PN-AAT-073

RESPIRATORY SYSTEM AND HEART PROBLEMS

STUDENT TEXT

1980
Rural Health Development Project
Ministry of Health and Social Welfare
Maseru, Lesotho

ACKNOWLEDGEMENTS

Nurse Clinician training materials are Lesotho adaptations based upon the MEDEX prototype curriculum for training mid-level health workers.

The prototype MEDEX materials were developed by the Health Manpower Development Staff of the John A.Burns School of Medicine, University of Hawaii. The original prototypes were based on training experience in over a dozen third-world countries. These were revised on the basis of HMDS experience in Micronesia, Thailand, Pakistan, and Guyana before being made available to Lesotho under a U.S.A.I.D. funded contract.

Major adaptation in Lesotho began at the National Nurse Clinician Training Programme Curriculum Adaptation Workshop held at Mazenod in January 1980. The nearly fifty participants represented all major health and health related activities in Lesotho, both Government and private. These participants and others working as individuals and then as review committees have adapted the Nurse Clinician training materials to meet the conditions and needs of Lesotho.

The Government of Lesotho and particularly the staff of the Nurse Clinician Training Programme are grateful to HMDS for supplying the prototype materials and to all those individuals who have helped in the Lesotho adaptation process.

First Edition May 1980

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REFERENCES USED IN THE DEVELOPMENT OF THE RESPIRATORY SYSTEM AND HEART MODULE

General References

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Rakel, R.E.; Conn, H.F. Family Practice, Saunders, 1978.

ILLUSTRATIONS
REFERENCES

Module: RESPIRATORY SYSTEM AND HEART

*If not applicable - NA

	Source	*Permission Requested (Date & Initial)	Permission Received (Date)
Fig.RH 1-9 and 11	HIRU, School of Medicine, University of Hawaii, Honolulu, HI.	NA	
Fig.RH 10	Dr.James LaRose, MEDEX/Guyana Program, Georgetown, Guyana, South America.	NA	

SCHEDULE

RESPIRATORY SYSTEM AND HEART PROBLEMS

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Session 1 Respiratory System: Anatomy & Physiology	Session 3 Respiratory Diseases -Common Cold & Influenza -Pneumonia -Acute Bronchitis & Emphysema -Pleural fluid	Session 5 Heart: Anatomy & Physiology/Abnormal Signs & Symptoms	Session 7 Heart Diseases: -Congestive Coronary Failure (CCF) -Rheumatic Heart Disease -Chest Pain	Session 9 PERFORMANCE EXAM
Session 2 Respiratory System: Physical Exam	Session 4 Respiratory Diseases (continued) -Bronchial Asthma -Tuberculosis	Session 6 Clinical Practice - Physical Exam Technique	Session 8 Clinical Practice - Identification of Heart & Respiratory Problems	Session 10 Review and Final Exam

STUDENT GUIDE

RESPIRATORY SYSTEM: ANATOMY, PHYSIOLOGY AND PHYSICAL EXAMINATION

I. Entry Skills and Knowledge

Before starting this Unit, you should be able to:

1. Define the words listed in the glossary pertaining to the respiratory system.
2. Explain the normal anatomy and physiology of respiratory system.

II. Objectives

Using the information and experiences provided by the instructor and the module text, you will be able to:

1. Identify the structures of the respiratory system and define their functions.
2. Explain the mechanics of breathing.
3. Demonstrate a physical examination of the chest, including the following:
   a. inspection
   b. palpation
   c. percussion
   d. auscultation
4. Describe normal and abnormal physical exam findings:
   a. dullness to percussion
   b. wheezing
   c. rales
   d. rhonchi
   e. dyspnoea
   g. cyanosis
   h. flaring nostrils
   i. sternal retraction
   j. abnormal fremitus
   k. increased/decreased breath sounds

III. Evaluation

Upon completion of the module, you will be assessed on:

1. Knowledge: Written test based upon contents of unit in module text. Acceptable performance, 80%.
2. Skill: Physical exam of respiratory system.

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IV. Activities you will be participating in to complete the above objectives.

1. Students read module on the anatomy, physiology and pathophysiology of the respiratory system, and answer review questions.
2. Instructor presents slides or A/V presentation to clarify and reinforce module text.
3. Instructor conducts discussion session to reinforce text and slide or A/V presentation.
4. Students read module text on physical exam techniques for examination of the chest and answer review questions.
5. Instructor or assistant demonstrates physical exam of the chest and describe abnormal signs.
6. Students practice recognizing signs of abnormal respiratory functions in clinical setting.

BASIC CONCEPTS RELATED TO THE RESPIRATORY SYSTEM

Anatomy and Physiology of the Respiratory System

The respiratory system includes the throat, the larynx and trachea, the bronchi, the bronchioles, and the lungs. (Figure RH 1) The nose and the mouth can also be considered part of the respiratory system. They are discussed in detail in the EENT Module.

Air enters the respiratory system through the nose and mouth. It then passes through the throat (pharynx), larynx and trachea. During this passage it is warmed, moistened with water, and filtered of dust, microbes, etc. These three functions are performed by the linings of the respiratory tract called mucous membranes.

The mucous membranes produce a layer of mucous which lines the entire respiratory tract. This mucous film is also important in protecting the airway against infection by microbes. Microscopic hair-like projections from the mucous membranes move in a wave-like manner to keep the mucous moving up and out of the respiratory tract.

From the trachea, air is directed into smaller tubes inside the lungs called bronchi and from there into smaller tubes called bronchioles. Eventually air ends up in the tiny "air sacs" of the lungs called alveoli. The lungs are made up of millions of these microscopic alveoli. (Figure RH 2). The wall of each alveolus is lined with many capillaries which are the smallest of blood vessels. Oxygen (O_2) is absorbed from the air in the alveoli into the red blood cells (RBCs) in the capillaries. At the same time, carbon dioxide (CO_2) is passed from the RBCs to the alveolus to be discharged into the air on expiration (breathing out). (Figure RH 3)

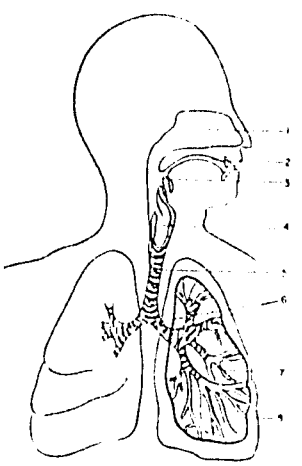

Figure RH 1 - The respiratory system includes: 1) nasal cavity, 2) mouth, 3) pharynx (throat), 4) larynx, 5) trachea, 6) bronchi, 7) bronchioles, 8) pleural space.

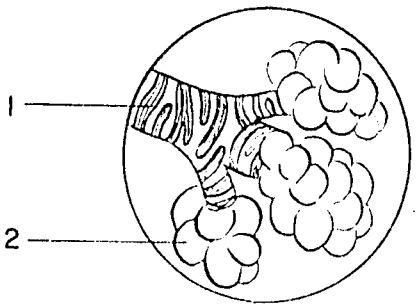

Figure RH 2 - Blow-up showing 1) bronchiole and 2) alveolus.

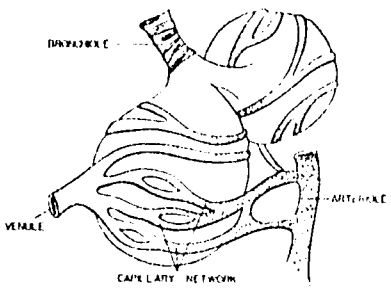

Figure RH 3 - Capillary networks surrounded alveoli for the exchange of O_2 and CO_2.

Much of the respiratory tract and both lungs are found inside the chest. The lining of the lungs and the chest cavity is called pleura. The space between the lung and the chest wall is called the pleural space.

The movement of air into the lungs and out again is caused by the contraction of the diaphragm and the intercostal muscles. When these muscles contract, they cause the chest cavity to enlarge. This in turn causes air to be drawn into the lungs (inspiration). When these muscles are relaxed, air is forced back out of the lungs (expiration) as the chest cavity becomes smaller (Figure RH 4).

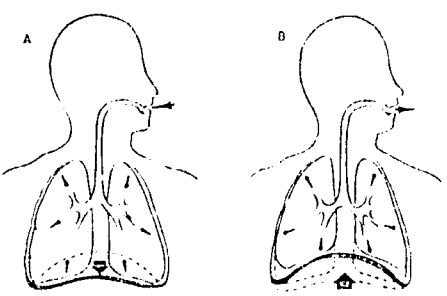

Figure RH 4 - Positioning of diaphragm and chest during A) inspiration and B) expiration.

Problems of the Respiratory System

What kind of problems affect the respiratory system?

Diseases of the respiratory tract and lungs can cause two types of problems affecting the exchange of O_2 and CO_2.

1. Decrease in the movement of air through the respiratory tract.

2. Decrease in the movement of O_2 and CO_2 between the alveoli and the capillaries.

What causes a decrease in the movement of air through the respiratory tract?

There are three main causes:

1. Increased mucous secretions (sputum) from the mucous membranes results in heavy and thick secretions which block the airway (Figure RII 7).

The illustrations below show how the walls of the bronchi and especially the bronchioles can narrow the airways and decrease the movement of air through the respiratory tract. Two or all three mechanisms may occur at the same time such as in an acute asthmatic attack.

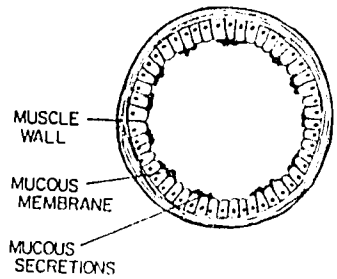

Figure RII 6 - Normal.

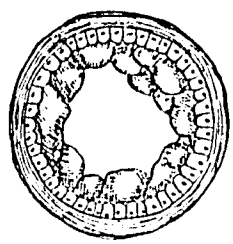

Figure RII 7 - Increased mucous secretions.

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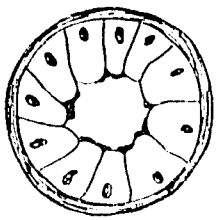

Figure RH 8 - Oedema of mucous membranes.

Figure RH 9 - Constriction of the muscle wall.

2. Edema of the mucous membranes causes the airway to become smaller (Figure RH 8).

3. Constriction of the muscle wall of the bronchi and bronchioles causes the airway to become smaller. This is most important in asthma (Figure RH 9).

What causes a decrease in the movement of O_2 and CO_2 between the alveoli and capillaries?

There are three main causes:

1. Mucous or fluid inside the alveoli decreases the amount of air reaching the alveolar wall.

2. Edema of the alveolar wall decreases the amount of O_2 and CO_2 transferred between the alveoli and the capillaries.

3. Scarring and destruction of alveolar walls. This reduces the effective surface area for exchanging O_2 and CO_2.

Physical Examination of the Respiratory System

Examination of the respiratory system consists mainly of an examination of the chest. Examination of the throat, nose and mouth are covered in the EENT Module.

What are the procedures used in examining the respiratory system?

Four traditional procedures plus a special procedure are used. You may want to review the discussion of all of these in the Physical Examination Module. These procedures are:

1. Inspection (to look at)
2. Palpation (to feel)
3. Percussion (to tap)
4. Auscultation (to listen to)

How are these techniques used in examining the respiratory system?

Inspection: An inspection of a patient's respiratory system would include the following things:

1. General Condition

   normal: The adult or child appears normally active and alert.

   abnormal: The patient may appear tired or weak, cyanotic, or ill in some manner.

2. Respiratory Rate (at rest)

   normal:

Adult or older child	15-20/min.
6 months - 4 years	20-40/min.
Newborn	30-50/min.
Premature	40-90/min.

   abnormal: A rate outside this range, especially higher (tachypnea)

3. Ease of Breathing

   normal: Breathing is easy and quiet without concern. Inspiration is longer than expiration.

   abnormal. Patient requires extra effort to breathe. This is called dyspnoea. Expiration or inspiration (or both) may be prolonged (as in bronchial asthma or croup) or shortened (as in pneumonia). When dyspnoea is very severe the colour of the lips inside the mouth, and the fingernails will turn blue (cyanosis). This is due to a lack of oxygen in the RBCs.

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4. Movement of Chest Wall

normal: Both sides expand and contract equally and together.

abnormal: Movement of one or both sides of the chest is increased or decreased. One side lags behind the other in moving in and out. In children, the spaces between the ribs can be pulled in during inspiration. In infants, especially prematures, the sternum may also be drawn in. Both of these are signs of serious dyspnoea in children.

5. Movement of Nasal Opening (children)

normal: No movement with respiration.

abnormal: Widening (or flaring) on inspiration - nasal flaring. This is another sign of dyspnoea in a child.

Palpation: Palpation of the chest is limited in its usefulness. There are, however, two things which can be examined by palpation.

1. Movement of the Chest Wall

Palpation of the movement of the chest (using the flat of the hand) is helpful in confirming what is seen on inspection.

2. Vocal Fremitus

Vocal fremitus refers to the vibrations caused by talking which can be felt by placing the flat of the hands at various places on the chest. With the hands in place, have the patient say "99" and feel the intensity of vibration. The intensity of fremitus should be consistant with the intensity of breath sounds. (And breath sounds are easier to evaluate.)

normal: Fremitus is moderate and equal in symmetrical areas. Example: left lower chest equal to right lower chest.

abnormal: There is an asymmetrical increase or decrease in fremitus.

Percussion: Percussion of the chest is performed by placing the left hand palm down against the chest wall and tapping the middle and/or index finger with the index and middle finger of the right hand (Figure RH 10). This produces a sound in the chest cavity that can be heard by the examiner.

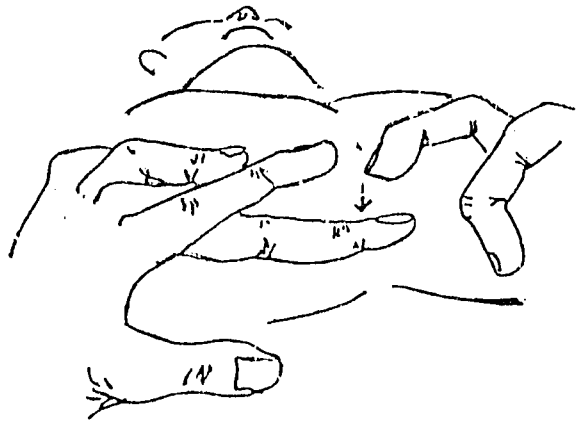

Figure RH 10 - Percussion of the chest.

normal: The normal sound is resonant (vibrating) when performed anywhere over the chest. It normally increases with full inspiration (breathing in) and decreases with full expiration.

abnormal: Dullness to percussion may occur anywhere in the chest. This is a sign of consolidation, which means the normal air spaces are filled with fluid or other solid mass. Increased resonance may also occur. It is heard all over the chest in chronic bronchitis with emphysema.

Auscultation: Auscultation of the chest refers to listening to the various sounds in the chest produced in the process of breathing. It is of great importance and should be practiced and learned well. Auscultation is normally performed with the use of a stethoscope. The bell side of the stethoscope is best of hearing low pitched sounds. The diaphragm side is best for higher pitched sounds. In emergencies, the ear can be placed directly on the chest wall.

normal: Normal breath sounds are best understood by simply listening to your own breath sounds, those of fellow students and many, many patients.
There is a wide range of normal breath sounds, varying with the age, size, general physical shape, etc. of the patient. Care must be taken not to confuse sounds from the movement of the stethoscope on the skin or hair with abnormal sounds from the chest.

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abnormal: Auscultation of the chest may result in any combination of the following findings:

1. Decreased breath sounds are normal in quality but decreased in intensity, due to fluid or some other mass in the plural cavity or due to a collapsed lung.

2. Bronchial breathing (or increased breath sounds) refers to the increased intensity of breath sounds due to the consolidation of lung tissue which causes an increase in the transmission of sound.

3. Wheezing refers to the "musical" sounds produced by the narrowing of the small airways. It is heard without a stethoscope.

4. Rales refer to the fine crackling sound caused by mucous or fluid in the alveoli. This sound can be closely imitated by rubbing hair together. Rales are an important sign of pneumonia and congestive heart failure.

5. Rhonchi refers to the coarser sound produced by an increase in mucous in the bronchi and bronchioles.

6. Stridor is a harsh sound heard even without a stethoscope. It is caused by a marked narrowing of the upper airway - trachea, larynx and/or epiglotis. This is the characteristic sound of croup.

REVIEW QUESTIONS

1. List the anatomical structures included in the respiratory system:

2. The respiratory tract is lined with mucous membranes which perform three (3) specific functions. Name the functions.

   1)

   2)

   3)

3. What function does the alveoli play in respiration?

4. Explain the mechanics of breathing.

5. Define the following terms:

   a. bronchioles:

   b. alveoli:

   c. capilliaries:

   d. R.B.C.:

   e. pleura:

   f. pleural space:

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6. Using the following outline, describe the normal and abnormal conditions of patients as you might find them in doing an examination of the respiratory system.

	Normal	Abnormal
I. Inspection		
1. General condition:		
2. Respiratory rate:		
3. Ease of breathing:		
4. Movement of chest wall:		
5. Movement of nasal opening:		
II. Palpation		
1. Movement of chest wall:		
2. Vocal fremitus:		
III. Percussion:		

7. Match the following descriptions of abnormal findings on auscultation.

____Decreased breath sounds	1. "Musical" sounds produced by the narrowing of the small airways. It is heard without a stethoscope.
____Bronchial breathing	2. The coarser sound produced by an increase in mucous in the bronchi and bronchioles.
____Wheezing	3. (Or <u>increased</u> breath sounds) increased intensity of breath sounds due to the consolidation of lung tissue which causes an increase in the transmission of sound.
____Rhonchi	4. Breaths sounds normal in quality but decreased in intensity, due to fluid or some other mass in the <u>plural</u> cavity or due to a collapsed lung.
____Stridor	5. Fine crackling sound caused by mucous or fluid in the alveoli. This sound can be closely imitated by rubbing hair together. This is an important sign of pneumonia and congestive heart failure.
	6. Harsh sound heard even without a stethoscope, caused by a marked narrowing of the upper airway - trachea, larynx and/or epiglotis. The characteristic sound of <u>croup</u>.

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STUDENT GUIDE

RESPIRATORY DISEASES

I. Entry Level Skills and Knowledge

Before starting this unit, you should be able to:

1. Explain the normal anatomy and physiology of the respiratory system.
2. Perform physical examination of the respiratory system and identify abnormal signs.

II. Objectives

Using the information and experiences provided by the instructor and the module text, you will be able to:

1. Identify the physical signs associated with each of the following diseases:
   - -Common Cold
   - -Influenza
   - -Pneumonia
   - -Acute Bronchitis
   - -Acute Bronchitis and Emphysema
   - -Pleural fluid
   - -Bronchial asthma
   - -Tuberculosis
2. Demonstrate physical exam procedures in the diagnosis of the above mentioned diseases.
3. Describe the general characteristics and course of the diseases.
4. Describe the management procedures of the disease.
5. Use protocols as a guide to diagnose respiratory diseases.

III. Evaluation

Upon completion of the module, you will be assessed on:

1. Knowledge: Written test based upon content of unit in module text. Acceptable performance, 80%.
2. Skill: Use of protocol to identify problems of respiratory system.

IV. Activities you will be participating in to complete the above objectives.

1. Students read module text on respiratory diseases and answer review questions.
2. Instructor makes visual presentation to clarify and reinforce module text.
3. Instructor conducts discussion session for reinforcement.
4. Clinical Practice. Students are assigned to a clinic to practice their skill in using protocols to diagnose and treat common problems of the respiratory system. Students keep record of their experiences. Instructor or assistants evaluate student performance using Diagnostic Skill Checklist.

COMMON COLD AND INFLUENZA

(Upper Respiratory Infections)

General Considerations:

Both the Common Cold and Influenza are primarily upper respiratory tract infections and both are caused by viruses. Anyone can get the Common Cold or the Flu. However, childre, old people and sick people are more prone to catching them. They also tend to occur in Epidemics and Influenza in particular can cause deaths in the aged and in very sick people.

The spread is by droplet infection.

Clinical Picture - Common Cold

Symptoms -

There is fever, running nose, running eyes, sore throat and malaise.

Signs -

The temperature is 38°-39°.
The pharynx is red and inflamed and tonsils are red and swollen.
The cough is non-productive initially but with subsequent bacterial infection, the cough will become productive and the sputum is yellow-green.

Clinical Picture - Influenza

It presents very much like the Common Cold except for a few features e.g. the patient with Flu looks sick, tends to be more febrile and has severe muscle pains (Myalgia).

Complications

The Common Cold can develop into Bronchitis or in children - Croup. It could also lead to the development of a Pneumonia or Otitis Media (due to oedema around the Eustachian tube and subsequent obstruction - stasis and infection of the middle ear).
Sinusitis can also occur.
The danger of pneumonia is greater in old people and those who have recurrent lung problems like Chronic Bronchitis.

Management

DRUGS: Aspirin

0- 1 years	1/4	tab (60 mg)
2- 4 years	½	tab (150 mg)
5-11 years	1	tab (300 mg)
12- Adult	1-2	tabs (300-600 mg)

PATIENTS ADVICE:

- Rest
- Drink lots of fluid
- Eat lots of citrus fruits

Prevention

Get enough sleep and eat well.
Eat lots of citrus and other fruits that contain Vitamin C.

REVIEW QUESTIONS

1. What type of organism usually causes the Common Cold?

2. What are four (4) common symptoms of the Common Cold?

   1)

   2)

   3)

   4)

3. Are antibiotics necessary in the treatment of a Common Cold?

4. List the common signs of Influenza.

   1)

   2)

   3)

   4)

PNEUMONIA

General Considerations

Pneumonia is an inflammation of the lungs, usually due to an infection by a bacteria or a virus. It may occur alone or as a complication of another disease, such as measles. It is spread by exposure to droplets containing the bacteria or viruses that are coughed out by a person with the infection.

Pneumonia

It is more common and usually more severe in younger children.

Tuberculosis and whooping cough (pertussis) are two particular types of pneumonia which are discussed separately.

Clinical Picture

Pneumonia is usually a severe illness, especially in infants and young children. The onset is usually sudden, often following an upper respiratory infection (URI), or measles.

The most important physical signs associated with pneumonia are:

1. Increased respiratory rate (tachypnea).
2. Dyspnoea (associated with flaring nostrils and intercostal retractions in young children).
3. Cough.
4. Fever.
5. Pleuritic pain (pain during breathing or coughing).
6. Râles.

In the more severe cases where consolidation of a portion of the lung has occurred, two other important signs will be present:

7. Dullness to percussion over area(s) of consolidation.
8. Bronchial (increased) breathing sounds over area(s) of consolidation.

In mild cases, the onset is usually slow coming on over several days. All the symptoms and signs are usually less severe and the patient's improvement more rapid. In more severe cases where consolidation of a portion of the lung occurs, the patient will appear very ill after a sudden onset. All the symptoms and signs will be more severe. Dullness to percussion and bronchial breathing sounds will be heard over the area of consolidation.

In most cases, improvement is seen within one to two days after starting treatment. Complete healing usually takes from one to two weeks, depending upon the severity.

Management

Since pneumonia is a life-threatening disease, be certain you can observe the patient during the first 24 hours either at his home or at the centre. During that time, IM antibiotics will be given. After improvement, oral medication can be given. If no improvement in 24 to 48 hours, the patient should be referred to a hospital.

1. Antibiotics

   Procaine PCN IM once every 24 hours
   - 0- 1 year 300,000 u (1 cc)
   - 2- 4 years 600,000 u (2 cc)
   - 5-10 years 900,000 u (3 cc)
   - 11- Adult 1,200,000 u (4 cc)

   Followed by:

   Penicillin V four times a day for seven days:
   - 0- 2 years ½ tab (125 mg)
   - 3- 4 years 1 tab (250 mg)
   - 5- Adult 2 tabs (500 mg)

2. Expectorant Cough Mixture

   Children - 5 ml (1 tsp.) four times a day.

   Adults - 10 ml (2 tsp.) four times a day.

3. Lots of liquids. Salt-sugar solution is recommended but plain water or other fluids are satisfactory.

4. Good balanced diet. Continue breast feeding for infants and young children.

5. If the patient is not improving within two days after starting treatment, refer to hospital or medical centre.

REVIEW QUESTIONS

Pneumonia

1. Pneumonia is an inflammation of the _____ due to a bacterial or viral infection.

True (T) or False (F)

2. ____Pneumonia is more common and usually more severe in older people.

3. ____Pneumonia is not contagious.

4. ____The onset of pneumonia is usually sudden often following an upper respiratory infection.

5. ____In most cases, improvement is seen within one or two days after starting treatment.

6. ____Pneumonia may occur alone or as a complication of other diseases such as measles.

7. List four (4) important physical signs associated with pneumonia.

   1)

   2)

   3)

   4)

8. A mother brings her one year old child to the clinic with signs you diagnose as pneumonia. What would you administer and advise the mother to provide for the child in managing this case?

ACUTE BRONCHITTIS

General Considerations

Inflammation of the bronchi is either due to infection or irritation. It is often seen as a complication of a cold (URI) or other lung condition. Repeated infections, smoking or contact with smoke-filled house or factory may cause permanent damage to the bronchiole.

Clinical Picture

Acute bronchitis is associated with fever and cough. The cough is productive; that is, sputum that is thick and yellow or greenish in colour is produced with coughing. On examination wheezing and rhonchi may be heard.

Complication

Repeated episodes for acute bronchitis will cause permanent damage to the bronchioles which leads to chronic bronchitis and emphysema.

Management

1. Increase fluid intake

2. Bed rest

3. Avoid smoking, smoke filled or dusty areas.

4. Expectorant Cough Mixture

   Children- 5 ml (1 tsp.) four times a day

   Adults - 10 ml (2 tsp.) four times a day

4. Ampicillin four times a day for seven days.

0 - 5 years	5 ml	(125 mg)
6 -11 years	1 cap	(250 mg)
12 to adult	2 caps	(500 mg)

Prevention of Complications

1. Stop smoking and avoid smoke-filled environments.

2. Promote the use of smokeless stoves.

REVIEW QUESTIONS

1. Acute bronchitis is an inflammation of the bronchi due to infection or irritation. The usual signs of infection are present along with lung associated signs. They are:

2. Repeated episodes of acute bronchitis can cause permanent damage to lung tissue leading to which diseases:

   a) chronic bronchitis
   b) asthma
   c) emphysema
   d) pneumonia

3. You are managing a 5-year old child with acute bronchitis.

   a) What is your treatment?

   b) What instructions do you give the mother about home care?

CHRONIC BRONCHITIS AND EMPHYSEMA

General Considerations

Chronic bronchitis is a disease which usually affects adults who are heavy smokers. Frequent contact with a smoke-filled environment, e.g. smoke-filled house etc., may also play a part in the progression of this disease.

Clinical Picture

Most patients with chronic bronchitis have a cough with a mild amount of sputum, especially in the mornings, the year round. Periodically, the patient develops an infection and these symptoms become much worse and are accompanied by dyspnoea, wheezing and/or rhonchi. These patients gradually become worse over a period of years.

Eventually, the patient will develop emphysema, a severe chronic illness due to the destruction of lung tissue. Emphysema is diagnosed by:

1) mild to severe chronic dyspnoea (may be cyanotic)
2) enlargement of the chest cavity
3) decreased movement of the chest cavity with respiration
4) decreased vocal fremitus
5) increased resonance on percussion
6) decreased breath sounds

During periods of infection the sputum increases and changes colour to yellow or green. Difficulty in breathing also increases. During these times, treatment should be given.

Management

1. Ampicillin four times a day for one week:
   12 to adult - 2 caps (500 mg)

2. Increase fluids
3. Rest
4. Stop smoking. Avoid smoke filled and dusty rooms.

Prevention

1. Stop or at least reduce smoking and/or avoid smoke-filled environments.

2. Early antibiotic treatment when the sputum changes prevents progression of the disease.

REVIEW QUESTIONS

1. Describe the symptoms of chronic bronchitis.

2. A patient with chronic bronchitis will usually eventually develop emphysema. What is emphysema?

3. Name four (4) symptoms which assist in the diagnosis of emphysema.

   1)

   2)

   3)

   4)

4. Management of the infectious periods of chronic bronchitis and emphysema involves:

   1)

   2)

   3)

5. Explain two preventive measures which are helpful in managing people who have emphysema.

PLEURAL FLUID

General Considerations

Pleural fluid refers to the collection of fluid in the chest between the lungs and the chest wall. This collection of fluid can result from several diseases affecting either the lungs or the heart. The two most common causes of pleural fluid are tuberculosis and congestive heart failure.

Clinical Picture

The symptoms and signs directly related to the presence of pleural fluid include:

1. dyspnoea (shortness of breath)
2. reduced breath sounds
3. marked dullness to percussion
4. reduced movement of chest

Other symptoms and signs related to the underlying disease will also be present.

If not treated, the patient may develop so much fluid that he will be unable to breathe adequately, and will die.

Management

The underlying disease must be treated so the patient should be referred to a physician.

REVIEW QUESTIONS

1. What does the condition "Pleural fluid" refer to?

2. The two most common causes of pleural fluid are

   _____ ___ and _____ .

3. What are the four (4) criteria for diagnosing pleural fluid?

   1)

   2)

   3)

   4)

4. What is your responsibility in the management of a patient with pleural fluid?

BRONCHIAL ASTHMA

General Considerations

Bronchial thma is a chronic allergic disease affecting the lungs and lower airway. It is characterized by repeated attacks of dyspnoea, wheezing and cough.

Bronchial asthma is caused by an allergic reaction. Individual patients are allergic to different things such as dust, hair, pollens, wool, infections and sometimes food.

Bronchial asthma tends to occur more frequently in children. It is most common in families with a history of bronchial asthma or other allergic conditions.

Clinical Picture

Attacks of bronchial asthma usually present with wheezing, cough and/or dyspnoea. The patient gives a history of repeated attacks. Examination reveals wheezing and prolonged expiration. Other features may include history of eczema, thickened sputum.

The underlying reasons for these attacks of asthma are:

1. oedema of the lining of the small airways (bronchi and bronchioles),

2. increased secretion of a thickened mucous into the small airways,

3. contractions of the muscle wall of the small airways.

All of these result in a smaller airway and reduce the flow of air.

The course of an attack is variable. Most attacks last for a few hours and then disappear. Other attacks become progressively worse and may last for days (status asthmaticus).

Most children with asthma have repeated attacks until the age of puberty. At that time, the condition improves considerable and may disappear completely. The attacks may persist into adulthood. Most adult attacks occur at the time of respiratory infections.

Management

Basic treatment at first sign of wheezing:

1. Instruct the patient to drink large amounts of water. Water helps loosen secretions.

2. Water vapor inhalation. The patient can breathe steam from water boiling in a bowl using a cloth over his head to concentrate the steam. This is to be done at home at the first sign of an attack. This helps loosen secretions.

3. Aminophylline

3 - 11 years	1 tab (100 mg) four times a day
12 to adult	1½ tabs (150 -200 mg) four times a day.

During acute attacks:

1. Reassurance.

2. Epinephrine 1:1000 subcutaneously every 20 to 30 minutes until attack has been cleared (limit two (2) injections). This helps to relax the muscle walls:

1 - 2 years	0.1 to 0.2 ml
3 -12 years	0.2 ml
12 to adult	0.5 ml

3. Drink large amounts of water.

4. Start oral aminophylline during attack:

3 - 11 years	1 tab (100 mg) four times a day
12 to adult	1½ to 2 tabs. (150 - 200 mg) four times a day.

5. Patients who do not respond to epinephrine should be referred to the hospital.

Between attacks:

1. Environmental control. The patient should sleep in a dust-free environment. Patients should avoid contact with anything that seems to cause attacks such as cats, dogs, dust, and smoke.

2. Drink lots of water or other fluids.

3. Aminophylline. This can be taken by mouth at home at the first sign of an attack. Dosages as above.

4. Water vapor inhalation. The patient can breathe steam from boiling water in a bowl using a cloth over the head. This is to be done at home at the first sign of an attack. This helps loosen secretions.

REVIEW QUESTIONS

1. Bronchial asthma affects what two parts of the respiratory system?

   a.

   b.

2. Bronchial asthma is caused by an allergic reaction. Give four examples of substances which can cause asthma attacks.

   1)

   2)

   3)

   4)

3. In the list below, check those items which apply to bronchial asthma.

   ____ infection
   ____ familial
   ____ contagious
   ____ affects children
   ____ history of eczema

4. Give three underlying reasons for asthmatic attacks reulting in smaller airways and reduced flow of air.

   1)

   2)

   3)

5. A mother brings her five-year old child to the clinic. The child is having first signs of wheezing. What three immediate things would you do in the clinic to treat the child?

   1)

   2)

   3)

6. Explain the effect of environmental control on asthma patients.

7. The drug of choice in treating asthma is epinephrine. What is the action of this drug?

STUDENT GUIDE

TUBERCULOSIS

I. Entry Level Knowledge and Skills

Before starting this unit, you should be able to:

1. Describe the anatomy and physiology of the respiratory system.
2. Explain the infection process by droplet spread.
3. Elicit a patient history including productivity of cough, patterns of fever and sweating, loss of weight, loss of appetite.

II. Objectives

Using the information and experiences provided by the instructor and module text, you will be able to:

1. Describe the transmission of tuberculosis.
2. Diagnose and manage tuberculosis of the lung.
3. Demonstrate collection of an adequate sputum specimen for examination.
4. Recognize the symptoms of tuberculosis in organs other than the lungs.
5. Explain the actions, side effects and doses of anti-tuberculosis drugs including: INH, TBl, Streptomycin, Ethambutal, Ethionamide, Pyrazinamide, PAS, Rifampicin.
6. Explain two-phased treatment of tuberculosis and the reasons it is used.
7. Discuss the value of BCG vaccination.
8. Demonstrate proper procedures for giving BCG vaccination.
9. Describe prevention procedures for tuberculosis.
10. Demonstrate proper reporting of tuberculosis.

III. Evaluation

Module Phase: Upon completion of the module you will be assessed on:

1. Knowledge: Written test based on contents of module text. Acceptable performance 80%.
2. Skills:
   a. Your ability to elicit a history of tuberculosis symptoms.
   b. Your ability to make physical examination discriminations for tuberculosis.
   c. Your ability to collect an adequate sputum examination.
   d. Your ability to describe tuberculosis.
   e. Your ability to properly report a tuberculosis case.

Rotation Phase: Upon completion of rotation phase, you will be assessed on:

1. Your ability to diagnose and manage tuberculosis of the lung.
2. Your ability to give BCG vaccination.
3. Your ability to describe tuberculosis prevention.

IV. Activities you will use to accomplish the objectives:

1. Students read module text on tuberculosis and answer review questions.
2. Instructor conducts a discussion of the diagnosis, management and prevention of tuberculosis.
3. Student exercise on tuberculosis.
4. Clinical practice for students on history taking, physical examination and sputum collection on tuberculosis patient.

TUBERCULOSIS

General Considerations

Some knowledge of tuberculosis and how it is caused will help in understanding the steps you will need to take to diagnose, cure, and prevent its spread. A knowledge of how it affects the human body will help in understanding how tuberculosis makes people sick. This will also explain why it is so important to discover every patient and start treatment at the earliest possible stage of the disease.

Everybody must know that every year in Lesotho tuberculosis causes a great amount of illness and loss of earnings, and many deaths. In order to reduce this suffering and loss, the National Tuberculosis Programme has been established. The aims of the programme are to protect people from tuberculosis and to find, treat and cure those who do get the disease.

Cause of Tuberculosis

Tuberculosis is an infectious disease. It is caused by infection with a germ. The germ is called Mycobacterium tuberculosis or "the tubercule bacillus." There are several other related Mycobacteria. The bovine type affects cattle and can cause disease in humans through infected milk or meat. So far as is known the cattle in Lesotho are free from tuberculosis and therefore cannot infect humans.

Spread of Disease to Other People

Patients who have disease of the lungs are the commonest source. Such patients usually have cough and sputum. The sputum coughed up can contain millions of germs, and coughing even without obvious sputum, can spray drops of moisture from the mouth. These droplets, too small to be seen, may contain germs, and if another person breathes them in, he can get tuberculosis infection and disease.

Once the droplets leave the air and fall to a surface such as a table or the floor it is very difficult for them to again become airborne in the size required to infect a person. The germs can be readily killed either while in the air or after falling to a surface by direct sunlight. By circulating fresh air through a house the germs can be diluted and blown away. Since stomach acid kills the tuberculosis germ, those taken into the body with food are unlikely to infect the person except in the case of very large numbers of the germs which may rarely cause infection in the mouth or throat.

Clinical Picture

The first infection nearly always occurs in the lungs. While it usually gets into the blood stream the infection is usually confined to the lungs where the body walls it off and builds a calcification around it. But, if a person is weak or undernourished or has another disease, or if he has caught infection by a very large dose of germs, then the disease instead of healing up may spread throughout the blood stream. In this way the germs can affect the meninges causing meningitis. They can also affect bones and joints, the kidneys and genital organs, or the spinal column or the lymphatic nodes.

Wherever the disease occurs it causes destruction of tissue. This destroyed material forms an abscess. If in the lungs, this lesion may rupture into a bronchus. The material is then coughed up, leaving a cavity in the lungs and providing the germs for spread through droplets to others. Similarly, abscesses of lymph nodes, especially in the neck, may form and rupture and abscesses and cavities can develop in the kidneys and elsewhere.

The longer the disease remains untreated the greater the destruction of tissue. This tissue can never be replaced and the patient is left with permanent damage and loss of function in the affected organ.

TUBERCULOSIS AFFECTS THE LUNGS FAR OFTENER THAN ANY OTHER ORGAN.

Symptoms of Tuberculosis of the Lungs

Most patients with tuberculosis of the lungs feel something is wrong with them. Generally, the more advanced the disease, the more severe the symptoms. Any or all of the following may be present:

a. cough and sputum
b. blood in sputum
c. rise of temperature
d. sweating, shortness of breath, tiredness, weakness
e. loss of appetite and loss of wieght

It is important to note that all of these can occur in other diseases too. If cough and sputum persist for more than two weeks or so, and especially if some of the other symptoms are present also, this is reason enough for the patient to go to the clinic and see the Nurse Clinician or doctor who will decide after examination whether further tests are needed.

Physical Examination of Patient

The physical examination should first focus on the general appearance of the patient. Does the patient appear chronically ill? Is the complexion sallow and dull? Does the patient appear to have lost weight? Does the patient appear weak? Is the patient coughing or having shortness of breath? Does the patient show signs of anaemia?

The lungs should be carefully examined by percussion and auscultation. In cases of a solid disease lesion or consolidation in the lung, percussion will give a dull sound and breath sounds may be increased. In the case of a ruptured hollow disease lesion or cavity, percussion will give a hollow sound. Ronchi or rales may be heard. Since tuberculosis more commonly affects the upper lungs, abnormalities will more commonly be found in the upper lung fields. Rales heard after the patient coughs are often a sign of tuberculosis.

Sputum Examination

The sputum examination is the most important test. It must be done with great care at all stages.

First, the collection of sputum must be done correctly. The patient should be told to cough very strongly and to bring up, if possible, a specimen of sputum from deep down in his chest. If thick sputum can be gotten up, this is most useful. A specimen of saliva from the mouth is rarely worth examining. If the patient is unable to cough up an adequate sputum specimen, try having him breathe in the steam rising from a pot of boiling water for a few minutes to stimulate sputum production. Sputum collected first thing in the morning is often the most useful.

Second, the specimen should be carefully sent to the laboratory in a labelled container using care to avoid direct sunlight, excessive heat or freezing.

Finding tubercule bacilli in the sputum is the only certain way of diagnosing tuberculosis of the lungs. It should be remembered, however, that many people who have early disease may never have the germs found in their sputum. Getting an adequate sputum examination from a child is very difficult and often impossible.

If the sputum is negative, the test must be repeated, on new specimens, at least twice more.

Chest X-Ray

If the sputum is negative, and also sometimes when positive, an X-Ray examination of the chest may be required. This may show disease which is so certainly tuberculosis that treatment is started, even though the sputum examination has not confirmed the diagnosis.

Note: A diagnosis of tuberculosis is a serious matter for the patient and also for his family and other close contacts. These contacts, especially those with symptoms, will all need to be investigated to see if any of them have tuberculosis. In the case of a patient who is having treatment for tuberculosis without confirmation of the diagnosis by a positive sputum, it is generally advisable to reconsider the diagnosis at least every month and try for confirmation by repeat sputum examinations.

Non-Pulmonary Tuberculosis

Diagnosis and treatment of tuberculosis in organs other than the lungs usually requires admission to a hospital. The parts commonly affected are:

a. Lymph nodes, usually of the neck. (Surgery may be required.)
b. Bones and joints, especially hip and knee joints.
c. Spinal column. If neglected, and if the part affected is high up in the thoracic region, this can cause paraplegia by pressing on the spinal cord.
d. Kidneys and bladder.
e. Genital organs, male and female.

Treatment of Tuberculosis

Hospital Treatment is required for about ten or fifteen percent of patients diagnosed with tuberculosis.

1. Some patients have such severe disease when discovered that hospital treatment with skilled nursing care may be necessary to save their lives.
2. Some patients live in such poor conditions and perhaps in such remote places that they also require hospital treatment, at least for a short period of time.

Some doctors feel very strongly that all patients diagnosed with tuberculosis should be treated for a period in the hospital. They regard this period as of value in permitting education of the patient in the need to take treatment regularly as prescribed. It also gives opportunity for education in ways of preventing infection in others. If this education can be done through your clinic while the patient is at home, so much the better, and there will be no need for hospitalization.

Drug Treatment of Tuberculosis includes a number of drugs which can either kill the tubercule bacillus or at least prevent it from growing and causing disease in the human body. At present there are about a dozen drugs available which are used as anti-tuberculosis drugs.

None of these drugs is perfect. Some are more powerful than others and all have a danger of causing some toxic side-effects.

The most powerful drugs are those which are bactericidal. This means they are capable of killing the tubercule bacilli. The bacilli are at their most vulnerable to these drugs when the disease is most active and the bacilli are rapidly multiplying. Therefore, at the start of treatment (Phase I - see below) it is usual to give the patient at least two of the bactericidal drugs, one of them usually being isoniazid (INH), with at least one other drug.

The less powerful drugs, which are capable of preventing the bacilli from growing but do not kill them are called the bacteriostatic drugs.

During Phase II, the continuation phase, when most of the bacilli have been killed, less medication is required to help the body conquer the disease, but at least two drugs must still be used at all times to prevent the development of resistance - and one of these is usually INH.

The drugs vary greatly in cost. Some are too expensive to use except in patients who develop resistance to other drugs or are unable to tolerate the side effects.

Resistant Tubercule Bacilli

Incorrect use of any of these drugs can result in the patient having organisms which are resistant to the incorrectly used drug or to several drugs, which are then no longer of use.

To prevent the occurrence of resistant bacilli it is practically always necessary to use two or more anti-tuberculosis drugs at the same time in treatment, so that if some of a patient's germs are resistant to one drug at the start of treatment or develop resistance during treatment, one or more of the other drugs being given will attack these germs. In order to ensure that at least two drugs will be taken, two are often combined in one tablet so that they cannot be seperated.

Toxic Effects of Anti-tuberculosis Drugs

Allergic Reactions may occur to any of the drugs. Generally it is after the patient has been having the drug for some weeks that they appear. They usually consist of skin rashes of various kinds together with fever. The rashes vary greatly in severity and are not of specific types for particular drugs. They usually, but not always subside quickly when the drug is stopped.

Toxic Effects specific for each drug may occur. They may affect various organs and may or may not subside when the drug is stopped.

The Three Drugs prescribed for use in the NTP have been proved to be able to give very good results if correctly used and if the patient takes them correctly as instructed. They are safer and easier to take than many of the other drugs and also much cheaper. They are Isoniazed (INH), Thiacetazone (TB1) and Streptomycin.

Isoniazid

This is the most valuable of all the anti-tuberculosis drugs yet discovered. It is powerfully bactericidal, simple to take by mouth, safer than most other drugs, and very cheap.

The dose is generally 300 mgm daily. In children and very small adults the dose should be reduced by 10 mgm/Kgm/24 hours. It is best given in one dose a day with a meal. Larger doses are occasionally prescribed by a physician.

Toxic Effects are relatively rare but do occur. A burning sensation in the limbs due to peripheral neuropathy may occur, especially in undernourished patients. It can be prevented or cured by giving pyridoxine (Vitamin B 6) 60 mgm/24 hours. It does not require stopping the drug.

The most serious toxic effect, hepatitis, is extremely rare and occurs almost exclusively in patients older than 35 years age. Prolonged nausea and vomiting and especially jaundice demand that the drug be stopped at once.

Allergic reactions may occur and require stopping the drug, perhaps only temporarily.

Various central nervous and behavioural disturbances have been described but are rare.

Thiacetazone (TBl)

This drug is bacteriostatic only. It serves as a valuable companion drug to INH, preventing the growth of any bacilli which may be resistant to INH. The two drugs are usually combined in one tablet: 300 mgm of INH and 150 mgm of TBl. An alternative tablet, containing 100 mgm INH and 50 mgm TBl may be given in smaller patients or in divided doses if the patient is unable to tolerate the single daily dose.

Toxic Effects of TBl are difficult to separate from those of INH since they are usually given together. Any allergic reaction such as flushing or itching of the skin might equally be due to either drug.

More serious toxic effects, fortunately rare, are blood disorders, liver-toxicity and severe skin conditions. Again, jaundice or a suspicion of it will call for stopping both drugs. The same applies to any sign of rashes or of central nervous system disturbances.

Streptomycin

This is a bactericidal drug which is very valuable in the early stages of treatment especially. It is destroyed in the stomach and must be given by intramuscular injection. The injection should be given deeply into the muscle mass in the upper outer quadrant of the buttock.

The usual dose is 1 gram per day in one dose. In children the dose is 20 mgm/kgm/24 hours. For those over 50 years of age, the dose is reduced to 0.75 gram/day. Small adults should be given the same dosage as for children, 20 mgm/kgm/24 hours. As with other antituberculosis drugs, a single daily dose is the preferable schedule

Toxic Effects specific for streptomycin are on the 8th cranial nerve, both the vestibular and the auditory divisions. This is likely to occur if too big a dose is given, but can occur at usual doses. Since Streptomycin in excreted through the kidneys, if kidney function is impaired, a high level may build up in the blood and increase the risk of toxicity. Vestibular disturbances show themselves by dizziness and unsteadiness in walking. Buzzing in the ears usually occurs first, and it should be a warning to stop the drug or reduce the dose. Testing can be done by observing the patient's ability to do a heel-to-toe walk and to walk with rapid turn-abouts. Deafness due to effect on the auditory division of the 8th nerve may be permanent, but is rare unless as a result of negligence - for example giving too high a dose, especially to an elderly patient whose hearing is already impaired.

Allergic rashes with fever are relatively common with streptomycin and require stopping the drug, at least temporarily. Desensitization is often successful. Nurses and others who handle streptomycin occasionally develop hypersensitivity of the skin - tingling of hands and mouth especially - and this may be very difficult to cure. People giving streptomycin injections should try to prevent it coming in contact with their skin.

National Tuberculosis Programme Usual Scheme of Treatment

I. Phase I of Treatment

These three drugs, INH, TBl, and streptomycin should be given daily for a minimum of two months, after which the sputum in most patients can be expected to be negative. The period may have to be extended if the sputum is still positive, or if the disease is unusually severe and extensive.

II. Phase II of Treatment

Streptomycin is now stopped and treatment is continued with INH and TBl. The usual dose is one table daily containing INH 300 mgm and TBl 150 mgm. This phase is continued to a total of twelve months and may be extended if necessary.

Note: It is of the greatest importance to ensure that every patient takes the treatment every day for as long as prescribed. If the patient changes his place of living or for some other reason changes to a different clinic,

a. he should be given a supply of tablets to keep taking until he attends the new clinic;
b. the change should be entered on the "Case Holding Record" which is sent to your parent hospital and by them to the National Tuberculosis Programme;
c. every effort should be made to ensure that the patient understands the need to take the drugs as prescribed;
d. the patient should be warned to report any of the signs of toxic effects of any drugs being taken.

Other Drugs Which May be Used

Ethambutol

(Manufacturer's name Myambutol) This is one of the bacteriostatic anti-tuberculosis drugs. It is highly valuable because of its safety if correct doses are used. Its chief use is as a companion drug to prevent emergence of resistant strains of tubercule bacilli. It is less powerful than INH or streptomycin, but probably more powerful than TBl. It is an expensive drug.

The usual dose is 15 mgm/kgm/24 hours. Greater doses increase the risk of toxic effects.

Toxic Effects of ethambutal are on the optic nerve, causing impaired vision (acuity and colour preception.) If too large a dose is given for too long this can cause blindness. Since, like streptomycin, it is excreted through the kidneys, it must be used very carefully, if at all in patients with impaired kidney function.

All patients having ethambutol should be warned to report any trouble with vision such as difficulty in reading or sewing and any unusual difficulty in distinguishing colours.

Ethionamide

(Manufacturer's name Treseatyl.) This is a powerful anti-tuberculosis drug with a bactericidal effect. Its value is limited by its extremely bad taste and the stomach irritation in causes which many people cannot tolerate.

The usual dose is 500 mgm to 1 gram daily and is best taken divided into three doses and taken with meals. As with other bad-tasting drugs, encouragement can often help the patient to continue taking ethionamide.

Toxic Effects include allergic rashes which may require stopping the drug. The most serious toxic effect is hepatitis, especially in diabetics. Prolonged nausea and vomiting and most especially jaundice require stopping the drug.

Pyrazinamide

This is a bacteriocidal drug effective only against intra-cellular bacilli. It may be of particular value in initial treatment of tuberculosis when combined with streptomycin which is highly effective against extra-cellular organisms. Its major effect probably occurs in the first two months of treatment. Unfortunately it is expensive, which prevents its wide use.

The usual oral dose is 1.5 gram to 2 grams daily in three divided doses.

Toxic Effects are usually relatively minor when it is used for only short periods. With longer treatment the risk of toxicity increases. Allergic rash and fever can occur. Patients taking the drug should not expose the skin to direct sunlight which can cause a marked reddish colour. Rarely gout can develop. Nausea is common. Liver damage can occur, and if jaundice is noticed the drug should be stopped immediately.

Para-amino-Salicylic Acid (PAS)

This bacteriostatic drug is of about the same potency as TB1 or Ethambutal. It needs to be taken in very large doses. It often causes nausea which is enough to make it difficult for many patients.

The usual dose is 200 to 300 mgm/kgm/24 hours up to 12 grams per day, divided into two or three doses before meals.

Toxic Effects can include troublesome allergic rashes. Its main danger is liver damage. If jaundice occurs the drug must be stopped at once.

Rifampicin

This bactericidal drug ranks with INH as the most potent and valuable drug yet discovered. Programmes of treatment containing INH, rifampicin and one other drug are more effective than any others for the early attack phase of treatment. Such programmes are in general use in many countries. For the continuation phase a less expensive drug than rifampicin can be substituted along with INH. The use of rifampicin can permit very important advantages such as shorter length of treatment. It is expensive, however.

The usual dose is 15 to 20 mgm/kgm/24 hours in one dose. The maximum dose is usually 600 mgm/24 hours.

Toxic Effects such as allergic reactions occur occasionally. Liver damage is rare but can occur and may be serious if not noticed early. Prolonged nausea and vomiting progressing to jaundice demand stopping of the drug at once. Thrombocytopenia with purpura or haemorrhage occurs rarely and also demands immediate stoppage of the drug. Rifampicin can be given intermittently, for example twice or three times a week, but toxic effects may be more common than when it is given daily. Toxic effects are in fact rare requiring a change of drug in less than five percent of patients treated with rifampicin daily and when they are correctly managed almost invariable complete recovery occurs.

Note: Oral contraceptives are less effective in patients taking rifampicin. Another contraceptive method should be employed. Rifampicin should not be given to pregnant women.

General Management of the Patient

After the start of effective treatment, the toxic symptoms of tuberculosis such as cough, fever, weakness, loss of appetite generally subside quickly unless the disease is far advanced. When these symptoms have subsided the patient should be encouraged to live his or her normal life including return to work. Men employed in the mines should not return to underground work while still under treatment, if ever.

Cough medicine is usually not used because the cough is needed to clear the breathing passages. Multivitamins may be useful as may iron tablets if the patient is anaemic. Very few people can be relied upon to take all of their drugs for the long period required by tuberculosis treatment. All patients should be regularly reminded of how necessary it is to do so.

Patients having INH/TB1 should be warned to stop the drugs if they get rashes, or nausea and vomiting, and especially if they notice jaundice. If the drugs are stopped they should go to the clinic as soon as possible.

Note: The Nurse Clinician or the Public Health Nurse should use the VHW, or if the village does not yet have a VHW, get the assistance of a friend or neighbour of the patient to help and encourage the patient. They should:

a. Ensure that treatment is taken;
b. Watch for toxic effects of drugs;
c. Ensure that contacts are examined;
d. Ensure that care is taken in sputum disposal and disinfection of house of the patient.

Children with Tuberculosis Infection

Since tuberculin testing to determine the presence of tuberculosis infection even before disease begins is not yet generally available in Lesotho, it is sometimes necessary to assume that infection has taken place. It can be assumed, for example, in the case of the infant of a mother with sputum-positive untreated tuberculosis. Such an assumed infection should be treated by INH and TB1.

The infant of a mother who is under treatment when the baby is born may be given INH alone for six months as a prophylactic or preventive measure against infection. Breast feeding should be continued and at six months BCG vaccination may be given.

Prevention of Tuberculosis

BCG Vaccination

BCG is a weakened form of tubercule bacillus. It is capable of causing a weak infection that does no harm. It may produce a degree of resistance to infection with ordinary tubercule bacilli which cause tuberculosis disease. The protection given by BCG vaccination may last about seven to ten years.

The vaccine is given by injection of 0.1 ml of the made-up preparation into the patient's upper arm. The injection must be made into the skin (intradermally). It raises a small swelling of about seven mm in the skin. For infants, half the dose is given.

The Reaction begins as a small red swelling that appears after two to three weeks at the site of injection and slowly increases in size to about ten mm in diameter. It is tender; the swelling is a tiny abscess which bursts and heals up leaving a scar. The healing should be completed in three months.

Accelerated reaction sometimes occurs with a quicker appearance of the abscess, a larger abscess and a final scar that may be up to fifteen mm diameter.

Possible Complications of BCG Vaccination include:

a. Abscess formation may sometimes be larger than usual. Such abscesses need to be opened and drained;
b. Large ulcers may need dressings for some months;
c. Lymph node enlargement in the axilla may occur, especially in babies given an unnecessarily large dose. Very persistent complications may require treatment with anti-tuberculosis drugs. Such persistent ulcers suggest the possibility that the vaccinated person may have previously been infected with tuberculosis. This possibility should be investigated.

Value of BCG is somewhat controversial. Reports from different countries at different times have shown widely different degrees of protection by BCG.

Booster Doses may be required. Since the protective effect of BCG vaccination probably does not last longer than seven to ten years it is advisable to anticipate this by a repeat vaccination. This is usually given at age five years for those vaccinated at birth. A further booster dose given at ten years age would prolong the protection further.

Prevention of Spread

1. Care of Sputum
   A patient, when coughing, should always avoi coughing towards anyone else's face. He should cover his mouth with a paper handkerchief which can be safely burned. All sputum should preferable be spat into such a handkerchief and burned. If no paper handkerchief is available, the cough should be shielded with a hand and directed downward.

2. Treatment
The best means of preventing a patient from spreading tuberculosis to others is to treat and cure his disease. Soon after treatment starts, if it is correctly taken, the risk of spread is much less.

3. Contact Examination
When a person is discovered to have tuberculosis, it must be remembered that everyone who has been in close contact with him has been exposed to infection. All close contacts, especially those who have symptoms such as cough or sputum should be persuaded to come for examination. USE YOUR VHW TO ENCOURAGE THESE PEOPLE TO COME TO THE CLINIC FOR EXAMINATION.

Need for Information

In order to know the size of the tuberculosis problem, to make provision for its control, and to be certain patients receive treatment even if they move from one area to another, certain information is necessary.

a. Code numbers. Every hospital and every clinic has a code number which never changes.
b. Index number. (six digits) Each year each hospital is notified by NTP of the index numbers which are allocated to it. The hospital then uses a number for each new patient it diagnoses or that is diagnosed through its clinics.
c. District registration number. This consists of the hospital's code number with a number added to it for each new patient notified in the particular year. (3 digits for code. 2 digits for year. 3 digits for patient - 001 onwards.)

Forms

1. Case Finding List (NTP 5)

This form should be sent, with specimens of sputum, from the clinic at which the patient is first seen, to the laboratory. At the laboratory (which is the parent hospital) the result of sputum examination will be entered on the form. The patient's Index Number will also be entered. The list is then returned to the originating clinic, where it is kept.

2. Notification and Registration (NTP 3)

Every patient who is found to have tuberculosis must have his name and other particulars entered carefully on the "Notification List." This form is in triplicate. One copy is to be kept at the parent hospital.

When a patient is diagnosed at tuberculosis and treatment has been started or prescribed, the patient's particulars are entered on this form. These should include the Index number, the District Registration and the clinic code number.

Note: Although the notification list at present does not contain spaces for information such as:
a. Whether the sputum is positive or not;
b. What organ is affected, if non-pulmonary;
c. The patient's occupation, particularly if a history of mining;
this information should be included. This could be done on a separate sheet if necessary.

At the end of each month this form should be forwarded to your parent hospital. They will forward it to the National Tuberculosis Programme office in Maseru.

3. Case Holding Record (NTP 6)

This list gives information about the number of patients who are having treatment from a particular clinic, or who have transferred to another clinic, or who have failed to continue treatment, or who have died. This record should also be forwarded to your parent hospital monthly.

4. Drug Issue Report

This reports the drugs given to each patient. It serves as a requisition for further supplies of drugs, and should be forwarded to your parent hospital at the end of each month.

5. Transfer of Patient (NTP 4)

This form notifies the receiving Health Unit of the transfer of a patient from another Health Unit. It should be forwarded as soon as the transfer is discovered together with the following (NTP 1.)

6. Clinic/Treatment Card (NTP 1)

This record is to be kept in the clinic the patient is attending. It records the drugs used for the patient. It should give, under occupation, details of any history of employment in mining.

7. Appointment Card (NTP 2)

This card is kept by the patient. It serves to remind him of when to return to the clinic.

It should have both the Index number and also the District Registration Number.

SUMMARY ABOUT TUBERCULOSIS

Prevention

Public education about tuberculosis and how it is spread.

Public education about the need for those with persistent cough or other symptoms to go to clinic for examination.

Children and infants who are not thriving should be suspected of tuberculosis and advised to have examination.

Contacts of diagnosed cases must be examined.

Diagnosis

History of contact with tuberculosis case, persistent cough, sputum production especially if with blood, chronic fever, weakness or tiredness, loss of appetite or weight.

Physical Examination for chest abnormalities by percussion and auscultation.

Sputum Examination is diagnostic.

Chest X-Ray may be necessary.

Treatment

Begin with INH 300 mgm daily, TB1 150 mgm daily, and Streptomycin 1 gram IM daily for at least two months. (Smaller doses for children or small adults.)

Continue with INH 300 mgm daily and TB1 150 mgm daily for at least a total of twelve months (Smaller doses in children and small adults).

Follow-up

Encourage regular taking of all medication. Use your VHW if at all possible to help.

Watch for toxic effects of drug.

Be sure the patient is getting better.

Complete and forward all forms as directed.

REVIEW QUESTIONS

1. Place a "✓" in front of the descriptions below which correctly refer to TB.

____acute	____rare
____chronic	____mild
____infectious	____severe
____non-infectious	____sudden onset
____common	____slow development

2. Place a "✓" in front of the group(s) at greatest risk for developing TB.

____Children under age 5

____Children age 5 - 14

____Young adults

____Elderly

3. Resistance to TB may be lowered due to conditions other than age. Name four (4) such conditions:

1)

2)

3)

4)

4. How is TB spread from person to person.

a. Exposure to contamination of water supply.
b. Exposure to droplet spread from respiratory tract.
c. Exposure to contaminated eating utensils.
d. Eating contaminated food.

5. Presentation of TB in children may be different than that observed in adults. It may present no pulmonary finding, and instead, appear to be a non-specific chronic illness. On the list below, circle the more common signs and symptoms of TB in children.

a. weight loss	e. chronic fever
b. bloody sputum	f. painless enlarged lymph nodes
c. stiff neck	g. tiredness
d. pneumonia not healing with antibiotic	h. chronic cough

6. Pulmonary TB in adults starts gradually. On this list of the common symptoms, circle the <u>two</u> most common.

a. blood streaked sputum	e. increased pulse rate
b. night sweats	f. lack of appetite
c. fever	g. cough
d. chest pain	h. tiredness

7. Give two reasons for weight loss in TB patients.

   1)

   2)

Place a "T" or an "F" in front of each of the following statements to indicate whether they are TRUE or FALSE.

____8. All patients with TB without treatment will gradually worsen and progress to death.

____9. Hospital treatment is required for all patients diagnosed with TB.

___10. Any child with a chronic illness should be checked for TB.

___11. Diagnosis of TB is based on the presentation of cough for over one month.

___12. Diagnosis of TB is based on the acid fast bacillus test on sputum.

13. Explain why TB is always treated with a variety of different drugs.

14. Using the drug regimen in text, determine the dosage of anti-TB drugs for a 15 kg.child for Phase I.

15. You have just reached a diagnosis of TB for a 9-year old boy (weight 30 kg). In addition to the TB, blood tests reveal that the child is severely anaemic. How will you manage this patient?

16. Describe Phase I and Phase II treatment for a man with a positive for AFB sputum.

17. The information which should be obtained and recorded at monthly follow-up visits with the TB patient.

    a)

    b)

    c)

    d)

    e)

18. Describe two means of preventing TB.

    1)

    2)

19. You have been treating an adult woman for TB for 6 months. For the past three months, her weight has been steadily decreasing for no known reason. What could be possibly causing the weight loss and how will you manage it?

STUDENT GUIDE

THE HEART:
ANATOMY AND PHYSIOLOGY, ABNORMAL SIGNS AND SYMPTOMS

I. Entry Level Skills and Knowledge

Before starting this Unit, you should be able to explain the structure and function of the circulatory system.

II. Objectives

Using the information and experiences provided by the instructor and the module text, you will be able to:

1. Describe the course of blood flow through the heart.
2. Identify the categories of problems of the heart.
3. Explain the cause of heart problems.
4. Describe normal and abnormal physical exam findings:
   - oedema of ankles and sacrum
   - raised neck veins
   - pleuretic pain
   - angina pectoris
   - enlarged liver
   - shortness of breath
   - heart murmurs

III. Evaluation

1. Knowledge: Written test based upon contents of unit in module text. Acceptable performance, 80%.
2. Skill: Physical examination of the circulatory system.

IV. Activities you will be participating in to complete the above objectives.

1. Students read module text on anatomy and physiology, and abnormal signs.
2. Instructor presents slides to clarify and reinforce module text and conduct discussion.
3. Instructor or assistant demonstrates physical examination of the circulatory system; special emphasis on abnormal signs.
4. Students practice identification of abnormal heart signs in clinical setting.

BASIC CONCEPTS RELATED TO THE HEART

Anatomy and Physiology of the Heart

The heart is a muscular organ lying behind and just to the left of the sternum. It is the pump for the circulatory system. As was discussed in the Anatomy and Physiology Module it actually functions as two pumps - one for the pulmonary circulation and the other for the systemic circulation.

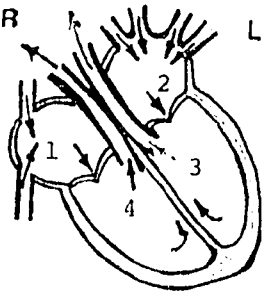

Figure AP 21 - Heart: 1) Right Atrium; 2) Left Atrium; 3) Left Ventricle; 4) Right Ventricle.

How does the heart pump blood?

The pumping action occurs as a result of two factors:

1. The contraction of cardia (heart) muscle which "squeezes" or forces blood to flow out of the heart.

2. The opening and closing of the system of valves which control the direction of blood flow.

What is the course of blood through the heart?

Blood enters the heart from the systemic circulation by way of two large veins, the superior vena cava and inferior vena cava. The blood flows into the right atrium. When this chamber contracts, the blood flows through the valve and into the right ventricle. When the right ventricle contracts the blood flows through the valve and into the lungs. Upon returning from the lungs through pulmonary veins, the blood flows into the left atrium. When this chamber empties, blood flows across the valve into the left ventricle. When the left ventricle contracts, blood moves through the valve into the aorta, and on into the systemic circulation. Upon its return from the systemic circulation blood once again enters the right atrium and the cycle is complete (Figure AP 21).

What keeps the blood flowing in the correct direction during the contractions of the heart muscle?

The valves open to allow blood to flow only in the direction described above. They close to prevent blood from flowing back. These valves are "flap valves." There are two or three thin skin-like flaps overlapping each other and closing off the valve opening. When blood "pushes" against the valves from one side they open easily and allow it to pass freely. However, when blood "pushes" from the other direction, the valves seal off the openings preventing blood from flowing back.

What is meant by systole (and systolic) and diastole (and diastolic)?

The terms refer to brief time periods during which the ventricles are either contracting or relaxing. When they are contracting and forcing blood out, this is called systole. When they are relaxing and being refilled with blood, this is called diastole.

During systole, the pressure in the circulatory system (referred to as systolic pressure) is at its highest. During diastole, the pressure (referred to as diastolic pressure) is at its lowest. These are the pressures measured when taking a blood pressure.

What causes heart sounds?

Heart sounds are caused by the closing of the valves. The first heart sound is caused by the closing of the atrio-ventricular or A-V valves as the ventricle contract. The second heart sound is caused by the closing of the aortic and pulmonic valves as the ventricles relax.

Problems of the Heart

What are the categories of problems of the heart?

There are three main categories:

1. Damage to the heart muscle resulting in a decreased ability of the heart to pump.

2. Damage to the valves resulting in a decreased ability of the heart to pump.

3. Congenital Malformations. Occasionally babies are born with hearts which are improperly formed. This is the result of a congenital heart disease. Many of these infants die before or soon after birth. (There is not very much that can be done for these babies except in a large hospital.)

4. High blood pressure (hypertension) is a category which affects the heart but is not "of the heart." Increased resistance in the circulatory system requires the heart to pump harder (higher pressure) in order to move enough blood. Hypertension is discussed in detail in another module.

What are the causes of heart problems?

1. Damage to the heart muscle usually occurs in older people and most frequently results from an inadequate supply of blood to the heart muscle. This lack of blood in turn is due to the narrowing of the coronary arteries. These may cause pain or congestive heart failure.

   Another less common cause of damage to the heart muscle is a lack of thiamine (Vitamin B_2) in the diet.

2. Damaged Heart Valves. Damage to the heart valves is most commonly caused by repeated attacks of rheumatic heart disease in childhood. There are two types of damage to heart valves.

   1) Narrowing of the valve which decreases the flow of blood through the valve.

   2) Insufficiency which allows blood to flow backwards.

3. Congenital Malformation. Congenital heart disease is usually due to genetic defects or infections in the uterus affecting the developmnet of baby before birth.

Other Conditions Causing Heart Problems:

Two other common conditions which can cause problems for the heart are high blood pressure and anaemia.

a. High blood pressure (hypertension) causes the heart to "work harder" in order to pump the same amount of blood throughout the body. High blood pressure is discussed in the Chronic Disease Module.

b. Anaemia also requires the heart to work harder in order to deliver the same amount of O_2 and nutrients to the body. The two main causes of anaemia are blood loss (acute or chronic) and inadequate diet (especially iron and folic acid). Anaemia is found more commonly in women. They have a greater loss of blood associated with menstruation and pregnancy. They also have a greater need for iron and folic acid again associated with menstruation and pregnancy.

What are the common symptoms and signs associated with heart problems?

1. Generalized weakness caused by heart disease indicates that the heart is simply too weak to pump all the blood needed to meet the body's normal demands for food and oxygent.

2. Chest pain caused by heart disease is of two varieties. The first is associated with "Angina Pectoris." This pain comes on with physical activity and goes away with rest. It is usually mild and comes and goes over months and even years. The other variety of pain is sudden, severe, often including the left shoulder, and may be associated with collapse of the patient. This kind of pain is associated with a heart attack (myocardial infarction - MI).

3. Irregular pulse means that the normal rhythm of the heart contractions is gone. It has been replaced with an irregular rhythm. This is caused by damage to the heart muscle.

4. Heart murmurs are abnormal noises heard with the use of a stethoscope. Murmers are heard between the normal heart sounds. Loud murmurs are most frequently associated with damage to heart valves due to rheumatic fever. They are also heard with some types of congenital heart diseases.

5. Shortness of breath which is more severe when lying down usually indicates fluid oedema of the lungs. The patient gives a history of sleeping better when propped up in bed (orthopnea).

6. Oedema of the feet and ankles due to congestive coronary failure is always "pitting oedema." When you press for about five seconds on the foot or ankles, a "pit" is formed. This "pit" will slowly disappear over several minutes. If a patient with pitting oedema has been lying down for a long time the pitting oedema will be most easily seen along the lower part of the back.

7. Raised neck veins is one of the most important signs of CCF. It is best seen when the patient is in a well-lighted area and positioned about half way between sitting up and lying down. With the head turned slightly to the opposite side, the enlarged veins will be seen pulsating several inches above the clavicle.

8. Enlargement of the liver due to CCF will be found along with other signs and symptoms of CCF. This is emphasized because an enlarged liver can be caused by several different diseases including cirrhosis, hepatitis and amoebic abscess.

REVIEW QUESTIONS

1. The pumping action of the heart occurs as a result of two factors. These are:

   1)

   2)

2. Define the function of the heart valves

3. When the ventricles are contracting and forcing blood out this is called _____.
   When the ventricles are relaxed and being filled with blood this is called _____.

4. List the three main categories of problems of the heart and their usual causes.

Problem	Cause
1)	
2)	
3)	

5. Explain the effect of high blood pressure on the heart.

6. Describe the following symptoms and signs of heart problems and explain the link between these and the heart.

   a) Generalized weakness:

   b) Irregular pulse:

   c) Shortness of breath:

   d) Raised neck veins:

STUDENT GUIDE

HEART DISEASES

I. Entry Level Skills and Knowledge

Before starting this unit, you should be able to:

1. Explain normal anatomy and physiology of the respiratory and circulatory system.
2. Describe the techniques for physical examination of the respiratory and circulatory system.

II. Objectives

Using the information and experiences provided by the instructor and module text, you will be able to:

1. Identify the physical signs associated chest pain, rheumatic heart disease and congestive heart failure (CHF).
2. Describe the general characteristics and course of these problems.
3. Describe the management procedures for heart problems.
4. Use the protocols as a guide to diagnose heart diseases.

III. Evaluation

Upon completion of this module you will be assessed on:

1. Knowledge: Written test based upon contents of unit in module text. Acceptable performance, 80%.
2. Skill: Use of the protocols for diagnosis of heart problems.

IV. Activities you will be participating in to complete the above objectives.

1. Students read module text on heart diseases and answer review questions.
2. Instructor presents slide or A-V presentation to clarify and reinforce module text and conducts discussion.
3. Trainees practice use of protocols.
4. Clinical practice. Students are assigned to a clinic to practice their skills in using protocols to diagnose and treat common problems of the circulatory system. Students keep record of their experience. Instructor or assistants evaluate students' performance using Diagnostic Skill Checklist.

CONGESTIVE CORONARY FAILURE (CCF)

General Considerations

Congestive coronary failure occurs when the heart is not able to pump sufficient blood to supply the body's needs over a prolonged period of time. Since the blood is carrying oxygen and insufficient blood is reaching the body tissues, the body tissues become short of oxygen. Blood returns to the heart through the veins. As the heart fails, it does not adequately pump the blood out of the veins, the pressure in the veins rises, and they become over-distended with blood. Fluid then builds up in the tissues causing oedema. When the right ventricle fails, blood is not adequately pumped from the systemic circulation. This causes the ankles and liver, especially, to become oedematous and swollen. When the left ventricle fails, blood is not pumped away adequately from the pulmonary veins, and the lungs develop oedema (pulmonary oedema). Actually, almost always both ventricles "fail" at the same time. Consequently, the patient develops both ankle and pulmonary oedema together.

Causes

Anything which prevents the heart from correctly pumping blood can cause heart failure. Some of the main causes are listed below:

1. Weakness of or damage to the heart muscle - caused by arteriosclerotic heart disease, myocarditis, myocardial infarcts, or Beriberi.

2. Damage or defects in the heart valves from rheumatic fever.

3. Prolonged heavy stress on the heart caused by hypertension, anaemia, or hyperthyroidism.

4. Birth defects of the heart.

Epidemiology

Congestive coronary failure is more common in the elderly, but all age groups are affected. For infants and children congenital heart defects and anaemia are important causes. Valvular heart disease, hypertension, and heart muscle diseases are more common in middle age. The elderly especially in urban areas often develop heart failure from atherosclerotic heart disease and myocardial infarcts (heart attacks).

Clinical Picture

Congestive coronary failure often starts gradually with mild shortness-of-breath on exertion. The patient later notices he has mild ankle swelling and a mild cough in the morning. Shortness-of-breath and ankle oedema become progressively worse, and the patient wakes up at night feeling that he must sit up to breathe (moderate). Ascites may develop. Finally, the patient is short of breath even while sitting at rest (severe). In this final stage as pulmonary oedema increases, the patient becomes more short of breath, coughs up frothy pinkish sputum and becomes bluish in colour. The patient who has reached this stage is in grave danger of dying unless corrective medications are given quickly.

A. Signs and Symptoms

The adult patient seeking medical help usually complains of shortness-of-breath on exertion, cough, and swollen ankles. With any one of these complaints consider heart failure. The signs and symptoms are listed below.

Almost always present:

1. Ankle oedema
2. Distended neck veins with the patient sitting at 45 degree angle
3. Shortness of breath on exertion

Usually present:

4. Cough
5. Increased pulse rate
6. Enlarged liver

Often present:

7. Rales
8. Irregular heart rhythm
9. Difficulty in breathing when lying down

Sometimes present:

10. Hypertension
11. Heart murmur
12. Bluish colour) Coronary failure with these
13 Shortness of breath at rest) symptoms demands immediate treatment.

B. Diagnosis in an Adult

The combination of PITTING ANKLE OEDEMA with DISTENDED NECK VEINS is sufficient to make the diagnosis. Look for other signs and symptoms as listed above to help confirm the diagnosis.

C. Diagnosis in an Infant

The infants with the combination of:
1) heart rate over 140;
2) respiration rater over 60/minute;
3) shortness of breath; and
4) enlarged liver usually has congestive heart failure.

Management

The initial management of congestive coronary failure should be done in a hospital or health centre.

A. Management of Moderate and Severe C F.

All moderate and severe cases should be sent to the doctor in the hospital sitting up (not lying down).

B. Management of mild CCF in Adult Patient at the Health Centre

1. Hydrochlorothiazide - ½ tab (25 mg) twice a day until oedema is gone.
2. Potassium Chloride Solution 15 ml (3 tsp.) per day.
3. Restrict salt - add no salt to food.
4. The patient must take extra rest every day.
5. He must be instructed to limit his work and exercise, to the point where he does not experience shortness of breath.

C. Long-Term Management

1. Patient-Family Education

Take sufficient time to explain coronary failure and its long-term treatment to the patient and family. When the patient and relatives understand they will usually come for long-term follow-up. They need to know:

a. That coronary failure is controlled but not cured by the medications.
b. That the patient must continue the medications for his lifetime and needs to be seen monthly.

c. That if he stops his medications his symptoms will return and his heart may be further weakened.
d. That he must avoid salt and sodium bicarbonate.
e. That he should sleep with his head and chest elevated.
f. That he gets extra rest.

2. See patients on a monthly basis with the following points in mind:

a. Check the apical and radial pulse. Both should be nearly the same. The apical pulse should be 64 to 88 after resting 10 minutes (sitting).
b. Check the Rhythm - the Rhythm should be fairly regular with not more than 5 premature beats per minute.
c. Check for oedema and record the patient's weight. If oedema is present add HYDROCHLOROTHIAZIDE 25 mg ½ tablet daily.
d. Give Potassium Chloride Solution 15 ml (3 tsp.) per day.
e. Inquire whether the patient is avoiding salt.
f. If the patient was placed on digoxin by a doctor, inquire about signs of TOO LITTLE DIGOXIN, which include:
   -a pulse above 88
   -oedema
   -shortness of breath
   -dyspnoea
   -difficulty breathing when lying down
   If present, refer back to the doctor.
g. If the patient was placed on digoxin by a doctor, check for and inquire about signs of TOO MUCH DIGOXIN. These include:
   -an apical pulse less than 64
   -nausea, vomiting, diarrhoea or lack of appetite
   -an irregular heart with more than 6 premature beats per minute.
   When these symptoms exist, stop the digoxin for one day and refer the patient back to the doctor.
h. When no adjustment is necessary, give one month of medications.
i. Whenever the patient is not doing well or a question exists whether the medications are too much or too little refer him to the doctor.

Prevention

Generally speaking, congestive heart failure is hard to prevent. However, some forms are preventable at least in those who are not elderly. Early detection and treatment of streptococcal sore throats (to prevent valvular damage from rheumatic fever), anaemia, and hypertension will prevent congestive heart failure from these causes. Active people who are not overweight and avoid smoking have less of a tendency to get arteriosclerotic heart disease.

When congestive coronary failure does occur, early detection and enlisting the cooperation of the patient and relatives for life-long regular medications will prevent needless early deaths from this illness.

REVIEW QUESTIONS

1. List four (4) conditions which may prevent the heart from correctly pumping blood and can cause heart failure.

   1.

   2.

   3.

   4.

2. Congestive coronary failure may affect persons at any age. However, it is most common among:

   ____infants

   ____children 2 - 14 years

   ____young adults

   ____elderly

3. Check the presenting signs or symptoms listed below which are almost always present in an adult patient with congestive coronary failure.

   ____ankle oedema

   ____cough

   ____distended neck veins

   ____rales

   ____ difficulty breathing when lying down

   ____ S.O.B.on exertion

4. Discuss how an infant's presentation with congestive coronary failure may differ from an adult's.

5. From the list below, select the two signs which are sufficient evidence to make the diagnosis of congestive coronary failure in adults.

____cough
____pitting ankle oedema
____dyspnoea
____ distended neck veins
____ increased pulse rate

6. Moderate and severe cases of congestive coronary failure are initially treated in the hospital. What is the best position for the patient to be in while traveling to the hospital?

7. You have just diagnosed a case of mild congestive coronary failure. You are to begin treatment in the health centre. Describe the management steps you will take to bring the congestive coronary failure under control.

1)

2)

3)

4)

8. Because controlling congestive coronary failure is a life-long process, patient education is an important means to enlist the cooperation of the patient and family. List four (4) points that should be emphasized to the patient and his family.

1)

2)

3)

4)

9. Congestive coronary failure is a difficult condition to prevent. However, there are some forms of prevention which are useful in those who are not elderly. Describe three of them.

1)

2)

3)

RHEUMATIC HEART DISEASE

General Considerations

Rheumatic heart disease (RHD) is a chronic disease of the heart resulting from repeated attacks of rheumatic fever (See Diseases of Infants and Children Module). Rheumatic fever in some cases results in carditis (or inflammation of the heart). In these cases the heart valves eventually become thickened and scarred. After several episodes - usually a period of many years - one or even two of the valves no longer functions properly. Although rheumatic fever is more common in the 5 to 15 year old age group, the appearance of symptoms of RHD may not occur until the patients are in their 20's, 30's or even 40's.

Clinical Picture

The earliest sign of RHD is the presence of a loud heart murmur in an older child or adult. If the patient has a clear history of attacks of rheumatic fever earlier in life then the diagnosis is almost certain. As years go by many patients show signs of increasing fatigue and eventually develop signs and symptoms of congestive coronary failure. (See discussion of CCF in this module.)

Management

Patients suspected of having RHD should be referred to the hospital for diagnosis.

A woman with RHD who becomes pregnant has a high risk of losing the baby and even dying herself. Therefore, women with RHD should be advised to use an effective family planning method (pill, I.U.D.) or to undergo sterilization to avoid this grave risk.

Prevention

Early treatment of streptococcal sore throat prevents rheumatic fever. (See Diseases of Infants and Children and EENT modules.)

REVIEW QUESTIONS

1. Explain the relationship between rheumatic fever and rheumatic heart disease.

2. Your patient is 45 years old and has a history of rheumatic fever as a child. What early sign would be most helpful in diagnosing Rheumatic Heart disease?

3. What action would you recommend for a woman of child bearing age who has rheumatic heart disease?

CHEST PAIN DUE TO HEART DISEASE

General Considerations

Chest pain that originates in the heart is usually due to insufficient blood reaching the heart muscle. The arteries supplying the heart become narrowed or obstructed completely. This is commonly seen with arteriosclerotic (hardening of the arteries) heart disease.

Chest pain may also originate in structures of the chest wall such as skin, muscles, ribs or the pleural surface. The history and physical are important in differentiating types of chest pain. Chest wall pain will be associated with tenderness over the chest and pleural pain is associated with pain when breathing deeply or coughing.

Clinical Picture

Angina Pectoris. A dull pain or pressure behind the sternum with radiation into the left shoulder or arm is typical of heart pain due to insufficient blood reaching the heart muscle. This pain often begins during physical activity and leaves after resting. This condition may progress to myocardial infarction.

Myocardial Infarction (heart attack). A much more severe and persistent pain may occur which is caused by complete blockage of the blood supply to a portion of the heart muscle. This crushing chest pain may be associated with severe weakness, nausea and shock. Death is possible.

Management

The patient with angina pectoris should be told that he has heart disease and he should be advised:

1. Not to smoke, because smoking increases the spasm in arteries.
2. To reduce his weight if he is overweight, because the heart must work harder in order to supply blood to the whole body including the excess fat.
3. To eat small frequent meals and to rest after eating because the heart must work hard during digestion.
4. To see a physician regarding his heart if possible.
5. Nitroglycerin - 1 tab under the tongue when the pain occurs.

The patient with a myocardial infarction should be treated as a medical emergency. He should be transported in a seated position to the nearest hospital. Treatment includes complete rest for 2-3 weeks.

If the pain is crushing and severe, give Pethidine 100 mg IM for pain.

REVIEW QUESTIONS

1. Which of the following best describes the chest pain due to heart disease?

   a. Pain associated with tenderness over the chest
   b. Pain associated with breathing deeply or coughing
   c. Pain or pressure behind the sternum radiating into the left arm or shoulder.

2. If your patient is experiencing angina pectoris you can manage him at the Health Centre. In addition to advising him about when to take nitroglycerin, what other important advise should you give to the patient?

3. Complete blockage of blood supply to a portion of the heart muscle is called a myocardial infarction or heart attack. How will this patient present and what is your responsibility?

MODULE PHASE

SKILL EVALUATION

Before you are advanced to the rotation phase of training, a staff member will evaluate your mastery of the physical examination procedures and discriminations which have been identified in the modules.

You will have the opportunity to be rated on your performance of these skills at any time during the module phase that you feel prepared.

To help you prepare, the module contains a list of the skills to be evaluated. You are advised to do the following:

1. Work at perfecting your techniques of examination by practicing with another student.
2. During the clinical practice time provided, each week, practice the skills applicable to the subject being taught.
3. Have a fellow student observe and evaluate your performance.
4. When you feel you are ready, ask a trainer to observe and rate your performance.
5. If your performance is unacceptable, the trainer will give you specific comments on how to improve.
6. Practice again until you are ready for evaluation, and arrange to be rated.
7. If after two attempts you are unable to perform a skill at an acceptable level, arrange for a meeting with members of the training staff, who will help you obtain the experiences necessary for improving your performance.