adequate diet and fluid intake, monitor respirations.

(2) Cough medicine.

(3) Penicillin G. sodium intramuscularly.

If not improved by 3 days, patient should be transferred to the hospital.

### 2.12 Bronchitis

(1) Adequate rest and diet.

(2) Aspirin.

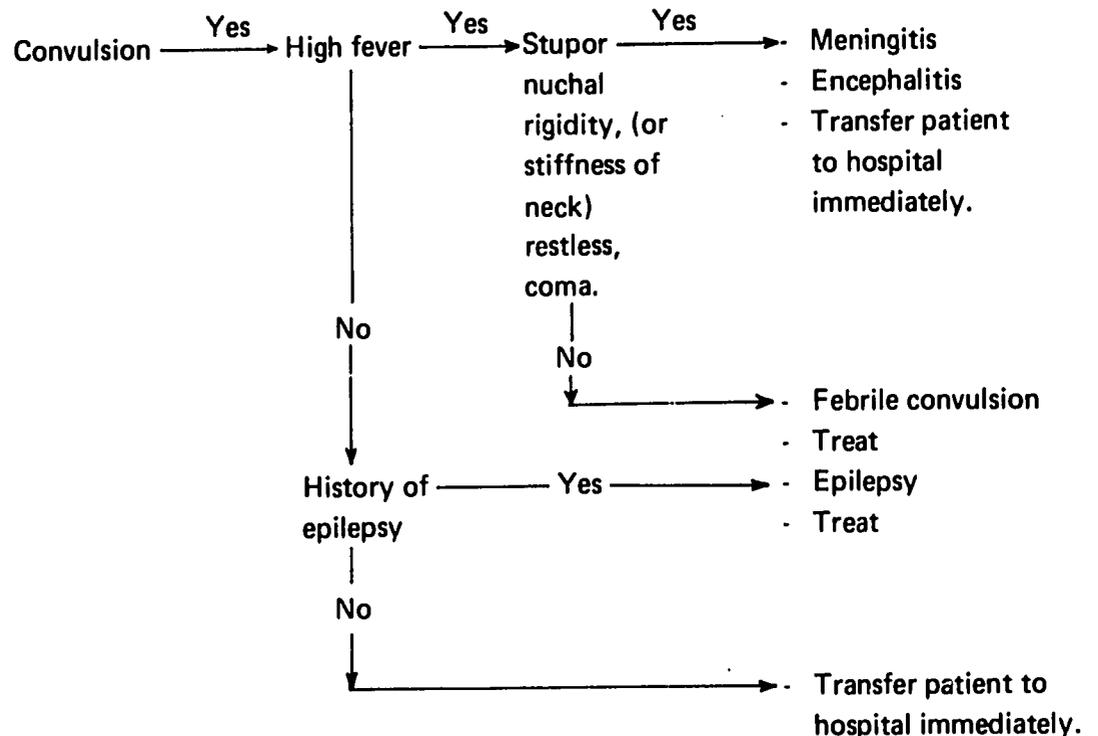
(3) Chlorpheniramine maleate.

(4) Cough medicine.

(5) Pen. V.

### Protocol 11.4 - Convulsion

<u>Presenting Condition</u>	<u>History, Symptom/Sign and Lab. Findings</u>	<u>Problems &amp; Solution</u>
-----------------------------	------------------------------------------------	--------------------------------



**2.13 Febrile Convulsion**

- (1) Clear airway. Use tongue blade to prevent airway obstruction.
- (2) Administer Diazepam intramuscularly.
- (3) Bathe patient with a tepid sponge to bring down the fever.
- (4) Treat cause of fever.

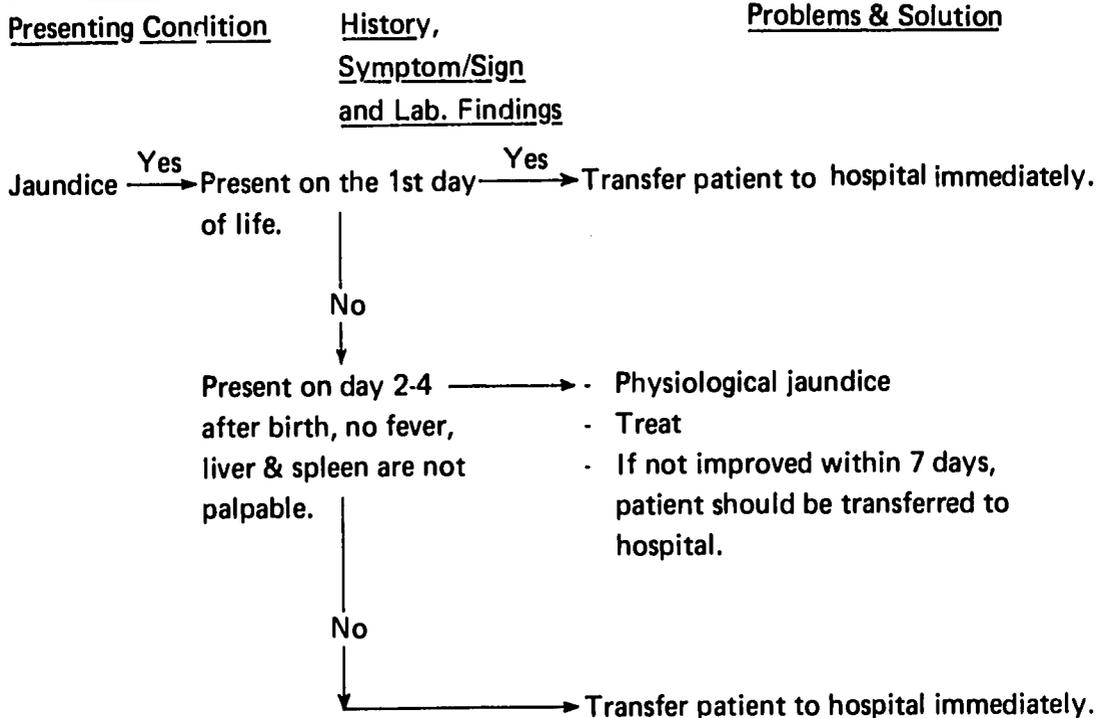
**2.14 Epilepsy**

First aid treatment:

- (1) Turn patient to the side so that pooled secretions are not aspirated.
- (2) Use a tongue blade to prevent injury to the tongue or other tissues of the oral cavity.
- (3) Clear airway.
- (4) Administer Diazepam intramuscularly if convulsions still persist.

Refer patient to physician.

**Protocol 11.5 - Jaundice in the Newborn.**



**2.15 Physiological Jaundice**

Under normal circumstances, a patient with physiological jaundice should have a spontaneous recovery within seven days of onset. If the patient has deep jaundice, he may be given Phenobarbital 5 to 15 mg/day orally for four days.

## 2.16 Presenting problems which need to be transferred to the hospital immediately.

- Vomiting, no bowel movement, and abdominal pain → Imperforated anus.  
- Gastrointestinal obstruction.  
- Obstructed hernia, etc.
- Stiff neck, stiff back, and convulsion → Meningitis.  
- Encephalitis.  
- Tetanus, etc.
- Refuses feeding, lockjaw, dysphagia, convulsions → Tetanus.
- Fever, headache, malaise, weakness or paralysis of muscles. → Poliomyelitis.

## 3. DISEASES OF INFANCY AND CHILDHOOD

### 3.1 Whooping Cough

Whooping cough is an acute respiratory infection caused by *Hemophilus pertussis* which can affect any susceptible host. Whooping cough has occurred in a child only 2 weeks old and in an adult 27 years old. The highest risk of disease is in children under 5 years. Mortality is greatest in young infants.

#### Clinical Manifestations:

The incubation period for pertussis has a mean of seven and a range of six to twenty days. The early symptoms are rhinorrhea, conjunctival injection, lacrimation, mild cough, and low grade fever for about ten days. Then episodes of coughing increase in severity. A repetitive series of five to ten forceful coughs during a single expiration is followed by a sudden massive inspiratory effort which produces the "whoop" as air is inhaled forcefully. Facial redness or cyanosis, bulging eyes, protrusion of the tongue, lacrimation, salivation, and distension of neck veins are noted during the attack. The episodes are exhausting and it is not unusual for the patient to appear dazed and apathetic, and to lose weight. Petichial or conjunctival hemorrhages may be noted about the head and neck. In some patients, cerebral hemorrhage may occur. This stage may take two to four weeks or longer. Episodes of coughing, whooping, and vomiting gradually decrease in frequency and severity. Cough may persist for several months.

#### Complications:

The common complications are pneumonia, otitis media, cerebral hemorrhage, tetanic seizures, epistaxis and hematemesis.

### Prognosis:

The prognosis is good, except in the event of complications in which case the patient may die of pneumonia or cerebral hemorrhage.

### Prevention:

Ideally, immunization is accomplished by providing pertussis in combination with diphtheria and tetanus toxoid (DPT). Primary immunization is initiated at two months of age and the schedule of active immunizations is followed.

### Treatment:

(1) Supportive care includes avoidance of factors that provoke attacks of coughing, and maintenance of proper hydration and nutrition.

(2) Antibiotic (Erythromycin).

(3) Cough suppressant.

(4) Diazepam.

### 3.2 Thai Hemorrhagic Fever

Thai hemorrhagic fever is a severe, often fatal, febrile disease caused by dengue virus and Chikungunya virus carried by *Aedes aegypti*. All age groups can be affected, but it is most commonly found in children from two to six years old. It appears equally in both sexes. The peak incidence rate of this infection is during the rainy season, usually from May to October.

#### Clinical Manifestations:

The incubation period of Thai hemorrhagic fever is unknown. The progression of the illness is rapid and life-threatening in the severely ill child. The first phase is relatively mild with abrupt onset of high fever (39<sup>o</sup>-40<sup>o</sup>C), malaise, vomiting, headache, anorexia and cough and is followed after two to five days by rapid clinical deterioration and physical collapse. In this second phase the patient usually manifests cold, clammy extremities, a warm trunk, flushed face, restlessness, irritability, and complains of mid-epigastric pain. Frequently, there are scattered petechiae on the forehead and extremities; spontaneous ecchymoses may also appear, and easy bruisability is common. There may be circumoral and peripheral cyanosis. Respiration is rapid and often labored. The pulse is weak, rapid and thready, and the heart sounds faint. The liver may become palpable four to six cm below the costal margin and is usually firm and nontender. Less than 10% of patients manifest gross ecchymosis or gastrointestinal bleeding. After a 24 to 36 hour period of crisis, convalescence is fairly rapid in the children who recover. The temperature may return to normal before or during the stage of shock. Infrequently there is residual brain damage due either to prolonged shock or occasionally to intracranial hemorrhage.

#### Differential Diagnosis:

- During stage of high fever, typhoid fever, influenza.
- During stage of vomiting and liver enlargement, infectious hepatitis, preicteric stage.
- During stage of shock, internal hemorrhage and blood dyscrasia.

**Prognosis:**

Survival is directly related to early diagnosis and early hospitalization. Death occurs in 10% to 40% of patients with shock.

**Prevention:**

Avoid mosquito bites by using insecticides and covering the body with clothes. Destruction of *Aedes aegypti* breeding sites is also effective.

**Treatment:**

Symptomatic and supportive treatments are practiced. Intravenous replacement of fluids and electrolytes is frequently sufficient to sustain patients until spontaneous recovery occurs. Transfusion of fresh blood or of plasma may be required to control bleeding and shock. Salicylates are contraindicated because of their effect on blood clotting.

### **3.3 Mumps**

Mumps is an acute contagious disease caused by a virus that is a member of the paramyxovirus group. Painful enlargement of the salivary glands, chiefly the parotids, is the usual presenting sign. The virus is spread from a human reservoir by direct contact, airborne droplet nuclei, and fomites contaminated by infectious saliva. Mumps affects both sexes equally and mainly occurs in children under the age of 15 years.

**Clinical Manifestations:**

The incubation period ranges from 14 to 24 days. In children prodromal symptoms and signs are rare, but may be manifest by fever, muscular pain (especially in the neck), headache, and malaise for 1 to 2 days. The onset of illness is usually characterized by pain and swelling in one or both parotid glands. The swelling may proceed extremely rapidly, reaching a maximum size within a few hours, although the peak is usually reached in 1 to 3 days. The swelling slowly subsides within 3 to 7 days. The swollen area is tender and painful, pain is especially elicited by tasting sour liquids such as lemon juice, or by chewing or opening the mouth.

**Complications:**

The common complications are orchitis, oophoritis and meningoencephalomyelitis.

- Orchitis lesions are common in adolescents and adults but rare in pre-pubescent boys. The orchitis usually follows parotitis within 8 days but sometimes is delayed. Approximately 30% to 40% of affected testes atrophy. Impairment of fertility is estimated to be about 13%, but absolute infertility is probably rare. In a case of oophoritis, pelvic pain and tenderness are noted in about 7% of postpuberal female patients. There is no evidence of impairment of fertility.

- Meningoencephalomyelitis is the most frequent complication in childhood. Clinical manifestations have been reported in over 10% of patients. Males are affected 3 to 5 times as frequently as females.

**Treatment:**

Symptomatic.

### 3.4 Pneumonia

Pneumonia is the infection of the parenchyma of the lung caused by bacteria, fungus, virus, parasite, or even aspirated materials such as a foreign body, food, vomitus, and sputum. Pneumonia is also found as a complication in chest injury and cold stress. Lying for a long time in one position favors its development. Clinical manifestations vary with the cause of pneumonia. Bacterial pneumonia is commonly caused by pneumococcus, streptococcus, and Hemophilus influenzae, which are found as common flora of the respiratory tract. A viral respiratory disease often precedes the development of bacterial pneumonia by a few days.

#### Clinical Manifestations:

The classic history is shaking and chill followed by a high fever. Cough, and chest pain may be seen in older children. In infants, a mild upper respiratory tract infection characterized by stuffy nose, fretfulness, and diminished appetite usually precedes the onset of pneumonia. This mild illness of several days ends with the abrupt onset of a fever of 39°C or higher, restlessness, apprehension, and respiratory distress. The patient appears ill with moderate to severe air hunger and often cyanosis. The respiratory distress manifests by grunting, flaring of the alae nasi, retractions of the supraclavicular, intercostal, and subcostal areas, tachypnea, and tachycardia. Cough is unusual initially, but may also occur later. Abdominal distension may be prominent. In children and teenagers there is often the onset of a shaking chill followed by fever as high as 40.5°C, and many children are noted to be splinting on the affected side to minimize pleuritic pain and to improve ventilation.

#### Complications:

Empyema results from extension of infection to the pleural surfaces and occurs most commonly in the young infant who has received medical attention late in the course of his illness or who has been inadequately treated. Myocarditis, pericarditis, peritonitis, arthritis, nephritis, and lung abscess are frequently found.

#### Treatment:

1. Rest with adequate diet.
2. Antibiotics (the drug of choice for the causative organism).
3. Treat complications.

### 3.5 Bronchitis

Acute bronchitis in children may not exist as an isolated clinical entity, but is usually associated with tracheal involvement. Tracheobronchitis is most commonly found in association with an upper respiratory tract infection such as nasopharyngitis, but is also associated with such specific infections as influenza, pertussis, measles, typhoid fever, and diphtheria. This condition may be caused by a bacterial or viral infection, air pollution, the climate, or an allergy. Chronic infections of the upper respiratory tract are also a contributory factor.

#### Clinical Manifestations:

Acute bronchitis is usually preceded by a viral upper respiratory infection. A secondary bacterial infection with *S. pneumoniae* or *Hemophilus influenzae* may occur. Typically, the child has a frequent, dry, hacking, unproductive cough of relatively gradual onset, beginning 3 or 4 days after the appearance of rhinitis. Low substernal discomfort or burning anterior chest pain is often present and may be aggravated by coughing. As the illness progresses the patient may be bothered by whistling sounds during respiration and soreness of the chest. Coughing paroxysms or gagging on secretion are occasionally associated with vomiting. Within several days the cough becomes productive and the sputum changes from clear to purulent. Usually within 5 to 10 days the mucus thins and the cough gradually disappears.

#### Treatment:

- (1) Rest, adequate diet intake.
- (2) Antipyretics.
- (3) Cough suppressants.
- (4) Antibiotics.
- (5) Postural drainage.

### 3.6 Upper Respiratory Tract Infection

Upper respiratory tract infections are those primarily affecting the structures of the respiratory tract above the larynx. The common causative organisms are viruses, but bacteria may cause complications.

#### Clinical Manifestations:

There is an incubation period of 12 to 48 hours. The patient may have sneezing, nasal obstruction and discharge, fever, headache, sore throat, and cough. Symptoms are more severe in infants, with vomiting and diarrhea as common associated symptoms.

#### Complications:

The frequently found complications are otitis media, sinusitis, laryngitis, bronchitis, and pneumonia.

#### Prevention:

It is quite difficult to prevent URI; however, suggestions are:

- (1) Adequate rest, keep the body warm.
- (2) Good ventilation.
- (3) Avoid exposure to the patient.
- (4) Good hygiene of mouth and throat.

#### Treatment:

- (1) Rest, keep body warm; adequate diet and water intake.
- (2) Antipyretic, analgesic.
- (3) Antihistamine.
- (4) Cough suppressant.
- (5) Antibiotic, when complicated with bacterial infection.

### 3.7 Measles

Measles is an acute communicable disease caused by a virus. It is commonly found in children. It is a droplet infection.

#### Clinical Manifestations:

The incubation period is approximately 10 to 12 days. At onset of the disease the patient will have a low-grade to moderate fever, a slight hacking cough, coryza, sore throat, and conjunctivitis. These almost always precede the appearance of Koplik spots, the pathognomonic sign of measles, by 2 or 3 days. Koplik spots are grayish white dots, usually as small as grains of sand, with a slight reddish areola. They tend to occur opposite the lower molars. They appear and disappear rapidly, usually within 12 to 18 hours. On the third or fourth day the maculopapular rash appears on the upper lateral parts of the neck, behind the ears, along the hairline, on the posterior part of the cheeks, upper part of the chest, back, abdomen, entire arms, thighs, and feet. It takes about 2 to 3 days for the rash to appear from head to feet. Then the fading of the rash proceeds downward in the same sequence as it appears. In the hemorrhagic type of measles, bleeding may occur from the mouth, nose, or bowel. Lymph nodes at the angle of the jaw and in the posterior cervical region are usually enlarged, and slight splenomegaly may be noted. Otitis media, bronchopneumonia, and gastrointestinal symptoms, such as diarrhea and vomiting, are more common in infants and small children.

#### Treatment:

Symptomatic treatment includes sedatives, antipyretics for high fever, bed rest, and an adequate fluid intake. The complications of otitis media and pneumonia require appropriate antibiotic therapy.

### 3.8 Exanthem Subitum

Exanthem subitum is an acute and probably viral disease of infants and young children (from 6 months to 3 years), usually occurring sporadically but occasionally in epidemics.

#### Clinical Manifestations:

The onset is sudden, with fever which rises abruptly as high as 39.4<sup>o</sup> to 41.2<sup>o</sup>C. Convulsions may occur at this time or later. There are no typical signs, although the pharyngeal mucosa is slightly inflamed and there is probably slight coryza. The outstanding feature of the disease is the absence of physical findings sufficiently to explain the fever. Usually the child looks quite well despite the height of the temperature. The fever falls by crisis on the third or fourth day. Just before or shortly after the return of the temperature to normal a macular or maculopapular eruption appears over the body, starting on the trunk and spreading to the arms and neck, with slight involvement of the face and legs. The rash soon fades, rarely remaining as long as 24 hours. Desquamation is rare, and no pigmentation remains.

#### Treatment:

Symptomatic treatment is practiced. In infants and young children who

are prone to convulsions, the administration of a sedative and antipyretics at the appearance of the sharp febrile onset may be necessary.

### 3.9 Chickenpox

Chickenpox is a highly contagious disease caused by a virus which is present in the vesicles. It is spread by direct contact or by droplet. The peak age of incidence is 2 to 6 years. Patients are infectious from about 24 hours before the appearance of the rash until all lesions are crusted, usually 6 to 7 days after the eruption.

#### Clinical Manifestations:

The incubation period varies from 11 to 21 days. At the end of the incubation period there may be slight fever, malaise, or anorexia, accompanied at times by a scarlatiniform or morbilliform rash. It is characteristic of the specific rash to appear rapidly. Typically, it begins as crops of small, red papules which almost immediately develop into clear, often oval, "tear-drop" vesicles on an erythematous base. These vesicles are usually not umbilicated. The contents become cloudy within about 24 hours. The vesicles are easily broken and become scabbed. Crops of widely scattered vesicles continue to erupt for 3 or 4 days, starting on the trunk and later spreading to the face and scalp, with minimal involvement of distal parts of the extremities. Characteristically, at the height of the disease the eruption consists of papules, early and late vesicles, and crusts present at the same time. Pruritus is a constant and annoying characteristic of the rash. Vesicles on the mucous membranes, particularly those of the mouth, rapidly become macerated. Less commonly, lesions are found on the genital mucous membranes and the conjunctiva and the cornea, where they are potentially dangerous to vision.

#### Complications:

Secondary bacterial infection of the skin lesions is the most common complication. Chickenpox pneumonia is uncommon in children. The most common central nervous system complication is postinfectious encephalitis.

#### Diagnosis:

Use the patient's history and the clinical picture of the rashes to differentiate from smallpox.

#### Treatment:

No specific treatment. Symptomatic treatment is given. Local and systemic antipruritic agents and sedatives are given as required. If secondary infection occurs, systemic antibiotic therapy is indicated.

### 3.10 Bronchial Asthma

Bronchial asthma is a leading cause of chronic illness in childhood. Most of the patients will have signs and symptoms similar to asthma during childhood (2 to 5 years).

The etiology of bronchial asthma can be divided into 2 major groups:

(1) Immunologic factors. In some patients with so-called extrinsic or allergic asthma, it is clear that attacks follow exposure to environmental factors such as dust, pollens, animal hair, dander, and foods.

(2) Unknown factors. Even from the history, physical examination, and laboratory findings, it is impossible to pinpoint the cause of asthma. The patient may have asthmatic attacks following upper respiratory tract infections, or changes in the weather and the ambient temperature.

Bronchial asthma is not an inherited disease, but the patient may have a family history of allergy.

**Clinical Manifestations :**

The onset of an attack of asthma may be acute or insidious. The signs and symptoms of asthma include cough, which sounds tight and is nonproductive early in the course of an attack; wheezing, tachypnea, and dyspnea with prolonged expiration and use of accessory muscles of respiration; and cyanosis, hyperinflation of the chest, tachycardia, and abdominal pain. During a severe attack, respiratory effort may be great and the child may sweat profusely; a low-grade fever may develop simply from the enormous work of breathing; fatigue may become severe. Between attacks the child may be entirely free of symptoms and have no evidence of pulmonary disease upon physical examination.

**Treatment:**

- (1) Avoidance of allergens.
- (2) Bronchodilator; oral, inhalation, intramuscular, or suppository.
- (3) Desensitization to known allergens.
- (4) Psychotherapy.

### 3.11 Febrile Convulsions

Approximately 3% to 5% of all children have convulsions when they have fever as high as 40° C. Most occur after the first 6 months of life, and within the first 2 to 3 years. The incidence decreases at ages 6 to 8 years. The patients usually have generalized convulsions that last less than 15 minutes.

**Treatment:**

- (1) Maintenance of adequate airway.
- (2) Anticonvulsant to stop convulsion.
- (3) Antipyretic, tepid sponge.
- (4) Treat primary cause of fever.

### 3.12 Jaundice

Jaundice is a condition that results from the accumulation in the skin and mucous membrane of bilirubin, with high levels of blood bilirubin.

**Mechanism of Jaundice :**

Bilirubin is derived principally from the degradation of hemoglobin arising from the red blood cells trapped by the spleen and reticuloendothelial system. The newly formed unconjugated bilirubin is bound to plasma albumin and transported to the liver and then taken into the hepatocyte. Conjugation of bilirubin requires an enzyme which reaches mature levels several days after birth. The secretion of conjugated bilirubin into bile is influenced by bile acid secretion. When bilirubin is secreted into bile and subsequently into the small intestine, several events may occur.

When the bilirubin level in the blood is high, the bilirubin will extravasate and stain the skin and mucous membranes. This may manifest as icteric of skin and sclera, or what is called "jaundice". The causes of jaundice may be summarized as follows:

- (1) Overproduction of bilirubin from excessive red blood cell hemolysis.
- (2) Defective transportation of bilirubin into the hepatocyte, a hereditary disease.
- (3) Defect in conjugating systems or in inhibitors of conjugation.
- (4) Defective hepatocellular phase of bile excretion, or obstruction of bile or hepatic ducts.

**3.12.1 Jaundice in the New Born Infant.** Jaundice is observed during the first week of life in approximately 60% of term infants and 80% of preterm infants. Jaundice should be considered a sign of risk for the infant. The degree of danger that it may represent depends upon factors that affect the production, metabolism, excretion, and distribution of bilirubin after birth.

Differential Diagnosis :

- (1) Jaundice appears in the first 24 hours.
- (2) Jaundice appears in day 2-4 after birth.
- (3) Jaundice appears after first week of life.

**Jaundice Appears in the First 24 Hours.** Jaundice may be noticed right after birth, or in the first 24 hours. The major causes are:

(1) Excessive destruction of red blood cells from fetomaternal blood group incompatibility. The affected baby may have severe hemolysis, resulting in jaundice and anemia which may need blood exchange transfusions.

(2) Intrauterine infection, such as congenital syphilis, and viral infection.

**Jaundice Appears in Day 2-4 after Birth.** Jaundice becomes visible on the second or third day. Jaundice resulting from breakdown of fetal red cells combined with transient limitation in the conjugation and excretion of bilirubin by liver is designated "physiologic jaundice". If jaundice persists longer than 7 days, with or without fever, the baby should be transferred to hospital for proper management.

**Jaundice Appears after First Week of Life.** This jaundice is mainly caused by either intrauterine or extrauterine infections. This group of babies should be transferred to the hospital for proper management.

Summary:

All cases of newborn infants with jaundice should be transferred to the hospital immediately, except those with physiologic jaundice.

### 3.13 Meningitis

Meningitis may be caused by bacteria or virus. The common bacterial causes are Pneumococcus, Hemophilus influenzae, Neisseria meningitidis, E. coli, etc.

Clinical Manifestations:

Regardless of etiology, most patients with meningitis present similar signs and symptoms, including fever, headache, nausea, vomiting, anorexia, restless-

ness, and irritability. Back pain, nuchal rigidity (neck stiffness), stupor, coma, and seizures may be noted.

### 3.14 Encephalitis

Encephalitis is a severe acute infection of the brain commonly caused by a virus the transmission of which can be divided into 2 major groups-- one with vector, and the other without vector. The common vectors are mosquitoes or other insects, fleas, ticks, etc.

#### Clinical Manifestations:

There is a wide range of severity of the clinical manifestations, even with the same etiologic agent. Most commonly the initial manifestation may be fever and headache; or, in infants, screaming spells, abdominal distress, nausea, and vomiting. Associated signs of mild nasopharyngitis may suggest a mere respiratory infection. As the temperature rises, new findings direct attention to the nervous system, mental dullness eventuating in stupor, bizarre movements, convulsions, nuchal rigidity, and focal neurologic signs which may be stationary, progress, or fluctuate. Loss of bowel and bladder control and unprovoked emotional bursts may be noted.

#### Diagnosis:

By evaluating the patient's history, by physical examination, by blood examination, by C.S.F. examination and by encephalomyelography.

#### Treatment:

- (1) Keep airway clear.
- (2) Give anticonvulsants.
- (3) Intravenous fluid therapy.
- (4) Oxygen inhalation, antipyretics, tepid sponge, enema or urinary catheterization if indicated.

### 3.15 Gastrointestinal Obstruction

Intestinal obstructions in children may be congenital or acquired, partial or complete. The cardinal signs are vomiting, abdominal distension, failure to pass feces, and abdominal pain.

The symptoms depend on the severity, location, and cause of obstruction. A high intestinal obstruction is characterized by vomiting which tends to be persistent even when feedings have been stopped. Distension may be absent. A low obstruction is characterized principally by distension. Vomiting may be only a later manifestation. When the obstruction is in the duodenum, symptoms may become manifest within a few hours; if it is in the large intestine, symptoms may be delayed for more than 24 hours.

The common types of congenital intestinal obstruction are pyloric stenosis, congenital intestinal obstruction, imperforated anus, intussusception, incarcerated hernia, postoperative adhesion, ascariasis, and foreign bodies.

#### Clinical Manifestation:

In congenital intestinal obstruction, the patient may develop signs of obstruction.

In pyloric stenosis there is initially regurgitation or occasional nonprojectile vomiting. The onset rarely occurs before 1 week of age and is usually in the second or third week. The onset is seldom delayed until the second or third month. The vomiting becomes projectile usually within a week after onset, and generally occurs during or shortly after feeding. The vomitus consists only of gastric contents. The stools may become very small and infrequent, depending on the amount of food that reaches the intestinal tract.

Obstructions in the lower ileum, colon, or rectum cause more generalized distension, often with bulging of the flanks, accompanied with no bowel movement.

Treatment:

Transfer the patient to the hospital. Most cases of intestinal obstruction require surgical correction.

### 3.16 Imperforated Anus

An imperforated anus is a relatively common congenital anomaly found in newborns. It results from interference with the development of the anorectal structure during the eight weeks of gestation.

Diagnosis:

An imperforate anus is not always visible and may require evidence obtained by the gentle insertion of the examiner's little finger or a rectal thermometer. For any newborn infant who has not passed meconium after 48 hours, the possibility of imperforated anus must be investigated.

Treatment:

Transfer the patient to the hospital for surgical correction as soon as possible.

### 3.17 Tetanus

Tetanus is an acute toxemic illness of the central nervous system caused by a soluble exotoxin of the bacterium *Clostridium tetani*, which is an anaerobe. This organism forms spores which are resistant to many disinfectants, including boiling. They can survive in soil for years if not exposed to sunlight. They may be found in house dust, soil, and feces of many animal species and man. The usual portals of entry are deep puncture wounds, burns, ulcers in the oral cavity or caries, and surgical wounds. In the newborn infant, unsterile techniques used during delivery or in cutting and tying of the umbilical cord are the most common routes of infection. *Clostridium tetani* is introduced into an area of injury as spores. The disease develops only after spores are converted to vegetative organisms, which produce tetanospasmin only under conditions of reduced oxygen potential. Tetanospasmin acts on the motor end plates in skeletal muscles, the spinal cord, the brain, and the sympathetic nervous system. Its effects are similar to those of strychnine and explain the hypertonicity, spasms, and seizures. Once bound to tissue, toxin is neither dissociated nor neutralized by tetanus antitoxin.

### Clinical Manifestations:

The incubation period generally is 3 to 4 days after injury but may be as long as several weeks. The onset starts with spasm of the masseter muscle associated with stiffness of the muscles in the neck and with difficulty in swallowing. Restlessness, irritability, and headache also are early findings. Spasm of the facial muscles produces a fixed sardonic grin (risus sardonicus). The lumbar and abdominal muscles may become rigid, and persistent spasm of the muscles of the back may result in opisthotonos.

Initially the spasms are mild, lasting for seconds to several minutes, and are separated by periods of relaxation; with time, they become severe, powerful, and exhausting. Spasms may be precipitated by almost any visual, auditory, or tactile stimulus. The patient is completely conscious during the course of the disease and experiences intense pain. Spasm of the laryngeal and respiratory muscles may produce respiratory obstruction; cyanosis and asphyxia may ensue. The forcefulness of the contractions may produce compression fractures of the spine and hemorrhage into muscle. Elevation of the body temperature generally is mild but temperatures of 40°C have been noted owing to the intense output of energy which accompanies tetanic seizures.

### Prognosis:

The case fatality rate of tetanus usually ranges between 20% to 50%, but the case fatality rate for neonatal tetanus is 60% or higher. This poor prognosis is affected by a number of factors including age and the interval between the injury and the appearance of clinical manifestations.

### Treatment:

- (1) Eliminate visual, auditory, and tactile stimuli. Provide adequate nutrition.
- (2) Give TAT 50,000 - 100,000 units, half intravenously and half intramuscularly.
- (3) Antibiotics.
- (4) Sedatives and muscle relaxants.

### 3.18 Poliomyelitis

Poliomyelitis is an acute viral infection transmitted by the oropharyngeal-fecal circuit. Casual unrecognized contact with alimentary tract content is probably the main source of viral transmission. The virus enters the body and multiplies in the alimentary tract and in its related lymph nodes; it affects the central nervous system.

The incubation period generally is 7 to 10 days.

### Clinical Manifestations:

There are two different types of poliomyelitis, nonparalytic and paralytic.

- (1) Nonparalytic Poliomyelitis. The patient may have fever, headache, sore throat, malaise, anorexia, nausea, vomiting, constipation, unlocalized abdominal pain, and stiffness of the posterior muscles of the neck, trunk and limbs.

(2) **Paralytic Poliomyelitis.** The manifestations are those enumerated for nonparalytic poliomyelitis plus weakness of one or more muscle groups, either skeletal or cranial. There is weakness of some of the muscles of the neck, abdomen, trunk, diaphragm, thorax, or extremities.

**Complications:**

The common complications are peptic ulcer, acute gastric dilatation causing further embarrassment of respiration, hypertension, dimness of vision, headache, myocarditis, acute pulmonary edema, pneumonia, urinary tract infection, and urinary calculi.

**Treatment:**

Symptomatic treatment is given. Patients with the nonparalytic and mildly paralytic forms may be treated at home. Most patients with the paralytic form require hospitalization and may need physical therapy or tracheostomy or respirator as indicated.

**Prevention:**

The most effective preventive measure is to give oral polio vaccine. Start the first dose at age 2 to 3 months.

### **3.19 Convulsive Disorders in Infants**

Convulsive phenomena are common in infants and children. They occur with a wide variety of the central nervous system as well as other systems. Convulsions are more common during the first 2 years than at any other period of life. Intracranial birth injuries, including the effects of anoxia and hemorrhage and congenital defects of the brain, are the most frequent causes of convulsions in very young infants. In the latter part of infancy and in early childhood acute infections are the most frequent causes.

A clinical manifestation of convulsion in the infant may be tonic and clonic movements, tonic spasm preceded by a few clonic jerks, irregular jerky movements and nystagmus or staring, pallor, and hypotonia. In some instances the respirations become slow irregular, with periods of apnea and feeble cries.

**Sequellae:**

- (1) Focal convulsion may cause exhaustion, physical and psychic trauma.
- (2) Generalized convulsion may cause cerebral anoxia, semiconsciousness, unconsciousness, followed by brain damage temporarily or permanently.

**Causes of Convulsions :**

- (1) High fever .
- (2) Central nervous system infection such as meningitis, encephalitis, tetanus.
- (3) Epilepsy .
- (4) Brain damage from head injuries .
- (5) Metabolic problems, such as hypoglycemia, hypocalcemia, hyponatremia.
- (6) Miscellaneous, such as tumor, poisoning with convulsant drug, cerebral sinus thrombosis, acute nephritis.

**3.19.1 Epilepsy.** Epilepsy is a symptom complex characterized by recurrent paroxysmal attacks of unconsciousness or impaired consciousness, usually with a succession of tonic or clonic muscular spasms or other abnormal behavior. These may be preceded by a momentary aura. Vague prodromal symptoms or signs, such as irritability, intestinal disturbances, headache, and mental dullness may forewarn patients or their parents of impending motor seizures.

The seizures are generalized convulsions, usually tonic and clonic phases of the muscular spasms. The onset of the paroxysm is abrupt, and the tonic spasm may occur simultaneously with loss of consciousness. The patient, if sitting or standing, falls to the ground. The face suddenly becomes pale, the pupils dilate and the conjunctivae become insensitive to touch. The eyeballs roll upward or to one side, the face is distorted, and the glottis is closed. The head may be thrown backward or to one side, the abdominal and chest muscles are held rigidly, and the limbs are contracted irregularly or stiffen out. The tongue may be severely bitten, and micturition and defecation may follow. The patients may awaken from their postconvulsive sleep with a severe, generalized headache and in a state of confusion and unable to recollect what they have experienced.

The primary cause of epilepsy is unknown. A variety of genetically determined conditions are associated with seizures. In addition, convulsions may occur after cerebral damage acquired in the prenatal, natal, or postnatal period; in brain tumor; cerebral vascular damage; in metabolic problems such as hypoglycemia and hypocalcemia.

When a patient comes in with convulsions without a definite history of epilepsy, the patient should be transferred to hospital.

**Treatment :**

First aid and symptomatic treatment during convulsions are very important. At the beginning of major seizure, clothing about the neck should be loosened. The patient should then be turned to the side so that pooled secretions are not aspirated. The patient should be observed carefully for changes in color. Administration of oxygen is indicated during prolonged convulsions. Any injury to the tongue or other tissues of the oral cavity during a convulsion is most apt to occur at the onset. The family should be counseled against placing a stick or other object between the teeth.

Patients with epilepsy may need anticonvulsants continuously for a long period of time; some may need them for their whole lives.

#### 4. IMMUNIZATION

Most of infectious diseases in Thailand are preventable. Immunization schedules recommended for health personnel are shown in the following tables.

Table 11.1 Immunization Schedule for Use in Urban Area.

Age	Immunization
Birth - 1 Month	1. B.C.G. vaccine
2 - 3 Months	1. D.P.T. 1st dose 2. O.P.V. 1st dose
4 - 5 Months	1. D.P.T. 2nd dose 2. O.P.V. 2nd dose 3. B.C.G. vaccine, if missed at age 0 - 3 months
6 - 7 Months	1. D.P.T. 2nd dose 2. O.P.V. 3rd dose 3. B.C.G. vaccine, if missed at age 0 - 5 months
1½ - 2 Years	1. D.P.T. booster dose 2. O.P.V. booster dose
4 - 7 Years	1. D.T. toxoid 2. Typhoid vaccine 3. B.C.G. vaccine, if missed at age 0 - 3 years.
11 - 14 Years (Before graduating from school)	1. Typhoid vaccine 2. Tetanus toxoid, repeat every 10 years.

**Table 11.2 Immunization Schedule for Use in Rural Area.**

Age	Immunization
Birth - 1 Month	1. B.C.G. vaccine
2 - 3 Months	1. D.P.T. 1st dose
4 - 5 Months	1. D.P.T. 2nd dose 2. B.C.G. vaccine, if missed at age 0 - 3 months.
1½ - 2 Years	1. D.P.T. booster dose
4 - 7 Years	1. D.T. toxoid 2. Typhoid vaccine 3. B.C.G. vaccine, if missed at age 0 - 3 years.
11 - 14 Years (Before graduating from primary school)	1. Typhoid vaccine 2. Tetanus toxoid, repeat every 10 years

**Remarks :** May follow the schedule for active immunization in urban area if oral polio vaccine (OPV) is available.

**Table 11.3 Immunization Schedule for Use with Older Child, Not Previously Immunized.**

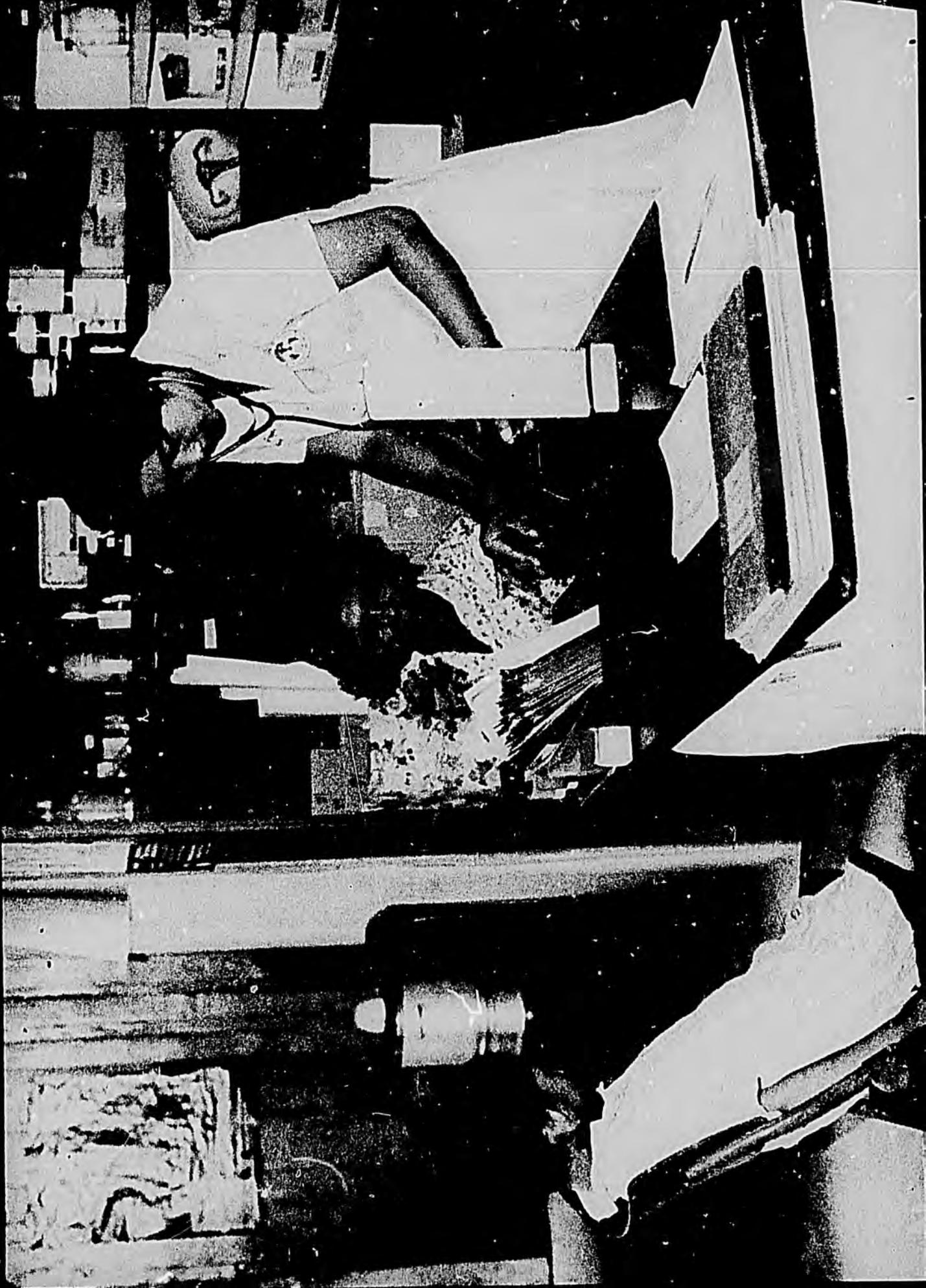
Visit.	Immunization
First	1. D.T. toxoid, 0.5 ml
Second (1 month apart)	1. Typhoid vaccine, 0.25 ml; or 0.5 ml if older than 10 years 2. B.C.G. vaccine
Third (1 month apart)	1. D.T. vaccine, 0.5 ml
Fourth (1 year apart)	1. D.T. vaccine, 0.5 ml
Fifth (age 11 - 14 years) (Before graduating from primary school)	1. Typhoid vaccine, 0.5 ml 2. Tetanus toxoid, 0.5 ml; repeat every 10 years

**Note:** DPT = Diphtheria and Tetanus toxoids combined with Pertussis vaccine.  
 OPV = Oral Polio Vaccine.  
 DT = Diphtheria and Tetanus toxoids.

**MODULE 12**  
**GYNECOLOGICAL PROBLEMS**

**NOPADOL SOMBOON, B.Sc. in Pharm., M.D., Dip. in Obst. (N.Z.)**

**Previous Page Blank**



## MODULE 12

### GYNECOLOGICAL PROBLEMS

#### 1. INSTRUCTIONAL OBJECTIVES

At the end of the course, the wechakorn will be able to:

(1) Diagnose, treat and/or refer, when indicated, the following gynecological problems:

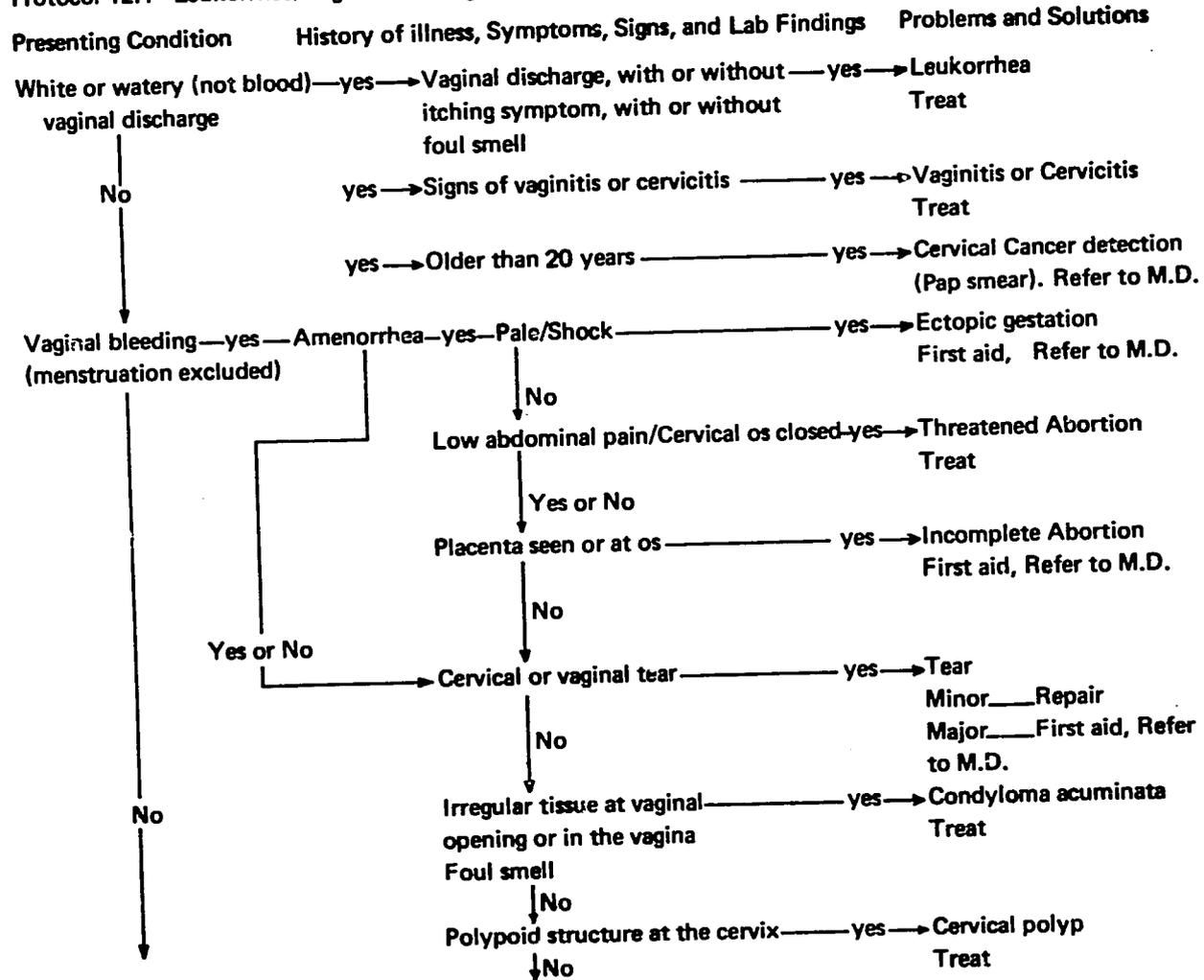
- Condyloma acuminata
- Vaginitis
- Vaginal tear
- Cervicitis
- Cervical polyp
- Leukorrhea
- Leukorrhea with itching symptom
- Leukorrhea with foul-smelling discharge
- Cervical cancer
- Repair of minor tear
- Gonorrhea
- Syphilis
- Cystitis

(2) Give first aid and refer patients with the following gynecological problems:

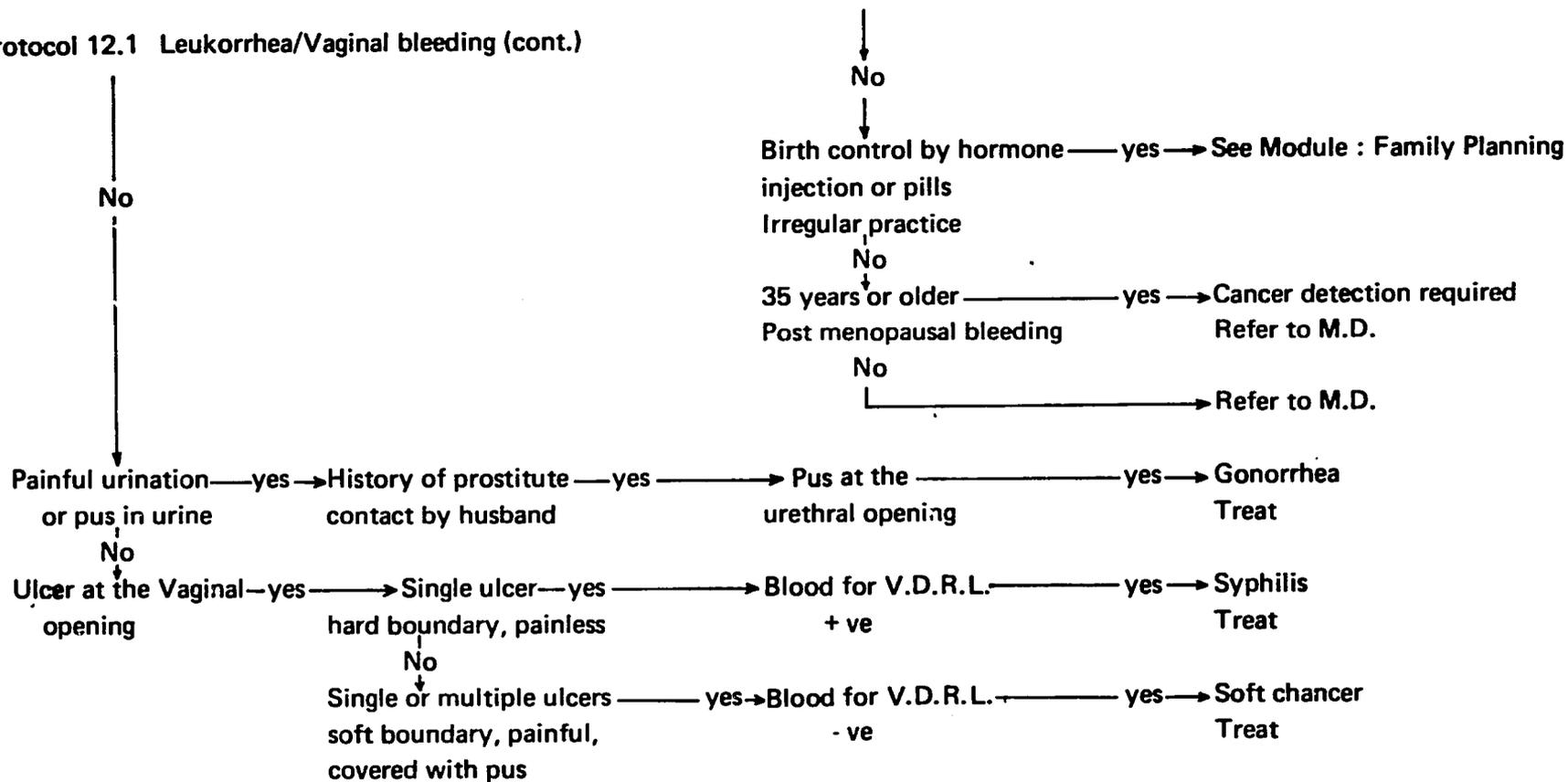
- Incomplete abortion
- Inevitable abortion
- Threatened abortion
- Missed abortion
- Ectopic gestation
- Carcinoma of the uterus or cervix
- Post-menopausal bleeding

**Previous Pages Blank**

Protocol 12.1 Leukorrhea/Vaginal bleeding



**Protocol 12.1 Leukorrhoea/Vaginal bleeding (cont.)**



## 2. TREATMENT AND PATIENT EDUCATION FOR SPECIFIC COMMON PROBLEMS

### 2.1 Leukorrhea

2.1.1 Mucous Leukorrhea. No itching, no foul smell, no blood, no fever, no abdominal pain.

Treatment: Sultrin vaginal suppository, 1 tab. Dip in clean water, insert deep in vaginal canal before bedtime, 7-15 consecutive nights.

2.1.2 Itching Leukorrhea. Symptoms usually increase before menstrual flow. Findings of milk curd-like discharge in vagina, normally no foul smell.

Treatment: Nystatin vaginal suppository, 1 tab. Dip in clean water, insert deeply in vaginal canal before bedtime, 7-10 consecutive nights.

Gentian violet. Paint in vagina 3 times every other 3 days.

2.1.3 Yellowish Foamy Leukorrhea. Usually with itching symptom, especially after menstruation, foul smell, and frequently burning symptom.

Treatment: Floraguin vaginal suppository, 1 tab. Dip in clean water, insert deeply in vaginal canal before bedtime, 10-20 consecutive nights.

Tab. Flagyl, 1 tab. Three times-after meals, 7-10 days.

Both the husband and the patient should take the medicine at the same time, to prevent repeated infection from the husband.

#### Health Education For Leukorrhea:

Cleaning the external genitalia, especially around the vaginal opening, daily or twice daily when taking a bath and every time after coitus, defecation, and urination. Carefully use water in public toilet.

### 2.2 Vaginitis

- (1) Tab. Pen V (400,000 units), t.i.d. ac. & hs.
- (2) P.G.S., 500,000 units once or twice daily in severe cases.
- (3) ASA, 2 tabs. p.r.n. for pain.
- (4) Sultrin vaginal suppository, 1 tab. hs, vaginal insertion.
- (5) For woman older than 20 years, cancer detection should be carried out after completion of treatment for vaginitis.

### 2.3 Cervicitis

Treated as for vaginitis.

### 2.4 Cervical Cancer

Leukorrhea may be a symptom of cancer. A Pap smear should be taken or the patient should be referred to an M.D. A yearly Pap smear is recommended for woman older than 20 years.

### 2.5 Ectopic Pregnancy

- (1) I.V. saline for first aid.
- (2) Immediate transportation to nearest hospital.
- (3) Laparotomy and resection to be considered.

### 2.6 Threatened Abortion

- (1) Bed rest. Heavy lifting to be avoided.

- (2) Phenobarb, gr. 1, 2 - 3 times/day.
- (3) Increase in pain or bleeding is indication for hospitalization.
- (4) A nourishing diet.

#### 2.7 Incomplete Abortion

- (1) I.V. Saline for first aid.
- (2) Uterine curettage is indicated.
- (3) Family planning recommended.

#### 2.8 Vaginal Tear

- (1) Suture for superficial or minor tear.
- (2) Tab. Pen V. (400,000 U), t.i.d. ac & hs.
- (3) Tetanus antitoxin, 1,500 U, subcutaneous after skin test.
- (4) Severe laceration should be treated in hospital after first aid. Wound should be covered with sterile gauze.

#### 2.9 Condyloma Acuminata

- (1) Appearance of a wart at vaginal opening may suggest occurrence in the vaginal canal or cervix.
- (2) Small lesion should be treated with podophyllin daily or every other day. Large or bleeding lesion should be seen by M.D.
- (3) V.D.R.L. of the couple should be checked.

#### 2.10 Cervical Polyp

Polyp with small pedicle can be removed by twisting with forceps. A deep or large polyp should be seen by M.D.

#### 2.11 Vaginal Bleeding

Abortion is most common among reproductive women (age 14-45). If there is prolonged, irregular bleeding after injection of Depoprovera, a vaginal examination is indicated.

##### Treatment:

- (1) Birth control pills, 2 tabs./day for 3-5 days until bleeding stops.
- (2) Estrogen, 10 mg. I.M.

If there is irregular bleeding in woman taking birth control pills, the pills should be continued without interruption. Undiagnosed vaginal bleeding (other than as above) should be taken care of by an M.D., as cancer must be excluded.

#### 2.12 Gonorrhea

- (1) Probenacid, 2 tabs. P.O., 20 min. before injection of penicilin.
- (2) Penicillin G, 5.0 million units, I.M.
- (3) Then observation for at least 15-30 min. to detect allergic reaction. Repeat treatment once if not cured. Cases resistant to treatment should be examined by M.D.

#### 2.13 Syphilis

- (1) PAM 3 ml I.M. daily 7-10 days.
- (2) Monthly V.D.R.L. until no reaction.
- (3) Persistent reactive V.D.R.L. should be seen by M.D.

## **2.14 Chancroid**

**Streptomycin 1 gm I.M. daily for 7 days, and/or SDZ 2 tabs. 4 times/day for 10-14 days. Clean once or twice daily.**

## **3. MEDICAL TERMS**

To identify the patient's health problem prior to treatment, history taking, physical examination, and laboratory workup according to the protocol are necessary. In gynecological diseases, especially, a basic understanding of the reproductive period, menopausal period, and menstruation is required. Skills in problem solving and knowledge of some diseases are very helpful.

### **3.1 Reproductive Period**

A reproductive woman generally is taken to mean a woman whose age lies between 14-45 years, the normal age for women capable of pregnancy. A missed menstrual period in a woman of this age is most commonly related to pregnancy. (Pregnancy and delivery details can be found in the module on Maternal and Child Health). Vaginal bleeding after a missed period is an indication of abortion.

### **3.2 Menopause**

The menopausal woman is not capable of bearing a child because she has no ovulation. She is usually 45 years old or older. Menstrual flow becomes less and less as time goes by and menstrual periods are farther apart. Psychological changes are frequent symptoms. They are anxiety, irritability, bad temper, flatulency, and hot flushes. However, her desire for sex usually stays on for a longer period of time.

### **3.3 Normal Menstruation**

The wechakorn should clearly understand the mechanism of normal menstruation in order to identify abnormal vaginal bleeding that requires medical treatment. Characteristics of normal menstruation are as follows:

- (1) Occurs only in women of reproductive age. Postmenopausal bleeding is abnormal and highly suggestive of cancer.
- (2) Regular periods occur every 28 + days. In a normal person, the period lasts no longer than 7 days. There is no menstruation during pregnancy except in highly unusual cases and in the first few months of pregnancy.
- (3) The amount of blood loss is about 100-200 ml. Two or three pads are used daily. Menstrual cycles are controlled by hormones. Bleeding is usually heavier on the first and second days. There are no blood clots, and the color of the blood is dark red.
- (4) Menstruation may be accompanied by premenstrual (low abdominal) pain. Palpitation, irritation, breast engorgement, decreased amount of urine, and insomnia may be associated with menstruation.

## 4. GYNECOLOGICAL DISEASES

### 4.1 Leukorrhea

Leukorrhea is a white vaginal discharge in larger amounts than usual. Normally, there is a small amount of white discharge, but with no foul smell, blood, or itching sensation. Leukorrhea is usually accompanied by itching, and is a foul-smelling or blood-stained discharge.

4.1.1 Bacterial Cervicitis. In chronic bacterial cervicitis, the discharge is characterized by a mucous appearance, or by mucus with pus. The causative organisms are bacteria.

4.1.2 Trichomonas vaginitis. In trichomonas vaginitis, the discharge is yellowish, clear or foamy. An itching sensation and foul-smelling discharge are associated symptoms. This increases in severity after menstruation.

4.1.3 Monilial vaginitis. In monilial vaginitis, a thick white, but not foul-smelling discharge is characteristic. Itching frequently occurs. This vaginitis increases in severity prior to menstruation. There is a higher incidence in pregnant or diabetic women, or women who are on prolonged courses of antibiotics or estrogen use.

4.1.4 Atrophic vaginitis. In atrophic vaginitis, a small amount of yellow or brown discharge with a burning sensation is characteristic.

4.1.5 Cancer of cervix. In cancer of the cervix a blood-stained discharge is the main characteristic.

### 4.2 Vaginitis

The term vaginitis includes all the types of leukorrhea mentioned above. It is usually caused by low resistance in the vagina. It frequently occurs after sexual intercourse. Gonorrhoea is the main cause, but nongonococcal vaginitis is increasingly found. Vaginitis may occur after childbirth, but this is usually self-limited.

### 4.3 Cervicitis

Acute cervicitis is characterized by a swollen cervix. The cervix is tender when touched or moved, and a profuse purulent discharge is seen at cervical opening.

Chronic cervicitis is very common among women. Most causes have no symptoms. Some cases however may cause leukorrhea, bleeding after intercourse, low back pain, and difficulty in becoming pregnant. Cervicitis with ulceration or bleeding may be indicative of cancer; such cases should be referred to a doctor.

### 4.4 Carcinoma of the cervix

Carcinoma of the cervix is found in women of all ages, but there is a higher incidence in woman older than 20 years. If vaginal examination shows an abnormal appearance of the cervix, especially accompanied by bleeding, the examiner should be highly suspicious of cancer. A Papanicolaou (Pap) smear is very useful for early detection of carcinoma of the cervix. A yearly Pap smear

for women older than 20 years is recommended. Bleeding after sexual intercourse is an early sign of invasive cancer.

#### 4.5 Ectopic Pregnancy

To understand ectopic pregnancy, normal pregnancy must first be understood. At about the midcycle day – approximately on the 14th day of menstruation – there will be ovulation. Sexual intercourse during the period 2 days before and 2 days after ovulation gives a chance for the ovum to meet with the spermatozoon. Spermatozoa from the man will pass through the cervical canal and uterine cavity into the fallopian tube, where only one spermatozoon will penetrate into the ovum. After penetration by the spermatozoon, the ovum is called a “fertilized ovum”; the process is called fertilization. The fertilized ovum will then travel through the tube into the uterine cavity where it becomes embedded in the endometrium (inner part of the uterus). Approximately 266 days or 38 weeks after fertilization, the pregnancy is usually ended by delivery. For convenience, we usually say that pregnancy lasts 40 weeks after the first day of the last menstrual period.

Ectopic pregnancy occurs when the fertilized ovum is embedded in the tube or outside the uterus. The common sites of ectopic pregnancy are the uterine tube, broad ligament, ovary, and abdominal cavity.

The most common site is the tube. After fertilization, the fertilized ovum becomes enlarged and the tube is distended, causing low abdominal pain. Pain increases until the tube is ruptured, and heavy bleeding may occur. If bleeding inside the abdomen is heavy, the patient may show symptoms and signs of blood loss such as weakness, palpitation, sweating and pallor. Abdominal pain may be accompanied by referred pain to the shoulder.

Treatment is blood transfusion and exploratory laparotomy to stop bleeding. The patient may lose her life if the treatment is delayed.

#### 4.6 Threatened Abortion

Abortion means termination of pregnancy before 20 weeks or before the abortus weight reaches 500 grams. Signs of abortion are pain, usually low abdominal cramping pain, and/or small amount of vaginal bleeding. The signs may disappear spontaneously and pregnancy may continue until full term. This type of abortion is called threatened abortion. Bed rest is the best treatment.

Threatened abortion may progress to true abortion. Complete abortion means that all of the conception product is passed through the cervix. If part of the conception product remains in the uterine cavity, the abortion is called an incomplete abortion. Complete abortion is usually followed by a small amount of bleeding for about 3-5 days.

#### 4.7 Incomplete Abortion

The material remaining in the uterine cavity in an incomplete abortion is usually part of the placenta. It is the cause of bleeding and infection; therefore it should be removed by curettage. If the bleeding is not stopped in

time, the patient may lose her life. Intravenous fluids or blood transfusions may be required in some cases.

#### 4.8 Vaginal Tear

The wechakorn is not expected to repair large tears of the vagina. Active bleeding points should be clamped with forceps and the wound should be covered with clean gauzes. The patient should then be referred to a doctor. Small tears, however, should be repaired.

The common causes of vaginal tears are accidents such as falling down from a bicycle, or falling upon hard surfaces. Tears may also occur during coitus, outside or inside the vagina. Small but prolonged bleeding from tears may be dangerous if it is neglected.

#### 4.9 Condyloma Acuminata

The lesion of condyloma acuminata looks like corn around the vaginal opening or in the vagina. It usually occurs at many sites at the same time. Condyloma acuminata is caused by a virus. It is spread by sexual contact. It causes a foul-smelling vaginal discharge. If not treated, it may enlarge up to the size of a cabbage. The lesion may cause bleeding or may be infected.

The pedicle differentiates condyloma acuminata from condyloma lata (caused by syphilis). Treatment using 25% podophyllin is usually effective. VDRL should be checked to exclude condyloma lata. A large lesion is best treated by electric cauterization or an excision performed by a doctor.

#### 4.10 Cervical Polyps

Polyps may increase vaginal discharge, and the discharge may be mixed with blood. Bleeding may occur after coitus. The treatment is to remove the polyp by twisting with forceps. After removal, the polyp should be sent for tissue examination to exclude the possibility of cancer.

#### 4.11 Bleeding from the Vagina

Bleeding from the vagina other than menstrual blood is usually caused by abortion, cervicitis, cancer, traumatic tears, and hormonal imbalance, (especially external sources of hormones, as when taken an oral medicine or injections).

#### 4.12 Gonorrhea

Gonorrhea is a venereal disease, usually caused by sexual contact. Inflammation usually occurs at the genital organs, but occasionally in the mouth or rectum. Ophthalmia neonatorum is an infection of the eyes of newborn infants; it may result in blindness.

A diagnosis can be made by smear and stain to identify the bacteria in the pus. A history of sexual contacts, symptoms of burning urination, and increased vaginal discharge is helpful in diagnosis.

#### 4.13 Syphilis

Syphilis is another form of venereal disease, spread by sexual contact; syphilitic chancre is called hard chancre. The incubation period is about 3-4 weeks. In the early stage, syphilis may cause fever, headache, joint pain, muscle pain, pallor, and chancre.

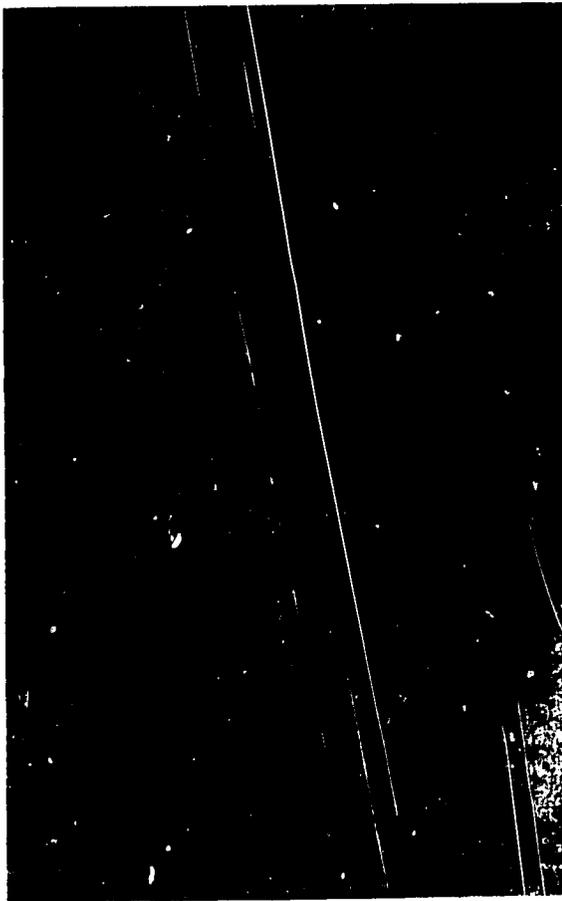
In a man, the chancre of syphilis is usually on the penis; in a woman it is usually at the vaginal opening or labia. Less common sites are lips and tongue. Syphilitic chancres generally are single; painless, have a red edge, and the bottom and edge of chancre are harder than normal tissue.

Diagnosis can be made from the history of sexual contact, characteristics of the chancre, and blood V.D.R.L.

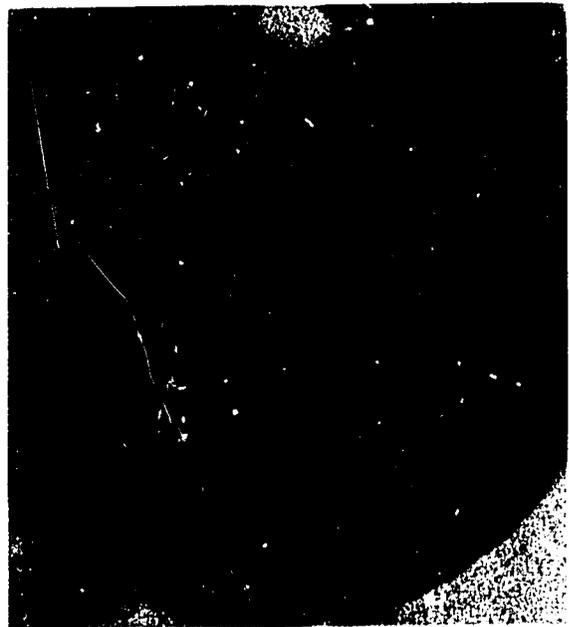
Neglected first stage syphilis may be followed by a second stage that includes skin rashes. The third stage of syphilis is characterized by its spread to the liver, lungs, heart and nervous system which may cause different symptoms and signs according to the site of the disease.

#### 4.14 Soft Chancre (Chancroid)

Another this type of chancre is called soft chancre. This is also a venereal disease caused by sexual contact. The incubation period for chancroid is 3-7 days. The lesions are multiple and begin with small pustules which later rupture and become chancres. They are very painful and soft. (In contrast, the hard chancre of syphilis is not painful, and sometimes is anesthetic).



Trichomoniasis is associated with a yellow-grey discharge, pruritis and a foul odour.



Trichomoniasis with strawberry-like appearance of cervix.

**MODULE 13**  
**EMERGENCY PROBLEMS**

**OKAS BALANKURA, M.D., F.A.C.S., F.I.S.,**  
**FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF THAILAND**

# សមាជិកសមាគមសុខភាព



## EMERGENCY PROBLEMS

### INSTRUCTIONAL OBJECTIVES

To help wechakorn develop ability to

- (1) Treat wounds and give first aid to patients with stab and gunshot wounds.
- (2) Stop bleeding and give first aid to patient with shock from blood loss.
- (3) Treat burns and scalds of less than 10 per cent of body surface area and give first aid to patients with severe burns and scalds.
- (4) Give first aid to patients with shock from causes other than blood loss.
- (5) Treat strains and sprains, contusion of muscle, and give first aid to patient with dislocation.
- (6) Give first aid to patients with fractures.
- (7) Give first aid to patients with head injuries.
- (8) Treat unconscious patients from alcoholic drinking, epilepsy, ordinary fainting and give first aid to unconscious patients from head injury, drug poisoning, diabetes, hepatic disease, cerebral malaria, and meningo-encephalitis.
- (9) Treat patients with high fever, epilepsy, fainting, hysteria, and beri-beri; and give first aid to patients with convulsions due to cerebral malaria, meningo-encephalitis, head injury, brain tumor, eclampsia and tetanus.
- (10) Give first aid to drowning person by mouth-to-mouth breathing.
- (11) Give first aid to patient with electrical shock.
- (12) Give first aid to person with anaphylactic shock.
- (13) Give first aid to person with drug poisoning.
- (14) Treat patients with animal bites.
- (15) Give first aid to psychotic patient.

### 1. CUTS, SCRAPES, AND SMALL WOUNDS

Remember that cleanliness is of first importance in preventing infection and helping wounds to heal.

#### 1.1 How to Treat a Wound

- (1) First, wash your hands very well with soap and water.
- (2) Then wash the wound well with soap and boiled water.
- (3) When cleaning the wound, be careful to clean out all the dirt. Lift up and clean under any flaps of skin. Use a clean forceps or other instruments to remove bits of dirt, but boil it first to be sure they are sterile.
- (4) If possible, squirt out the wound with boiled water in a syringe or suction bulb. Any bit of dirt that is left in a wound can cause an infection.

(5) Never put alcohol, Tincture of Iodine, or Merthiolate directly into a wound: doing so will only damage the flesh and make healing slower. Use soap and water.

### **1.2 Large Cuts: How to Close Large Cuts**

(1) A recent cut that is very clean will heal faster if the edges are brought together so the cut stays closed.

(2) Close a deep cut only when:

- (a) the cut is less than 12 hours old, and
- (b) the cut is very clean.

(3) Before closing that cut, wash it very well with boiled water and soap. If possible, squirt it out with a syringe and water. Be absolutely sure that no dirt is left behind in the cut.

(4) There are two methods to close a cut:

(a) 'Butterfly' Bandage of Adhesive Tape

Cut 2-3 inches of adhesive tape, fold it in half on its non-adhesive side and cut out the folded angles. Unfold the cut tape, stick one half of the tape on one side of dry clean skin edge across the cut. Pull the free half of the tape to bring the skin edge of the cut with the tape already stuck on to approximate to the opposite skin edge and stick it on the skin of the other side.

(b) Stitches or Sutures with Thread

To find out if a cut needs stitches, see if the edges of the skin come together by themselves. If they do, usually no stitches are needed.

### **1.3 How to Stitch a Wound:**

(1) Boil a straight sewing needle or a curved surgical needle, a thin cotton or silk thread, a toothed forceps and a needle holder if small needle is used for 10 minutes.

(2) Wash the wound with boiled water and soap.

(3) If more than one stitches are needed, infiltrate the subcutaneous tissue underneath the skin edges with 1% procaine hydrochloride or 0.5% xylocaine. Do not use more than 40 ml of the procaine or xylocaine. Wait 3 minutes, until the skin edges are anesthetized. Pricking the skin with needle to test for anesthesia.

(4) Thread the needle. Hold and lift up one skin edge and put the needle in 0.5-1.0 cm from the edge down to the deepest part of the cut and up on the other side. Tie a good knot just to close the edges but not so tightly. Make the first stitch in the middle of the cut, and other stitches to close the whole cut, about one centimeter apart.

(5) Cover the wound with a sterile gauze pad and bandage.

(6) Leave the stitches in place for 3 to 12 days (on the face 3 days, the hand and foot 10-12 days). Then remove the stitches: cut the thread on one side of the knot and pull the knot until the thread comes out.

(7) Only close the wounds that are very clean and less than 12 hours old. Old, dirty, or infected wounds must be left open. Bites from people, dogs, or other animals should be left open. Closing these can cause dangerous infections.

(8) If the wounds that has been closed shows any signs of infection, remove the stitches immediately and leave the wound open.

#### 1.4 How to Recognize and Treat Infected Wounds

(1) A wound is infected if:

- (a) it becomes red, swollen, hot, and painful,
- (b) it has pus, or
- (c) it begins to smell bad.

(2) The infection is spreading to other parts of the body if:

- (a) it causes fever,
- (b) there is red line above the wound, or
- (c) the nearby or regional lymph nodes become swollen and tender.

tender.

(3) Treatment of infected wounds:

(a) Put hot compress over the wound for 20 minutes 4 times a day. Hold an infected hand or foot in a bucket of hot water with soap or potassium permanganate (1 teaspoon to a bucket).

(b) Keep the infected part at rest and elevated (raised above the level of the heart).

(c) If the infection is severe give oral sulphadiazine or tetracycline or if the person has not been vaccinated against tetanus, use penicillin.

(d) If the wound has a bad smell, if brown or gray liquid oozes out, or if the skin around it turns black and forms air bubbles or blisters, this may be gangrene. Seek medical help fast.

#### 1.5 Bullet, Knife, and Other Serious Wounds

Any deep bullet or knife wound runs a high risk of dangerous infection. For this reason an antibiotic preferably penicillin or ampicillin should be used at once.

Person who have not been vaccinated against tetanus should perhaps be given an injection of tetanus antitoxin, and be vaccinated against tetanus as well.

If possible seek medical help.

(1) **Bullet Wounds in the Arms and Legs**

(a) If the wound is bleeding a lot, control the bleeding as described in the next chapter.

(b) If the bleeding is not serious, let the wound bleed for a short while. This will help clean it out.

(c) Wash the wound with boiled water and soap and apply clean bandage. In the case of gunshot wound, wash the surface (outside) only. It is usually better not to poke anything into the hole.

(d) Give antibiotics.

(e) If there is any possibility that the bullet has hit a bone, the bone may be broken. Using or putting weight on the wounded limb (standing for example) might cause a more serious break. If a break is suspected, it is best to splint the limb and not to use it for several weeks.

## (2) Deep Chest Wounds

(a) Chest wounds can be very dangerous. Seek medical help at once.

(b) If wound reaches the lungs, air will be sucked through the hole. When the person breathes, cover the wound at once so that no more air enters. Spread vaseline or vegetable oil tightly on a gauze pad or clean bandage and wrap it tightly over the hole with a cloth bandage.

(c) If there are signs of shock, give proper treatment as described in the later chapter.

(d) Give antibiotics and painkillers.

## (3) Bullet Wounds in the Head

(a) Cover the wound with a clean bandage.

(b) Place the injured person in a half-sitting position.

(c) Give antibiotics.

(d) Seek medical help.

## (4) Deep Wound in the Abdomen

Any wound that goes into the belly or gut is dangerous. Seek medical help immediately. But in the mean time:

(a) Cover the wound with a clean bandage.

(b) If the guts are partially outside of the wound, cover them with a clean cloth soaked in lightly salted, boiled water. Do not try to push the guts back in.

(c) If the wounded person is in shock, raise his feet higher than his head.

(d) Give absolutely nothing by mouth:  
no food, no drink, not even water.

(e) Never give an enema.

(f) Inject antibiotics.

## 2. BLEEDING

### 2.1 Symptoms of Blood Loss:

(1) **Acute Blood Loss.** If large amount of blood has lost the patient will become pale and the pulse may be weak and rapid. The blood pressure decreases to below 100 mmHg systolic. Then there are symptoms of shock, i.e., cold, clammy skin, the eyes are vacant, dazed, lack-luster, and the pupils dilated. There may be weakness, restlessness, and apprehension with a confused attitude. The pulse may become very rapid and not palpable and the blood pressure can not be measured. The breathing will be shallow and irregular, and in some cases the victim will lapse into unconsciousness and death.

(2) **Chronic Blood Loss.** In large infected wounds, small amount of blood may ooze for days and cause pallor and weakness similar to anemic patients infected by hookworm parasite, chronic severe anemia may cause heart failure with dyspnea, edema of ankles, engorged neck veins and enlarged liver.

## **2.2 Types of Bleeding**

(1) **Capillary Bleeding.** The most common type of bleeding is from the capillaries. It is described as "capillary oozing". A Band-Aid or sterile pad will ordinarily control capillary bleeding.

(2) **Venous Bleeding.** Venous bleeding occurs when a vein is severed or punctured, usually by a cutting instrument. Such bleeding will be characterized by an even flow of dark color blood without pulsation.

(3) **Arterial Bleeding.** Bleeding from an artery will occur when the artery is severed or opened. Injuries to the arteries are not common; however, when they are injured or severed, the condition is more serious and controlling the flow of blood is a matter of great concern to the first-aider and also to medical personnel. Bleeding from an artery is characterized by the irregular spurting of blood. The blood is a brighter red color, when there is a darker venous blood to compare.

(4) **Internal Bleeding.** Such bleeding refers to bleeding inside one of the body cavities. There is little that a first-aider can do about internal bleeding other than keep the victim down and quiet, control shock, and obtain or provide the best transportation possible to medical help. Common causes of such bleeding are knife wounds, bullet wounds, and crushing injuries. The basic symptoms of internal bleeding are restlessness, thirst, faintness, dizziness, cold and clammy skin, dilated pupils, shallow and irregular breathing, thin, rapid, and irregular pulse beat, and great anxiety.

## **2.3 Control of Bleeding**

(1) **Keep the victim down on his back, elevate the injured part and keep him as quiet as possible.**

(2) **By placing a compress over the wound and grasping it firmly with the hand. As one compress becomes saturated, place the second compress over the first, then the third, etc. Do not remove the compress to disturb the clot formation, but continue to add one compress on top of another until bleeding is stopped. For arterial bleeding the compress can be bound in place with a triangular bandage.**

(3) **Pressure points.** These pressure points refer to large arteries that are close to the unface and can be located easily with fingers, such as, brachial or femoral arteries. Fingers are used to apply pressure to the artery between the wound and the body for at least 10 minutes to lessen or control the flow of blood from the severed artery. If the bleeding does not stop and the bleeding point is clearly seen, it can be clamped with an artery forceps and tied with sterile ligature.

(4) **In severe bleeding in the hospital where blood bank is available, blood transfusion should be given.**

(5) Use of the tourniquet. Putting the tourniquet on the injured limb to control bleeding is dangerous and not recommended. It is, however, suggested that the tourniquet be used only in the most severe cases. The pressure of the tourniquet should be released every 15 to 20 minutes for a short interval.

#### 2.4 Nosebleed

Nosebleeds frequently occur in children. It is possible to rupture the tiny blood vessels in the mucous membrane of the nose by hard blowing, a blow to the nose, or a broken nose. Sometimes nosebleed occurs following severe infections and sickness. Persons suffering from high blood pressure may experience this problem.

Care of Nosebleed:

- (1) The victim should be placed in a sitting position with the head tilted back. Ask not to blow or scratch in the nose.
- (2) Ask the victim to breathe through the mouth and the first-aider pinch the nose with the thumb and index finger for 5 to 10 minutes.
- (3) Cold applications, ice pack or bag, should be applied to the head, face, nose and neck.
- (4) If the bleeding does not stop, do nasal packing. A 2 cm strip of gauze soaked with 2 ml of 1:1,000 adrenaline solution and 2 ml of 2% xylocaine solution is used to insert deep into the back of the nose and left for 5 minutes for topical anesthesia. Then another strip of gauze painted with vaseline is introduced into the nose leaving the outside end long enough to strap to the cheek. The packing is left in for 12-24 hours and removed.

### 3. BURNS AND SCALDS

Burns and scalds similarly affect the skin, except that burns are often more severe than scalds.

#### 3.1 Degrees of Burns

(1) First-Degree Burns are characterized by an intense reddening of the skin and pain. It will heal with little assistance and without scar. Only pain tablets are required.

(2) Second-Degree Burns are characterized by the formation of blisters and severe pain. It will heal in 8-14 days if not infected and not result in a scar formation. If infection occurs it will take longer to heal, may become third-degree burns and may have a scar.

(3) Third-Degree Burns penetrate through the entire thickness of the skin and cause a complete destruction of the skin tissues. Tendons, bones, and muscles and other underlying tissues in its path may also be destroyed. The skin is whitish pale or charred black without pain. It heals slowly and leaves a terrible thick scar. If it occurs around the joint a contracture and disability will result.

(4) Mixed Second and Third-Degree Burns occur in some victims of second-degree burns who have scattered areas of third-degree burns.

### **3.2 Risks of Burned Victims**

(1) Shock due to pain and loss of body fluid in the tissue underneath the burned area and into the oozing wound. Large area of burns causes severe body fluid loss, shock and death.

(2) Infection does not occur at the beginning of the burns. Improper care of the burns will result in contamination, infection, and slow healing. Large infected burns will cause septicemia and death.

(3) Disability as a result of third-degree burns.

### **3.3 Treatment**

#### **(1) First-Aid**

(a) Instruct the burned victim with his afire clothes to roll on the floor or ground to put off the fire instead of running for water as usually happens. Running while clothes are on fire will aggravate the fire resulting in more injuries.

(b) To help ease the pain and lessen damage caused by the burn, put the burned part in cold water at once.

(c) The burned victim often apprehends and suffers from pain. Pain tablets or injection and comforting will be helpful.

(d) The extent of the second-degree burned area over 10% of the body surface area or approximately the surface area of an upper limb is considered to be a serious burns and should be referred to hospital immediately. Cover burns with sterile gauze or ironed sheet to keep them from being contaminated.

#### **(2) Fluid Replacement**

(a) Loss of body fluid in serious burns can lead to shock and loss of life. Drinking salt and soda in water will help to control shock before medical help is obtained. Start salt and soda at the earliest possible moment.

(b) Have the victim lie flat and encourage him to drink as much water as he can. Salt and soda water is better than plain water. It is made by dissolving one tablespoon of baking soda in one liter of cool water.

(c) If intravenous normal saline solution is available, give him (adult) one liter intravenously.

#### **(3) Local Treatment of Second-Degree Burns**

(a) Prepare all instruments required, then scrub the hands with soap and water.

(b) Gently clean the burns, using sterile absorbent cotton and a mild antiseptic soap. Holding the cotton with sterile forceps instead of fingers.

(c) Do not break the unbroken blisters.

(d) Cover the clean burns with sterile vaseline gauze dressings.

(e) Burns of the fingers should be covered separately.

(f) Put sterile absorbent cotton on top of the vaseline gauze and bind with bandage. The dressings are left for 8 days when the burns will heal and dressings can be removed. If the burns are swollen and painful and fever

develops, there may be infection and the dressing should be removed, the burns examined and fresh dressings replaced.

(g) Ask the victim to move adjacent joints daily to prevent stiffness.

(h) For third-degree burns, the destroyed tissues are excised and skin grafted by surgeons.

(i) Tetanus toxoid and 5 days of antibiotic therapy are given.

### 3.4 Chemical Burns

Chemical burns of any degree may be produced by contact with strong acids or alkalis or with a corrosive chemical. The treatment of chemical burns are as follows:

(1) Remove, immediately, all contaminated clothing, and treat the burn by long and thorough drenching with water.

(2) After thorough washing, treat a acid burn by flooding it with a dilute solution of bicarbonate of soda (2 tablespoonfuls to 1 liter water), and an alkali burn with a dilute solution of vinegar (about half vinegar and half water).

(3) Surface carbolic acid burns should be flooded with alcohol and then thoroughly washed.

(4) After thorough irrigation and neutralization, chemical burns should be dressed with water-soluble antibiotic ointment and covered with a sterile nonadhering-type dressing.

(5) If the chemical gets into an eye, immediate extensive flushing of the eye (not with just an eyecup) is essential. The easiest way to accomplish adequate flushing is to fill a disposable intravenous fluid bag with warm tap water to which 1 teaspoonful of salt has been added to each liter. Raise the bag just high enough so that a gentle stream from the plastic nozzle end of the tubing flows into the eye.

## SHOCK

"Shock" is a depressed condition of many of the body functions due to failure of enough blood to circulate through the body following serious injuries such as severe blood loss from wound. Loss of body fluid in severe diarrhea also causes inadequate blood circulation. "Fainting" is a quickly passing form of shock when autonomic nervous system is being overstimulated in terror, excitement, hunger or pain.

### 4.1 Symptoms

(1) "Fainting" following an over stimulation of autonomic nervous system, the victim develops pale, cold, clammy skin, blurriness of vision, nausea, vomiting, confusion, loss of consciousness and falls down. The pulse is weak and slow to 50 per minute or less, the respiration shallow. Let him lie flat without a pillow and loosen his clothes to facilitate adequate respiration. Give a cotton ball soaked with spirit of ammonia for inhalation. Place him in a well ventilated place. Fainting will quickly pass in few minutes. Following the fainting spell he may feel weak which will recover after a short rest. Give pain tablets if there is pain.

(2) "Shock" due to severe loss of blood or body fluid has similar symptoms to fainting but the pulse will be weak and rapid, and the blood pressure below 90 mmHg systolic. If the shock is severe the pulse may not be palpable and the blood pressure not detected. The respiration is rapid and shallow.

#### 4.2 Treatment:

- (1) Stop bleeding in a bleeding wound.
- (2) Let him lie flat with the feet elevated on a chair.
- (3) Give analgesic if there is pain.
- (4) Keep warm with blankets if the weather is cool, but not too warm.
- (5) Give plenty of water to drink if there is no nausea and vomiting, except the victim is going to undergo an operation.

(6) In a severe loss of blood or body fluid, medical help should be obtained immediately. One liter of normal saline (0.9%) solution can be given intravenously in the meantime, provided this does not delay the medical help.

## 5. SPRAINS, STRAINS, AND DISLOCATION

### 5.1 Sprains

Sprains result from injury of the soft tissues about the joint. Sprains are common injuries, especially to the ankle joint as a result of the fall on an inverted ankle while stepping on an uneven surface. Such ankle is being twisted and the ligaments, blood vessels, and tendons about the joint injured, resulting in immediate swelling and pain. Extension of the ankle aggravates pain. The swelling and pain increase on the next day.

In some instances it is difficult to make a positive determination whether the injury is a sprain, dislocation, or fracture. Only an x-ray can help doctor make a positive diagnosis.

### 5.2 Strains

Strains are muscle injuries and are caused by stretching beyond a reasonable limit, or an unexpected movement such as may occur when one is attempting to lift a heavy weight improperly, so that the force being exerted by the muscles themselves is great enough to produce a tear in the muscle or its tendon. There will be a sharp pain in the injured muscle at the time of or shortly following the muscle exertion. A tendency for the injured part to become sore and stiff, and there is a feeling of intense pain in the injured part when attempts are made to use the area.

#### Treatment:

(1) Cold application-ice bag or cold towel should be continued for 24 hours. If the foot is injured dip it in a bucket of cold water.

(2) Put the part at rest to allow rapid healing of the injured part.

(a) Sling the injured arm with triangular bandage.

(b) Apply elastic bandage, or adhesive tape applying to the sole of the foot, up on the lateral aspect of the foot about the lateral malleolus and around the ankle and lower part of the leg. Thus strapping will fix the foot in

slight everting position to prevent stretching and keep the part at rest. A sufficient time should be allowed before it is healed and the pain disappears when he can gradually start to bear weight again.

(c) Let the victim lie on a flat and rigid bed or on a wooden floor.

(3) Give pain tablets for pain.

(4) In severe case of sprains or strains which positive diagnosis is difficult the victim should be referred to a hospital for x-ray examination to rule out fracture or dislocation.

**5.3 Dislocation.** Displacement of a bone end or of two bones from their joint is a dislocation. A forceful blow to the joint or a fall can cause dislocation such as a fall on outstretched arm causes dislocation of shoulder.

**Symptoms and Signs**

(1) Intense pain in the joint.

(2) Sudden swelling and discoloration.

(3) A noticeable deformity in the joint.

(4) Rigidity and loss of use of the injured joint.

(5) The injured part is longer or shorter than the corresponding part. It is usually shorter.

**Treatment:**

(1) Most dislocations require medical attention and should be referred immediately after the joint has been immobilized with splints or, in the case of the shoulder, an arm sling.

(2) However, dislocation of the fingers can be positioned by applying a steady pull.

## **6. FRACTURES**

Fractures are breaks in a bone produced by a direct blow, or by muscular action, which may twist or tear a bone to the breaking point such as the fracture of the clavicle as a result of fall on outstretched hand. There are 2 kinds:

(1) Simple fracture, the skin has not been broken.

(2) Compound fracture, the skin has been broken. The broken end of the bone has often penetrated or protruded to the outside, the danger of infection is great.

### **6.1 Symptoms and Signs**

(1) Feel the sensitivity to touch in the immediate area; the pain from the broken bone is more localized than in a sprain.

(2) Identify the false position and false motion when attempting to move the injured part.

(3) Feel the broken ends (crepitus).

(4) Realize the loss of use or function of the body part.

(5) The abnormal findings are less prominent in impacted fracture.

### **6.2 Treatment:**

(1) When fracture is suspected medical help should be obtained.

(2) The victim should be protected from shock and the injured part immobilized by temporary splints.

(a) Splints can best be made by padding boards of the right width and length with gauze or cloth.

(b) The splints should extend beyond the two broken ends of the bone.

(c) Be sure that the pulse distal to the fracture is palpable and the limb warm and pink in color. Weak pulse or pulseless in the distal limb with coldness and pale or discoloration of the skin indicates too tight application of the splinting. It should be removed and reapplied.

(d) The fractured leg bone can be immobilized by binding to the uninjured leg, or the arm fracture can be placed in an arm sling.

(3) Give pain tablets for pain.

### 6.3 Samples of Splints For Some Common Fractures

(1) Fractures of the Ribs. This can make breathing painful, more difficult and labored. Pressing antero-posteriorly with two hands causes pain at the fractured sites. Rib fractures can be protected best by binding them with several triangular bandages folded as cravats and by using wide strips of adhesive tape extending beyond the midline anteriorly and posteriorly.

(2) Fracture of the Clavicle. It is caused by a fall on out-stretched hand. The victim will not want to raise his arm upward because it hurts and the forearm of the injured side is being supported by the uninjured side. There is bulging tenderness of the clavicle at the fractured site. The best protection is to place the arm of the injured side in a sling and bind the arm to the body.

Fracture of the clavicle can be treated by 3 triangular bandages, two are tied around each axilla, if it is over the fracture put cotton wool in between the bandage and the fracture. The other bandage is used to tie the two bandages together in the back so that the shoulder is elevated and pulled backward. Keep the bandages tightly tied for 14 days.

(3) Fracture of the Neck and Back. A violent fall, fall from a height, fall of a heavy object on the head or road accident may cause this type of injury. It is a very severe and most dangerous fracture to protect. Improper or careless transportation of the broken neck or back a victim can be resulted in permanent paralysis or loss of life due to compression of the spinal cord by the broken bone. All victims with pain in the back bones should be suspected of fractures and immediate medical help obtained. The victim should be placed on a rigid platform. There should be sufficient help to lift the victim and keep his head, neck, and back in good alignment. There should be no bending, twisting, shaking, or jarring. If the neck is the suspected area, it should be secured by placing a sand bag on each side of the head and secured by tying.

(4) Open Fracture. This is an open wound, so there is possibility of contamination and severe infection due to injuries of the soft tissues about the fractured ends. Analgesic should be given parenterally for pain. Stop bleeding

if present and cover the wound with sterile gauze and apply bandage. Try to move the injured limb as little as possible. Do not try to put the fracture in place for such will further damage the surrounding soft tissues at the fractured ends. Protect and treat shock. Apply temporary immobilization and obtain immediate medical help.

## 7. HEAD INJURIES

A hit on the head, fall with the head hitting a hard surface, or road accident can cause injuries to the brain and bleeding in the cranium. Loss of consciousness following a head injury indicates brain damage, the longer the period of unconsciousness the more brain damage.

### Treatment:

(1) A loss of consciousness longer than 1 minute after injury should obtain medical help.

(2) A loss of consciousness for 2-3 seconds, the followings are observed for at least 8 hours.

(a) Note his consciousness by waking him up and ask questions. Ability to answer questions indicates good consciousness.

(b) Normal movements of the eyes, equality of size of both pupils and their reaction to light.

(c) Movement of the limbs and facial muscles.

(d) Pulse and blood pressure are recorded.

(3) Obtain medical help immediately when

(a) The victim is confused and drowsy.

(b) Clear fluid or blood flows from the ears, and noses, or there is blood in the eyes.

(c) The pulse rate increases or decreases to below 50 per minute.

(d) Pupil sizes are not equal and reaction to light diminished or absent

(e) Any limb or limbs are weak, or there is a retraction of the angle of mouth to one side while smiling, or the eyes crossed.

(4) Give pain tablets for headache, no parenteral analgesic should be given.

## 8. UNCONSCIOUSNESS

The case of the unconsciousness should be determined in order to give appropriate treatment to the victim. There are many causes such as asphyxia, shock, heatstroke, heat exhaustion, heart attack, epilepsy, intoxication, diabetic coma and insulin shock, and overdoses of drugs. The necessary care includes :

(1) Clear the air-way. Unconscious victims often lose their lives because of airway obstruction. Turn the victim on his side and the face down toward

the floor without a pillow to let the head lower than the body. Thus aspiration is protected. Wipe off the mucous secretion in the mouth with a gauze. Remove false teeth if there is any. If the victim still breathes loudly, extend the head and lift the mandible anteriorly to clear the tongue off the throat. An airway may be helpful in keeping the tongue from back of the throat. However, with an airway in place he may still need an elevation of the mandible.

(2) Changing side on which the victim lies every 2 hours and doing postural drainage of the bronchi are necessary for a long-term care to prevent pulmonary complications. Keep the bony prominences of the body which press against the bed padded and the skin clean.

(3) Urethral catheterization under aseptic technic is done if the victim does not void and bladder distended. This can be repeated in 8 hours. If more than 2 catheterizations are required the catheter should be retained.

## 9. CONVULSIONS

When a person suddenly loses consciousness and makes strange, jerking movements he has convulsions. Convulsions come from a problem in the brain. In small children common causes of convulsions are high fever and severe dehydration. In very ill persons, the cause may be meningitis, cerebral malaria, or poisoning. A person who often has convulsions may have epilepsy.

### Treatment:

- (1) Try to figure out the cause of a convulsion and treat it, if possible.
- (2) If the child has a high fever, lower it at once with water.
- (3) If the child is dehydrated, give an enema of rehydration. Drink slowly. Send for medical help. Give nothing by mouth during a convulsion.
- (4) If there are signs of meningitis, seek medical help at once. (Symptoms and signs of meningitis are fever, severe headache, stiff neck; the child looks very ill, and lies with his head and neck bent back; the back is too stiff to put the head between the knees; in baby under a year old, the fontanel bulges upward; vomiting is common; the child is very sleepy; sometimes there are convulsions or strange movements; the child often gets worse and worse until he loses consciousness; in a case of tubercular meningitis symptoms and signs develops slowly, over days or weeks, but other forms of meningitis they come on more quickly, in hours or days).
- (5) If cerebral malaria is suspected, give chloroquine intramuscularly.
- (6) Epilepsy causes convulsions in people who otherwise seem fairly healthy. Convulsions may come hours, days, weeks, or months apart. They cause loss of consciousness and violent movements.
- (7) When a person is having a convulsion, give following aids.
  - (a) Try to keep the person from hurting himself: move away all hard or sharp objects. If necessary, put a padded piece of wood or tongue depressor or handle of a spoon between his teeth to prevent him from biting his tongue or lips.

(b) After convulsion the person may be dull and sleepy. Let him sleep.

(c) If convulsions last a long time, inject diazepam or phenobarbital.

## 10. DROWNING

Drowning is common among children who do not swim, or alcoholic intoxicated adults who fall into the water, or epileptics who happen to develop sudden convulsion near the water, he may be already unconscious, cold, cyanotic, flaccid, does not breathe, pulseless, and frothy fluid gushing out from the mouth and noses.

### 10.1 Treatment

(1) As soon as a drowning victim is removed from the water, he should be prepared to receive artificial respiration, preferably by the mouth-to-mouth method. If it is possible to begin mouth-to-mouth resuscitation even before the victim has been removed from the water, this should be done.

(2) When respiratory movement is absent, mouth-to-mouth resuscitation should be started immediately.

(3) Unconscious drowning victim with lack of breathing, no pulse detected at wrist or neck, no heart beat, and noticeably enlarged pupils. This indicates cardiac arrest. External cardiac massage should be proceeded immediately even though the cardiac arrest is suspected.

(4) If the victim does not recover do not give up. Resuscitation should be continued for at least 2 hours. Instruct nearby persons to help in performing the procedures.

(5) If oxygen is available, give it through nasal catheter while doing month-to-mouth artificial respiration.

(6) When respiration and circulation have been restored and consciousness regained, the victim should be hospitalized otherwise delayed complications may occur.

### 10.2 Mouth-to-Mouth Artificial Respiration

When breathing stops, regardless of reasons, the tissue and cells deny oxygen, death can come in few minutes, because of lack of oxygen supply to the brain, heart, and other organs. Artificial respiration should be done as soon as possible. The most effective artificial respiration is mouth-to-mouth method. Steps in mouth-to-mouth artificial respiration are:

(1) Place the victim on his back.

(2) Check the victim's mouth and remove all foreign matter from the mouth.

(3) Kneel on the right side of the victim's head.

(4) Place the right hand beneath the victim's neck and elevate gently.

(5) Place the left hand on the victim's forehead and push down with the

heel of the hand, at the same time clamping the nostrils with forefinger and thumb.

(6) Breathe deeply, then place mouth over the victim's mouth and blow the air into his mouth and lungs.

(7) Watch the victim's chest expand and then remove mouth from the victim's mouth. Listen and feel the air as it escapes from the victim's mouth. Keep face close to the victim's nose and mouth.

(8) Repeat this process 10 to 15 times per minute for adults and 15 to 20 times per minute for children.

### 10.3 External Cardiac Massage

When the heart stops for a short period of time resuscitation by external cardiac massage can help restart the nonfunctioning heart, though the victim has been apparently dead. It is very important to remember that permanent brain damage occurs 4 to 6 minutes after the heart has stopped beating. So that the resuscitation should be applied immediately or within 5 minutes.

Cardiac arrest can be determined by: no pulse at wrist, or in neck, or at groin; no heart beat, by placing the ear on the chest of the victim; and dilated pupils. Steps in external cardiac massage are:

(1) Lay the victim down on his back on the floor or on some other firm surface.

(2) Stand or kneel at right angles to his chest.

(3) Tilt his head back and make certain that his mouth is clear and that his air passage is open.

(4) Blow into his lungs three times, using the mouth-to-mouth method.

(5) Place the heel of one hand, with the heel of the other hand on top of it, on the lower third of the breastbone, and apply firm pressure downward about once a second so that the breastbone moves approximately 1 to 2 inches toward the spine.

(6) Then relax hands completely, to permit the chest to expand.

(7) While massaging the heart, have someone give mouth-to-mouth resuscitation. If no one else is available, stop cardiac massage every ½ minute for about 10 seconds and give mouth-to-mouth resuscitation yourself, for four deep breaths.

(8) Get the patient to the hospital as quickly as possible.

(9) Resuscitation methods must be carried on until the patient is pronounced dead by a physician or until the physician has determined that the pulse and blood pressure are normal and that emergency resuscitation is no longer required.

## 11. ELECTRICAL SHOCK

Touching a bare live power line causes electrocution. Electrocution will be very effective if the victim's hands or feet are wet, such as an attempt to fix the power meter fuse on the post outside the house while raining, this can

be fatal due to shock and cardiac arrest.

Treatment:

(1) Break the circuit immediately by switching off at the corresponding switch or main cut-out. This is possible only when electrocution occurs in the house.

(2) Break the contact between victim and the source of electricity. Make sure not to make contact with the victim, since to do so would mean exposure to the same degree of shock. Be sure that the surface or floor where the victim lies and the body of the rescuer are not wet.

(3) Using a piece of dry rope or stick to pull victim from live wire or vice versa.

(4) Start artificial respiration if breathing stops and external cardiac massage if the heart is not beating.

## 12. ANAPHYLAXIS

Anaphylaxis or anaphylactic shock is the reaction of the body to overwhelming sensitization by a foreign protein. An example of anaphylactic shock is the serious illness (or even profound collapse) experienced by some people when stung by a bee, after taking certain medications, after eating certain foods, or as the result of an injection of a therapeutic or prophylactic agent containing horse serum. Anaphylaxis can produce death if counter measures are not taken immediately. Ones who have allergic reactions such as asthma, dermatitis, and rhinitis develop anaphylaxis more frequent than others.

### 12.1 Symptoms and Sign

(1) After injection or insect sting the victim experiences irritation and redness of skin.

(2) The victim may collapse, have rapid and weak pulse, hypotension, cold clammy skin, difficulty in getting breath, tightness of the chest, unconsciousness, and death may follow.

(3) The person may rapidly breakout in large wheal with severe itching all over the body, around the eyes, mouth, face and neck.

### 12.2 Treatment

(1) Unbutton the victim's clothes and loosen the belt to facilitate breathing. If the breathing becomes very slow and shallow, mouth-to-mouth resuscitation should be applied.

(2) Give 0.5 ml of 1:1,000 adrenaline solution subcutaneously. Second dose of 0.5 ml can be given 10 minutes later if there is no improvement.

(3) In mild cases oral antihistamine such as antistine, or chlorpheniramine, or phenergan can relieve allergic symptoms.

### 12.3 Precautionary Measure

(1) History of mild allergic reaction to a certain drug or an injection of a therapeutic or prophylactic agent containing foreign protein of animal serum

as manifested by irritation and itching of the skin should be noted and great caution taken while giving such agents.

(2) Antihistamine and adrenaline should always be immediately available when administering those agents or other agents.

(3) Instruct the victim who has experienced allergic reaction or anaphylaxis to inform the incidence to the other practitioner whom he may encounter every time.

## 13. POISONING

Poisoning occurs in a variety of ways. Sometimes it is the result of attempted suicide or homicide. Frequently it is accidental, as in children, having natural tendency to investigate their surroundings, take dangerous drugs to satisfy their curiosity.

### 13.1 Treatment

#### (1) General measures

(a) Identify the specific poison or the type of poison, if possible; note the symptoms, the content of glasses or bottles, and other related sources of information.

(b) Evacuation of the stomach contents by inducing vomiting except when the poison is corrosive or petroleum. vomiting may cause material to be aspirated into the respiratory tract and cause pneumonia. Vomiting may be brought on by tickling the throat or by drinking a glass of warm water with 2 teaspoonfuls of salt dissolved.

(c) Four hours after the poison has been taken the stomach should be emptied by a stomach tube and thoroughly washed out, except the victim is unconscious and the poison is petroleum.

(d) Obtain medical help immediately after the stomach has been emptied. If the victim is unconscious, put him on his side, let the head drop on the stretcher without pillow, and then pull forward the jaw to assure a free airway.

(e) If the breathing stops or is very weak, apply mouth-to-mouth artificial respiration.

### 13.2 Some Common Poisons

(1) Corrosive acids and alkalis. Clues to many of these are the stains and burns around the mouth or the presence of a characteristic odor. Pain is usually severe and the victim may go into shock. Give small amount of diluted milk of magnesia, or 1 teaspoonful of baking soda in a glass of water, or milk, or raw eggs beaten up in milk. Wash thoroughly the burned skin with water for 5-15 minutes. Sedative given and medical aid should be obtained quickly.

(2) Petroleum products (kerosine, benzine). Upon ingestion the victim will choke, gasp, and cough. There may be vomiting and aspiration into the lungs causing pneumonia. Do not give emetic or gastric lavage. Give 15 ml magnesium sulphate mixture for an adult, 0.5 ml per kg body weight for children and obtain immediate medical help.

(3) Aspirin. Rapid and deep breathing are the first signs follow fever, flushing, sweating, and convulsion. The stomach should be emptied immediately and further cleansed by means of gastric lavage. Obtain medical help quickly.

(4) Cyanide. Large dose are almost certain to be fatal. Death can occur within minutes. If a smaller dose is ingested, there will be nausea, vomiting, convulsion, shock, unconsciousness and death. Induce vomiting, give milk, then gastric lavage. Treat shock and obtain medical help immediately.

(5) Barbiturates. It is usually used for suicide. The symptoms of overdose are drowsy and confusion, his skin may be cyanotic, his breathing depressed. He may have a fast, weak pulse and dilated pupils followed by shock and death. If the victim is unconscious, clear his airway, put him on his side with his head lower. Pull forward his jaw. Treat shock and obtained medical help immediately. If his consciousness is good empty the stomach by gastric lavage.

(6) Alcoholic intoxication. With a history of too much alcoholic drinking the victim may be intoxicated. The victim has the odor of alcohol in his breath. He is partly or completely unconscious, and although he can usually be aroused temporarily, he soon relapses into a stupor. He may have nausea and severe vomiting. His stomach should be emptied by gastric lavage using water to remove the residual alcohol. If he is unconscious respiratory tract should be cleared like in the case of barbiturate overdose. If there is excessive wretching and vomiting give him chlorpromazine 25-50 mg orally or intramuscularly.

(7) Insecticides. Initially, the symptoms of intoxication consist of severe headache, blurred vision, nausea and vomiting, diarrhea, profuse sweating and weakness, and abdominal pain. There may also be shortness of breath, excessive salivation and lacrimation, irregular heartbeat, twitching of muscles, and convulsions. In severe cases, shock may occur, leading to coma and death. If the insecticide has been swallowed, the stomach should be emptied by gastric lavage, then give 15-30 gm of magnesium or sodium sulphate to purge the intestinal tract of the poison. Two to four milligrams of atropine should be immediately given intravenously or intramuscularly and medical help should be obtained immediately. Convulsions must be controlled by the use of amobarbital 0.25-0.5 gm intramuscularly or other anticonvulsive agent.

(8) Opium. In some rural areas the local people swallow smoking opium with lemon juice added for suicide. The victim has headache, nausea, restlessness, mentally stimulated, but this stimulation is quickly followed by drowsiness, slow shallow breathing, and finally unconsciousness and coma. The pupils become pinpoint in size. If the victim is still conscious empty his stomach by continuous gastric lavage because the absorbed opium excretes into the stomach. Also give 30 gm of sodium sulphate and obtain medical help.

(9) Mushroom poisoning. There are several varieties of mushrooms growing in the woods in raining season. Some are nonpoisonous and edible

but some are poisonous. If the poisonous mushrooms are taken, symptoms begin after eating; they are abdominal pain, diarrhea, and vomiting. The pulse is weak and rapid and the victim may go into shock and death may occur. The stomach should be emptied and atropine given under the victim's tongue or parenterally, and shock treated. Medical help should be obtained.

(10) Strychnine. Strychnine is used as dog poison. If it is accidentally taken, the symptoms come on rapidly. They are great apprehension, generalized spasm which grips the entire body, causing back arch, difficulty in breathing, and increase salivation. Half gram of amobarbital sodium in 10-20 ml distilled water is given intravenously or intramuscularly and medical help obtained immediately. Do not empty stomach by gastric lavage during spasm.

(11) Methyl alcohol. Methyl alcohol is used around the home for burning in spirit lamps. Unfortunately, it is also used as an adulterant in cheap bootleg liquor, and often is purloined as a substitute for ethyl alcohol. It is an extremely poisonous substance; the ingestion of a fraction of an ounce has been known to cause death due to toxic effect on central nervous system. It also has a specific degenerating effect on the optic nerve, which may result in permanent blindness even if only a very small quantity of the poison has been consumed. The most characteristic symptoms of methyl alcohol poisoning are great thirst, visual disturbances, very severe abdominal pain, and occasionally convulsions. While it may be desirable to wash out the stomach with 1-2% bicarbonate of soda as soon as the victim's condition is discovered, this probably has little effect in most cases because of the rapid absorption of the methyl alcohol. The most important facet of treatment is to correct the severe acidosis by the administration of 4% bicarbonate of soda in 5% dextrose given intravenously. Medical help should be obtained quickly.

## 14. POISONOUS BITES AND STINGS

### 14.1 Snakebite

There are 7 kinds of poisonous snakes in Thailand. They are cobra, king cobra, banded krait, malayan pit viper, Russell's viper, green pit viper and some sea snakes.

The snakes which are inhabitants of different parts of the country have different characteristics and different names.

#### Symptoms

(1) The bite of poisonous snakes leaves two distinctive puncture wounds at the points of entry of the two fangs in the forward portion of the upper jaw. The bite of a nonpoisonous variety differs in that there are six rows of teeth marks - four rows made from the teeth of the upper jaw, and two from the teeth of the lower jaw. This fact is important and means that a person bitten by a nonpoisonous variety of snake needs not be subjected to the measures necessary in the case of a bite by a poisonous snake.

(2) The venous of different snakes produces their poisonous effects in different ways.

(a) The cobra and king cobra inject powerful venoms which have strong effect on nerve tissue. The general symptoms consist of weakness, shortness of breath, increasing lassitude leading to unconsciousness, dimness of vision, rapid pulse, nausea and vomiting, and death.

(b) The venoms injected by Russell's viper, malayan pit viper and green pit viper produce effect on clotting mechanism of the blood and cause a flow of blood from the fang marks without clotting, and blood stained urine.

(c) Sea snakes has venom which affect muscles causing great pain and also damage to the kidneys.

#### Treatment:

(1) Immobilize the extremity and put a flat constricting band or the triangular bandage just above the bite and just tight enough to stop the flow of blood in the vein.

(2) Stop muscular activity at once.

(3) No alcoholic drink is allowed.

(4) Identify the kind of snake that has inflicted the bite and has usually been killed and brought along with the victim.

(5) Examine the bite.

(6) Give specific antivenom serum if it is available, if the kind of snake can not be identified use polyvalent antivenom serum intravenously. Before giving the antivenom the skin test for allergy must have proven negative, using 0.02 ml of 1:100 serum in 0.9% normal saline solution.

#### 14.2 Insect Sting

Wasps and hornets, when they sting a person, retain their stingers and can sting repeatedly, thus being capable of inflicting multiple injections of venom into the same person. On the other hand, when the honeybee sinks its barbed stinger into the skin, it is unable to withdraw it. In the nonsensitive individual a bee sting produces nothing more than a painful swelling with redness, aching and itching. But if several stings are received at one time, enough venom can be absorbed to make the victim quite ill and perhaps cause him to develop severe hives or a generalized swelling (angioneurotic edema) of all the tissues. Anaphylaxis may occur following a sting and death results from respiratory obstruction caused by swelling of vocal cords or severe constriction and congestion of the bronchial tubes, and anaphylactic shock.

#### Treatment:

(1) Local treatment of the area by application of ice water soaks may provide symptomatic relief and help to reduce the swelling.

(2) For severe symptoms give 0.3-0.5 ml of 1:1,000 adrenaline solution.

(3) Treat shock and obtain medical help immediately.

#### 14.3 Rabid Dog Bite

Rabies occurs as a result of rabid dog bite. It is one of the most dangerous diseases since without preventive treatment rendered before symp-

toms manifest, it is invariably fatal. The average incubation period between infection and the appearance of symptoms is 3 to 7 weeks.

#### Symptoms

Initially, there is burning sensation or itching at the site of the bite, followed by restlessness, drawsiness, irritability, increase salivation, convulsions and hydrophobia - when the patient wants to drink water, he will hold his breath and tight his jaws with an expression of great pain, and do not want to drink water any more, although he is very thirsty. He will eventually die in 5-6 days.

The signs of a rabid dog are photophobia by staying in a quiet and dark corner, denial of food, tendency to unusually come to close contact with the owner. After 48 hours of the initial signs there will be restlessness, paralysis of legs, stiff back, and daze. The animal may become vicious and attempt to fight any and all. Later generalized paralysis develops with inability to close the mouth, tongue drop, salivation, and death ensues in 2-3 days.

#### Treatment:

Obtain medical help immediately.

#### Prevention

(1) If the dog which bite the victim cannot be watched, but being a rabid dog is suspected, immunization should be given.

(2) If the animal does not have signs of rabies, it should be watched carefully for at least ten days. A rabid dog will eventually die in 5-10 days; no immunization is needed.

(3) If the animal has been killed, its head should be removed and sent for laboratory examination of the brain at the earliest moment, while immunization may have been started. If the examination is negative of the rabies infection, the immunization can be discontinued. If its is positive, continue on with immunization.

(4) The wound should be cleansed carefully with soap and water.

(5) Tetanus toxoid should always be given.

## 15. PSYCHO-NEUROTIC DISORDERS

Persons with psycho-neurotic disorders may occur as an emergency when there is sudden change in personality such as depression or mania with tendency to hurt other people, or too much worry and apprehension.

### 15.1 Psychosis

A change of personality to depression or mania is symptom of psychosis. Psychosis can be caused by many factors. A social background and experiences of life taken by a careful interview with the patient or/and his relatives may attribute to the cause of such mental disorder. Histories of alcoholic drinking, high fever, epileptic convulsions, liver disease with slight jaundice, diabetic patient during insulin treatment with development of hypoglycemia

because of insulin overdosage, meningo-encephalitis, rabies, cerebral malaria, and others should be elucidated.

Treatment:

- (1) Obtain medical help.
- (2) If the patient is very excited or aggressive, try to get hold of him very gently and sympathetically. He may calm down if he sees that we are not afraid of him but only want to help him. If necessary give 10 mg of diazepam or 150 mg of phenobarbital intramuscularly.
- (3) Special precaution must be observed when caring a very depressed person in preventing suicide. Avoid him of any sharp object or rope.

**15.2 Neurosis**

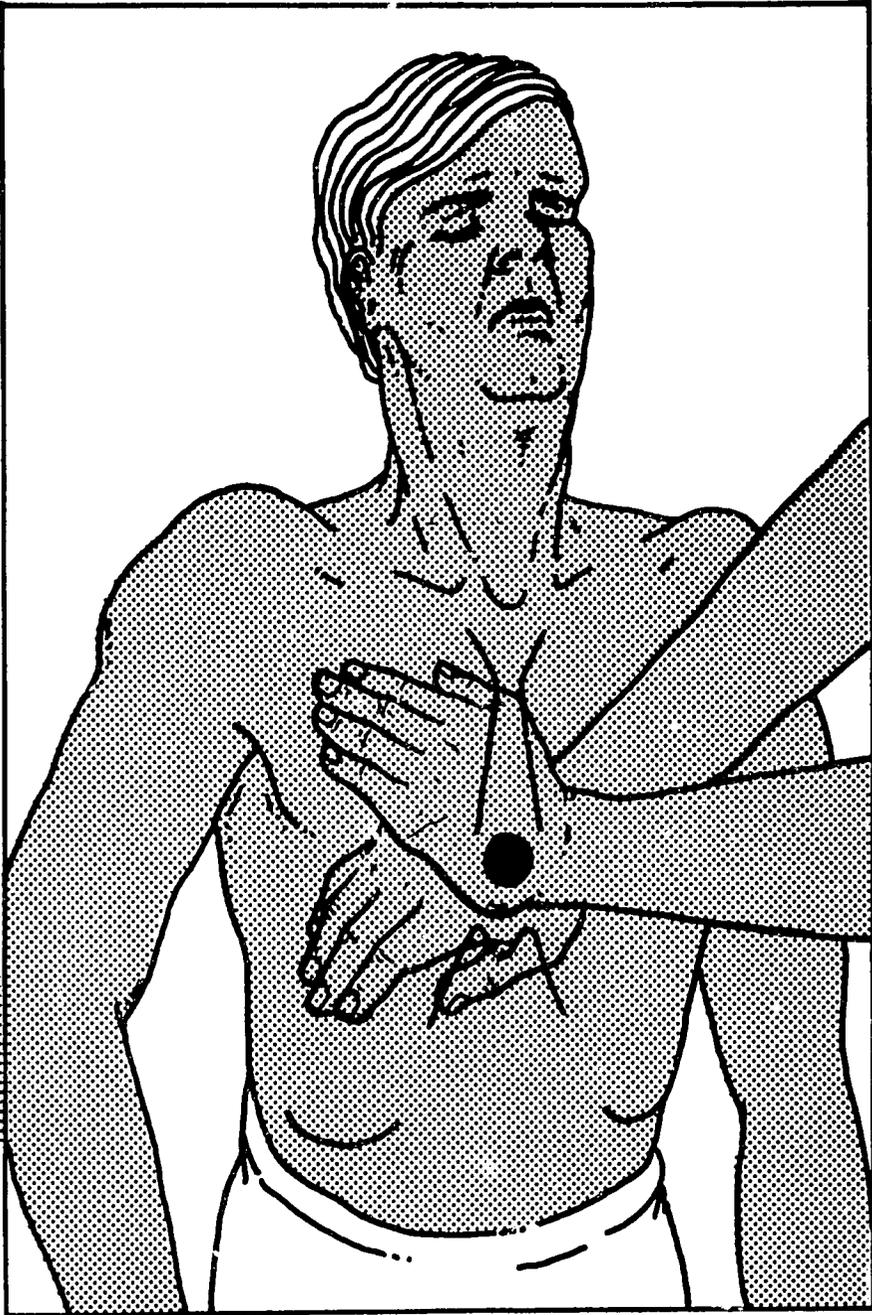
The patients often has many complaints and shows great anxiety, but examination reveals no abnormalities. They have neurosis, the cause of which often due to some long standing problems in the family life.

**Symptoms and Signs**

- (1) Weakness, headache, dizziness, anorexia, and impotence.
- (2) Feeling of burning sensation over the body.
- (3) Anxious appearance, rapid pulse and easily sweating.
- (4) Be sure that the patient does not have any organic disorder before making a conclusion that the trouble is due to his environmental problems.
- (5) Patients with similar symptoms may be encountered in the rural areas where they are inflicted with thiamine deficiency or beri-beri. The only important abnormal findings may be absent or exaggerated reflexes, and the troubles can be relieved by thiamine tablets.

Treatment:

- (1) Comfort the patients and give him relevant advice may almost cure them.
- (2) Always make a thorough physical examination to be sure that there is no organic disorders.
- (3) If necessary 2 or 5 mg diazepam tablets can be given orally.
- (4) In some instances these patients may be better treated by spiritual healers if they believe it. This is equivalent to Western method of psychotherapy.



External heart compression.