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Case Management
Of Acute Diarrhoea
In Childhood

DIARRHOEAL DISEASES MANAGEMENT
SELF INSTRUCTIONAL SERIES- No 2



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Case Management
Of Acute Diarrhoea
In Childhood

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INTENDED USERS :

Within the context of the task-based
curriculum for practicing physicians
residents and house-officers

POTENTIAL USERS :

Newly appointed physicians
Undergraduate medical students
Undergraduate students of the High Institute
of Nursing

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TABLE OF CONTENTS

	PAGE
TO THE LEARNER	i
TO THE TRAINER	ii
INTRODUCTION	iii
PREREQUISITES AND OBJECTIVES	iv
INFORMATION SECTION 1	
General Review	1
Practice Questions	2
Answers To Practice Questions	5
INFORMATION SECTION 2	
Oral Rehydration	6
Practice Questions	9
Answers To Practice Questions	10
INFORMATION SECTION 3	
Indications of nasogastric and intravenous therapy	11
Practice Questions	15
Answers To Practice Questions	17
INFORMATION SECTION 4	
Nutritional management	18
Practice Questions	21
Answers To Practice Questions	22
INFORMATION SECTION 5	
Drugs and Other Management Decisions	23
Practice Questions	
Answers To Practice Questions	
SUMMARY	
BIBLIOGRAPHY	34

TO THE LEARNER

This is a self instructional unit, covering the essential information you will need to complete the management plan for treating acute diarrhoea. This is an essential task to be carried out in the reception (intake) area of a rehydration center. The unit is self-contained. Learning is individualized. Upon completion of the unit you will be expected to accomplish the objectives covered in the topic. So, it is important that you follow closely the directions as stated.

DIRECTIONS

- 1- Read through the unit in sequence from beginning to end.
- 2- Read carefully the objectives. They will tell you what you are expected to learn from the information in the unit. Such objectives also indicate what you will be asked on the post-test at the end of the course.
- 3- Read the information in Section 1
- 4- Write your answers to the practice questions at the end of information Section 1 on a separate sheet of paper. Do this without looking back at the information.
- 5- After you write your answers, look at the answers given on the next page, in order to check your work.
- 6- If any of your answers are incorrect, go back and read information Section 1 again. Then make another attempt to answer the same questions. Make sure that all your answers are correct before moving on to the next section.
- 7- Proceed through the entire unit in the same manner.

TO THE TRAINER

Suggested below are various learner activities for preparation and follow up study.

SUGGESTED PREPARATION

They should have discussed the clinical manifestations of diarrhoea and dehydration and be able to identify the signs and symptoms of dehydration.

SUGGESTED FOLLOW UP

It is essential that learners work on case methods and examine diarrhoeal patients. This will give them an opportunity to practice and gain the skills required for writing a plan of management in both practice and real environment.

Note : There are other Self-Instructional units that would be helpful to physicians in their care of diarrhoeal cases and their families.

REMEMBER

Distribute this unit at the end of Day 2

Instruct the learners to read the material carefully and follow up the direction.

Next day make sure that learners responded correctly to the questions .

Discuss their problems.

Use the progress test as a post test for this unit to ensure that learners really learned the subject.

INTRODUCTION

Dear doctor,

Diarrhoea including its interaction with malnutrition is one of the most important health problems, and a major cause of death in infants and young children throughout the developing countries.

The average Egyptian child under 3 suffers from at least three serious bouts of diarrhoea per year. Although most diarrhoea episodes are of short duration, and clear up regardless of the intervention, yet acute diarrhoea is still the leading cause of death among Egyptian children, accounting for more than 50% of the deaths in children under two years of age. Each year, more than 100,000 Egyptian children die from diarrhoeal diseases.

As a physician you are responsible for developing the correct management plan for every patient you treat. You can, if you correctly manage cases of acute diarrhoea, save the lives of children and restore their health. It is your responsibility to determine whether the child needs medical care and if so, the type and urgency of the treatment plan of every diarrhoeal case you come across.

In this unit, you will be exposed to the different components of case management, and will learn that in writing the plan, you have to decide according to each case about the method of rehydration, nutrition, and if the child needs drugs or any further investigation.

In the first section of this unit you will read about methods of rehydration available. In the second you will learn about oral rehydration therapy. The third section will describe indications for nasogastric and intravenous therapy. In Section four you will read about the different nutritional plans and learn how to select the appropriate one. In the last section you will read about drugs and other management decisions that you may have to do.

Through your reading, you will acquire the necessary skills needed for writing a modern and effective treatment plan for several cases of diarrhoea. Your knowledge of the criteria and your skills in judgement and interpretation of clinical findings are highly needed to reduce mortality in our children.

PREREQUISITES

All learners should have learned how to carry out history taking, examine paediatric cases and identify signs and symptoms of dehydration and paediatric diseases.

OBJECTIVES

Upon completion of this unit the learner will be able to:

- 1- Decide on the rehydration plan for diarrhoea
- 2- Describe nutritional management regimen
- 3- Identify laboratory tests when required
- 4- Identify indications for drug therapy
- 5- Describe conditions for referral of cases

INFORMATION SECTION 1

GENERAL REVIEW
DEHYDRATION AND METHODS OF REHYDRATION

Dear Doctor

Management of acute diarrhoea involves a series of steps that entail decision making. Among the decisions is that related to the method of rehydration. Mortality from diarrhoeal diseases is usually due to dehydration. Dehydration means loss of water and electrolytes: "sodium, potassium, chloride and bicarbonate, beyond what the body can tolerate. In diarrhoea the small intestine loses its capacity to absorb water and electrolytes and instead secretes electrolytes rich fluid.

Dehydration as you already know by now can be mild, moderate or severe. When fluid loss from diarrhoea is up to 4% of body weight then dehydration is considered mild. It produces thirst but generally no other symptoms or signs. Greater losses (5-9%) produces typical signs of moderate dehydration: inelastic skin, sunken eyes, depressed fontanelle and oliguria, together with thirst. With 10% or more loss, dehydration is categorized as severe since shock may result. Shock is manifested by a weak thready pulse, low blood pressure, disrupted kidney function (anuria), collapsed peripheral blood vessels leading to cold extremities and stupor or coma. With dehydration, acids build up, leading to metabolic acidosis which can lead to death particularly if the loss reaches 15% or more of the body weight.

So, for dehydration caused by diarrhoea, fluid therapy is the first and only effective treatment. Fluid therapy does not prevent or cure the infections that cause diarrhoea, but it counteracts the dehydration; the main cause of mortality from diarrhoeal diseases.

Fluid therapy involves administering a solution composed of ions of sodium, potassium, chloride and bicarbonate (or citrate). The solution is dissolved in water and can be given orally by cup and spoon, via a nasogastric tube, or intravenously.

Remember that initial rehydration means correction of clinically manifested dehydration within the first 4-6 hours of management. Maintenance of hydration is needed to prevent recurrence of dehydration.

METHODS OF ADMINISTERING
FLUID THERAPY

- o Orally by cup and spoon
- o Nasogastric tube (Ryle)
- o Intravenously

Intravenous administration developed before oral therapy. It was effective in reducing the death rate in a hospitalized population. You realize, however, that this method can only be performed under close supervision in a hospital and requires well trained personnel. In intravenous therapy, trauma and the chance of infection from the intravenous needle always exists. Moreover, in our country, not all cases have easy access to hospital beds, or will seek hospital care even if hospital beds become accessible. Indeed the number of diarrhoeal cases would overwhelm the hospitals. The cost would be too high as the method is expensive.

In table I there is a comparison between intravenous and oral rehydration therapy. It covers most of the points we have discussed. It also indicates that with oral rehydration therapy (ORT) there is a broader tolerance range. It indicates that ORT can be administered at hospitals, health centers and homes. It ensures that the mother is involved in the care of her child.

The scientific rationale for oral rehydration is firmly established. However, the major issue today is the provision of necessary services and essential supplies to all who require them.

Please note that if the average child under 5 years of age needs at minimum 30 packets (5.5 gm) per year, the annual cost of treating one child may be only 1.35 LE. Though this cost seems to be low, but the overall cost at the national levels is high. A cost that may not be afforded by some developing countries. You have to realize that intravenous rehydration therapy is even much more expensive. Therefore the latter should only be administered when medically indicated.

TABLE I
COMPARISON OF INTRAVENOUS AND ORAL REHYDRATION THERAPY

INTRAVENOUS THERAPY	ORAL REHYDRATION THERAPY
<ul style="list-style-type: none">○ Applicable in all cases requiring rehydration○ Preventive use not feasible○ Requires hospitals○ Supplies are cumbersome to deliver to rural areas○ Administration requires well-trained personnel	<ul style="list-style-type: none">○ Applicable in all cases except where shock or severe vomiting interfere○ Easily administered in every case of diarrhoea; if begun early may prevent dehydration○ Can be prepared and administered in centers, hospitals and home○ Packets of oral salts easily distributed○ Can be distributed and prepared by minimally trained village workers, and prepared by family members
<ul style="list-style-type: none">○ Narrow range of body tolerance for variations in fluid composition○ Monitoring needed to prevent over-hydration	<ul style="list-style-type: none">○ Broader tolerance range but care in mixing still needed
<ul style="list-style-type: none">○ Requires sterile preparation and equipment○ Expensive○ Trauma and chance of infection from intravenous needle○ Mother totally excluded from care of child	<ul style="list-style-type: none">○ Early in diarrhoea, satisfaction of thirst usually prevents over-hydration○ Household utensils can be used to mix○ Inexpensive○ Possible risk of using contaminated water○ Mother involved in care of child

INFORMATION SECTION 1

PRACTICE QUESTIONS

Complete the following sentences :

- 1- The only effective method for treatment of dehydration is
- 2- Fluid therapy involves administering a solution composed of ions of , , and .
- 3- Methods of administering fluid therapy are , and .
- 4- ORT can be administered at , , and .

Check if the following statements are false or true

- | | False | True |
|--------------------------------------------------------------|-------|------|
| 5- Intravenous therapy requires hospitalization. | [] | [] |
| 6- ORT can prevent dehydration | [] | [] |
| 7- Intravenous therapy is a safe method | [] | [] |
| 8- In ORT the mother does not share in the care of her child | [] | [] |

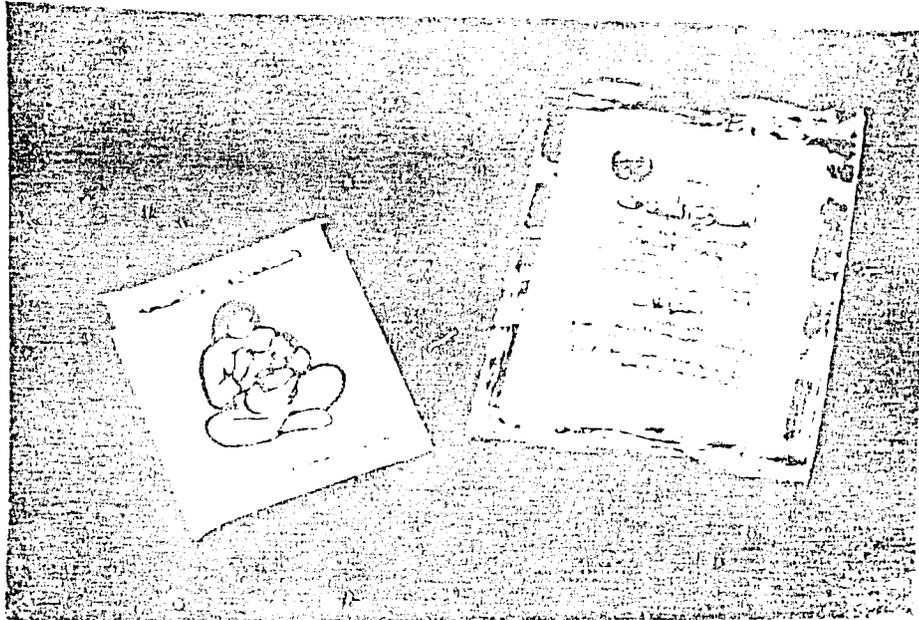
INFORMATION SECTION 1

ANSWERS TO PRACTICE QUESTIONS

- 1- The only effective method for treatment of dehydration is fluid therapy.
- 2- Fluid therapy involves administering a solution composed of ions of sodium, potassium, chloride, and bicarbonate.
- 3- Methods of administering fluid therapy are the oral intravenous and nasogastric.
- 4- ORT can be administered at hospitals, health centers and homes.
- 5- [✓] true
- 6- [✓] true
- 7- [✓] false
- 8- [✓] false

INFORMATION SECTION 2

ORAL REHYDRATION



Oral rehydration is physiologically the best treatment for appropriate cases. This method is considered the single most important discovery since the introduction of penicillin. Oral therapy is high quality treatment that is easily prepared and administered. The salts are relatively inexpensive and easy to obtain. They only to be mixed with clean water in the proper proportions.

In Egypt, the oral rehydration salts used follow the standard WHO formula. We are using the 5.5 gram packets which must be dissolved in 200 c.c of water.

The packet contains:

Sodium Chloride	0.7 grams
Sodium bicarbonate	0.5 grams
Potassium chloride	0.3 grams
Glucose	4.0 grams

5.5 grams

The formula has a concentration of :

Sodium (Na^+)	90 m moles /lit
Potassium(K^+)	20 m moles/lit
Bicarbonate(HCO_3^-)	30 m moles/lit
Chloride (Cl^-)	80 m moles/lit
Glucose	111 m moles/lit

Certain modifications of this standard formula are considered. Since 1984 ,WHO is recommending a new formula where trisodium citrate is substituted for sodium bicarbonate. Studies show that the new formula has a longer shelf life and reduces stool volume. It also may improve the taste. In a second variation ,rice powder may be substituted for glucose resulting in a super ORS which is claimed to reverse dehydration and reduce stool output. These modifications are currently being considered by the project.

There are several uses of oral fluid. Oral rehydration can be used for the following :

- o Prevent dehydration
- o Rehydrate most cases
- o Complete rehydration after I.V
- o Maintain hydration

Oral fluid therapy may, if given as soon as diarrhoea starts prevent dehydration. Early adequate fluid and electrolyte intake might slow or reverse dehydration. Oral fluids could rehydrate most of the cases of dehydration (85%- 90%), whether hypotonic, isotonic or hypertonic and whether hypo or hyperkalaemic. It is given by cup and spoon to those who can drink. If the child can not drink, and is not in shock or in coma, the same fluid can be given by nasogastric tube. ORT is also used to complete rehydration after intravenous therapy has eliminated the signs of shock.

What cases should be treated by ORT ?

Oral rehydration is indicated in almost all cases of diarrhoea, as long as the child is alert and strong enough to drink. It is relatively easy to determine whether oral rehydration is the treatment of choice or not.

How much ORS should be prescribed ?

Generally speaking give ORS AD Libitum (freely), as the amount needed for rehydration can usually be determined by the child himself. However, a mildly dehydrated child requires 50 mls/kgms, while moderately dehydrated child needs 100 mls/kgms within the initial rehydrated period. A dehydrated child is a thirsty child. So, with few exceptions he will continue to take ORS until he is rehydrated. In the Self Instructional Unit covering monitoring you will learn to deal with the cases that are an exception to this rule.

Dear doctor, remember that oral rehydration is your method of choice as long as the child is able to drink. It corrects dehydration ,the main killer in diarrhoea.



INFORMATION SECTION 2

PRACTICE QUESTIONS

1- State the uses of oral fluid

- o
- o
- o
- o

Complete the following:

2- Oral rehydration is indicated as long as the child is
.....

3- Oral rehydration should be given

Check [✓] if the following statements are false or true

Oral rehydration is given only :

4- When dehydration develops

False

True

[]

[]

5- For isotonic dehydration

[]

[]

INFORMATION SECTION 2

ANSWERS TO PRACTICE QUESTIONS

1-

Prevent dehydration
Rehydrate most cases
Complete rehydration after I.V.
Maintain hydration

2-

Oral rehydration is indicated as long as the child is alert and strong enough to drink

3-

Oral rehydration should be given AD Libitum.

4-

False

5-

False

INFORMATION SECTION 3

INDICATIONS FOR NASOGASTRIC AND INTRAVENOUS REHYDRATION

When should a doctor decide to use the nasogastric rehydration method at the reception area (intake) ?

It should be emphasized that this type of rehydration is a temporary one, where the standard ORS solution is given via the nasogastric (Ryle) tube. Moreover, this method of rehydration requires a trained physician who is able to insert the tube. It should always be done in a health facility.

So, what are the indications of nasogastric rehydration at the reception area ?

The main indications are :

- o Child suffering from apparent drug intoxication particularly antiemetics, yet not severely dehydrated.
- o Child is severely dehydrated but intravenous therapy not available.
- o Child comes late at night, mother is likely to sleep and child will be less frequently observed.

The most common indication for nasogastric rehydration , however, is persistent vomiting as observed from monitoring the child. Do not rely on the mother's complaint, who may exaggerate the occurrence of vomiting. If the mother reports vomiting, start with ORS by cup and spoon and monitor the child. Only shift to nasogastric if monitoring indicates a need. You will read more about this subject in the self instructional unit dealing with monitoring.

Sometimes oral rehydration fails because the child is too tired to drink, yet not severely dehydrated. You will not be able to decide if the child will drink or not at the reception area (intake). Later on during your monitoring once you observe that the child is too tired to drink ORS, switch to nasogastric rehydration.

Now, you will only decide on nasogastric therapy if there is an indication to do so, and only if you have the facilities to do so. If you have not the facilities to carry out nasogastric rehydration, you must refer the child to a health facility that provide nasogastric therapy. However, you must advise the mother to continue giving ORS, slowly, and she must use the dropper until she reaches the facility.



A physician is adjusting the drip rate for nasogastric rehydration in a diarrhoea ward

When should a doctor decide to use intravenous rehydration at the reception area (Intake) ?

Intravenous rehydration is accomplished using a special polyvalent single solution: **Diarrhoea Rehydration Intravenous Infusion**. This solution is available in a polyvalent formula.

Intravenous therapy should not be used as a routine method for all cases of dehydration. **it is only necessary for 5-10% of cases.** At the reception area the choice of intravenous should be restricted to the following cases:

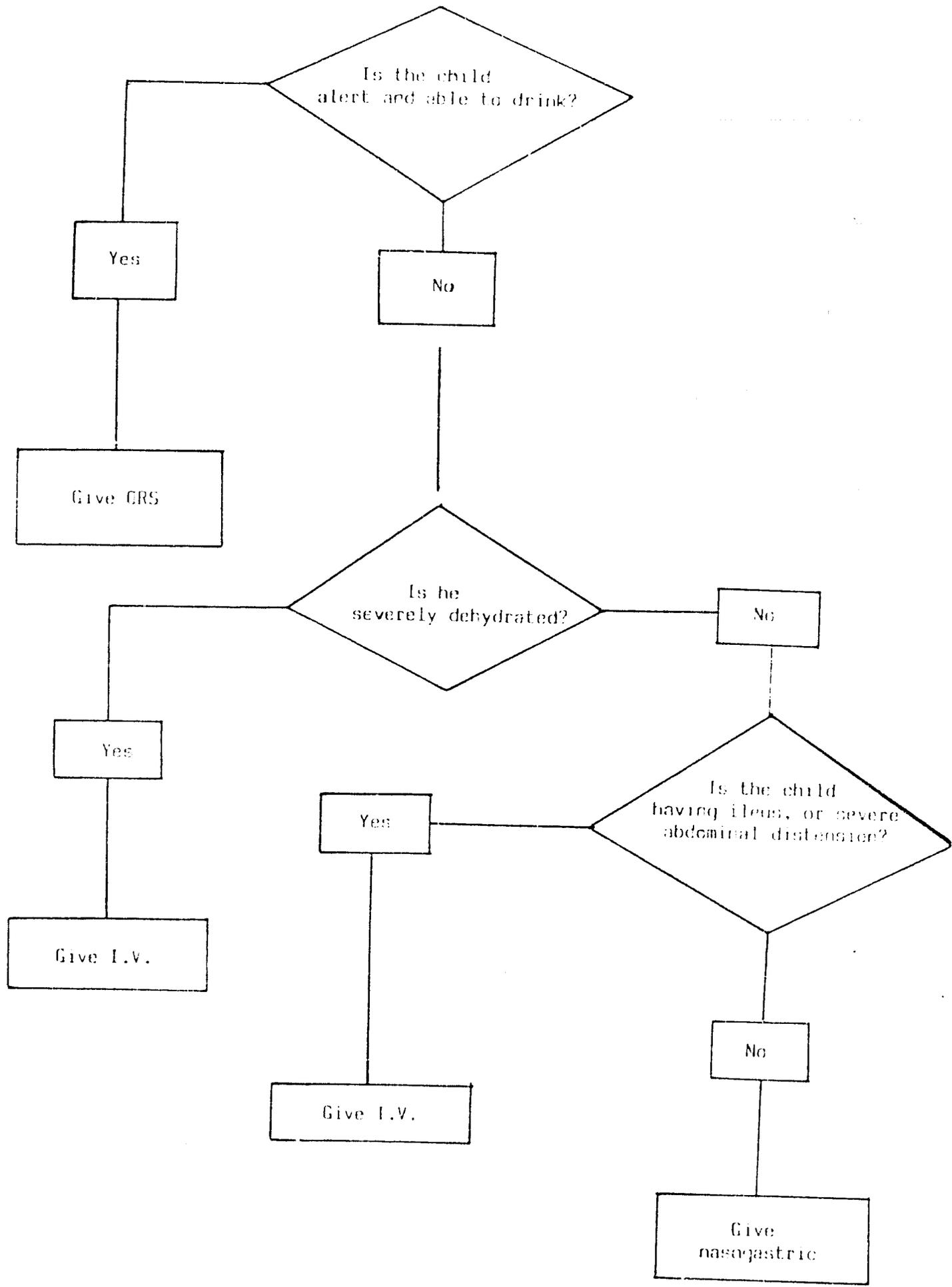
- o Shock
- o Coma, unconscious cases
- o Ileus
- o Severe abdominal distension
- o Children who should receive nasogastric therapy, but nasogastric therapy could not be administered for one reason or another

If you are working in a primary health care center and encounter any of the above cases at the reception area, your decision should be to transfer these cases urgently and immediately to the hospital. These cases should always be considered as emergency cases .



An unconscious child being rehydrated intravenously in a diarrhoeal ward

METHOD OF REHYDRATION



INFORMATION SECTION 3

PRACTICE QUESTIONS

1- State three indications seen at the reception area for nasogastric rehydration

- o
- o
- o

2- State five indications seen at the reception area for intravenous rehydration

- o
- o
- o
- o
- o

Decide on the method of rehydration for the following cases:

3- A child who was diagnosed as having mild dehydration. Thirst was the only manifestation present. The child took antiemetic drug. He looked toxic.

Method of rehydration is :

4- A child with sunken eyes, depressed fontanelle and with loss of skin elasticity came late at night. His mother looked ill and tired.

Method of rehydration is:

5- A child came in shock. You examined him he was severely dehydrated.

Method of rehydration is:

6- You examined a child suffering from diarrhoea. You assessed his degree of dehydration as being moderate. His mother is concerned as the child vomited six times during the last hour.

Method of rehydration is :

7- A child came to the rehydration center. He had sunken eyes, and loss of skin elasticity. The abdomen was severely distended. Bowel sounds were not heard.

Method of rehydration is :

8- You examined a child in the rehydration center. The child had sunken eyes, depressed fontanelle and fever. The child was alert and conscious.

Method of rehydration is :

INFORMATION SECTION 3

ANSWERS TO PRACTICE QUESTIONS

1-

- o Child suffering from apparent drug intoxication, but not severely dehydrated
- o Child is severely dehydrated but intravenous therapy is not available
- o Child comes late at night, mother is likely to sleep and child will be less frequently observed

2-

- o Shock
- o Coma, unconscious cases
- o Ileus
- o Severe abdominal distension
- o Children who should receive nasogastric therapy, but it could not be administered for one reason or another.

3-

Nasogastric therapy

4-

Nasogastric therapy

5-

Intravenous therapy

6-

Oral rehydration by cup and spoon. Note the occurrence of vomiting on the case management sheet. Leave standing orders to the nurse to observe.

7-

Intravenous therapy

8-

Oral rehydration by cup and spoon

INFORMATION SECTION 4

NUTRITIONAL MANAGEMENT

Dear Doctor,

The key concern for every oral rehydration therapy is feeding diarrhoea . Indeed proper management requires that feeding be an integral part of oral rehydration therapy. Thus from the start you have to decide on nutritional management of the case. ORT must involve both fluids and feeding both during and after diarrhoea.

NCDDP follows World Health Organization(WHO) Guidelines and recommends continue feeding. The reason to continue feeding during diarrhoea is basically nutritional. Moreover, recent clinical research suggests that if a child is given food rich in protein and carbohydrates along with ORS, the stool output and frequency will actually be diminished. Further, children who are fed during diarrhoea recovered sooner and gained weight better than those who are not. Remember that increased intake of potassium rich foods as banana, lemon potassium in ORS to restore potassium lost in diarrhoea, is recommended.

Dear doctor, most scientists agree that it is important to continue breast feeding. If breast feeding is discontinued lactation may be reduced raising far greater dangers of malnutrition and infection. Even for children who are not breast fed, short term deprivation of nutrients is serious. Why ?
A fasting child loses as estimated 1-2 % of body weight daily.

Breast feeding should be encouraged.



Diarrhoea may lead to malnutrition or aggravate it, not only through the withholding of food, but because diarrhoea is usually associated with loss of appetite, reduced intestinal absorption and the metabolic breakdown of fat and muscle tissue. So, diarrhoea aggravates malnutrition through:

- o loss of appetite
- o Reduced intestinal absorption
- o Metabolic breakdown of fat and muscle tissue
- o Withholding food

Some physicians have argued that the formula contains too much sodium for infants whose kidneys are less able to excrete excessive loads of sodium than the adult kidneys. So, to minimize any danger of hypernatraemia, the Project recommends giving infants additional fluid along with the standard ORS during the maintenance phase of fluid therapy. You should make this very clear to mothers. For those who are breast fed, no other fluids are necessary to supplement ORS.

So what are the essentials of nutritional management? Your plan will depend on the clinical findings. You have to remember, however, that foods recommended for a particular child should be consistent with his normal eating habits.

Let us discuss some examples. If the child suffers from diarrhoea, but with no dehydration, ask the mother to give him more fluids and continue with the regular child feeding. If the child is having diarrhoea, with no clinical signs of dehydration except thirst, it goes without saying he has to have ORS. If he is on the breast, encourage the mother to continue nursing the child. Ask the mother to give breast milk more often than normal. If the child is not breast fed, you may delay feeding until the child has taken one cup of ORS. The mother should dilute the milk feed with an equal volume of water. Offer the milk feed at least every 3 hours. Then gradually increase the strength of formula until you reach the full concentration on the second day.

Now what about children who are moderately or severely dehydrated? First you have to rehydrate them. Milk and food should be withheld only until visible signs of dehydration have disappeared. Once initial rehydration is accomplished, resume their normal feeding. Children who are breast fed, should be given the breast, while those on formula should be given half-strength formula until full concentration is reached in 24 hours.

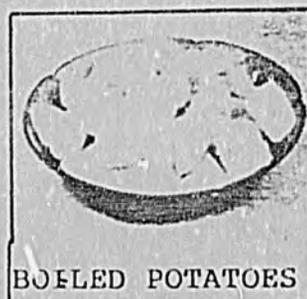
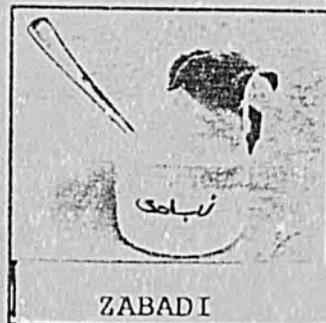
All mothers who are giving liquid supplements to their children should be encouraged to do so. Advise mothers to give food-based fluids such as gruel, soup and rice water in addition to milk (whether breast or formula)

For older children who are taking solid food, first give soft foods that are high in protein and carbohydrates, such as mahalabia, belila, balouza, mashed potatoes, mashed bananas, bread and rice. Yoghurt " zabadi" is especially good for the child with diarrhoea.

An important consideration in Egypt is the fact that many children with diarrhoea are already malnourished. Remember that diarrhoea is longer and more severe in malnourished children. So to prevent more severe malnutrition you have to emphasise continued feeding during diarrhoea. Moreover, as soon as diarrhoea disappears, the child should resume his normal diet. Feeding should be increased during convalescence to make up for reduced nutritional intake during illness.

Now as a paediatrician and a community doctor you should always encourage and promote breast feeding. You have to find the time to discuss with every mother you come across during your work the importance of breast feeding. Explain to mothers that breast feeding not only confers protection against infection, but also provides a source of low cost and highly nutritious uncontaminated food. Breast feeding promotes growth of the child and protects him against malnutrition. Point out to them that Islam encourages mothers to nurse their babies for a period of 24 months. Moreover, breast feeding creates a bond between mother and child. In the very few occasions where the child suffers from glucose or protein intolerance, refer the child to a specialist for nutritional advice.

Foods to be recommended



INFORMATION SECTION 4

PRACTICE QUESTIONS

Complete the following sentences :

- 1- An integral part of oral rehydration therapy is
- 2- A child who is fasting even in the absence of fluid losses due to diarrhoea, loses daily an estimated
- 3- State four ways in which diarrhoea may lead to malnutrition.
 - o
 - o
 - o
 - o

Write down nutritional plans for the following cases:

- 4- A child aged 6 months who is moderately dehydrated. His mother nurses him but usually gives him as well rice water, soup and karawya.
- 5- A child with no visible signs of dehydration except thirst, who is 3 months of age. The child is being artificially fed.
- 6- A child 15 months of age who is severely dehydrated- He takes a variety of fluids as milk and seven up. He usually eats rice, zabadi, vegetables and occasionally meat.

INFORMATION SECTION 4

ANSWERS TO PRACTICE QUESTIONS

- 1- An integral part of oral rehydration is feeding.
- 2- A child who is fasting in the absence of fluid losses due to diarrhoea, loses daily an estimated 1-2% of his body weight.
- 3-
 - o Loss of appetite
 - o Reduced intestinal absorption
 - o Metabolic breakdown of fat and muscle tissue
 - o Withholding food
- 4-

After being initially rehydrated, when visible signs of dehydration have disappeared, allow the child to be nursed as usual. The mother can also give rice water, soup and gruel
- 5-

Delay feeding until the child has taken one cup of ORS. Then start giving formula half strength every 3 hours. Gradually increase the strength to full strength after 24 hours.
- 6-

After the child is initially rehydrated, advise his mother to give him zabadi, mashed banana, mashed potatoes, rice. Encourage her to give him fluids that the child is accustomed to. Avoid 7-Up as it usually increases the diarrhoea due to the osmotic effect of its high sugar content.

INFORMATION SECTION 5

DRUGS AND OTHER MANAGEMENT DECISIONS

Dear doctor

Acute diarrhoea is caused by a variety of pathogens virus, bacteria, and protozoa.

Viruses causing diarrhoea in children include:

- o Rota virus
- o Norwalk virus
- o Adeno virus
- o Others

Bacteria causing diarrhoea include :

- o Shigella
- o E.coli
- o Vibrio cholera
- o Yersinia
- o Klebsiella
- o Salmonella
- o Campylobacter
- o Clostridia
- o Others

Protozoa include:

- o Entamoeba histolytica
- o Giardia lamblia

Going through these lists of pathogens, you can realize that modern antimicrobials are not effective in dealing with the majority of them. As you know, the majority of childhood diarrhoeas are caused by viral or unknown agents. Moreover, sensitivity studies done here in Egypt have shown that of the remaining diarrhoeal cases, most are caused by bacteria which are resistant to or do not respond to antimicrobials. Antimicrobials are generally effective for Cholera, Shigella (bacillary) dysentery, Entamoeba histolytica and Giardia Lamblia. While prescribing antimicrobials for such cases, don't forget to give ORT.

At the reception area (intake), you can suspect Cholera, if the mother describes the stools as resembling rice water. If there have been no confirmed cases of cholera in the area, you should obtain laboratory confirmation before prescribing an antibiotic for this case. If cholera has been reported in the area; if other family members or neighbours have confirmed cholera cases, cholera may be presumed and treatment for cholera indicated on the management plan. Tetracycline is given in a dose of 50 mg/kg/day in 4 divided doses X 3 days. The first of these doses should be administered while the child is receiving initial rehydration.

Cholera cases should not be treated in primary health care facilities or general hospitals. These cases should be treated in a Communicable Disease Hospital (fever hospital). At the same time you should notify the health authorities at once. Doing so, you will help the country to control the epidemic in a shorter time. At the reception area, you will notify the authority and refer your patient to the Communicable Disease hospital. You should make arrangements for rapid transfer of the child. In cholera, large volumes of stools are produced and dehydration proceeds rapidly. If the child is conscious and can drink ORS, ask the mother to start giving him ORS until he reaches the hospital.

If the history suggests watery stool with blood and mucus, tenesmus, fever and prostration, which are confirmed by clinical examination, Shigella infection may be presumed and the management plan should include treatment with ampicillin (50-100 mg/kg/day in 4 divided doses X 5 days orally), or trimethoprim (TMP)/sulfamethoxazole (SMX) a combined drug (4 mg/kg orally in divided doses). Stool analysis and bacterial culture will be needed to confirm the diagnosis of bacillary dysentery.

If the mother reports during the history that her child is suffering from chronic diarrhoea (more than two weeks) and where the patient is passing stools with blood and mucus, you should order microscopic examination of stools for parasites. At this point you should indicate that Entamoeba histolytica is suspected. Detection of trophozoites in a stool specimen under a microscope confirms the diagnosis of intestinal amebiasis. In this case your management plan is to give metronidazole (flagyl) orally (25 - 50 mg/kg/day every 8 hours for 10 continuous days.

Sometimes you will come across patients who complain of recurrent diarrhoea, with bulky, pale and frothy foul smelling stools. Giardia lamblia may be suspected and should be indicated on the management sheet. Confirm your diagnosis of Giardia lamblia infestation by ordering microscopic examination of stools for parasites. If the diagnosis is confirmed, your management plan should include metronidazole (flagyl) in a dose of 25-100 mg/kg/day for 10 days on 3 divided doses.

Antimicrobials are indicated as well when diarrhoea is accompanied by another specific infection such as pneumonia, otitis media etc. In these cases you should rehydrate the child, and can prescribe ampicillin. In these cases always explain to the mother why you are giving the antibiotic. Explain that in these cases the antibiotics prescribed are Not For The Diarrhoea; but for the other accompanying infection. You know that in our culture mothers tend to repeat prescriptions without consulting doctors particularly if they were convinced that it was effective. So it is important that they know what is the standard treatment for diarrhoea (ORT) and why you are prescribing antibiotics.

Dear doctor, antibiotics are only effective when indicated. Antibiotics prolong diarrhoea and some are hazardous in themselves. Some physicians up till now prescribe chloramphenicol and neomycin. Both drugs are not only ineffective in dealing with diarrhoea, but are potentially hazardous antibiotics causing respectively aplastic anaemia and renal damage.

Moreover, neomycin not only causes renal damage, but it makes diarrhoea, dehydration and nutritional losses worse and could interfere with oral rehydration therapy. It has been well established that neomycin reduces intestinal absorption of electrolytes and nutrients (sodium, potassium, iron, vit B 12, sucrose, lactose, etc). Note well that overuse of antibiotics at a community level may reduce the effectiveness of antibiotics when they are needed, since organisms build up resistance to antibiotics.

Now what about other drugs ? There is no place in a diarrhoea management plan for traditional purgatives. In diarrhoea, purgatives only accelerate dehydration. Anti-emetics are not needed. Vomiting is often caused by acidosis. So, logically your first line of treatment is to correct acidosis. Recent studies in Egypt have shown that ORS because of its bicarbonate content, is effective in correcting acidosis. Giving slowly a few hundred ccs of ORS will usually control vomiting. If vomiting persists you have to use a nasogastric tube to administer ORS. In extreme cases of persistent vomiting, your ultimate management plan will revert to the use of intravenous therapy.

Dear doctor, in formulating your management plan, anti-diarrhoeals or antimotility drugs should never be considered. Anti-diarrhoeals or constipatives such as chalk and bismuth mixtures do thicken the stools. However, the amount of water loss and therefore the amount of dehydration is the same but since the diarrhoea is masked, the mother and the doctor may delay taking proper action. Constipatives are definitely contraindicated in the case of new borns. They may cause intestinal obstruction. Also antimotility drugs like diphenoxylate and loperamide do not change the course of diarrhoea. These drugs may temporarily relieve cramps and other symptoms. However, they also prevent the natural cleansing of the intestine by keeping the bacteria and toxins inside. Their use is frequently responsible for ileus seen with diarrhoea. Moreover, in infants who are severely ill, dehydrated and in shock, diphenoxylate is hazardous since it can depress respiration and worsen the cardiovascular state of the infant.

Dear doctor, it is not good practice to prescribe drugs if not really indicated. Also remember that these are a waste of scarce supplies. Families should spend their money on essentials; like proper food. You should always explain to the mother why you are avoiding prescribing drugs.

Not all cases attending a rehydration center will be suffering only from dehydration. If you have examined your patient carefully, you may have detected signs and symptoms of other diseases or conditions. This may be an infectious disease such as pneumonia, otitis media, or a complication of dehydration like ileus or abdominal distension. The child may also be malnourished. Your decisions would depend on the condition you are encountering. You may or may not prescribe drugs accordingly.

If pneumonia

- o Antibiotics should be prescribed at the reception
- o Start rehydration
- o Refer to inpatient/hospital

If otitis media/tonsillitis

- o Antibiotics should be prescribed at the reception and first dose administered at treatment station
- o Complete rehydration
- o Refer to ENT specialist

If abdominal distension

- o Examine to exclude ileus
- o Relieve the abdominal distension by inserting a Ryle tube and applying suction
- o Give ORS slowly, potassium syrup

If ileus

- o Refer immediately to hospital

If malnutrition

- o Drug therapy may be needed if patient has an infectious disease as well
- o Complete rehydration and refer for nutritional therapy

If congenital anomalies

- o Complete rehydration
- o Counsel the mother
- o Maybe you have to refer the patient to a specialist
e.g in case of congenital heart

In the reception area, you have to decide on the management plan, for all cases. To support your decision you have to examine the child thoroughly. Your decisions in managing the case are not only important in saving the life of the child, but will always reflect your abilities as a doctor, and the standard of medical care rendered in your country. A long list of prescription of drugs that are not indicated, means that you are not aware of the new advances of medicine and results of scientific studies. Your list will burden the child's family, and may affect his health.

Table 1 lists the antimicrobials used in the treatment of specific cases of diarrhoea.

TABLE 1

Antimicrobials used in the treatment of specific cases of diarrhoea

Disease	Drug	Dose
Shigella (bacillary dysentery)	Sulfamethoxazole/ trimethoprim	4mg/kg/day in 2 divided doses X5 days
	OR Ampicillin	50-100 mg/kg/ day in 4 divided doses X 5 days
Cholera (Vibrio cholera)	Tetracycline	50 mg/kg/day in 4 divided doses X 3 days
Amoebic dysentery Giardia lamblia	Metronidazole (Flagyl)	25-50 mg/kg/day every 8 hours for 10 contin- uous days
Pneumonia, otitis media, tonsillitis or any other accompanying infection	Ampicillin	50-100 mg/kg/d in 4 divided doses X5 days

INFORMATION SECTION 5

PRACTICE QUESTIONS

Check the correct answer:

1- Antibiotics should be prescribed in case of diarrhoea caused by

- a- [] Rota virus
- b- [] Klebsiella
- c- [] Clostridia
- d- [] Adenovirus
- e- [] None of the above

Match Column A and B

2- Column A Disease	Column B Drug therapy
a- Amoebic dysentery	i- Tetracycline
b- Bacillary dysentery	ii- Sulfamethoxazole/ trimethoxazole
c- Cholera	iii- Neomycin
d- Pneumonia	iv- Chloramphenicol
	v- Ampicillin
	vi- Metronidazole

Indicate your management plan for the following cases with regard to drug therapy along with fluid therapy. Only in these cases where drugs are indicated, state name of drug and the dose recommended.

3- A child aged 8 months weighing 8 kgms presenting with watery stools, tenesmus, fever, and prostration. On examination you find that the child is moderately dehydrated and has blood in the stools.

4- A child weighing 6 kgms, severely dehydrated passing 10 motions of watery stools per day for the last two days.

- 5- A child weighing 12 Kgms, having recurrent diarrhoea, with bulky, pale and frothy foul stools. The child is only mildly dehydrated.
- 6- A child weighing 10 kgms is moderately dehydrated. The child has otitis media as well.
- 7- A child weighing 15 Kgms suffering from diarrhoea for one month. The child is mildly dehydrated but there was blood and mucus in stools.
- 8- Child moderately dehydrated, weighing 8 Kgms. His mother stated that the child is vomiting

Check [] if the statement is false or true

- | | False | True |
|--------------------------------------------------------------------------------------|-------|------|
| 9- In case of malnutrition you have to refer the case immediately to hospital | [] | [] |
| 10- In ileus, the decision must be to refer the case as an emergency to the hospital | [] | [] |

- | | False | True |
|----------------------------------------------------------------------------------------------------------|-------|------|
| 11- For a case of pneumonia, plan to start rehydration first then refer to a hospital | [] | [] |
| 12- In case of Otitis media, you should refer the case immediately to the hospital | [] | [] |
| 13- After rehydrating a mentally retarded case, you should discuss with the mother the child's condition | [] | [] |
| 14- You should examine every case of abdominal distension to exclude ileus before rehydrating the child | [] | [] |

5- Match column A & B

- | A | B |
|------------------------------------------------------|----------------------------|
| a. Abdominal distention | i. microscopic examination |
| b. Watery stool, blood & mucus | ii. bacterial culture |
| c. Recurrent chronic diarrhoea with or without blood | iii. serum electrolyte |
| | iv. serological tests |

INFORMATION SECTION 5

ANSWERS TO PRACTICE QUESTIONS

- 1- e []
- 2-
 - a and vi
 - b and ii
 - c and i
 - d and v
- 3-

Sulfamethoxazole /trimethoprim 4X8mg/day orally in two divided doses.Or: Ampicillin 50 - 100 X 8mg/day orally in 4 divided doses for 5 days. The exact dose will depend on the severity of the clinical picture. Stool analysis and bacterial culture will be needed to confirm the diagnosis of bacillary dysentery.
- 4-

No drugs-Only intravenous
- 5-

Suspect Giardia.Confirm diagnosis by a microscopic examination of stools for parasites-Once confirmed give metronidazole(flagyl) 25-50 X12 mgs /day every 8 hours for 10 continuous days the dose depends on the severity of the case
- 6-

Ampicillin for otitis media 10 X 50-100 mgs/day in 4 divided doses for 5 days. The dose depends on the severity of the case. You may have to refer the case to a specialist as well.
- 7-

This is suggestive of Amoebic dysentery.Confirm the diagnosis by ordering a microscopic examination for parasites. If confirmed give metronidazole (flagyl) 25-50 X 15 mgs/day/8hours for continuous 10 days. The dose depends on the severity of the case.
- 8-

None. This child does not require any drugs other than ORT. If vomiting persists and is not controlled shift to nasogastric.

- 9- [] False- Rehydrate the child first
- 10- [] True
- 11- [] True
- 12- [] False Carry out rehydration first, then refer to
 ENT specialist
- 13 - [] True
- 14- !] True

- 5- a iv
- b ii
- c i

SUMMARY

Dear doctor,

You have been exposed to a Self Instructional Unit on Case Management Of Acute Diarrhoea In Children. You have learned that the standard treatment of diarrhoea is given to correct dehydration. If the case is mild or moderate, you should decide on ORT. Nasogastric therapy is a temporary method. The main indications of nasogastric rehydration at the reception area are : a child suffering from drug intoxication, a child attending late at night, or if severely dehydrated ,but intravenous therapy is not available. You also learned that only in severe cases where the child has ileus, is in shock or in coma , then intravenous therapy is indicated.

It was also pointed out that proper management requires that feeding be an integral part of oral rehydration therapy. Continued feeding is recommended and breast feeding is encouraged. Now you are also able to identify cases in need of drug therapy. Drugs are only indicated in case of bacillary dysentery, cholera, amoebic dysentery and in case of giardia lamblia. Diagnosis of these conditions should be confirmed by laboratory investigations. Also antimicrobials are indicated when diarrhoea is accompanied by another specific infection such as pneumonia, tonsillitis ,otitis media etc... Remember that antibiotics at a community level may reduce the effectiveness of antibiotics when they are needed since organisms build up resistance to antibiotics.

Among the decisions to be taken is referring cases to hospitals ,or to specialists. Some of your referrals should be done immediately. In other cases you have first to initiate rehydration before you refer the case.

I would like to draw your attention to the importance of explaining to the mother your management plan and the decisions you make. In doing so, you are not only training her but you will involve her in the care of the child. Remember she is the one who will actually give the care at home.

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