

Diarrheal Diseases

Prof. Faten M. Rabie

Objectives of the lecture

Definition of diarrhea

Type of diarrhoeal diseases

Assessment of dehydration

Oral rehydration therapy

Indications of drugs in the treatment of diarrhea

Prevention of diarrhea

INTRODUCTION

Diarrheal disease is the second leading cause of death in children under five years old, and is responsible for killing 1.5 million children every year.

Diarrhea can last several days, and can leave the body without the water and salts that are necessary for survival.

Most people who die from diarrhea actually die from severe dehydration and fluid loss.

Children who are malnourished or have impaired immunity are most at risk of life-threatening diarrhea.

Definition of diarrhea

Diarrhea from the Greek "diarrhea" meaning "a flowing through"

Diarrhea is the passage of loose or watery stools, usually at least three times in 24 hour period.

It is the consistency of the stools rather than the number that is most important.

Frequent passing of formed stools is not diarrhea.

Babies fed only breast milk often pass loose, "pasty" stools; this also is not diarrhea

To most individuals, diarrhea means an increased frequency or decreased consistency of bowel movements; however, the medical definition is more exact than this.

Diarrhea best correlates with an increase in stool weight; stool weights above (300 gs) per day generally indicates diarrhea. This is mainly due to excess water, which normally makes up 60-85% of fecal matter.

In this way, true diarrhea is distinguished from diseases that cause only an increase in the number of bowel movements (hyper defecation) or incontinence (involuntary loss of bowel contents).

Classification of diarrhea

Secretory diarrhea

Secretory diarrhea means that there is an increase in the active secretion

There is little to no structural damage.

The most common cause of this type of diarrhea is a cholera toxin that stimulates the secretion of chloride ions. Therefore, to maintain a charge balance in the lumen, sodium is carried with it, along with water.

Osmotic diarrhea

Osmotic diarrhea occurs when too much water is drawn into the bowels.

This can be the result of maldigestion (e.g., pancreatic disease or [Coeliac disease](#)), (in which the nutrients are left in the lumen to pull in water.

Osmotic diarrhea can also be caused by osmotic [laxatives](#)) which work to alleviate [constipation](#) by drawing water into the bowels).

In healthy individuals, too much [magnesium](#) or [vitamin C](#) or undigested [lactose](#) can produce osmotic diarrhea and distention of the bowel.

Exudative diarrhea

Exudative diarrhea occurs with the presence of blood and pus in the stool. This occurs with

[inflammatory bowel diseases](#)

[Crohn's disease](#)

[ulcerative colitis](#)

Other severe infections

Motility-related diarrhea

Motility-related diarrhea is caused by the rapid movement of food through the intestines (hypermotility).

If the food moves too quickly through the GI tract, there is not enough time for sufficient nutrients and water to be absorbed.

This can be due to a

Vagotomy

Diabetic neuropathy

Hyperthyroidism can produce hypermotility and lead to **pseudodiarrhea** and occasionally real diarrhea.

Diarrhea can be treated with antimotility agents

Inflammatory diarrhea

Inflammatory diarrhea occurs when there is damage to the mucosal lining or brush border, which leads to a passive loss of protein-rich fluids, and a decreased ability to absorb these lost fluids.

Features of all three of the other types of diarrhea can be found in this type of diarrhea.

It can be caused by bacterial infections, viral infections, parasitic infections, or autoimmune problems, tuberculosis, colon cancer, and enteritis.

Clinical types of diarrheal diseases

Four clinical types of diarrhoea can be recognized, each reflecting the basic underlying pathology and altered physiology:

Acute watery diarrhoea (including cholera), which lasts several hours or days: the main danger is dehydration; weight loss also occurs if feeding is not continued;

Acute bloody diarrhoea, which is also called *dysentery*: the main dangers are intestinal damage, sepsis and malnutrition; other complications, including dehydration, may also occur;

Persistent diarrhea,

which lasts 14 days or longer: the main danger is malnutrition and serious non-intestinal infection; dehydration may also occur;

Diarrhea with severe malnutrition (marasmus or kwashiorkor):

the main dangers are severe systemic infection, dehydration, heart failure and vitamin and mineral deficiency.

The most common causes of acute diarrhea are infections, food poisoning, and medications.

Medications are a frequent and often over-looked cause, especially [antibiotics](#) and [antacids](#).

Less often, various sugar free foods, which sometimes contain poorly absorbable materials, cause diarrhea.

COMMON ORGANISMS CAUSING DIARRHEA

Common organisms causing diarrhea are:

- Viruses** : Rotavirus
Enterovirus
- Bacteria** : E. coli
Shigella
Camylobacter jejuni
V. Cholerae
Salmonella (non typhoidal (
- Protozoal** : Giardia duodenalis
Entamoeba Histolytica
Cryptosporidium

The following are the more usual causes of chronic diarrhea:

AIDS

colon [cancer](#) and other bowel tumors

endocrine or hormonal abnormalities (thyroid, diabetes mellitus)

food allergy

inflammatory bowel disease (Crohn's disease and ulcerative colitis)

lactose intolerance

malabsorption syndromes (celiac and Whipple's disease)

other (alcohol, microscopic colitis, radiation, surgery)

Assessment of dehydration

◦ History:

Ask about:

Presence of blood in the stool;

Duration of diarrhea

Presence of fever, cough, or other important problems (e.g. Convulsions, recent measles);

Pre-illness feeding practices;

Type and amount of fluids (including breastmilk) and food taken during the illness;

Drugs or other remedies taken;

Immunization history.

Physical examination

First, check for **signs and symptoms of dehydration.**

- **General condition:** is the child alert; restless or irritable; lethargic or unconscious?
- **Are the eyes normal or sunken?**
- **When water or ORS solution is offered to drink, is it taken normally or refused, taken eagerly, or is the child unable to drink owing to lethargy or coma?**
- **Skin turgor.** When the skin over the abdomen is pinched and released, does it flatten immediately, slowly, or very slowly (more than 2 seconds)?

Then, check for signs of other important problems.

- **Does the child's stool contain red blood?**
- **Is the child malnourished?**
- **Look also for oedema of the feet; if this is present with muscle wasting, the child is severely malnourished.**

Take the child's temperature :

- **Fever may be caused by severe dehydration, or by a non-intestinal infection such as malaria or pneumonia.**

Determine the degree of dehydration and select a treatment plan

GENERAL CONDITION	Well, alert	Restless, irritable	Lethargic or unconscious
EYES	Normal	Sunken	Sunken
THIRST	Drinks normally, not thirsty	Thirsty, drinks eagerly	Drinks poorly, or not able to drink
SKIN PINCH	Goes back quickly	Goes back slowly	Goes back very slowly
DECIDE	The patient has NO SIGNS OF DEHYDRATION	If the patient has two or more signs in B there is SOME DEHYDRATION	If the patients has two or more signs in C, there is SEVERE DEHYDRATION
TREAT	Use Treatment Pan A	use Treatment Plan B	use Treatment Plan C

Estimate the fluid deficit

Assessment	Fluid deficit as % of body weight	Fluid deficit in ml/kg body weight
No signs of dehydration	<5%	<50 ml/kg
Some dehydration	5-10%	50-100 ml/kg
Severe dehydration	>10%	>100 ml/kg

For example, a child weighing 5 kg and showing signs of "some dehydration" has a fluid deficit of 250-500 ml.

Plan A

four rules of Treatment Plan A:

Rule 1: Give the child more fluids than usual, to prevent dehydration

Rule 2: Give supplemental zinc (10 - 20 mg) to the child, every morning for 14 days

Rule 3: Continue to feed the child, to prevent malnutrition

Rule 4: Take the child to a health worker if there are signs of dehydration or other problems

Rule 1: Fluids

Suitable fluids:

Most fluids that a child normally takes can be used.

It is helpful to divide suitable fluids into two groups:

➤ *Fluids that normally contain salt, such as:*

- ORS solution
- salted drinks (e.g. salted rice water or a salted yoghurt drink)
- vegetable or chicken soup with salt.

➤ ***Fluids that do not contain salt, such as:***

- plain water
- water in which a cereal has been cooked (e.g. unsalted rice water)
- unsalted soup
- yoghurt drinks without salt
- green coconut water
- weak tea (unsweetened)
- unsweetened fresh fruit juice.

Unsuitable fluids

A few fluids are potentially dangerous and should be avoided during diarrhea. Especially important are drinks sweetened with sugar, which can cause osmotic diarrhoea and hypernatraemia. Some examples are:

- soft drinks
- sweetened fruit drinks
- sweetened tea.

Other fluids to avoid are those with stimulant, diuretic or purgative effects, for example:

- coffee
- some medicinal teas

Constituents of WHO ORS

Sodium chloride: 3.5 gm ,

Sodium bicarbonate: 2.5 gm ,

Potassium chloride: 1.5 gm and

Glucose : 20 gm in one liter of water .

How much fluid to give

The general rule is: give as much fluid as the child or adult wants until diarrhea stops. As a guide, after each loose stool, give:

- **children under 2 years of age:** 50-100 ml (a quarter to half a large cup) of fluid
- **children aged 2 up to 5 years:** 100-200 ml (a half to one large cup)

Rule 2: Give supplemental zinc

By giving zinc as soon as diarrhoea starts, the duration and severity of the episode as well as the risk of dehydration will be reduced.

By continuing zinc supplementation for 14 days, the zinc lost during diarrhoea is fully replaced and the risk of the child having new episodes of diarrhoea in the following 2 to 3 months is reduced.

Give 20 mg per day for infants and children above 6 months old and only 10mg per day for infants below 6 months old.

Rule 3: Continue to feed the child

Feeding should be continued during diarrhea and increased afterwards. Food should *never* be withheld and the child's usual foods should *not* be diluted. Breastfeeding should *always* be continued.

When food is given, sufficient nutrients are usually absorbed to support continued growth and weight gain.

Continued feeding also speeds the recovery of normal intestinal function, including the ability to digest and absorb various nutrients.

Rule 4: Take the child to a health worker if there are signs of dehydration or other problems

The mother should take her child to a health worker if the child:

- Starts to pass many watery stools;
- Has repeated vomiting;
- Becomes very thirsty;
- Is eating or drinking poorly;
- Develops a fever;
- Has blood in the stool; or
- The child does not get better in three days

Plan B

Children with some dehydration should receive oral rehydration therapy (ORT) with ORS solution in a health facility for **4 hours**

Children with some dehydration should also receive zinc supplementation as described above.

How much ORS solution is needed

The amount is estimated by multiplying the **child's weight in kg times 75 ml.**

If the child's weight is not known, select the approximate amount according to the child's age.

Monitoring the progress of oral rehydration therapy

After four hours, reassess the child fully, Then decide what treatment to give next:

- **If signs of *severe dehydration* have appeared, intravenous (IV) therapy should be started following Treatment Plan C.**
- **This is very unusual, however, occurring only in children who drink ORS solution poorly and pass large watery stools frequently during the rehydration period.**

-
- If there are *no signs of dehydration*, the child should be considered fully rehydrated. When rehydration is complete:
 - the skin pinch is normal;
 - thirst has subsided;
 - urine is passed;
 - the child becomes quiet, is no longer irritable and often falls asleep

Drug indications in diarrhea

Antimicrobials should not be used routinely.

This is because it is not possible to distinguish clinically episodes that *might* respond, such as diarrhea caused by enterotoxigenic *E. coli*, from those caused by agents unresponsive to antimicrobials, such as rotavirus or cryptosporidium.

In addition, use of antimicrobials adds to the cost of treatment, risks adverse reactions and enhances the development of resistant bacteria

Antimicrobials are reliably helpful *only* for:

- **Children with bloody diarrhea (probable shigellosis)**
- **Suspected cholera with severe dehydration**
- **Serious non-intestinal infections such as pneumonia.**
- **Anti-protozoal drugs are *rarely* indicated.**

Prevention of diarrhea

Key measures to prevent diarrhoea include :

access to safe drinking-water

improved sanitation

exclusive breastfeeding for the first six months of life

Improved weaning practices

good personal and food hygiene

health education about how infections spread

rotavirus vaccination.

The End



Thank You

