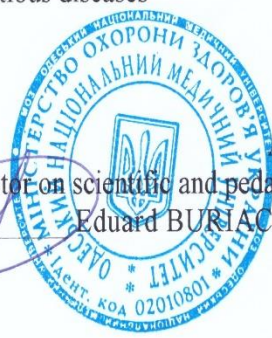


Report

MINISTRY OF HEALTH OF UKRAINE
ODESSA NATIONAL MEDICAL UNIVERSITY
Faculty of Medicine
Department of infectious diseases


Vice rector on scientific and pedagogical work
Eduard BURIACHKIVSKYI
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APPROVED

STUDENT'S GUIDELINES
FOR SELF-INDIVIDUAL WORK
ON STUDY DISCIPLINE

Faculty of dentistry, course 4
Infectious diseases
Content module 1

Approved:

Meeting of the Department of Infectious Diseases

Odessa National Medical University

Protocol No. 1 of 29.08.2024

Head of the Department of Infectious Diseases



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Teacher(s)

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Topic No. 2: "Dehydration shock in the clinic of infectious diseases"

Goal:To improve students' knowledge of pathogenesis, clinical manifestations and emergency care for dehydration shock;

Basic concepts:dehydration shock, diarrhea, emergency conditions.

Plan:

1. Theoretical questions:

Dehydration shock is a pathological condition that develops as a result of a catastrophic decrease in the volume of circulating blood (CCB) due to the body's loss of water and electrolytes (dehydration and demineralization) during vomiting and diarrhea; characterized by pronounced changes in water-electrolyte balance, acid-base status, cardiac activity, vascular and muscle tone, kidney function, and the development of hypoxia. Dehydration shock is a type of hypovolemic shock that develops as a result of external fluid losses and a significant decrease in BCC.

Hypovolemia and hypovolemic shock can develop for many reasons. According to the classification of E. Braunwald and G. Williams (1987), hypovolemic shock is divided into two main groups:

- Caused by external fluid losses:
 - blood loss (hemorrhagic shock);
 - dehydration (losses due to vomiting and diarrhea);
 - losses through the kidneys (diabetes and insipidus; excess intake of diuretics);
 - losses through the skin (wound traumatic disease; hyperthermia, excessive sweating).
- Caused by sequestration of fluid inside the body:
 - fractures (traumatic shock);
 - ascites (peritonitis, pancreatitis, liver cirrhosis);
 - intestinal obstruction;
 - extensive swelling;
 - hemothorax, hemoperitoneum.

Rules of infusion therapy in conditions of dehydration:

It should be noted that the issue of initial treatment measures is decided depending on the reasons that led to the development of dehydration. Thus, in the early stages of dehydration with salmonellosis, food toxic infections, Zonne's shigellosis, an urgent measure is the removal of toxins from the gastrointestinal tract. In cholera, some variants of the course of escherichia, and viral gastroenteritis, the trigger mechanism for the development of dehydration is different, which is why mechanical removal of toxins from the digestive tract is impractical. Therefore, the main importance will be the correctly conducted rehydration therapy, which, according to the figurative expression of A.V. Shkurby (2002), will enable the body to "gather strength" in order to cope with the mechanisms that "triggered" the dehydration shock.

A patient with severe dehydration (dehydration shock) should be hospitalized in the general intensive care unit closest to the place of detection. Long-term transportation of the patient to infectious hospitals (especially remote ones) is

unacceptable, which is often explained by the need for strict isolation of the infectious patient. Patients with intestinal infections can also be hospitalized in ordinary wards, because their contagiousness is low, but at the same time, the requirements for disinfection of their secretions increase.

In the case of a sharp violation of hemodynamics due to dehydration with the presence of shock, treatment should be started at the place of detection of such a patient. It is possible to transport the patient to the hospital only after stabilization of his hemodynamic parameters. In addition, during the entire time of transporting the patient to the hospital, it is necessary to continue the started infusion therapy, while carefully counting (and recording) the amount of injected solutions. During transportation, it is necessary to regularly measure blood pressure, heart rate (HR), blood saturation, monitor the rate of urination. The speed of introduction of solutions:

1. The first 20-30 minutes — 100-120 ml/min. (2-3 liters),
2. The next 30-40 minutes — 50-60 ml/min.
3. Further administration is carried out at a rate of 25-30 ml/min.

No matter how serious the patient's condition seems, the infusion should always be started only with crystalloids. First of all, it is necessary to eliminate dehydration ("hydra-" - water!). Therefore, it is necessary to give this water to the patient's body - at least 800-1000 ml of crystalloids should be infused first, and only then should the colloids be administered.

What does this tactic give? Firstly, it will save the patient from additional depletion of interstitial and intracellular space, and secondly, it will greatly reduce the possibility of such a patient developing complications typical of the use of colloids (coagulation disorders and kidney failure).

We believe that crystalloids should still be the basis of infusion therapy in patients with dehydration. But even colloids cannot be dispensed with in modern infusionology. After all, no one canceled the classic rules of infusion therapy! According to the same classical rules, the ratio of crystalloids and colloids in most patients should be 4:1. Taking into account the peculiarities of the pathogenesis of the state of dehydration (predominant loss of water and electrolytes of the interstitial space), the recommendation to slightly increase this ratio in favor of crystalloids seems pathogenetically justified. That is, crystalloids : colloids = 5 : 1. In practice, this will mean: for every 1 liter of crystalloids, you need to pour 200 ml of modern colloids. Among the latter are solutions of hydroxyethyl starch (for example, Hecodez or Hekoton) and gelatin derivatives (for example, Volutenz).

It should also be noted that in some cases it is necessary to transfuse a very large amount of saline solutions due to continued fluid loss in the hospital with diarrhea and vomiting, for example, with cholera. Individual patients, according to the materials of cholera hospitals, had to transfuse 40-60 liters of saline solutions per day. Therefore, careful monitoring of infusion therapy is of great importance. To characterize the adequacy of the latter, you need:

strict accounting of fluid losses by patients (number of stools and vomitus, volume of diuresis); monitoring of heart rate, blood pressure, breathing rate;

observation of the dynamics of the degree of hydration of the mucous membrane of the oral cavity, the speed of straightening of the skin fold (turgor), the tone of the eyeballs.

One of the main clinical indicators that indicate the adequacy and sufficiency of the correction of water-electrolyte disorders is a decrease in the frequency and prevalence of skeletal muscle spasms.

The control of the effectiveness of therapy is the CVT indicator. With a norm of 6-12 cm of water. Art. with severe dehydration, this indicator can drop to zero. Against the background of active rehydration, the CVT level should increase. If the CVT rose above 12-15 cm of water. Art., this indicates either a dangerous overload of the vascular bed with solutions (hypervolemia due to excessive transfusion of infusion solutions), or a previously neglected concomitant cardiac pathology with left ventricular failure. In any case, the rise of CVT above 15 cm of water. Art. is an alarm signal and should be avoided during treatment. Accordingly, if the patient has a central catheter, it is highly desirable to measure the CVT level often enough (at least 2-3 times a day).

2. Questions for self-control:

- The concept of dehydration, types of dehydration, degrees of dehydration.
- Stages of the pathogenesis of dehydration shock.
- The main infectious nosologies, which are characterized by the development of dehydration shock.
- Features of the clinical manifestations of dehydration of the 4th degree.
- Possible complications of dehydration shock.
- Methods of laboratory-instrumental research, which must be performed in case of suspicion of dehydration shock.
- Tactics of treatment of patients with dehydration shock.

3. Indicative tasks for processing theoretical material.

- Compile a dictionary of basic concepts on the topic.

4. Practical tasks.

- Determine the plan of laboratory and instrumental studies of a patient with 3rd degree of dehydration according to Pokrovsky.
- Carry out differential diagnosis of dehydration and cardiogenic shock.
- to create a treatment plan for a patient with cholera, weighing 80 kg., with dehydration of the 4th degree according to Pokrovsky.

5. Individual tasks for students of higher education:

Make an oral report on one of the suggested topics:

- Characteristics of the main solutions used for the treatment of dehydration shock, differences between them.
- A clinical case of dehydration shock (based on the analysis of scientific literature)

6. List of recommended literature:

Main:

1. Infectious diseases: textbook / O.A. Golubovska, M.A. Andreychyn, A.V. Shkurba and others; under the editorship O.A. Golubovska 4th ed., revised. and added K.: VSV "Medicine", 2022. p. 346-358.

Additional:

1. Infectious diseases. Course of lectures: study guide / E.V. Nikitin, K.L. Servetskyi, T.V. Shepherd [and others]. Odesa: ONMedU, 2012. p. 232-249. (Medical student library series).
2. Epidemiology in schemes: study guide / M.D. Chemych, N.G. Malysh, O.M. Chemych, N.I. Ilyina – Vinnytsia: Nova Kniga, 2020. – 256 p.
3. Atlas of infectious diseases / [M.A. Andreychyn, V.S. Kopcha, S.O. Kramarev and others]; under the editorship MA. Andreychyna – 2nd ed., corr. and added – Ternopil: Textbooks and manuals, 2017. – 288 p.
4. Infectious diseases: a textbook: in 2 volumes / edited by V.P. Malyo, M.A. Andreychyna – Lviv: Magnolia 2006, 2018. – Volume 2. - 726 p.
5. Infectious diseases: a textbook: in 2 volumes/edited by V. P. Malyo, M. A. Andreychyna. – Lviv: Magnolia 2006, 2018. – T. 1. – 652 p.

Electronic information resources:

1. <http://moz.gov.ua>- Ministry of Health of Ukraine
2. www.ama-assn.org–American Medical Association /American Medical Association
3. www.who.int- World Health Organization
4. www.dec.gov.ua/mtd/home/- State Expert Center of the Ministry of Health of Ukraine
5. <http://bma.org.uk>– British Medical Association
6. www.gmc-uk.org- General Medical Council (GMC)
7. www.bundesaerztekammer.de– German Medical Association
8. <https://library.odmu.edu.ua/catalog/>- Electronic catalog

Topic № 3: "Helminth infections"

Goal: To form and improve students' knowledge of etiology, epidemiology, pathogenesis, clinical manifestations, diagnosis and treatment of helminth infections.

Basic concepts: helminthiasis, nematodes, cestodoses, trematodes, anthelmintic drugs.

Plan:

1. Theoretical questions:

Helminth infections are a group of parasitic diseases caused by roundworms and flatworms, which are chronic and have a systemic effect on the body.

Helminth infections are classified depending on the biological species of the parasitic worms, ways of infection, place of residence in the human body, way of existence in the external environment.

Depending on the biological characteristics, the following are distinguished:

- nematodes (enterobiosis, ascariasis, trichocephalosis, nekatorosis, hookworm disease) - occur due to roundworms;
- cestodoses (echinococcosis, teniosis, teniarynchosis, cysticercosis, hymenolepidosis) - provoked by flat tapeworms;
- trematodes (fasciolosis, clonorchosis, opisthorchosis, schistosomiasis) - caused by flatworms from the class of hermits.

Depending on the place of localization, helminths are:

- intestinal - parasitic in the intestines;
- extraintestinal - live in the liver and biliary tract, blood vessels, subcutaneous tissue, brain, urinary tract, lungs, muscles, bones, heart and other organs and tissues.

Intestinal helminthiasis is more common.

Depending on the way of existence, worms are divided into:

- luminal - live in the cavity of the organ;
- tissue - live in subcutaneous fat and other tissues.

Depending on the ways of infection and the features of the development of worms, these parasitic diseases are divided into:

• **Geohelminthiasis.**

In most cases, they occur due to roundworms, for example: roundworm, hookworm or nekator, intestinal acne, etc. The development of eggs and larvae occurs in the soil under certain external conditions. Invasion appears when personal hygiene rules are not followed, eating contaminated water, fruits, vegetables and other contacts with soil contaminated with feces.

• **Biohelminthiasis.**

Caused by tapeworms, tapeworms, and some roundworms. These infestations include opisthorchosis, dirofilariasis, teniosis, trichinellosis, echinococcosis, fasciolosis and other types of helminthic lesions. To infect a person, the worm must develop in the body of one or more intermediate hosts (for example, in fish,

molluscs, insects, etc.). Infection occurs when drinking raw water or eating meat and fish that have undergone improper heat treatment.

- **Contagious.**

Infection with these parasites occurs during contact between a sick and a healthy person, through common objects: dishes, linen, etc., or through self-infection due to non-compliance with the rules of personal hygiene. These helminth infections include enterobiosis, cysticercosis, strongyloidiasis, and hymenolepidosis.

Infection with helminthiasis occurs in two ways:

- orally - parasites enter the body when swallowed with water and food or due to non-compliance with hygiene rules;
- percutaneously - larval stages of worms enter the body through the skin.

Most often, infection occurs orally due to non-compliance with hygiene rules, improper heat treatment of meat and fish, consumption of contaminated food and water. The source of the spread of eggs or larvae of worms is a sick person or an infected domestic or wild animal

Clinical manifestations of helminthiasis:

Signs of worms are variable and depend on many factors: the type of parasite, the degree of infection, the nature of the body's general immune response to the invasion. In the course of helminthiasis, early (or acute) and chronic phases are distinguished. The acute stage lasts from the moment of infection and lasts from 2–3 weeks to 2 (sometimes 4) months. Chronic phase - several years.

The main symptoms of worms are associated with mechanical damage to organs and tissues, toxic-allergic reaction, decreased immunity, vitamin and nutritional deficiency.

Acute phase

The main symptoms of worms are toxic-allergic reactions that occur due to toxins. Their entry into the blood leads to the appearance of the following symptoms of worm infestation:

- low fever;
- muscle pain;
- polymorphic and exudative rash on the skin;
- swelling of the face;
- conjunctivitis;
- an increase in lymph nodes.

The toxic effect on the nervous system leads to the appearance of such symptoms of worms as increased fatigue, sleep disturbances, excessive irritability or apathy. A person's appetite may also be impaired.

Depending on the location of the parasites, signs of various syndromes appear:

- abdominal - abdominal pain, various indigestion;
- pulmonary - dry cough, shortness of breath, bronchial spasm, volatile infiltrates in the lungs;
- Hepatolienal — an increase in the size of the liver and spleen.

In severe cases, lymphadenopathy, sore throat, migratory pneumonia (with massive lesions), pleuropneumonia, myocarditis, hepatitis, thrombosis of brain vessels, meningoencephalitis may develop.

A characteristic, and sometimes the only, sign of the presence of worms in the body is revealed during a general blood test. Due to the presence of parasites and their toxins, the level of eosinophils increases. It is by this indicator that a therapist or a pediatrician can suspect the development of an invasion. With massive lesions, leukocytosis is observed.

The lack of specific treatment leads to the development of the chronic stage.

Chronic phase

At this stage of the development of the invasion, organ-specific symptoms, which are determined by mechanical damage to tissues or organs, prevail.

With intestinal helminths, abdominal pain and indigestion come to the fore. Long-term deterioration of absorption in the intestine leads to the appearance of symptoms of worms, which are caused by hypovitaminosis and insufficient nutrients. As a result, a person constantly loses weight, he develops iron deficiency anemia. Massive worm infestations can lead to hemorrhagic colitis, rectal prolapse, or intestinal obstruction.

If helminthic infections affect the hepatobiliary system, a person may develop cholecystitis, cholangitis, mechanical jaundice, and pancreatitis. In these cases, pains mostly appear in the upper parts of the abdomen, in the right hypochondrium. Sometimes the condition is aggravated by biliary colic.

The migration of pinworms in girls and women to the genitals can provoke the development of vaginitis, endometritis and salpingitis. Patients with enterobiosis often complain of itching in the anus area, which especially often occurs at night, when the female crawls out of the rectum and lays eggs.

Chronic strongyloidiasis causes stomach and duodenal ulcers. Trichinellosis can lead to damage:

- respiratory organs: bronchitis and bronchopneumonia;
- heart and blood vessels: myocarditis, heart failure;
- nervous system: meningoencephalitis, encephalomyelitis.

Echinococcosis can provoke the appearance of lung and liver cysts, which can fester and cause purulent pleurisy or peritonitis. During filariasis, blockage of lymphatic vessels can cause lymphangitis, lymphedema of the legs with swelling of the mammary glands and genitals. The chronic course of hookworms leads to iron deficiency anemia more often than other infestations.

With worm infestations, which are accompanied by the reproduction of larvae, manifestations of an allergic nature often persist. Particularly severe allergic manifestations are observed during single-chamber echinococcosis. Anaphylactic shock sometimes develops when the cysts formed by this parasite are ruptured.

Such helminthiasis as toxocariasis, larval paragonimosis, single-chamber echinococcosis, alveococcosis, and cysticercosis are particularly difficult to treat. They are often accompanied by multiple lesions of the lungs, eyes, brain, kidneys, heart and other organs. Also, a severe course is noted during such tropical invasions as filariasis and schistosomiasis.

If the course of chronic helminthiasis continues for a long time, some worms may self-eliminate due to natural death or expulsion. Their presence in the body

always leads to residual phenomena, which in severe cases become the cause of invalidation of the patient.

The nature of the consequences of worms depends on their species.

Complications of helminthiasis can be various pathologies and conditions:

- Hypovitaminosis
- A significant decrease in body weight
- Anemia
- Frequent infections
- Peritonitis
- Acute appendicitis
- Intestinal obstruction
- Allergic reactions
- Deficiency of trace elements and nutrients
- Violation of psycho-emotional state and psyche
- Termination of pregnancy
- Violation of fetal development
- Inflammatory diseases: colitis, cholecystitis, pancreatitis, hepatitis, myocarditis, bronchitis, pneumonia, meningoencephalitis, cystitis, vaginitis, etc.
- Destruction of organs and tissues: heart, brain, eyes, kidneys, etc

Especially often, complications develop in the absence of treatment.

To detect helminthiasis, you need to contact an infectious disease specialist. Identification of the causative agent of the invasion is carried out with the help of laboratory tests.

To detect parasites, the doctor can prescribe various tests for worms:

- scraping for enterobiosis;
- stool analysis for worm eggs;
- serological tests: IFA, RSK, RIF, RNGA;
- histological coprology;
- helmintolarvoscopy.

The type and time of the tests are determined by the doctor, who takes into account the specifics of the clinical case.

To obtain a detailed picture of worm infestation and assess the degree of damage to each organ, various types of laboratory and instrumental diagnostics are prescribed:

- general analysis of blood and urine;
- blood biochemistry;
- Ultrasound of internal organs;
- FGDS;
- radiography;
- MRI;
- CT;
- colonoscopy;
- endoscopic biopsy, etc.

The diagnostic plan is drawn up individually. If necessary, gastroenterologists, cardiologists, nephrologists and other specialized specialists are involved for consultation.

For treatment, etiotropic therapy is used - anthelmintic drugs. They are prescribed taking into account the type of helminth, age and general health of the patient. Symptomatic treatment is also recommended to the patient.

Various drugs can be used for etiotropic treatment of helminthiasis:

- anti-nematodes;
- anti-trematozoans;
- proticestodous;
- broad antiparasitic spectrum.

For symptomatic therapy, the following are used:

- enterosorbents;
- probiotics;
- antihistamines;
- enzymes;
- vitamin and mineral complexes;
- cardiac glycosides;
- glucocorticoids, etc.

Sometimes surgical operation is the main method of treatment. During echinococcosis, a cyst or abscess of the liver or lung is removed. Operations are also performed during alveococcosis, cysticercosis and other dangerous invasions. Their volume depends on the clinical case. Surgical intervention may be prescribed additionally during the treatment of peritonitis, purulent pleurisy, intestinal obstruction, acute appendicitis and other complications.

The effectiveness of deworming is determined by the results of repeated parasitological studies. The order of their implementation is determined by the doctor depending on the type of invasion.

2. Questions for self-control:

- Concept of helminthiasis, classification of helminthiasis?
- Etiology, life cycle, and clinical manifestations of nematodes?
- Etiology, life cycle, and clinical manifestations of trematodes?
- Etiology, life cycle, and clinical manifestations of cestodoses?
- Peculiarities of collecting epidemiological anamnesis in patients suspected of helminthiasis?
- Methods of laboratory diagnosis of helminthiasis?
- Methods of treatment of helminthiasis? Anthelmintic drugs?
- Ways to prevent helminth infections?

3. Tasks for processing theoretical materials.

- Compile a dictionary of basic concepts on the topic.

4. Practical tasks.

- Carry out a differential diagnosis of ascariasis and opisthorchosis.
- Make a plan for a laboratory-instrumental examination of a patient suspected of strongyloidiasis.
- Make a treatment plan for a patient diagnosed with fasciolosis.

5. Individual tasks for students of higher education:

Make an oral report on one of the suggested topics:

- Relevance of helminth infections.
- Lung lesions in helminthiasis.
- Cysticercosis - clinical manifestations, treatment and prognosis.

6. List of recommended literature:

Main:

1. Infectious diseases: textbook / O.A. Golubovska, M.A. Andreychyn, A.V. Shkurba and others; under the editorship O.A. Golubovska 4th ed., revised. and added K.: VSV "Medicine", 2022. p. 346-358.

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Electronic information resources:

1. <http://moz.gov.ua>- Ministry of Health of Ukraine
2. www.ama-assn.org– American Medical Association /American Medical Association
3. www.who.int- World Health Organization
4. www.dec.gov.ua/mtd/home/- State Expert Center of the Ministry of Health of Ukraine
5. <http://bma.org.uk>– British Medical Association
6. www.gmc-uk.org- General Medical Council (GMC)
7. www.bundesaerztekammer.de– German Medical Association
8. <https://library.odmu.edu.ua/catalog/>- Electronic catalog