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«CONGENITAL DEFECTS IN CHILDREN»

MINISTRY OF HIGHER EDUCATION, SCIENCE AND INNOVATIONS OF THE REPUBLIC OF UZBEKISTAN

SAMARKAND STATE MEDICAL UNIVERSITY

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«CONGENITAL DEFECTS IN CHILDREN»

Textbook
for students of foreign faculties in the direction of education
"General medicine"

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The textbook covers current issues of the most common congenital: malformations and anomalies of the esophagus, chest and lungs, kidneys and urinary tract, genital organs and lower urinary tract, liver, bile ducts and pancreas, vaginal process of the peritoneum and testicles; high and low intestinal obstruction in children.

Each chapter of the textbook includes the purpose and objectives of learning, text material with illustrations, as well as basic practical skills, educational tasks and interactive games. In addition, for each topic, the location of the classes (patient ward, dressing room or operating room) is recommended individually.

Particular attention is paid to the step-by-step diagnosis of congenital malformations in children and the tactics of a general practitioner. A distinctive feature of this textbook is the accessibility for students of presentation of the main issues and diagnostic material (patient complaints, anamnesis vitae, objective and additional examination methods), differential diagnosis, treatment and rehabilitation measures for congenital malformations requiring surgical treatment.

The control-training block includes control questions, test tasks and typical situational tasks with sample solutions.

The textbook is intended for medical students pursuing the MBBS program.

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List of abbreviations:

AB - antireflux barrier

GP - general practitioner

PE - pectus excavatum

GI - I. Gizhitsky index

LES - lower esophageal sphincter

PH - portal hypertension

USG - ultrasonography

ECG - electrocardiography

EchoCG - echocardiography

SWOT - Strengths, Weakness; Opportunities; Threats

INTRODUCTION

Peculiarities of the children's contingent of patients leave a certain imprint on the activities of the staff of children's surgical institutions. This applies to general pediatric training of staff, relationships with a sick child, deontological and some other issues.

A pediatric surgeon often has to differentiate surgical diseases from various infectious diseases, observe children with malformations, treat newborns and even premature babies, so he must be well versed in infectious diseases, know the basics of genetics, embryology and obstetrics. The difficulty of diagnosing some surgical diseases and their variability largely depend on the background on which the disease proceeds - age, development, general condition of the child, therefore, a pediatric surgeon absolutely needs fundamental knowledge of pediatrics.

Great attention should be paid to the relationship of staff with sick children. Taking into account the lability of the psyche and the lack of strong-willed qualities, the negativism of the child, the fear of being left in unusual conditions without parents, the staff of the pediatric surgical department should show maximum sensitivity and attention to their patients. A pediatrician, in particular a surgeon, is also an educator, so the tone and manner of speaking with a small patient are of great importance. It is important to gain the trust of the child. It should not be said that he will not be hurt if a deliberately painful and unpleasant procedure is ahead. It is more correct to warn that it can be a little painful, but other children easily endured it. In general, it is useful to refer to other children who have already undergone this or that procedure, and then they themselves will explain to their neighbor or roommate "that this is not very scary." However, along with an attentive and sensitive attitude towards the child, the doctor should not follow the lead of his sometimes capricious patient and firmly carry out the necessary examinations and treatment.

The surgeon should have great tact and sensitivity when communicating with the parents of his patients. It is difficult for parents who are very worried about the fate of the child to listen to insufficiently serious and reasoned conclusions about his condition and treatment. The free and careless tone of the doctor during the

conversation is unacceptable, since parents may get the impression that their child has come to frivolous, frivolous doctors. It is necessary to ensure that there are no conflicting information about the child's condition and his further treatment, transmitted by various doctors and nurses.

Approximately 1% of newborns have a non-random combination of several minor developmental anomalies and congenital defects, of which in 40% one or another syndrome can already be diagnosed, and in 60% of cases the so-called new syndromes need to be identified. This indicates the complexity of diagnosing syndromes, the number of which currently exceeds 1500, and at least 10-15 new nosological forms are described annually in the periodical literature.

The frequency of most syndromic forms of pathology is quite low (1 case per 10,000-10,000 births), however, the share of syndromic forms in the overall morbidity structure is significant. For example, among children with esophageal atresia, the frequency of syndromic forms of pathology reaches 55%, among children with anorectal defects - 60%, among children with congenital deformities of the chest - 30%.

Separate syndromes are most common, which requires the skills of their diagnosis not only by a geneticist, but also by a pediatrician and pediatric surgeon. So, for example, among children with cryptorchidism and congenital heart defects, Noonan syndrome occurs, the frequency of which in the general population is 1 case per 2000 people; among newborns with embryonic and umbilical hernia, Beckwith-Wiedemann syndrome is detected with a frequency of at least 1 case per 12,000 births.

Some syndromes are well known in surgical practice as extremely important, capable of causing serious complications. For example, Ehlers-Danlos syndrome has been described in at least 500 publications and several monographs, as it plays an important role in general surgery, pediatric surgery, and vascular surgery.

The suspicion of syndromic pathology will be justified in a child with a bilateral lesion, for example, in cases of a bilateral congenital defect of the hand or foot (polydactyly, congenital clubhand). Some congenital malformations or minor

developmental anomalies are highly likely to indicate a syndromic pathology or a specific birth defect. Thus, preaxial polydactyly (doubling of the first toe or foot) with a high degree of probability indicates a syndromic pathology, while postaxial polydactyly (doubling of the little finger or foot) is usually an isolated congenital malformation. The presence of polythelia (additional nipples or vestigial mammary glands) indicates a high likelihood of congenital pathology of the kidneys and ureters. Congenital bilateral absence or hypoplasia of the first fingers of the hand indicates the possibility of a congenital heart defect or the presence of thrombocytopathy, which can cause serious complications during surgery or in the postoperative period.

The most frequent and important for surgeons are connective tissue diseases, the biological basis of which is the pathology of extracellular matrix proteins (collagen proteins, elastin, proteoglycans and glucoproteins). These diseases are represented by the most common syndromes of Marfan, Ehlers-Danlos, osteogenesis imperfecta, as well as more rare dysplasias and mucopolysaccharidoses.

Modern data indicate a significant role of hereditary diseases in the structure of childhood morbidity and mortality, for example, 25% of patients in children's clinics are diagnosed with hereditary pathology, and among deceased children this figure is 50%.

The highest proportion among hereditary diseases is occupied by congenital developmental defects, which, according to the modern classification, are divided into 4 categories: congenital malformations, disruptions, deformities and dysplasias.

Congenital malformation - an anatomical defect of an organ as a result of a primary genetically determined violation of embryonic differentiation (polydactyly, agenesis or doubling of the kidney, hypospadias, etc.).

Disruption - an anatomical defect of an organ as a result of a secondary violation of embryonic differentiation with a normal genotype (teratogenic defects caused by external influences in relation to the embryo - intrauterine infections, radiation, chemical and medical preparations, diseases of the mother).

Deformity - an abnormal shape or abnormal position of a body part caused by a mechanical cause during fetal development without disturbing embryonic differentiation (congenital clubfoot, torticollis, congenital pectus excavatum, etc.).

Dysplasia - a morphological tissue defect as a result of a primary genetically determined violation of the differentiation of this tissue (hemangioma, pigmented nevi, neoplasia, etc.).

The congenital developmental defects listed above can occur as an isolated or the only sign in a newborn with a frequency of 3% and as multiple birth defects with a frequency of 0.7%.

In children with multiple congenital developmental defects, it is extremely important to diagnose syndromes, i.e., certain diseases that often require special therapeutic and surgical management of the patient.

Syndrome - a disease characterized by a non-random combination of two or more birth defects caused by the same cause.

This cause may be a gene or chromosomal mutation (Marfan's syndrome, Down's syndrome); intrauterine infection (rubella syndrome); mother's disease (diabetic embryopathy syndrome); teratogenic effects of alcohol (fetal alcohol syndrome). Biological types of syndromes.

In clinical practice, the diagnosis of syndromes is based on the knowledge of certain congenital developmental defects with a change in the phenotype of a sick child. These changes in the phenotype or appearance are characterized by a complex of minor developmental anomalies (dysembryogenesis stigmas), the diagnosis and interpretation of which require certain experience and qualifications of a physician.

A minor developmental anomaly - a rare variant of the body structure or a congenital anomaly that has no medical significance, i.e., does not require treatment (epicant, Mongoloid or anti-Mongoloid incision of the eyes, coloboma of the iris, i.e., a radial defect of the iris, skin appendages in front of the auricle, the only flexion fold of the palm, microhypospadias, hypertelorism, i.e. widely spaced orbits).

Small developmental anomalies in newborns can be a single or isolated sign with a frequency of 14% or multiple (two or more small developmental anomalies in a

child) with a frequency of up to 11%. A newborn with three or more minor developmental anomalies has a 90% chance of a congenital developmental defect, and a search for the defect is required. A child with three or more minor developmental anomalies can be diagnosed with a certain syndrome with a probability of 40% - timely diagnosis is necessary. With a delay in psychomotor development and the presence of three small developmental anomalies, in 20% of cases there is a possibility of mental retardation, and the correct prognosis is of great importance.

The detection of three or more minor developmental anomalies in a newborn requires a thorough ultrasound examination of the heart, brain, kidneys and abdominal organs in order to timely diagnose congenital malformations that do not yet have clinical manifestations at this age. In addition, it is necessary to consult a geneticist for the purpose of timely diagnosis of certain syndromes with subsequent dispensary observation.

CHAPTER 1. MALFORMATIONS AND ANOMALIES OF THE ESOPHAGUS (ATRESIA, ESOPHAGEAL-TRACHEAL FISTULAS, CONGENITAL SHORT ESOPHAGUS, CHALAZIA, ESOPHAGEAL ACHALASIA), CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The pediatric surgery course is a part of the discipline containing a description of the origin, diagnosis and treatment of congenital malformations and developmental anomalies that require surgical correction.

The main principle of teaching pediatric surgery is teaching the skills of recognition, nosological diagnosis and provision of standard general medical care and postoperative rehabilitation of children with congenital malformations and developmental anomalies.

The curriculum of the faculty course in pediatric surgery provides for the integration of knowledge and skills acquired in previous courses in fundamental and initial clinical disciplines, including phylo-, onto- and embryogenesis, physiology and pathology of human growth and development, semiotics and modern methods of laboratory and instrumental diagnostics, basics of classical standards of treatment and rehabilitation.

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

- Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;
- Development of students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;
- Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;
- Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;
- Development of skills and abilities of general medical care based on medical and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Venue: Department of Thoracic Surgery, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control: control questions, performance of training tasks in groups.

Written control: control questions.

ESOPHAGEAL ATRESIA

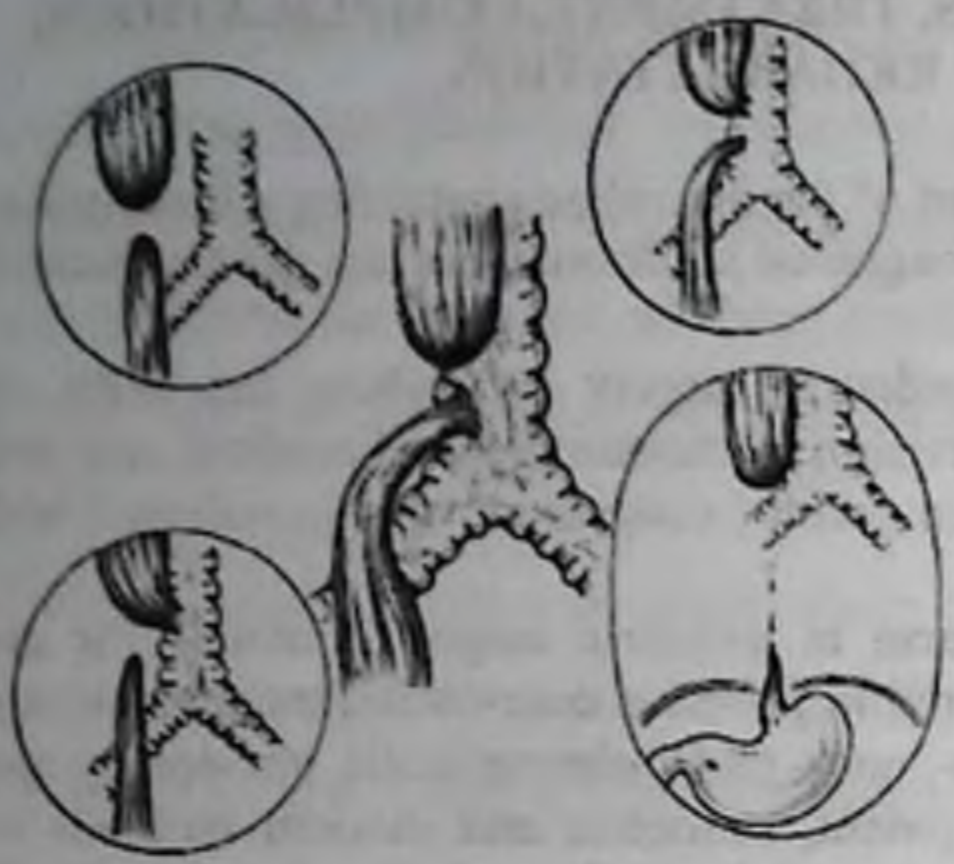


Figure 1. Options for esophageal atresia

Esophageal atresia is a severe malformation in which the upper segment of the esophagus ends blindly, the lower one most often communicates with the trachea. Often, esophageal atresia is combined with other malformations - congenital malformations of the heart, gastrointestinal tract, genitourinary system, etc. In 5% of cases, esophageal atresia occurs with chromosomal diseases. The population frequency is -0.3-1000, the combination of male and female is 1:1.

The development of the defect is associated with disorders in the early stages of embryogenesis. It is known that the trachea and esophagus arise from one rudiment - the head end of the foregut. In the earliest stages, the trachea communicates extensively with the esophagus. Their separation occurs at the 4-5th week of embryogenesis. If the direction and growth rate of the trachea and the esophagus do not match, as well as the processes of vacuolization in the solid tissue that the esophagus passes along with other formations of the intestinal tube in the period from the 20th to the 40th day, the development of esophageal atresia is possible (Fig. 1). From the anamnesis of pregnancy, polyhydramnios and the threat of miscarriage in the first trimester are typical.

Clinic and diagnostics. Signs of esophageal atresia are clearly manifested in the first hours after the birth of a child. The upper blind segment of the esophagus and the nasopharynx are overflowing with mucus, the child has abundant foamy discharge from the mouth. Part of the mucus is aspirated by the newborn, bouts of cyanosis occur. After aspiration of the contents of the nasopharynx, it soon reappears. Very quickly, wheezing begins to be heard in the lungs, shortness of breath increases.

Figure 2. Probing the esophagus

The diagnosis is clarified by catheterization of the esophagus with a thin urethral catheter with a rounded end (Fig. 2). The catheter is inserted through the nose; having passed to a depth of 6-8 cm, the catheter rests against the blind end of he esophagus or, wrapping itself, exits through the child's mouth. Produce suction of mucus. Air introduced into the blind end of the esophagus is emitted with noise from the nasopharynx (positive symptom of Elefant).

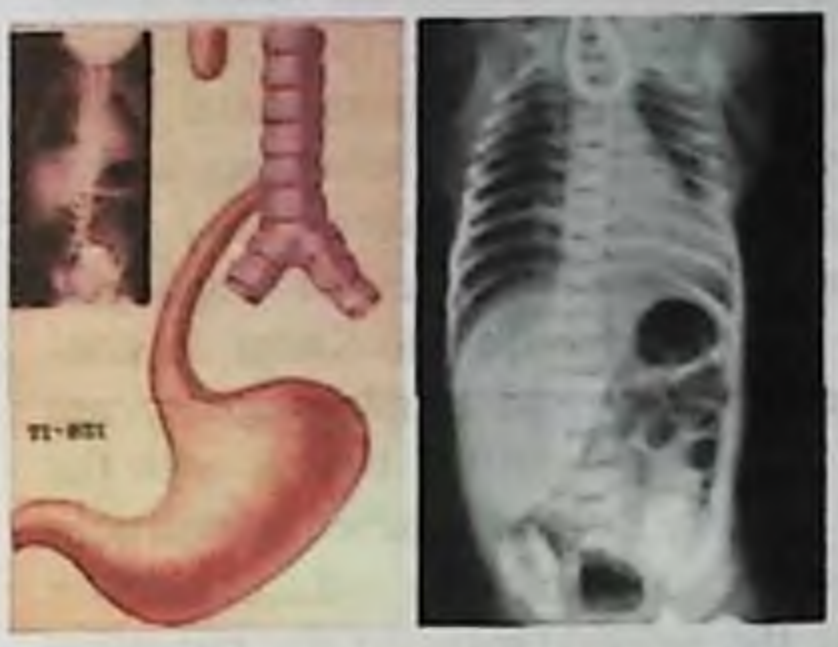


Figure 3. Probing of the esophagus under x-ray control

Given the great importance of early diagnosis of atresia - before the onset of aspiration pneumonia, probing the esophagus is advisable for all infants with respiratory distress syndrome immediately after birth.

The clinical picture may have some features depending on the form of atresia. With the most common form of atresia with a distal tracheoesophageal fistula, abdominal distension is detected, especially in the epigastric region. The severity of the aspiration syndrome depends on the diameter of the tracheoesophageal anastomosis.

The final diagnosis is made after X-ray examination. The catheter is inserted into the esophagus until it stops, after which a plain radiograph of the chest and abdominal organs is performed. In atresia, a radiopaque catheter is clearly visible in the blind segment of the esophagus. Detection of air in the stomach and intestines indicates the presence of a fistula between the trachea and the abdominal segment of the esophagus. With fistulous forms, against the background of a sunken abdomen, a complete darkening of the abdominal cavity is noted. In children with fistulous forms of atresia, the length of the diastasis between the ends of the esophagus can be judged to some extent by the lateral radiograph. The use of radiopaque solutions for diagnosis, especially barium suspension, is highly undesirable due to the risk of aspiration pneumonia (Fig. 3).

Treatment. Only early surgical intervention can save the life of a child with esophageal atresia. Already in the maternity hospital, preoperative preparation should be started, including aspiration of the contents of the oropharynx and nasopharynx every 15-20 minutes, oxygen supply, and the complete exclusion of feeding through the mouth. Transportation must be carried out by a specialized team as soon as possible. The total duration of preoperative preparation is determined by the severity of homeostasis and hemodynamic disturbances, respiratory failure, and the degree of dehydration. With obvious signs of aspiration, respiratory failure, and even more so with pneumonia or atelectasis, it is necessary to resort to direct laryngoscopy with tracheal catheterization and aspiration as soon as possible. If the latter is ineffective under anesthesia, bronchoscopy or tracheal intubation is performed with careful aspiration of the contents. The patient is placed in an incubator, providing a

continuous supply of oxygen, aspiration of the contents of the oropharynx, and warming. Assign infusion, antibacterial, symptomatic therapy.

The choice of the method of surgical intervention is determined by the form of atresia and the patient's condition. In the most common form of atresia with a distal tracheoesophageal fistula in patients with low operational risk (term, without concomitant malformations of vital organs and symptoms of intracranial birth trauma), it is advisable to start with thoracotomy, division of the tracheoesophageal fistula. If the diastasis between the ends of the esophagus does not exceed 1.5-2 cm, a direct anastomosis is applied. With a large diastasis of the segments of the esophagus, a cervical esophagostomy and a gastrostomy are applied according to Kader. In non-fistulous forms, due to significant diastasis, gastrostomy and esophagostomy are performed. In patients with a high operational risk, surgery often begins with the imposition of a double gastrostomy (the first for feeding through a tube inserted into the duodenum, the second for gastric decompression and aspiration reduction). The second stage of the operation is performed after the improvement of the condition after 2-4 days.

In the postoperative period, the started intensive therapy is continued. The child is fed through a probe inserted intraoperatively through the anastomosis or into the gastrostomy after the passage through the intestine is restored. On the 6-7th day, the consistency of the anastomosis is examined. Under the control of the x-ray screen, 1-2 ml of a water-soluble contrast agent is injected through the child's mouth. The patency of the anastomosis zone is assessed, streaks of the contrast agent are excluded. In the absence of complications, the child begins to feed through the mouth. 2-3 weeks after the operation, a control fibroesophagogastroscopy is performed with an assessment of the degree of patency of the anastomosis zone, the state of the cardia, and symptoms of esophagitis. The narrowing of the anastomosis, which occurs in 30-40% of cases, requires bougienage (bougie No. 22-24). The duration of bougienage is controlled by esophagoscopy.

In the postoperative period during the first year of a child's life, constant dispensary observation is necessary. Possible phenomena of dysphagia, complicated by obstruction in the area of the anastomosis, which requires urgent esophagoscopy. In this regard, children in the first year of life are recommended to be given a homogenized food mass. Cardia insufficiency and gastroesophageal reflux, which often complicates the postoperative period, are clinically manifested by nocturnal regurgitation, repeated pneumonia, regurgitation and require timely diagnosis. In connection with the surgical injury of the recurrent nerve in children, hoarseness of voice is possible in the next 6-12 months.

In children with esophagus and gastrostomy at the age of 2-3 months to 3 years, the second stage of the operation is performed - esophagoplasty with a colonic graft.

CONGENITAL TRACHEOESOPHAGEAL FISTULA

Isolated congenital tracheoesophageal fistula is a rare malformation: its frequency is 3-4% of all esophageal anomalies. The fistula, as a rule, is located high, at the level of the VII cervical or I thoracic vertebra.

There are three types of tracheoesophageal fistulas: narrow and long, short and wide (most common), with no separation of the esophagus and trachea over a large extent (Fig. 4).

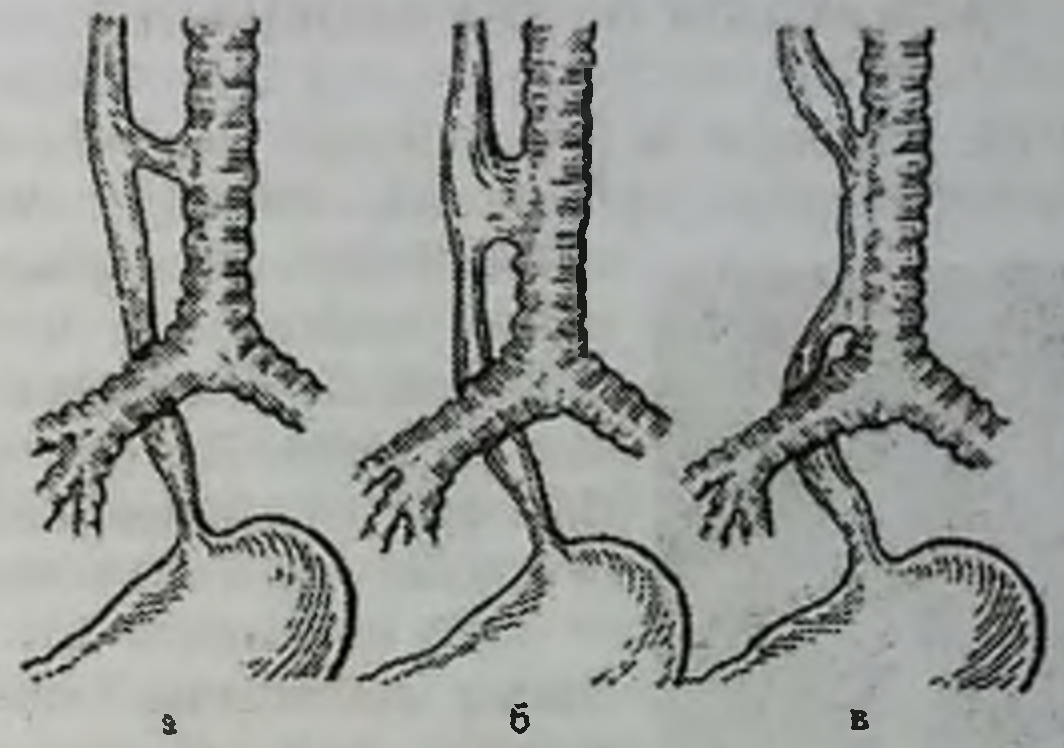


Figure 4. Tracheoesophageal fistula variants

Clinic and diagnostics. The severity of symptoms depends on the diameter of the fistula and the angle of entry into the trachea. Characteristic symptoms: attacks of coughing and cyanosis that occur during feeding, more pronounced in the horizontal position of the child. With narrow and long fistulas, only coughing of the child during feeding can be noted. As the position changes, the symptoms decrease. The child often develops pneumonia. The most striking clinical picture is observed with wide fistulas, when already at the beginning of feeding, milk easily penetrates into the tracheobronchial tree. An acute inflammatory process develops rapidly in the lungs with atelectasis.

Diagnosis of tracheoesophageal fistula is difficult, especially in narrow fistulas. The complex of studies includes X-ray and instrumental methods. Radiography is performed in a horizontal position of the child. A solution of a water-soluble contrast agent is injected through a probe inserted into the initial section of the esophagus under the control of the screen. Its flow into the trachea indicates the presence of a fistula. The information content of this method is low. Tracheoscopy is of greater diagnostic value. The trachea is examined all the way from the glottis to the bifurcation. A slit-like fistula is located along the posterior surface of the trachea. A direct sign of a fistula is the appearance of air bubbles with mucus.

Differential diagnosis is carried out with atresia of the esophagus, achalasia of the cardia, gastroesophageal reflux, narrowing of the esophagus, dysphagia associated with trauma to the vocal cords during resuscitation during childbirth, dysphagia of central origin.

Treatment is only surgical. Preoperative preparation consists in sanitation of the tracheobronchial tree, treatment of aspiration pneumonia. For this purpose, sanitation bronchoscopy is performed, UHF, antibacterial, infusion therapy is prescribed. Completely exclude feeding through the mouth. The operation of mobilization, ligation and intersection of the anastomosis is performed using a right-sided cervical access, less often a posterolateral thoracotomy is performed. With timely diagnosis, the prognosis is favorable.

ACHALASIA OF THE ESOPHAGUS

Achalasia of the esophagus is a pathological condition characterized by a functional impairment of the patency of the cardiac esophagus. With the progression of the disease, the esophagus loses its motor activity, which leads to its dilatation. In childhood, the disease is much less common than in adults. The onset of the disease in children is on average attributed to 8-9 years of age, although it can occur in infants.

Figure 5. Contrast study of the esophagus – achalasia

At one time, it was believed that the disease was associated with disorders in the ganglion cells of the Auerbach plexus, however, electron microscopy studies conducted in subsequent years made it possible to detect degenerative changes in the motor nuclei of the vagus nerves in patients.

Clinic. The main symptoms of the disease are dysphagia and regurgitation. These symptoms of obstruction of the passage of food through the esophagus and vomiting of unchanged food are more common with coarse food than with liquid food. Symptoms such as a feeling of discomfort, some pressure behind the sternum, moderate pain in the epigastric region or behind the chest are difficult to describe by pediatric patients, which presents certain diagnostic difficulties. In young children, dysphagia is manifested by a number of indirect signs: they eat slowly, chew food thoroughly, do not eat the entire amount of food, choke while eating. In order to facilitate the passage of food, older children resort to such methods as increased swallowing (empty swallowing movements), drinking water, etc. Due to the fact that the disease occurs quite rarely in childhood, these symptoms are more often associated with psychological problems, which also somewhat delays the diagnosis. This in turn leads to weight loss in children, and nocturnal aspiration of esophageal contents can cause recurrent pneumonia. The disease in some cases is of an

intermittent nature, i.e. periods of deterioration may alternate with intervals of clinical well-being.

Diagnostics. The main methods for diagnosing this disease are x-ray examination of the esophagus with a contrast agent (most often with barium) and esophagoscopy (Fig. 5). Already with survey fluoroscopy performed in a vertical position, the level of fluid in the dilated esophagus can be detected, which indicates impaired patency. Then the study is supplemented with the intake of a barium suspension of a creamy consistency. In this case, the barium suspension either does not enter the stomach at all, or passes into it in a thin stream. During the study, relaxation of the cardia and the flow of a significant portion of the contrast agent into the stomach is possible - a symptom of "failure", which is a reliable sign of a functional disorder of the cardia. Stimulation of this symptom is possible if the patient is given the mixture to drink with water.

Esophagoscopy is a mandatory study, as it allows you to identify signs of esophagitis and determine the degree of its severity, and the free passage of a fibroesophagoscope into the stomach indicates the absence of congenital stenosis or secondary stenosis associated with reflux esophagitis or other causes.

The use of manometry in the diagnosis of this disease in children is currently limited. However, the improvement of this diagnostic method in the future will make it possible to differentiate achalasia and cardiospasm, which in turn may allow a differentiated approach to the choice of treatment tactics.

Esophageal achalasia must be differentiated from congenital stenosis of the esophagus, peptic and post-burn stenosis, esophageal diverticulum, as well as benign and malignant tumors of the stomach and esophagus.

Treatment. There are conservative and surgical treatments for achalasia. The conservative ones include drug therapy, forced bougienage and cardiodilation (in pediatric practice balloonodilatation with pneumo- and hydrodilators is used). When they are used, there is an immediate improvement, but the effect of the treatment is unstable.

The most common treatment option for esophageal achalasia in children is surgical correction. Extramucosal cardiomyotomy, combined with esophagocardiofundoplication, has been widely used.

Patients with esophageal achalasia should be under dispensary observation, especially in the postoperative period. After radical (surgical) treatment, they are examined after 6-12 months; patients who have not received radical treatment - 3-4 times a year.

Since the treatment of achalasia cardia is aimed at eliminating the main symptoms of the disease, but is not pathogenetic, patients must comply with certain working and rest conditions and periodically undergo examination even in the absence of a clinical picture of a relapse of the disease.

CHALASIA OF THE ESOPHAGUS

Chalasia of the esophagus is a disease of the esophagus caused by the reflux of gastric contents into the esophagus due to functional failure of the zone of the

esophageal-gastric junction. Accepted by most clinicians in Europe and North America, the term "reflux disease" reflects a very wide range of symptoms associated with cardia dysfunction, which may be due to esophagitis, aspiration disorders and other manifestations.

Thus, chalazia of the esophagus is, as it were, one of the symptoms of reflux disease, which, however, has other aspects that we consider it necessary to briefly highlight the pathophysiological common with it. Reflux disease now appears to be a multi-etiological disease, although the main factor is the passage of acid or other damaging substances from the stomach into the esophagus.

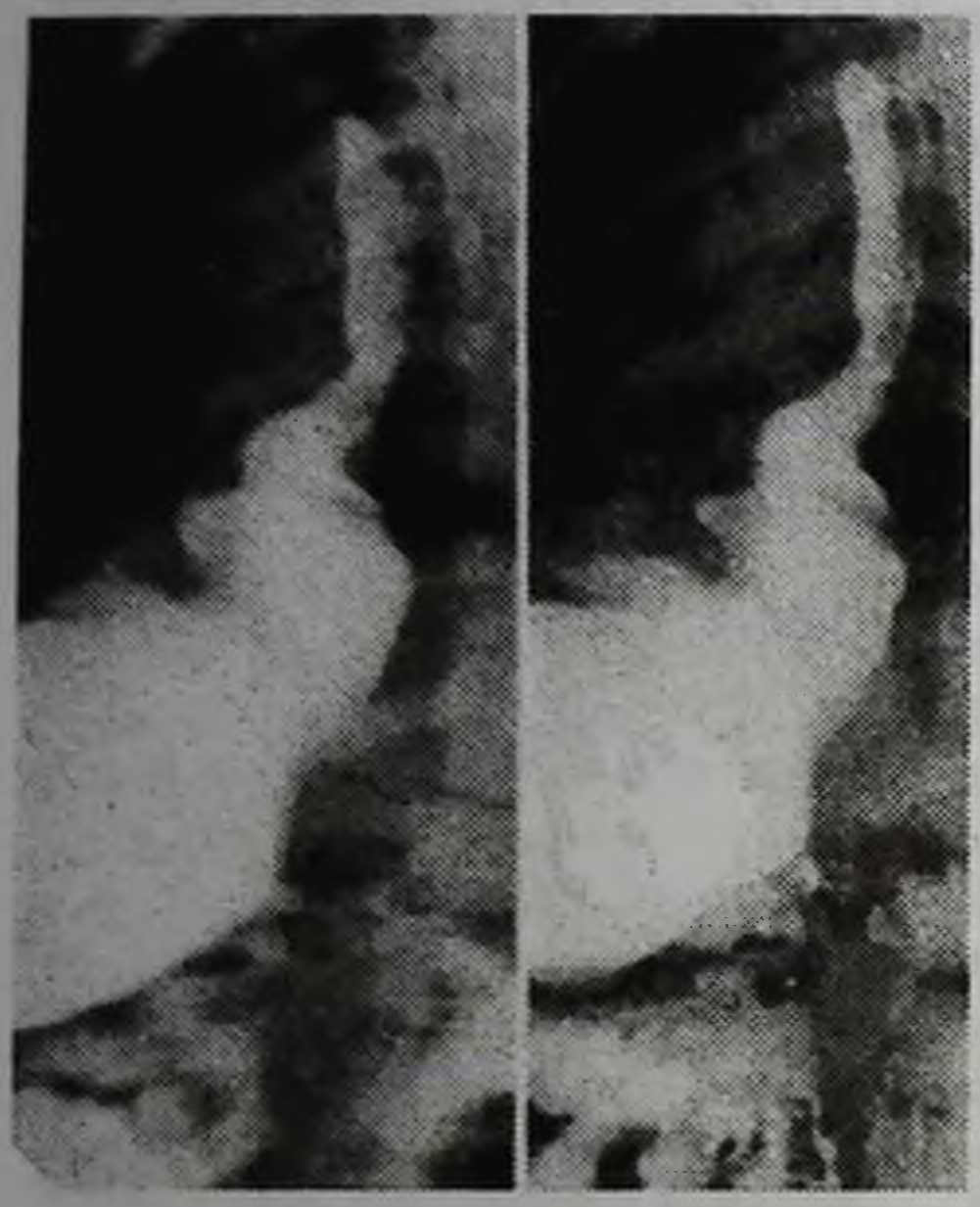


Figure 6. Esophageal contrast study – esophageal chalasia

Under normal physiological circumstances, the movement of gastric contents into the esophagus is prevented by the antireflux barrier (AB), which is carried out by a complex of anatomical structures in the region of the esophageal-gastric junction. In the literature of recent years, the importance of such components as the lower esophageal sphincter (LES), the acute angle of His, the esophagophrenic ligament (Lymer's membrane), the crura of the diaphragm, the abdominal part of the esophagus, etc. should be emphasized.

Not only the multicomponent, but also the dynamism of the antireflux barrier due to a constant change in pressure in the chest and abdominal cavities.

Therefore, chalazia or functional insufficiency of the cardia, or rather, the insufficiency of the antireflux barrier plays a decisive role in the occurrence of pathological gastroesophageal reflux. A variety of combinations of disorders in certain components of the antireflux barrier can cause chalazia or create prerequisites for the onset of reflux. This may be the result of a decrease in baseline pressure in the lower esophageal sphincter or loss of control over the function of the lower esophageal sphincter, including its transient relaxation. Such chalazia may be the result of impaired closing function of the diaphragmatic crura, which play a role in the antireflux barrier during respiration. The causes of chalazia in the light of the presented concepts are even better seen in the presence of a sliding or fixed hiatal hernia, when there are several disturbed components at once: a change in the angle of

His, displacement of the lower esophageal sphincter into the negative pressure zone due to failure of the esophagophrenic ligament, reduction or disappearance of the abdominal part of the esophagus and others.

In addition to those listed above, cicatricial changes in the wall of the esophagus and paraesophageal tissue as a result of chemical burns of the esophagus, as well as due to surgical interventions on the corresponding sections of the esophagus and stomach, can lead to functional failure of the cardia.

It is quite obvious that the existence of mechanisms of aggressive action on the esophagus has developed in the body a mechanism of protection against it to prevent the development of reflux esophagitis. These include mechanisms for clearing the esophagus from refluxant (increased peristalsis of the esophagus, increased salivation), as well as the resistance of the cells of the esophageal mucosa, the role of which has yet to be clarified, and other mechanisms that have not been sufficiently studied to date.

Thus, the imbalance between the forces of aggression and defense in favor of the former causes the occurrence of reflux esophagitis.

Clinic. The most characteristic clinical symptoms of reflux esophagitis in young children are frequent vomiting and regurgitation, anxiety, loss of appetite, lag in body weight and anemia, a "wet pillow" symptom during sleep, the presence of traces of blood in the vomit, and in rare cases, bleeding. More than 50% of cases have recurrent pneumonia, bronchitis. Older children may complain of heartburn, pain in the epigastric region or behind the chest, and also note an unpleasant aftertaste or bitterness in the mouth.

Violation of the esophageal patency as a result of its stenosis due to the cicatricial process on the basis of ulcerative esophagitis is accompanied by symptoms of dysphagia, esophageal vomiting, and more rapid loss of body weight. The presence of these symptoms gives serious grounds to suspect gastroesophageal reflux in a child and conduct additional studies to clarify the diagnosis. **Diagnostics.** The most common and informative research methods in pediatric practice, which often allow to confirm the presence of gastroesophageal reflux, and in some cases to clarify its cause, are X-ray and endoscopic.

X-ray examination with a contrast agent (barium sulfate) is performed with the patient lying down (Fig. 6). In this case, the following radiological signs of cardia failure can be detected: reflux of barium suspension from the stomach into the esophagus, an increase in the His angle, a flask-shaped expansion of the part of the stomach located above the diaphragm, the presence of longitudinal folds of the gastric mucosa in the terminal esophagus. In cases where a conventional examination does not reveal these signs, provocative techniques (Trendelenburg position, drinking water during the examination, and moderate compression on the stomach) can be used, which in some cases help to detect reflux. In the presence of cicatricial peptic stenosis, an x-ray examination of the esophagus with a contrast agent allows you to determine its level and extent. Endoscopic examination performed with flexible endoscopes makes it possible to detect esophagitis and determine its nature, as well as to reveal cardia gaping or displacement of the Z-line above the esophageal opening of the diaphragm. It should be noted that visual assessment of the esophageal mucosa

is not always objective. So, in the absence of visible inflammatory changes, a biopsy and subsequent histological examination can confirm the presence of inflammatory changes in the mucosa of the esophagus, as well as clarify the nature of metaplasia. Very promising in diagnosis is prolonged pH-metry, which accurately indicates the frequency of throwing gastric contents into the esophagus during the day.

Treatment. The principle of conservative therapy in the presence of gastroesophageal reflux is the same for all age groups and does not depend on the causes of cardia insufficiency. Treatment is mainly aimed at creating conditions conducive to preventing the reflux of stomach contents into the esophagus and trachea, as well as eliminating or reducing inflammatory changes in the esophagus.

In conservative therapy, non-drug and drug treatments are distinguished. The former include options for postural therapy and diet therapy. To equip a general practitioner with knowledge, to teach standard skills in a specified professional field, to teach skills to work with a patient, his family and friends, to teach rational tactics in solving medical and social problems can only be done through non-traditional, active, problem-based learning, choosing methods adequate to the goals and objectives. To this end, it is proposed to conduct business games, solving situational problems.

I. Curation of patients on the topic – 15 min;
II. Participation in the dressing room and operating room – 20 min;
III. Implementation of practical skills – 15 min:

PRACTICAL SKILLS

ELEPHANT TEST

- indications: suspicion of esophageal atresia;
- check the readiness of the necessary tools and medicines: sterile wipes, balls, alcohol, a thin urethral catheter with a rounded end, a 20.0 ml syringe;
- hands are washed under running water with soap, dried with a towel, treated with alcohol;
- lay the patient on the examination table lying on his back;
- the child's head is fixed with the left hand, the catheter is inserted through the nose with the right hand;
- passing through the nasopharynx, oropharynx to a depth of 6-8 cm. the catheter rests against the blind end of the esophagus;
- produce suction of mucus;
- air introduced into the blind end of the esophagus through a catheter using a syringe is emitted with noise from the nasopharynx, which indicates a positive symptom of "Elephant";
- the catheter is slowly removed from the nose.

STOMACH PROBING

- check the readiness of the necessary tools and medicines - sterile wipes, balls, alcohol, gastric tube;

- hands are washed under running water with soap, dried with a towel, treated with alcohol;

- puts the patient on the examination table lying on his back;

- the required length of the gastric tube is measured - from the tip of the nose to the xiphoid process;

- with the left hand fix the child's head, with the right hand the catheter is slowly inserted through the nose, preferably through the left nasal nostril;

- passing through the nasopharynx, oropharynx, the esophagus at a previously determined length, the end of the catheter enters the stomach;

- gastric contents begin to flow through the catheter;

- the catheter is slowly removed from the nose.

GASTRIC LAVAGE

Indications:

1. for medicinal purposes;
2. for diagnostic purposes;
3. removal from the stomach of poor-quality food, pesticides, medicines, toxins of bacterial and plant origin that have entered the child's body.

Preparation:

-Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:

1. manipulation room;
2. couch or table for swaddling newborns;
3. washing solution (water, 2% sodium bicarbonate solution or light pink solution of potassium permanganate at room temperature, solutions of antidotes according to indications);
4. thick probe 70-100 cm long and 10-12 mm in diameter (for older children), thin probe 3-5 mm in diameter (for young children);
5. glass syringe (20 gr.);
6. funnel;
7. pelvis;
8. vaseline oil;
9. to determine the length of the probe inserted into the stomach, you can use a guideline by measuring the distance from the bridge of the nose to the navel.

More precisely, the distance from the teeth to the entrance to the stomach can be calculated using the formula: 20 + n, where n is the child's age.

Execution technique (asepsis rules are followed):

1. The position of children during gastric lavage (children of younger or infant age are most often laid on their side with their faces slightly turned down, a nurse or her

assistant picks up a preschool child, wraps him in a sheet or diaper, the child's legs are tightly clamped between their legs , press his head to his shoulder).

2. Check the patency of the probe with the solution.

3. Lubricate the end of the catheter in vaseline oil.

4. Take the probe in the right hand, ask the child to open his mouth or open it with a spatula and quickly insert the probe at the root of the tongue (for a child of preschool and school age).

5. Ask the child to make several swallowing movements, during which the nurse advances the probe along the esophagus to a previously made mark without violent movements.

6. Confirmation that the probe is in the stomach is the cessation of vomiting, as well as the introduction of air with a syringe and listening with a phonendoscope over the stomach to blow air.

7. Older children are seated on a chair for gastric lavage, the chest is covered with an oilcloth apron or sheet (diaper).

8. After inserting the probe into the stomach, a glass funnel with a capacity of about 500 ml is attached to its outer end and filled with the liquid prepared for washing. Using the siphon principle, the funnel is lifted up and liquid is injected into the stomach.

9. For young children, gastric lavage can be performed using a 20-gram syringe.

10. After the end of the procedure, remove the funnel and remove the probe with a quick movement.

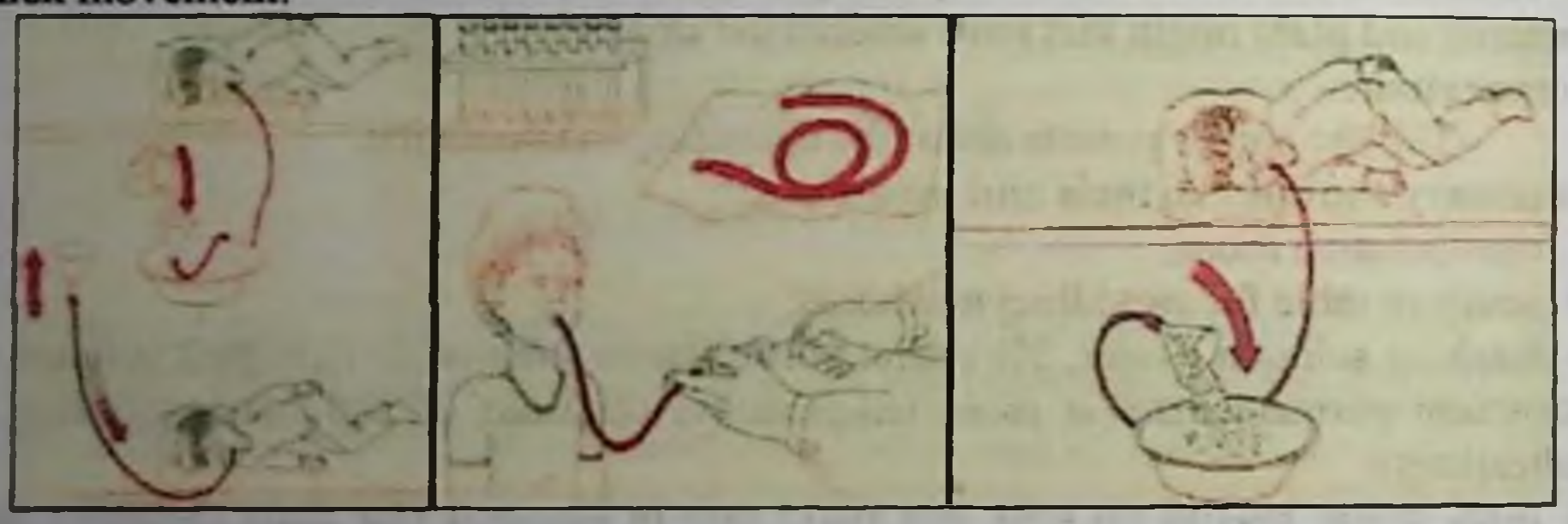


Figure 7. Scheme of gastric lavage

IV. Big break - 40 minutes (11.50-12.30).

V. Practical session (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

STUDY TASKS

Appendix 1

Rules for working in groups

Member of each group

- Respect for the thoughts of their comrades;

- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: Hypotrophy, vomiting, cyanosis, shortness of breath, regurgitation, pain, bleeding.

Appendix 2

Tasks for groups

1. Specify 5 types of esophageal atresia? Cluster, SWOT table, Venn diagram for the word vomiting and chart Why? and hierarchical diagram How? Atresia of the esophagus.
2. Clinical signs of esophageal atresia. Cluster, SWOT table, Venn diagram for cyanosis and chart Why? and hierarchical diagram How? Achalasia of the esophagus.
3. Specify the clinical signs of esophageal achalasia. Cluster, SWOT table, Venn diagram for the word dysphagia and chart Why? and hierarchical diagram How? Chalazia of the esophagus.
4. What method of surgical intervention is used for congenital short esophagus? Make a cluster, SWOT table, Venn diagram for the word "habitus" and draw diagrams Why? and hierarchical diagram How? Congenital short esophagus.
5. What are the main symptoms of esophageal achalasia? Create a cluster, SWOT table, Venn diagram for the word regurgitation and chart Why? and hierarchical diagram How? Tracheoesophageal fistula

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	1 task	2 task	3 task: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	1 - question	2 - question	3 - question	(3,0)
1						
2						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol. barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;

b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concept	V	+	-	?
Malformations and anomalies of the esophagus (atresia, tracheo-esophageal fistulas, congenital short esophagus, chalazia, esophageal achalasia) clinic, diagnosis, treatment, complications, postoperative rehabilitation				

Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where: V - corresponds to significant knowledge (information) about ...

- Exceptional knowledge of...

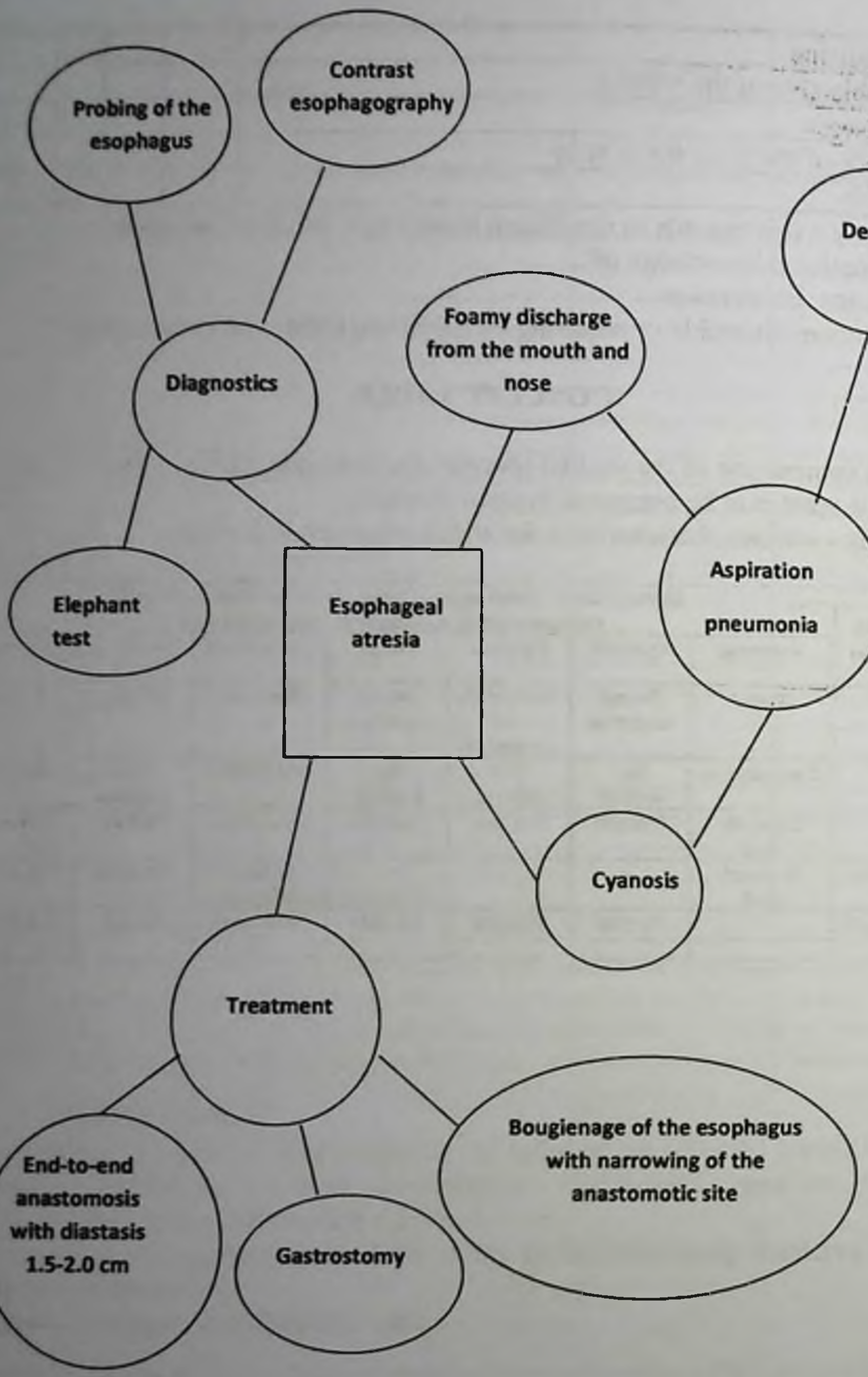
+ - is new information

? - incomprehensible or requiring clarification, additional information

CONCEPT TABLE

- provides a comparison of the studied phenomena, concepts, views, topics.
- vertically is what is to be compared (views, theories)
- horizontally - various characteristics for which comparison is made

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located. (recommendations, categories, various signs, etc.)						
	Vomiting	Cyanosis	Dyspnea	Cough	Auscultation	Percussion	Hypotrophy
Atresia	Foamy	During aspiration	As a result of pneumonia	During aspiration	Wet rales	Dulling	Possible
Achalasia	Regurgitation	Not marked	Not marked	Not marked	Not marked	Not marked	Possible
Chalasia	Digested food	Possible	Possible	Possible	Wet rales	Dulling	Not marked
Short congenital esophagus	Digested food	-	-	-	Without changes	Vesicular	Not marked
Tracheoesophageal fistula	-	Possible	Possible	Possible	Wet rales	Dulling	Not marked



Note: see 2nd appendix.

Figure 8. Algorithm for the diagnosis and treatment of esophageal atresia
SCHEME "WHY?"

SWOT

(homework or independent work of the student: for creative thinking after lectures or practical classes)

SWOT – analysis of the acquired knowledge, the initial letters of the English alphabet:

Strengths - strong side;

Weakness - weak side;

Opportunities

Threats - the disturbing side of the disease

Analytical table - SWOT

S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle)

A way of mapping information is to collect ideas around some major factor to focus and make sense of the whole construct.

Clustering technology:

In the center of a blackboard or a large sheet of paper, a keyword or a 1-2-word topic title is written. By association with the keyword, "satellites" are attributed to the side of it in smaller circles - words or sentences that are related to this topic.

Connect them with lines to the "main" word. These "satellites" may have small satellites, and so on. Recording continues until the allotted time expires or until ideas are exhausted.

This is a whole chain of reasoning to identify the root cause of the problem.

Develops and activates systemic, creative, analytical thinking. Get acquainted with the rules for constructing a "Why" diagram?

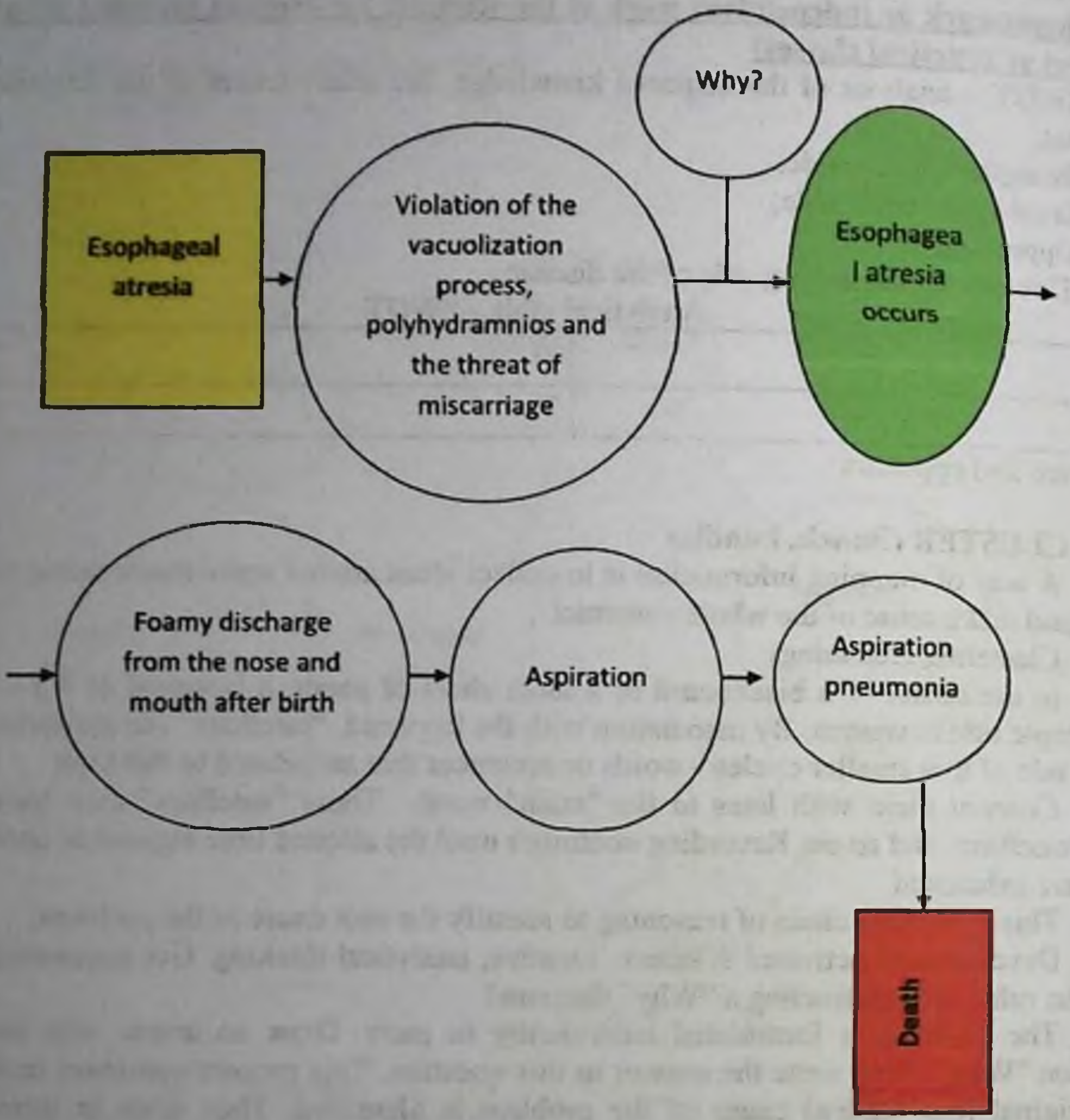
The problem is formulated individually in pairs. Draw an arrow with the question "Why"? And write the answer to this question. This process continues until the original (but hidden) cause of the problem is identified. They unite in mini-groups, compare and supplement their schemes. Reduced to a common. Presentation of results.

RULES FOR CONSTRUCTING THE "HOW" DIAGRAM

When solving a problem, in most cases you do not need to think about "What to do?".

The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them;



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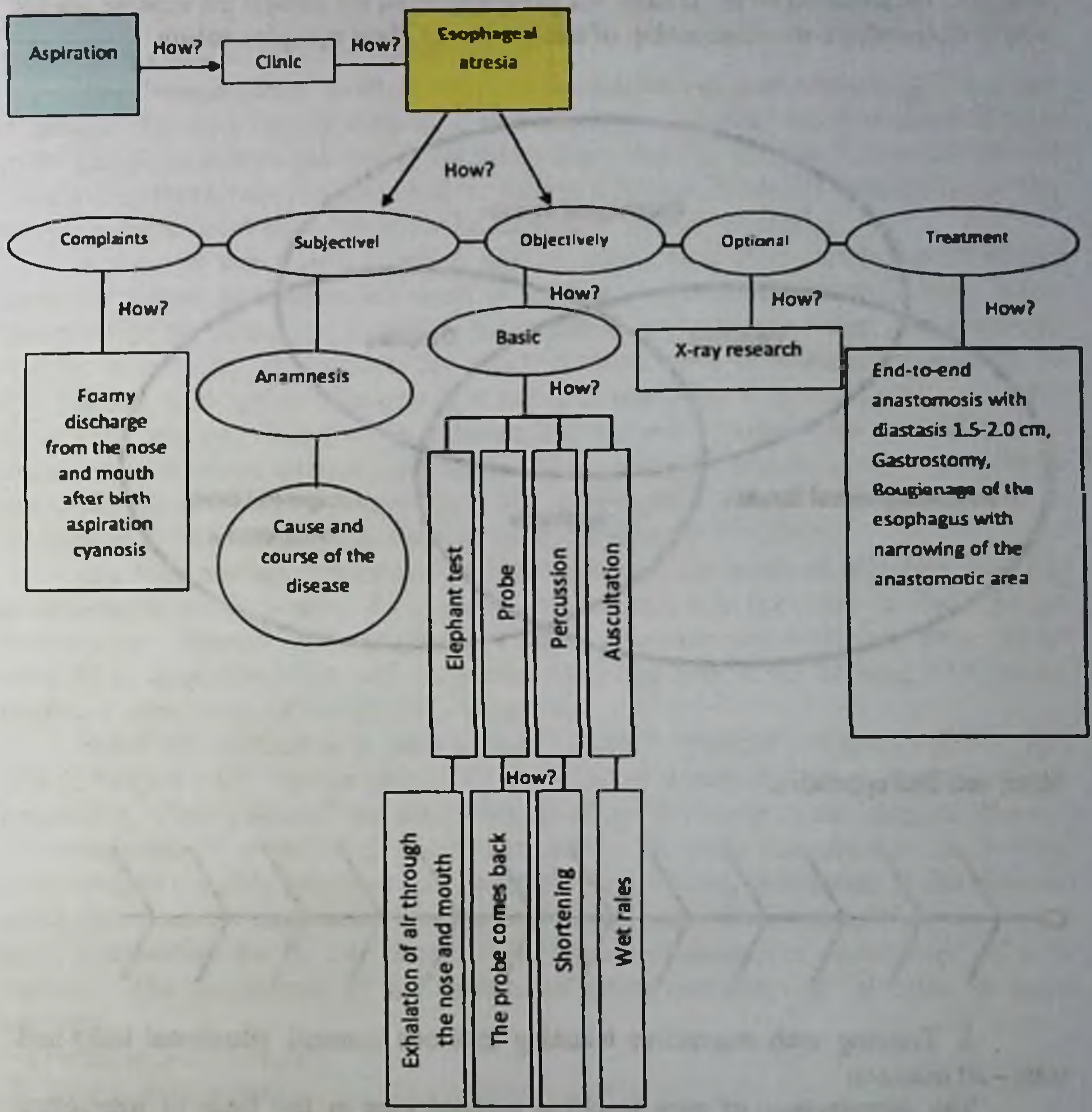


Note: see 2nd appendix.

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features

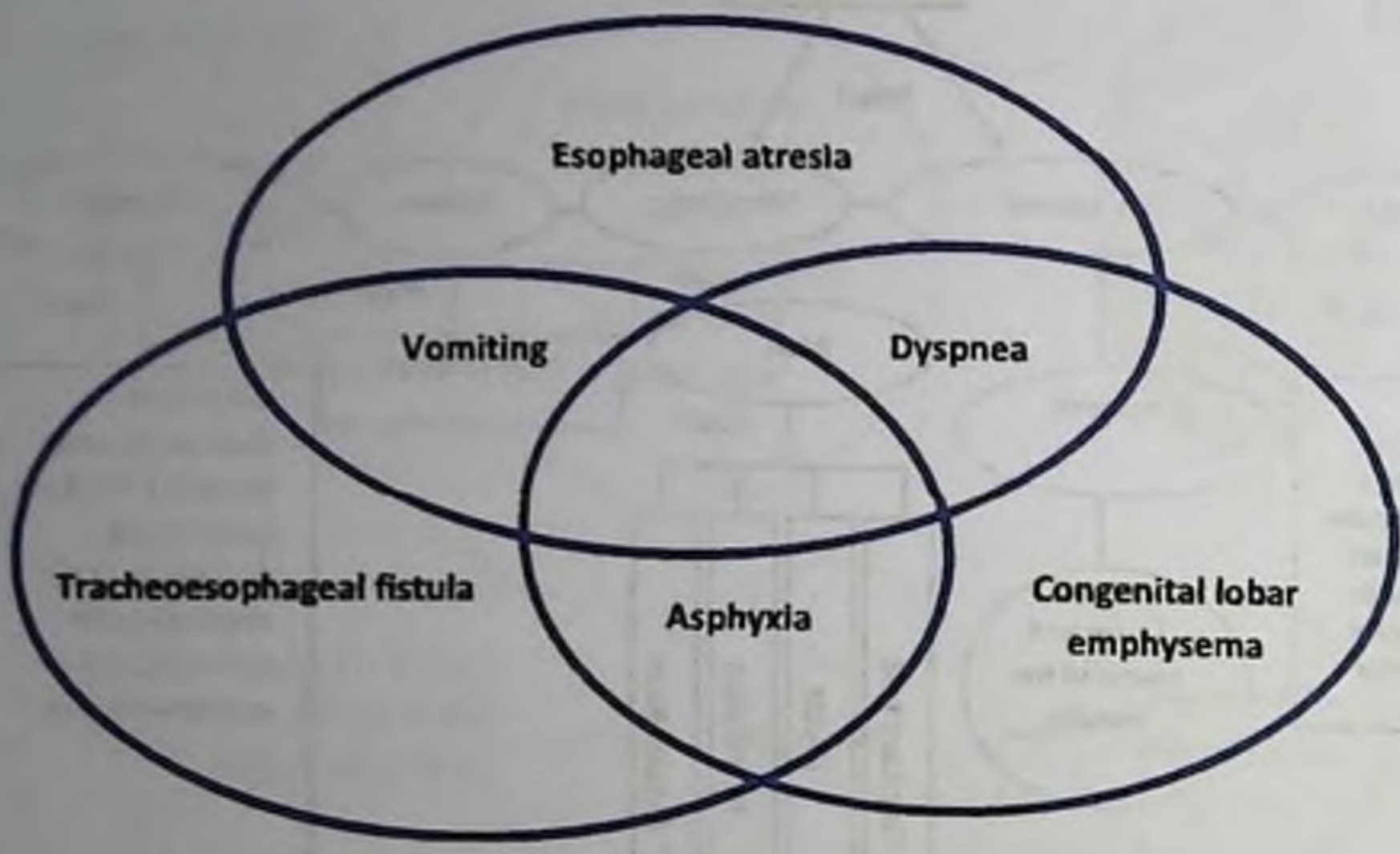
SCHEME "FISH SKELETON"

Allows you to describe the whole circle (field) of the problem and try to solve it.

Develops and activates systemic, creative, analytical, analytical thinking. Familiarize yourself with the rules for constructing a diagram.

Individually in pairs, write down the wording of sub-problems on the top "bone", and on the bottom - the facts confirming that these sub-problems exist. They

unite in mini-groups, compare and supplement their schemes. Reduced to a general scheme. Presentation of the results: the presentation of the completed scheme allows you to demonstrate the relationship of sub-problems, their complex nature.



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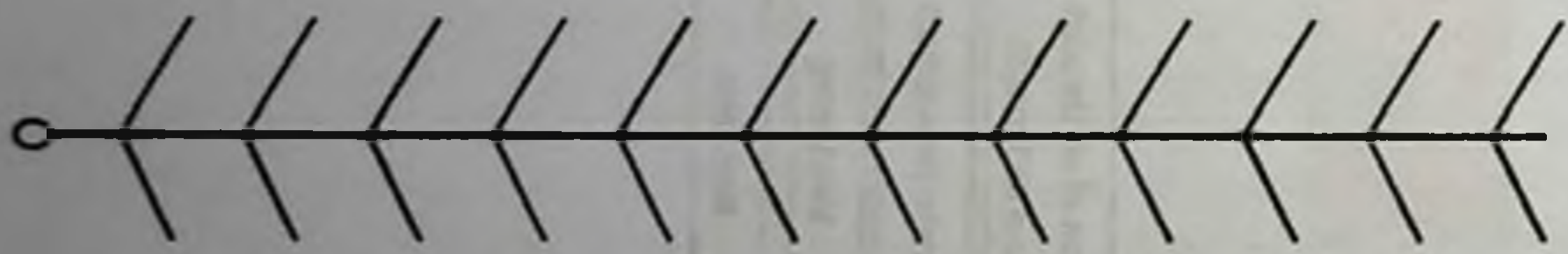


3. Training with interactive teaching methods (games), situational tasks and tests - 20 minutes;

The introduction of new teaching technologies in the form of interactive forms, one of which is the competition **"CAT IN A POUCH"**, in pediatric surgery is a necessary condition for mastering thematic material, acquiring special knowledge by students.

This method contributes to the expansion of the stereotype of thinking, to abstract from existing limitations, to develop the dynamism of mental activity, to intensify learning activities. Its value lies in working out and consolidating new educational information, summarizing knowledge on some completed section or as a way to conduct one of the stages of intermediate control.

The teacher prepares cards with options for tasks in a special bag in advance. Participants in this competition draw cards at random. Questions are answered in

writing. The work of students is checked by consultants. At the end of the lesson, the consultants announce the number of points received by the students and name the best students who received the most points.

The **"round table"** method refers to the methods of active learning of students in groups. To work on this method, it is necessary to establish an atmosphere of trust in the group, overcome psychological stress as an obstacle to open discussion, and set the time for work, which should not be long in duration, leading to distraction of the teacher's attention. This method can be applied in writing or orally.

A sheet of paper with a task is passed around in a circle, each student writes down his answer and passes the sheet to another, or the whole group is orally asked one question for everyone, to which each student answers in writing, and questions will be asked every 30 seconds, for which students have to manage. According to this scheme, each group of students is asked 5 questions in turn. Everyone writes down their answers, then there is a discussion: incorrect answers are crossed out, by the number of correct answers, the student's knowledge is assessed. Answers will be evaluated on a 3 point system, i.e. for a complete answer - 3 points, for an incomplete answer - 1 point, and for an incorrect answer - 0 points.

The **"three-stage interview"** method refers to the methods of active learning of students in small groups. To work on this method, it is necessary to form groups of 3 people, establish an atmosphere of trust, overcome psychological stress as an obstacle to open discussion, and set a work time that should not be long in duration, leading to distraction of the student's attention.

Roles are distributed in each group: "doctor", "patient", "expert – GP". The role of "expert - GP" can be played by a student or a teacher who evaluates what is happening. The "patients" are anonymously given the name of the surgical disease, the symptoms of which they must describe in an open narrative or in writing. According to the data provided (complaints of the patient, symptoms of the disease, some data from the anamnesis), the "doctor" must make the correct diagnosis with a brief justification for it, the "expert - GP" must evaluate the correctness of their actions. The assessment of the actions of group members is recorded in three sections:

1) what is done correctly;
2) what is done wrong;
3) how to do it.

Each group demonstrates a consultation with expert comments, which are evaluated by all participants in the training. Another option - students act as experts at a real consultation between a doctor and a patient in a clinic, the discussion is held by the whole group and the teacher.

This method combines the ability to expand the stereotype of thinking, abstract from existing limitations, develop the dynamism of mental activity, and intensify learning activities. Its value lies in the development and consolidation of new educational information.

"SNOW". Two groups of students jointly discuss one problem or situation in order to get the greatest number of correct answers. Each correct answer is recorded

as a score for that group in the form of "snowballs". The group with the highest number of points gets excellent marks.

The interactive game **"Weak Link"** is played as follows. The responsible game assistant prepares 30-50 questions on each topic. Questions should be short, specific, and should be answered within 5-15 seconds. Students of one group are built in a row in a semicircle according to the list, the assistant of the group with the list sits next to them to register points. The assistant in charge of the game introduces the participants to its conditions, according to which the student must start answering the question within 3 seconds, the full answer is given up to 10 seconds, provided that the answer is correct. In the absence or incorrect answer, the assistant asks the next question to another participant, so all students are asked in turn - this is the so-called first round. It is advisable to prepare questions for each circle on one topic, then the number of circles will depend on the number of topics for which a survey is required. For example, the first round of questions on the topic "Acute appendicitis", the second on the topic "Closed abdominal trauma", etc. The answer to each question is evaluated on a 3-point system, as correct complete - 3 points, correct incomplete - 2 points, incorrect - 0 points. At the end, the scores are summed up, the average score is displayed and announced to the students.

INTERACTIVE GAME QUESTIONS:

1. Specify 5 types of esophageal atresia in children

Rep. The upper segment ends blindly, and the lower one communicates with the trachea, the upper segment communicates with the trachea, and the lower one ends blindly, both segments end blindly, both segments communicate with the trachea.

2. Specify the leading clinical sign of esophageal atresia.

Rep. Foamy discharge from mouth and nose

3. List the diagnostic measures for esophageal atresia

Rep. probing of the esophagus, X-ray examination

4. What is the name of the method of introducing air through a catheter into the esophagus, in which air comes out of the nose or mouth with noise?

Rep. symptom of Elephanta

5. At what size of diastasis is a direct anastomosis applied in case of esophageal atresia?

Rep. Less than 1.5x2.0cm

6. What is the name of the malformation, in which the distal esophagus is lined with the mucous membrane of the stomach for a greater or lesser extent?

Rep. congenital short esophagus

7. Specify the main investigations carried out in congenital short esophagus.

Rep. Contrast radiography, esophagoscopy

8. What is the name of the violation of the patency of the cardiac part of the esophagus, not associated with the presence of an organic obstacle in this area?

Rep. Achalasia of the esophagus

9. Specify 2 main clinical symptoms of esophageal achalasia.

Rep. Regurgitation and dysphagia

10. In what disease is vomiting observed, which occurs from the first days of life and occurs soon after feeding, more often in the supine position, when screaming, crying.
Rep. chalazia esophagus

SELF-CHECK TESTS:

1. If both ends of the esophagus end blind, what signs are found on plain radiography?
1. Numerous small Kloiber bowls
2. Two large Cloiber bowls
3. The presence of a silent zone in the abdominal region
4. Intestinal pneumatosis
5. Presence of profuse gas in the stomach

2. X-ray picture in the upper esophageal-tracheal fistula of esophageal atresia?
1. Numerous small Kloiber bowls
2. Two large Cloiber bowls
3. The presence of a silent zone in the abdominal region
4. Intestinal pneumatosis
5. Presence of profuse gas in the stomach

3. X-ray picture in case of low esophageal-tracheal fistula of esophageal atresia?
1. Numerous small Kloiber bowls
2. Two large Cloiber bowls
3. The presence of a silent zone in the abdominal region
4. Intestinal pneumatosis
5. Presence of profuse gas in the stomach

4. What research method is considered the most reliable for esophageal atresia in newborns?
1. Objective research
2. X-ray - contrast study
3. Laboratory research
4. Ultrasound
5. Plain chest x-ray

5. What disease causes gastric contents in the vomit?
1.Achalasia of the esophagus
2. Chalazia of the esophagus
3. Low congenital intestinal obstruction
4. Congenital stenosis of the esophagus
5. Cicatricial stenosis of the esophagus

6. What symptom is considered the most important and early in esophageal atresia?
1. Cough
2. Cyanosis

3. Vomiting since birth
4. Foamy discharge from the mouth and nose
5. Increase in body temperature

7. What signs are found in chalazia of the esophagus?
1. Fountain vomiting
2. The presence of constant pain and swelling in the epigastric region
3. Vomiting when crying, restlessness in a horizontal position
4. Regurgitation of unchanged food
5. Vomiting blood

8. Contrast x-ray examination in the Trendelenburg position shows that the return of the contrast agent into the esophagus proves what disease?
1. Congenital short esophagus
2. Achalasia of the esophagus
3. Chalazia of the esophagus
4. Pyloric stenosis
5. Congenital stenosis of the esophagus

9. What is the nature of vomiting in esophageal achalasia?
1. Repeated vomiting with an admixture of bile
2. Repeated vomiting with an admixture of blood
3. Vomiting when crying and restlessness
4. Regurgitation of unchanged food
5. Fountain vomiting

10. What factor determines the manifestation of intestinal symptoms in congenital stenosis of the esophagus?
1. Anatomical location of the narrowed place
2. The length of the narrowed place
3. The degree of narrowing
4. Concomitant diseases
5. Age of the child

11. What position is considered correct in X-ray examination of esophageal chalazia?
1. Standing position
2. Sitting position
3. Position on the back
4. Trendelenburg position
5. Side position

12. What does the presence of air in the intestine mean on plain radiography of the abdominal cavity in case of esophageal atresia in newborns?
1. Fistulous form of esophageal atresia
2. Presence of an upper esophageal-tracheal fistula
3. The presence of a lower esophageal-tracheal fistula

4. Agenesis of the esophagus
5. Aplasia of the esophagus

13. What position is considered correct when transporting newborns who have a lower tracheal fistula?
1. Right side
2. Left side
3. Upright
4. Horizontal
5. The position of the patient does not matter

14. In case of esophageal atresia, up to what distance between segments can surgery be performed?
1.up to 0.5 cm
2. up to 1.0 cm
3. up to 1.5 cm
4. up to 2.0 cm
5. up to 2.5 cm

15. What are the most severe complications in esophageal atresia?
1. Destructive pneumonia
2. Intestinal obstruction
3. Cardiovascular insufficiency
4. Aspiration pneumonia
5. Bleeding from the gastrointestinal tract

16. What is the best treatment for congenital esophageal stenosis?
1. use of antispasmodics
2. operational
3. bougienage
4. vagotomy
5. laser therapy

17. Where is the patency impaired in esophageal atresia?
1. in the cardia
2. 1st physiological constriction
3. 2nd physiological constriction
4. 1st and 2nd physiological constriction
5. in all parts of the esophagus

18. What congenital malformation of the esophagus is common?
1. separate esophageal-tracheal fistula
2. aplasia of the esophagus
3. fistulous form of esophageal atresia
4. lower esophago-tracheal fistula
5. upper esophageal-tracheal fistula

19. What research method cannot be performed in case of esophageal atresia?
1. contrast radiography
2. esophagoscopy
3. radiography with the application of a rubber catheter into the esophagus
4. tracheobronchoscopy
5. Applying a rubber catheter, introducing air

20. What will we find if a contrast agent is injected above the esophageal atresia?
1. long esophageal atresia
2. types of esophageal atresia
3. inflammatory signs in the lungs
4. width of the esophageal-tracheal fistula
5. detection of air in the intestine, which has a lower esophageal-tracheal fistula

21. What measures are considered optional in patients with esophageal atresia when appointing a surgical hospital?
1. Vikosal recommendation
2. administration of antibiotics
3. put the newborn into the incubator
4. collect feces
5. put a rubber tube on the upper segment to prevent salivary aspiration

22. If esophageal atresia is suspected, what method is considered the most reliable and simple?
1. contrast radiography of the esophagus
2. insertion of the probe into the stomach
3. X-ray view of the abdomen
4. esophagoscopy
5. chest ultrasound

23. What is injected through the tube to test the elephant?
1. air
2. water
3. contrast agent
4. antiseptic solution
5. hydrogen peroxide

24. What is the cause of esophageal atresia?
1. violation of the blood supply to the esophagus in the embryonic period
2. violation of the detection of the primary tube of the esophagus
3. violation of the vacuolization process
4. violation of the manifestation of a neighboring organ
5. abnormal delivery

25. What kind of contrast agent is used for contrast examination?
1. barium sulfate

2. stodomepol
3. iodine lipol
4. brilliant green
5. methylene blue

26. What factor does not matter for the appearance of clinical signs in a chemical burn of the esophagus?
1. kind of chemical
2. chemical concentration
3. time of day
4. validity
5. amount of substance

27. Common type of esophageal atresia?
1. both ends end blindly
2. the upper end ends blindly, and the lower end has a tracheal fistula
3. both ends open into the trachea
4. the esophagus opens into the trachea and both form one wall
5. the upper end is open into the trachea, and the lower end is blind

28. What is the esophagus formed from in the embryonic period?
1. from lung tissue
2. from the cranial part of the rectum
3. from the midgut
4. from the tissue of the upper respiratory tract
5. from mediastinal vessels

29. After how many days is it allowed to perform diagnostic esophagoscopy in case of suspected esophagus burn?
1. 1-2 days
2. 3-4 days
3. 5-6 days
4. 10 days
5. 12 days

30. If a newborn vomits after the first feeding, what should we do to rule out esophageal atresia?
1.contrast examination of the intestine
2. auscultation of the abdominal cavity
3. re-feeding the baby in an upright position
4. plain chest x-ray
5. insertion of the probe into the stomach

Answers to tests for self-control

1-3, 2-5, 3-4, 4-2, 5-3, 6-4, 7-4, 8-3, 9-2, 10-3, 11-4, 12-3, 13-5, 14-4, 15-4, 16-2, 17-4, 18-4, 19-4, 20-1, 21-4, 22-1, 23-1, 24-3, 25-3, 26-3, 27-2, 28-1, 29-3, 30-5.

CHAPTER 2. CONGENITAL ANOMALIES AND MALFORMATIONS OF THE CHEST AND LUNGS (FUNNEL-SHAPED AND KEELED CHEST, DIAPHRAGMATIC HERNIAS, LOBAR EMPHYSEMA, CONGENITAL LUNG CYSTS, PULMONARY SEQUESTRATION, CONGENITAL BRONCHIECTASIS) CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

1. Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;

2. Development of students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;

3. Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to the life of the child;

4. Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;

5. Development of skills and abilities of general medical care: based on medical diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

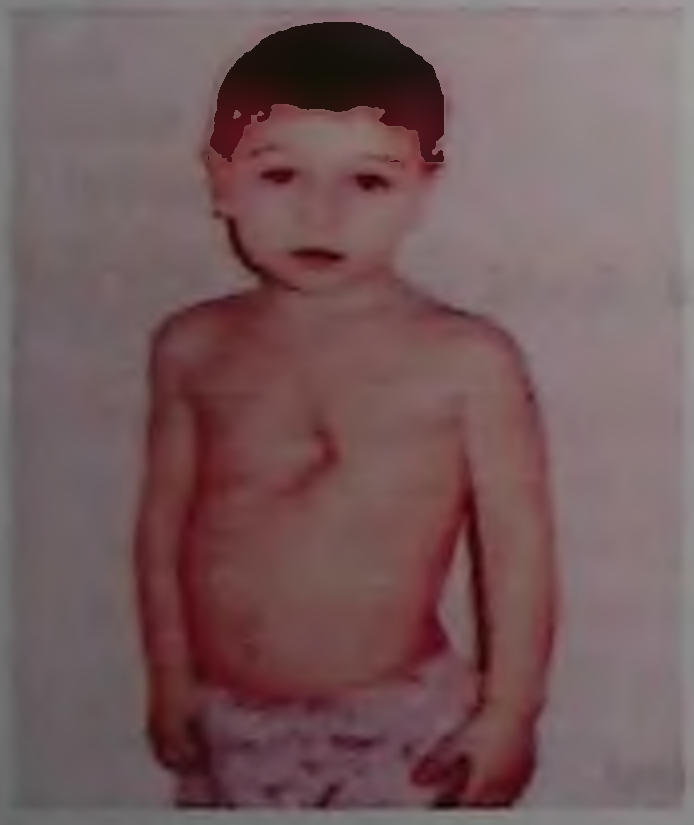
Location of the lesson: Department of Thoracic Surgery, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control: control questions,

performance of educational tasks in groups.

Written control: control questions.

CONGENITAL DEFORMATIONS OF THE CHEST



External signs of **pectus excavatum** are characterized by retraction of the sternum and the adjacent part of the ribs. The costal arches are somewhat deployed, the epigastric region bulges.

Clinic and diagnostics. As a rule, the deformity is determined immediately after birth, with a characteristic symptom of the paradox of inspiration (retraction of the ribs and sternum during inspiration). In about half of the patients, as they grow, the deformity progresses and becomes fixed by the age of 3-5 years. Deformation may appear at a later date - usually during the period of accelerated growth of the child.

Figure 9. Patient with pectus excavatum.

It is noted that the most profound deformities that have arisen in the pubertal period are rarely pronounced (Fig. 9).

When examining a child, it is possible to identify stigmas characteristic of a particular syndrome (increased joint mobility, flat back, reduced tissue turgor, poor vision, gothic sky, etc.).

Along with the inspection data, radiographic and functional research methods are important. An X-ray in direct projection reveals the degree of displacement of the heart (usually to the left), which indirectly makes it possible to judge the effect of deformation on heart function. With the help of a lateral radiograph, the depth of the depression of the sternum is determined, the thoracovertebral index or the index of I. Gizhitskaya (IG) (1962) is measured. The latter is the ratio of the smallest distance between the posterior end of the sternum and the anterior end of the spine to the largest. This is the basis for the classification of funnel chest deformity: a) by degree - I degree IG - 1-0.7; II degree IG - 0.7-0.5; III degree IG less than 0.5; b) in shape - symmetrical, asymmetric, flat. Functional changes in external respiration and hemodynamics are detected with severe deformities and directly depend on its degree. Disorders of external respiration are manifested by a decrease in maximum ventilation of the lungs, an increase in the minute volume of breathing and an indicator of oxygen consumption per minute. Oxygen utilization factor is reduced. ECG changes are noted. However, the most informative study of the heart is echocardiography, which allows to clarify the morphological changes in the heart. This is important due to the fact that with funnel chest deformity, especially with syndromic pathology, mitral valve prolapse is common.

Treatment. There are no conservative treatments for pectus excavatum. Indications for surgery are determined on the basis of the degree and form of PE. Thoracoplasty is unconditionally indicated for grade III PE and is indicated for grade II PE. With PE I degree (with the exception of flat forms), thoracoplasty, as a rule, is not performed [Urmonas V.K., Kondrashin N.I., 1983]. The optimal age for the operation is 5 years. With great care, one should approach surgical treatment in children with syndromic forms of deformity. Only after a comprehensive examination and in the absence of contraindications can surgery be recommended. Recently, the NASSA method has been most widely used. The operation consists in the establishment of a titanium plate in the retrosternal space. There are no relapses and complications with a correctly performed operation (Fig. 10).

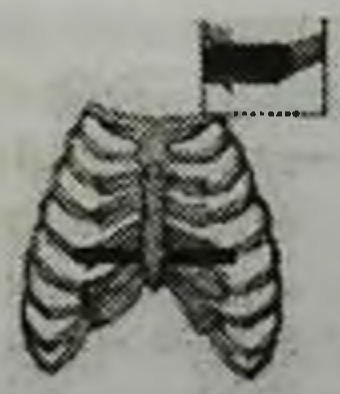


Figure 10. NASSA Method

Keeled deformity of the chest, as well as funnel-shaped, is a malformation. Often there is a hereditary transmission of the defect, which may be an integral component of one of the syndromes.

Clinic and diagnostics. The deformity is usually detected at birth and increases with age. The sternum protruding forward and the ribs sinking along its edges give the chest a characteristic keeled shape. Deformation can be symmetrical

or asymmetric. With an asymmetric shape, the cartilaginous sections of the ribs lift the sternum on one side, and it curves along the axis. There are combined forms, when the upper third of the sternum is raised, and the lower part with the xiphoid process falls sharply. At the same time, pairing of the IV and V ribs was noticed, and the IV rib is located above the V rib at the place of articulation with the sternum. Functional disorders, as a rule, are not detected. With syndromic forms and with a pronounced decrease in the volume of the chest, there may be complaints of fatigue, shortness of breath, and palpitations during exercise. However, in most cases, children and their parents are concerned about a cosmetic defect.

Treatment. Indications for surgery occur mainly in children older than 5 years with a pronounced cosmetic defect. Several methods of surgical interventions have been proposed, based on subperichondral resection of the parasternal part of the ribs, transverse sternotomy, and cutting off the xiphoid process. Fixation of the sternum in the correct position is carried out by stitching the sternum with the perichondrium and the remaining ends of the ribs. The results of surgical treatment of keeled deformity are good.

Rib anomalies may include deformation or absence of individual costal cartilages, bifurcation and synostosis of the ribs, deformation of groups of costal cartilages, absence or wide divergence of the ribs.

A bifurcation of the thoracic ribs (Luschke's ribs) usually appears as a dense protruding mass next to the sternum. In rare cases, it is necessary to carry out a differential diagnosis with a tumor process. Treatment is required only for significant deformities for cosmetic purposes. It consists in the subchondral removal of deformed cartilage.

Cerebro-costo-mandibular syndrome. Rib defects (absence, bifurcation, pseudoarthrosis, etc.) are combined with non-closure of the upper palate or gothic palate, hypoplasia of the lower jaw, micrognathia, glossoptosis, and microcephaly. Surgical treatment is indicated in extreme cases with a significant chest wall defect with paradoxical breathing.

Poland's syndrome is always characterized by a unilateral lesion, including aplasia or hypoplasia of the pectoralis major muscle, hypoplasia of the pectoralis minor muscle. It is often accompanied by the absence of part of the underlying costal cartilages and ribs, aplasia or hypoplasia of the nipple, aplasia of the mammary gland in girls, deformity of the arm and hand. Diagnosis is based on external examination. X-rays are used to clarify the condition of the ribs. In the presence of a significant defect with the formation of a pulmonary hernia, a rib defect is repaired using autotransplantation of the ribs from the healthy side. It is possible to use the above- and underlying ribs with their splitting and displacement towards the defect. Some surgeons have successfully used synthetic materials. To replace the missing muscles, the flap or the entire latissimus dorsi is moved. Operations for wide defects with paradoxical breathing are performed at an early age.

The splitting of the sternum is a rare malformation, which consists in the presence of a longitudinal gap located along the midline. The defect can vary in length and width up to complete splitting of the sternum.

At the same time, a paradoxical movement of the mediastinal organs is noted, covered at the defect site only with a thinned layer of soft tissues and skin. The pulsation of the heart and large vessels is visible. The defect is detected in early infancy and increases as the child grows. Along with anatomical manifestations, functional disorders are also noted. Respiratory disturbances up to bouts of cyanosis are possible. Children usually lag behind in physical development.

The operation is performed at an early age. It consists in releasing the edges of the defect, which are sutured throughout with interrupted nylon sutures. When examining children with malformations of the chest, attention should be paid to identifying stigmas of disembryogenesis, such as anomalies in the finger pattern, shortening of the fingers, etc. With medical genetic counseling for sporadic cases of the syndrome, the prognosis for the birth of a healthy child is favorable.

MALFORMATIONS OF THE LUNGS

Violations of the process of lung embryogenesis as a result of the influence of various teratogenic factors on the fetus cause the appearance of various malformations of the lungs.

It is known that the cessation of growth of bronchopulmonary kidneys in the early stages (4th week) leads to agenesis of one or both lungs; delay in the development of bronchopulmonary kidneys on the 5th week causes the occurrence of aplasia or deep hypoplasia of the lungs, on the 5-6th week - the occurrence of agenesis, aplasia or hypoplasia of the lobes. Thus, it can be said with certainty that the degree of impaired lung development is inversely related to the age of the fetus, in which it was exposed to teratogenic factors.

The most common malformations associated with the development of anatomical, structural and tissue elements of the lung include lung agenesis and aplasia, hypoplasia, congenital lobar emphysema; to malformations associated with the presence of excessive dysembryogenetic formations - an additional lung with abnormal blood supply (extralobar sequestration), a lung cyst, a hamartoma. Among the malformations of the vessels of the lungs, which have clinical significance and are more related to pulmonology, arteriovenous fistulas should be mentioned.

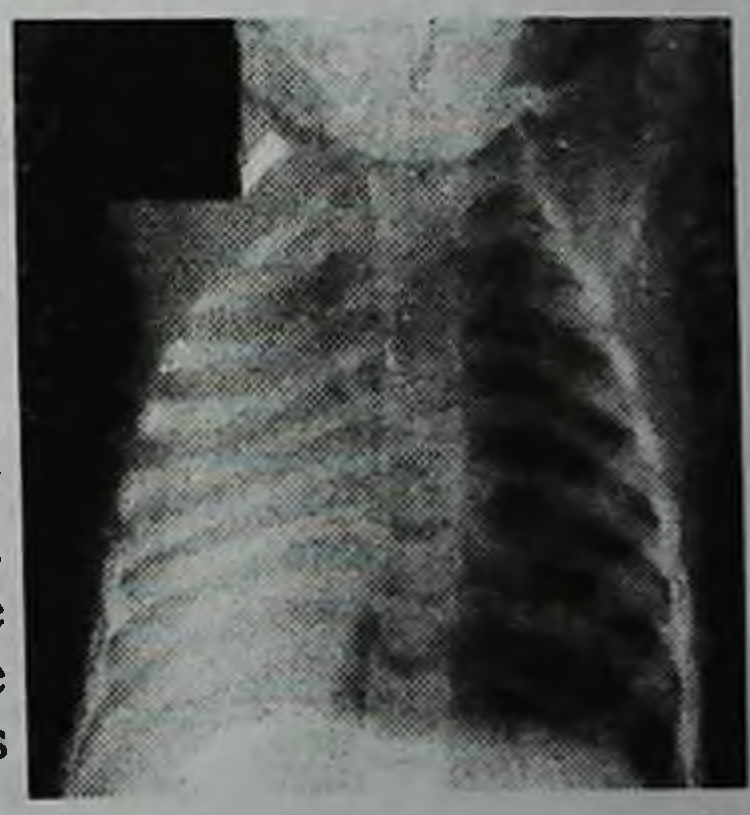


Figure 11. Chest x-ray. Aplasia of the right lung

Agenesis should be understood as the absence of a lung simultaneously with the absence of the main bronchus.

Aplasia - the absence of a lung or part of it in the presence of a formed or rudimentary bronchus. With bilateral agenesis or aplasia of the lungs, children are not viable, with a unilateral defect, they can live and develop normally (Fig. 11).

The clinical picture of these malformations is very similar and is manifested by such symptoms as respiratory asymmetry, dullness of percussion sound, as well as the absence or significant weakening of breathing detected on auscultation on the side of the lesion, clinical and radiological symptoms of mediastinal displacement to the diseased side. On a plain chest radiograph, a total darkening of half of the chest cavity is possible. Over time, however, a symptom of a mediastinal hernia may join, due to the movement of part of the lung to the opposite side. Such a clinical and radiological picture resembles neonatal atelectasis, in the differential diagnosis of which such additional research methods as bronchoscopy, bronchography, and angiopulmonography can be used. Surgical treatment, as a rule, is not required for these defects.

Lung hypolasia - underdevelopment of all its structural elements. Underdevelopment can affect both lungs, the whole of one lung or part of it (lobe, segment). In this regard, it becomes clear that the term "hypoplasia" combines a number of defects, the form of which depends on the stage of embryogenesis at which the differentiation of the structural elements of the lung stopped or lingered.

Most clinicians describe the two most common forms of pulmonary hypoplasia, **simple** and **cystic.**

A simple form of hypoplasia is characterized by a uniform decrease in the volume of the lung or lobe, narrowing of the bronchi and blood vessels. The clinical form of this defect depends, as in many other forms, on the extent of the lesion and the presence (absence) of inflammatory changes in the vicious or adjacent sections of the lung. In this case, there may be signs of respiratory failure, asymmetry of the chest and respiratory asymmetry, clinical and radiological symptoms of displacement of the mediastinal organs towards the reduced lung. To varying degrees, impaired functions of ventilation, secretion, and drainage function of the bronchi can be accompanied by corresponding clinical and radiological symptoms: dullness of percussion sound with weakened breathing, the presence of dry and moist rales of various sizes, and a change in the transparency of the lung tissue. However, the main factor causing the clinical picture is a purulent-inflammatory process in the hypoplastic part of the lung, which quite often accompanies malformations of the lungs. It is repeated inflammatory diseases of the lungs of the corresponding localization that are most often a reason to suspect the presence of a defect.

Carrying out in these cases additional and special studies (bronchoscopy, bronchography, angiopulmonography, lung scanning) allows, as a rule, to clarify the diagnosis. During bronchoscopy, the severity and localization of inflammatory changes, options for the discharge of the bronchi and the degree of narrowing of their mouths, etc. are determined. As a rule, deformation of the bronchial tree is noted on the bronchogram. Angiopulmonography reveals a significant depletion of blood flow. Radiological methods allow to determine the degree of functional disorders (ventilation and blood flow) in areas corresponding to the localization of the defect.

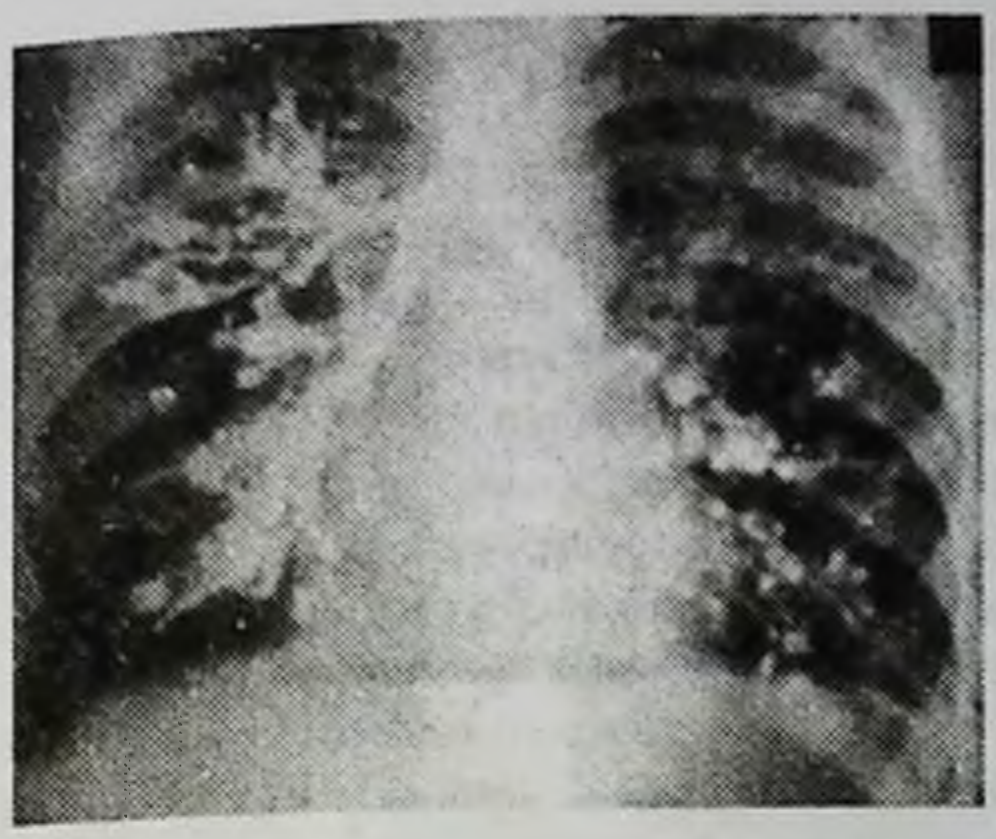


Figure 12. On contrast bronchography, polycystic disease of both lungs

Cystic hypoplasia of the lung (congenital polycystic) is a malformation in which the terminal sections of the bronchial tree at the level of subsegmental bronchi or bronchioles are an expansion of a cystic form of various sizes.

The clinical picture of the cystic form of hypoplasia differs little from a simple one, however

on the radiograph in the zone corresponding to the defect, multiple thin-walled air cavities, which usually

do not contain liquid, can be determined. The prolonged existence of such cavities, the accumulation of bronchial secretions in them, its stagnation and infection, as a rule, cause a purulent-inflammatory process. The most characteristic in this case may be intoxication, a wet cough with purulent sputum, respiratory failure, as well as symptoms caused by a change in the volume of lung tissue due to its underdevelopment and inflammation in it. Radiologically during this period, multiple levels of fluid may appear in the cystic cavities. With the long-term existence of the inflammatory process, difficulties often arise in the differential diagnosis of cystic hypoplasia and bronchiectasis (with saccular bronchiectasis) (Fig. 12).

Treatment of hypoplasia is surgical - removal of the affected part of the lung. Attention should be paid to the maximum relief of the acute inflammatory process before surgery, which allows to reduce the percentage of postoperative complications and improve the results of surgical treatment.

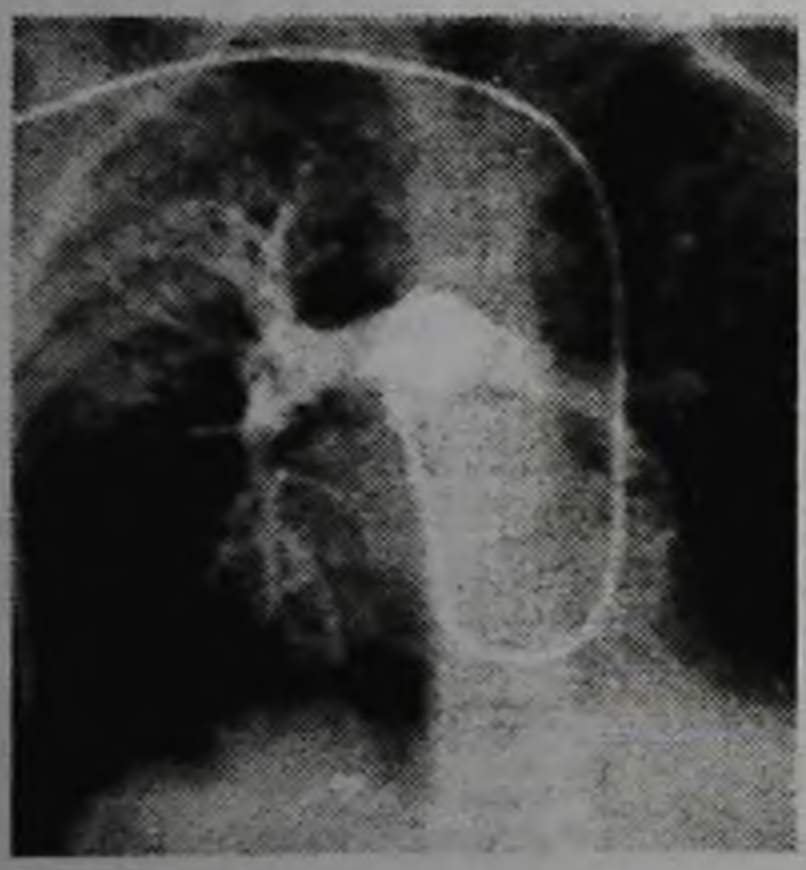
Morphological confirmation of the diagnosis of lung hypoplasia should be the basis for continuous follow-up of such patients in the postoperative period, since they cannot exclude the presence of less pronounced disorders in the structural elements of the remaining parts of the lungs, which, in turn, can lead to the addition of inflammatory changes in them.

This malformation is characterized by stretching of a part of the lung (usually one lobe). For its designation, the terms **"congenital lobar emphysema"**, **"localized emphysema"**, **"obstructive emphysema"**, **"hypertrophic emphysema"** are also used. The true causes of the defect remain unclear. However, some authors associate its occurrence with aplasia of the cartilaginous elements of the bronchi, hypoplasia of elastic fibers, hypoplasia of the smooth muscles of the terminal and respiratory bronchioles, and other disorders in the structural units of the lung tissue. These factors create the prerequisites for the emergence of a valvular mechanism that

contributes to excessive swelling of the corresponding part of the lung and the development of respiratory disorders.

Clinic and diagnostics. Clinical disorders are due to the presence and severity of symptoms of respiratory and cardiovascular insufficiency. The following factors play a role in the pathogenesis of respiratory failure: exclusion of a large volume of lung tissue from the respiratory function (lack of respiratory function in the malformed section of the lung and collapse of normally formed sections as a result of compression by their overly stretched sections of the malformed lung), as well as a significant percentage of blood shunting in the collapsed lung. parts of the lung.

An increase in intrathoracic pressure and mediastinal displacement, which are often found in this malformation, are another pathogenetic mechanism that causes cardiovascular disorders in such patients. There are decompensated, subcompensated and compensated forms of congenital lobar emphysema. With **a decompensated form**, the defect manifests itself from birth. Quite often, general cyanosis, shortness of breath, respiratory asymmetry (lag in the act of breathing of the swollen half of the chest), anxiety of the child, frequent dry cough, attacks of asphyxia during feeding are noted. X-ray examination is decisive in the diagnosis, in which an increase in the transparency of the lung tissue can be detected up to the complete disappearance of the lung pattern, mediastinal displacement, sometimes with the presence of a mediastinal hernia, compression of healthy parts of the lung in the form of a triangular shadow of atelectasis. The latter sign is extremely important in the differential diagnosis with pneumothorax.



The most convincing signs of localization of emphysema are found with angiopulmonography, which can be performed only in cases where the patient's condition allows, i.e., with subcompensated and compensated forms. At the same time, in the zone of increased transparency is determined by depleted vascular network and contiguous vessels in the compressed parts of the lung (Fig. 13).

Figure 13. Angiopulmonography shows congenital lobar emphysema on the left

With **a compensated form** of congenital lobar emphysema, the listed symptoms can be extremely mild, intermittent, noticeable only to an experienced clinician. Often only the occurrence of inflammatory changes in the malformed section of the lung or collapse in other sections is the reason for an x-ray examination, which allows an accurate diagnosis.

Treatment. The only correct method of treating this malformation is operative - removal of the viciously developed lobe.

This malformation is characterized by the presence of a cystic formation located centrally, i.e., in the root zone or closer to the periphery. Other names can be found in the literature: **"bronchogenic cyst", "bronchial cyst".** These names are justified, since microscopic examination of the walls of cystic formations in most cases makes it possible to identify elements of the bronchial walls in them: cartilaginous plates, cylindrical epithelium, elastic and muscle fibers and etc. Embryogenesis of such cysts, apparently, is associated with the formation of an additional hypoplastic lobe (segment, subsegment), which is completely separated from the bronchial tree or retains communication with it.

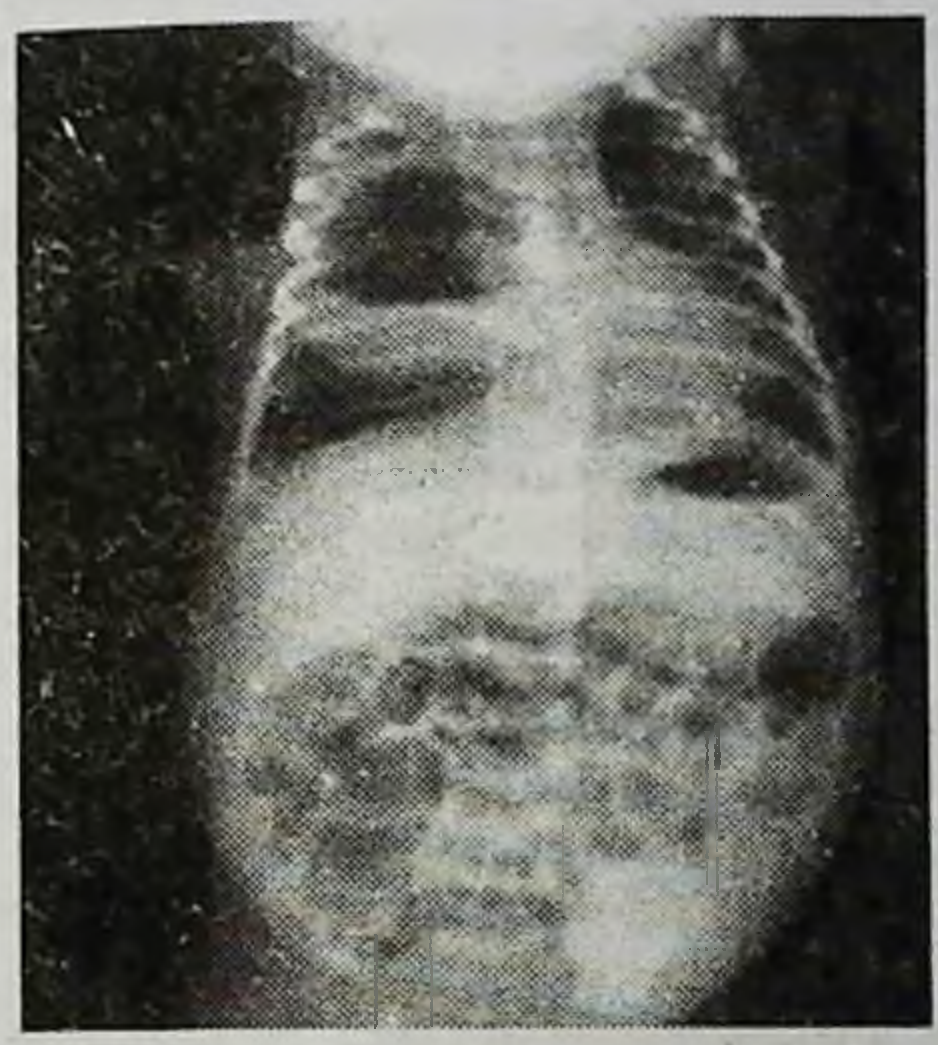


Figure 14. On the radiograph, a bronchogenic cyst on the right

Clinic and diagnostics. With small sizes of cysts that do not communicate with the bronchial tree, clinical manifestations of the defect may be absent, and often these formations are an accidental x-ray finding. If there are reports of a cyst with a bronchial tree, symptoms may appear due to partial drainage of the contents of the cyst into the bronchial tree (wet cough, the presence of dry rales during auscultation). X-ray examination in such cases makes it possible to detect the level of fluid in the cyst cavity (Fig. 14). When the cyst becomes infected, symptoms of inflammation and intoxication may appear (fever, anxiety, loss of appetite, etc.).

The presence of large centrally located solitary cysts of the lung, more often communicating with the bronchial tree, may be accompanied by a syndrome of respiratory disorders caused by compression of large lung areas. The occurrence of a valvular mechanism in such a cyst causes the appearance of respiratory and cardiovascular insufficiency, similar to how it happens with tension pneumothorax. The nature of the physical data depends on the size of the cyst, the contents, the degree of tension.

Significant volume or tense air cysts are more characterized by weakening of breathing on the side of the lesion, the presence of a pulmonary sound with a box shade during percussion, and a shift of the mediastinum in the opposite direction. In

the absence of mediastinal displacement, tension syndrome can be manifested by anxiety, refusal to eat, reflex vomiting, etc.

The presence of cysts, even of considerable size, filled with liquid contents, is rarely accompanied by tension syndrome, and the characteristic physical data are weakening of breathing and dullness of lung sound on the side of the lesion.

The diagnosis is clarified with the help of X-ray methods of investigation. At the same time, an air cystic formation with clear contours can already be detected on a plain radiograph. The presence of a fluid level in the cavity indicates partial drainage of the contents of the cavity through the bronchial tree. Homogeneous darkening with clear contours makes it reasonable to conduct a differential diagnosis with a parasitic cyst (usually echinococcus), as well as a lung tumor. Radiography in two projections, polypositional fluoroscopy, as well as tomography can clarify the localization of the formation.

Angiopulmonography and bronchography are of considerable informative value in these cases. However, it should be remembered that bronchography in conditions of severe respiratory failure is more dangerous than angiography.

A characteristic endemic history, the presence of positive serological reactions and other symptoms serve as a rationale for an ultrasound examination of the liver in a patient with suspected echinococcosis of the lung due to frequent concomitant lesions of these organs.

Treatment. The complexity of the differential diagnosis between a cyst and a tumor, as well as the inability to predict the course of the disease (enlargement, suppuration, rupture) give grounds for surgical treatment in a planned manner, which often consists in removing a cyst or a section of the lung along with a cyst (segment or lobectomy).

Lung sequestration is understood as a malformation in which an additional hypoplastic lobe, sometimes communicating with the bronchial tree of the main lung, has an autonomous bl[illegible]d supply by an abnormal artery extending from the aorta or its branches. Venous drainage of such a site, as a rule, is carried out into the system of a small circle and much less often into the system of the superior vena cava. The hypoplastic part of the lung with abnormal blood supply may be a single cyst or polycystic formation located outside the tissue of the main lung and having its own pleural sheet or located inside the lung tissue, which gives reason to isolate extrapulmonary and intrapulmonary sequestration.

The most common localization of the defect is the lower medial lung. There are reports in the literature about the localization of the sequestered area of the lung in the abdominal cavity.

Clinic and diagnostics. Signs of pathology occur during infection and the attachment of the inflammatory process in the viciously developed and adjacent normal sections of the lung. At the same time, certain symptoms are due not only to the degree of inflammatory changes, but also to the sequestration variant: the presence of simple or cystic hypoplasia, the presence or absence of communication between the sequestered area and the common bronchial system, extrapulmonary or intrapulmonary localization of the malformed area.

So, in the absence of communication with the bronchus and inflammation, a defect in the form of a darkening area of greater or lesser intensity in certain parts of the lungs can be detected by chance - during an X-ray examination performed for other reasons. The accession of the inflammatory process is accompanied by the corresponding symptoms: fever, physical data characteristic of lobar pneumonia or localized bronchiectasis.

Diagnosis of lung sequestration is difficult, since the clinical and radiographic symptoms of other diseases and malformations (polycystic and bronchiectasis, solitary cyst and lung abscess, etc.) are very similar. Only the identification of an abnormal vessel, the shadow of which can sometimes be detected by tomography and in most cases by aortography, makes it possible to make a diagnosis before surgery.

The importance of preoperative diagnosis of this malformation should be emphasized due to the fact that the presence of an abnormal, very large arterial branch located in an atypical place and extending directly from the aorta poses a certain danger during surgery.

Surgical treatment.

Bronchiectasis (bronchodilation) is a chronic lung disease, accompanied by a pathological expansion of the bronchi, in which a purulent process is localized. Pneumosclerosis develops in the lung parenchyma.

The prevalence of bronchiectasis in children ranges from 0.5 to 1.7%. Currently, bronchiectasis is much less common.

Bronchiectasis can develop under the influence of many reasons, which are divided into the following groups:

- congenital bronchiectasis;
- inflammatory diseases of the respiratory system;
- foreign bodies of the bronchi.

The theory of congenital bronchiectasis was proposed in the last century, but there is still no consensus. It is more correct to consider that bronchiectasis can exist both at the birth of a child and form in the first years of life as a result of embryonic disorders, delays in the formation of bronchial walls and cartilaginous plates with hypoplasia.

Inflammatory lung diseases, especially recurrent ones, play an important role in the development of bronchiectasis. The first is bronchitis. The peribronchitis and interstitial inflammation that develops in this case cause a violation of the drainage function, which leads to the formation of bronchiectasis. Protracted and often recurrent pneumonia, especially in young children, contribute to the development of significant changes in the interstitial tissue.

Foreign bodies of the tracheobronchial tree. The development of destruction in the bronchi is affected not so much by the location of the foreign body as by the degree of obstruction of the bronchus. Organic and plant objects, while in the bronchi, cause bronchiectasis faster than plastic, metal and glass. Obturation leads to atelectasis, and subsequent infection leads to the development of bronchiectasis.

The pathogenesis of the development of bronchiectasis has not yet been unambiguously interpreted, however, the main points leading to the development of

bronchiectasis are morphological inferiority of the congenital order, an inflammatory agent in the postnatal period, a violation of the drainage function with or without the development of atelectasis, endobronchitis, turning into panbronchitis, peribronchitis with transition of inflammation to the lung parenchyma. There comes a deformation of the bronchus of a cylindrical or saccular type, the bronchi do not pass into the bronchioles and end blindly with the formation of atelectasis or, conversely, emphysema. This site does not take part in ventilation and gas exchange does not occur in it. Such a destructive-purulent area of the lung is only a source of intoxication. According to histological studies, it is often not possible to differentiate congenital bronchiectasis from those acquired as a result of changes in tissues that occur as a result of a suppurative process.

The following classification of bronchiectasis has been adopted.

By genesis: congenital, acquired.

In shape: cylindrical, saccular, cystic.

By distribution: one-sided, two-sided.

Clinic and diagnostics. Complaints of the child or parents of lethargy, weakness, fatigue. The main symptom is a loose cough, more in the morning, with sputum that may be mucous, mucopurulent, and purulent. The amount of sputum depends on the extent of the lesion. Hemoptysis in children with bronchiectasis is rare, more often it occurs during a process caused by a foreign body, and is due to the presence of granulations above the aspirated object.

Complaints are more pronounced in processes of considerable length (a share or more) and during an exacerbation. Children under 5 years of age usually swallow sputum, so even parents may not notice the fact of its discharge.

With percussion, a shortening of the percussion sound is detected above the affected lobe in cases of atelectatic bronchiectasis, especially with extensive atelectasis. The borders of the heart in these children are also displaced to the affected side.

Auscultation is more informative. According to the affected area, wheezing is heard, often moist, of various sizes, even large bubbling. With a limited process, wheezing disappears after coughing. Loud wheezing can be heard as wired and over a healthy part of the lung, even on the other side, especially in children under 5 years of age. Auscultation also noted a weakening of breathing or its bronchial shade over the affected area. Auscultatory examination is carried out repeatedly, including in the morning immediately after sleep.

Diagnosis of bronchiectasis is based on anamnestic data, especially the first year of life, and symptoms, which may vary depending on the length of the process. The final diagnosis is made only after a complete clinical bronchial examination: bronchoscopy, radiography, bronchography and radioisotope studies.

One of the main symptoms that parents always note is a cough. It is a consequence of bronchitis - a constant companion of the bronchiectasis process, and it is cough that is an indication for bronchoscopy.

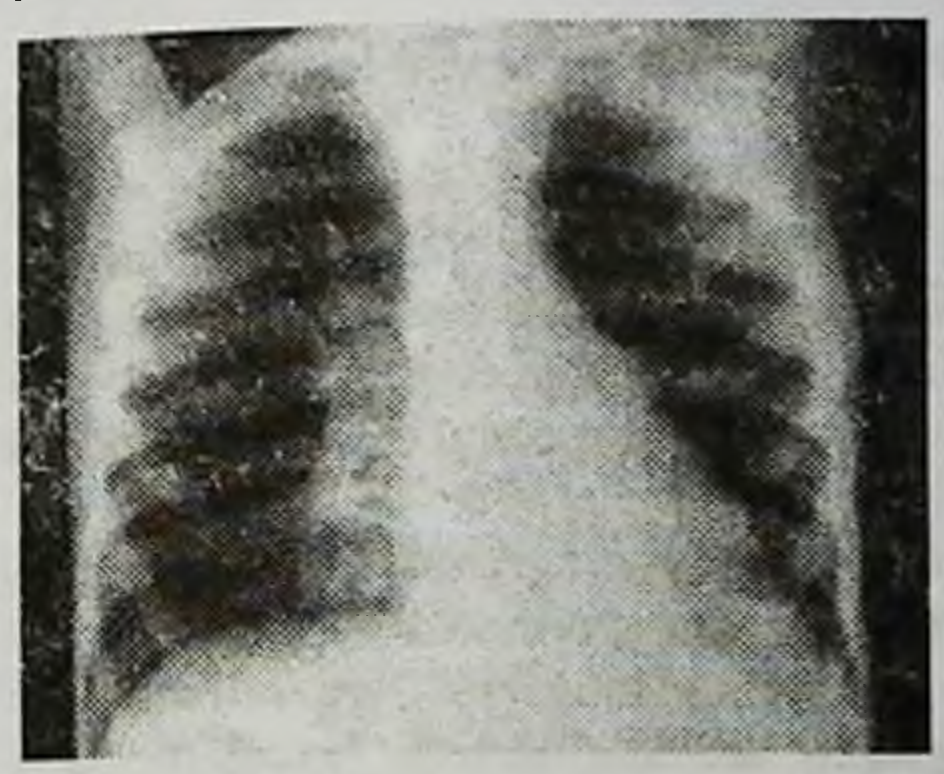
Endoscopic diagnosis is based on a visual assessment of the state of the mucous membrane of the tracheobronchial tree, and bronchitis can be catarrhal or purulent, depending on the nature of the process. With formed bronchiectasis, even

during remission, purulent sputum is found in the bronchi of the affected area. With catarrhal bronchitis, the discharge is mucous in nature.

With bronchiectasis, purulent or catarrhal-purulent bronchitis is determined, corresponding to the affected area.

Local endobronchitis, spreading within the lobe of the lung, indirectly indicates a lobar bronchiectasis process. With bilateral bronchiectasis, especially wide, diffuse purulent endobronchitis is found. Sputum is examined to establish the microflora, in some cases - to detect tuberculosis.

X-ray diagnostics consists of survey methods, bronchography and radioisotope studies. Angiography is used for limited indications, mainly when pulmonary hypertension is suspected.



Plain radiography may reveal an increase in the bronchovascular pattern, more in the root zone, infiltration, fibrosis, elements of emphysema, atelectasis from a segment to the entire lung, but the absence of changes on a chest x-ray does not deny the presence of bronchiectasis, especially a local form.

Bronchiectasis of the lower lobe of the left lung. Plain radiograph.

Figure 15. On the radiograph, signs of bronchiectasis in the lower lobe of the left lung

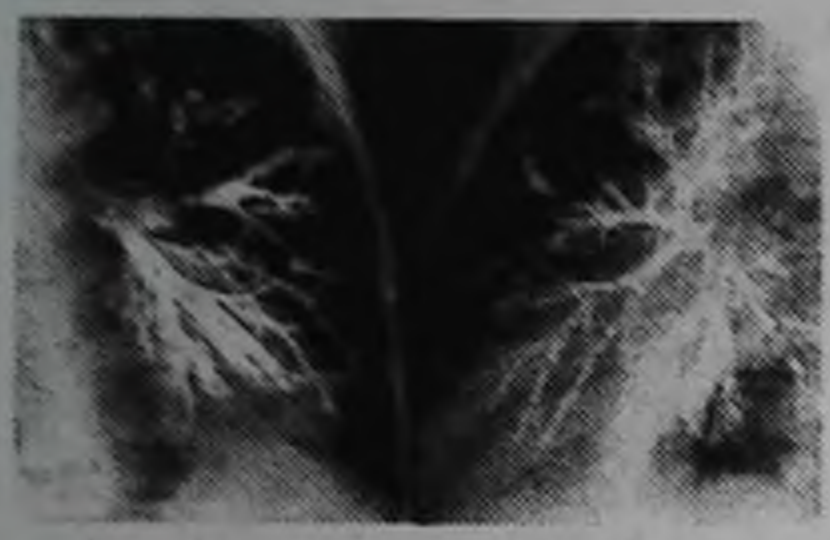
Atelectasis of the lower lobe of the left lung is determined. The transparency of the left lung field is increased. The shadow of the mediastinum is shifted to the left. The most informative X-ray method is bronchography, which allows you to identify the presence of bronchiectasis, their nature - cylindrical or saccular, the extent of the lesion and establish the state of healthy parts of the lung (Fig. 15).

In childhood, combined lesions are often found, when there are, for example, bronchiectasis of one lobe and segments of another.

Angiopneumography reveals a depletion of blood flow in accordance with the affected area, and in the absence of blood flow, "silent" contrast zones are determined.

A radionuclide study for bronchiectasis in children makes it possible to judge the functional state of all parts of the lung (this is evidenced by the degree of decrease in the accumulation of a radioactive substance) and serves as an additional diagnostic method in combination with the results of other studies. Differential diagnosis of bronchiectasis in the early stages in outpatient settings is carried out with asthmatic bronchitis.

In contrast to bronchiectasis, in these cases, there is a more pronounced paroxysmal respiratory failure, wheezing is heard over the surface of both lungs and quickly disappears at the end of the attack.



With recurrent prolonged pneumonia, the process, unlike bronchiectasis, is localized in the interstitial tissue, so the manifestations of bronchitis fade into the background. Radiography is of great help (Fig. 16).

Figure 16. Bronchography shows bronchiectasis of the right and left lung

Many patients with bronchiectasis have previously been unreasonably treated for tuberculosis. In differential diagnosis; it is necessary to take into account the anamnesis. Contact with a patient with tuberculosis, unclear causes of fever without an x-ray picture of pneumonia require tuberculosis tests. If an outpatient diagnosis is not possible, the child should be placed in a hospital for a complete bronchological examination.

In clinical conditions, bronchiectasis has to be differentiated from various malformations of the bronchopulmonary system with associated suppuration. In some cases, plain radiographs of the lungs (festering lung cyst) are sufficient, in others, it is necessary to conduct bronchography and angiography (intrapulmonary sequestration).

A number of systemic diseases, especially in children of the first years of life, also require a complete bronchological examination for the purpose of differential diagnosis. These include cystic fibrosis, immunodeficiency states, Hamman-Rich syndrome, in which, in addition to the expansion and deformation of the bronchi, small shadows are detected, diffuse emphysema, and increased bronchovascular pattern.

Treatment of bronchiectasis in children is carried out by radical transthoracic surgery with the removal of the affected part of the lung.

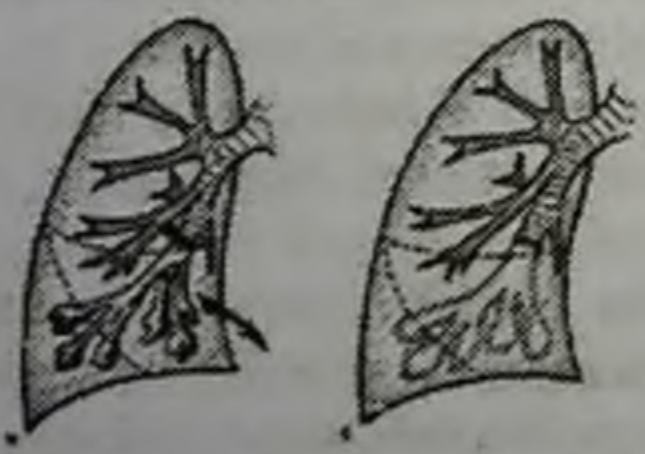


Figure 17. Scheme of resection and extirpation of the bronchi of the lower lobe according to E.A. Stepanov

With the defeat of individual segments, an operation can be applied - resection and extirpation of the bronchi of this segment according to E.A. Stepanov (Fig. 17).

The advantage of this operation is the fact that healthy nearby parts of the lung are not injured, there is no wound surface, and the left area of the parenchyma without bronchi is very quickly pneumatized due to the penetration of air into it through the pores of Kohn and is a good biological prosthesis.

Conservative treatment is indicated for deforming bronchitis, exacerbation of the process, with temporary or final contraindications to surgery in cases of widespread bilateral bronchiectasis and to prepare the patient for a planned operation.

Sanitation of the tracheobronchial tree is carried out by physical therapy, active coughing, postural drainage, inhalations aimed at reducing the viscosity of sputum and repeated bronchoscopy.

It is mandatory to carry out detoxification, desensitizing and restorative therapy. A good effect is also given by sanatorium-and-spa treatment.

The prognosis after surgery depends on the volume of the removed part of the lung and the severity of bronchitis in the so-called healthy areas of the lung. When bronchitis is stopped and no more than two lobes of the lung are removed, the prognosis is favorable, often even pulmonectomy, in the absence of a lesion on the other side, leads the child to recovery. More extensive resections are fraught with the development of hypertension in the pulmonary circulation with the formation of cor pulmonale.

Dispensary supervision is aimed at organizing a rehabilitation system in the coming years. Mandatory control studies of the bronchial tree (bronchoscopy, bronchography), spa treatment, sanitation of all foci of chronic inflammation, exercise therapy.

In the future, it is important to choose a profession that is not related to chemical production, dust.

Diaphragmatic hernia is understood as the movement of the abdominal organs into the chest through a defect in the abdominal barrier (diaphragm). Unlike other hernias, they do not always have a hernial sac.

In children, congenital hernias are mainly noted, which are a malformation of the diaphragm. The frequency of occurrence of diaphragmatic hernia varies, according to different authors, over a wide range - from 1:2000 to 1:4000 newborns, while a large group of stillborns with malformations of the diaphragm is not taken into account.

The defect begins to form in the embryo at the 4th week of pregnancy, when a septum is formed between the pericardial cavity and the body of the embryo. The underdevelopment of muscles in certain areas of the abdominal obstruction leads to the appearance of hernias with a bag, the walls of which consist of serous integuments - the abdominal and pleural sheets. Such hernias are true. With false hernias, there is a through hole in the diaphragm, which is formed either as a result of underdevelopment of the pleuroperitoneal membrane, or due to its rupture due to overstretching.

By origin and localization, diaphragmatic hernias should be divided as follows (Fig. 18).

Congenital diaphragmatic hernias:

- diaphragmatic-pleural (false and true);

- parasternal (true);
- frenopericardial (true);
- hiatal hernia (true).

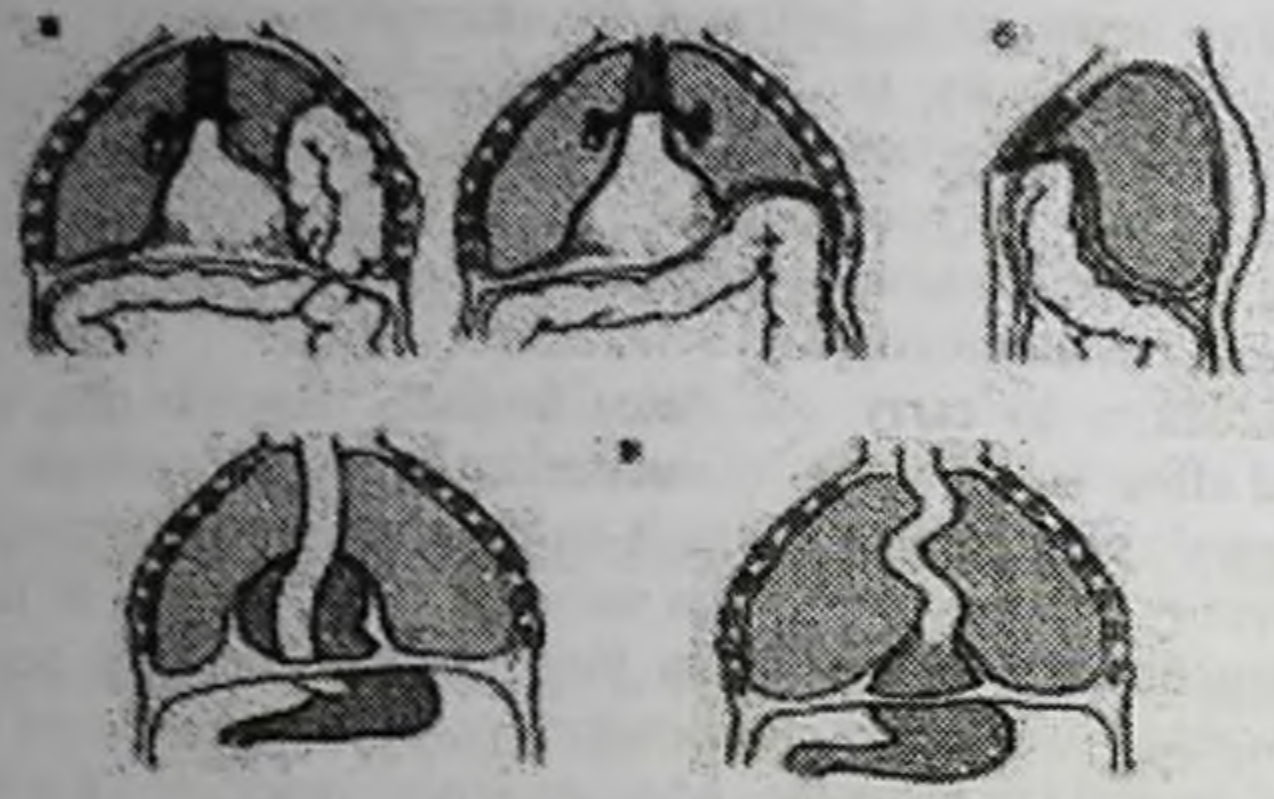


Figure 18. Types of diaphragmatic hernias

II. Acquired hernias - traumatic (false).

Most often in children there are diaphragmatic-pleural hernias, hernias of the esophageal opening of the diaphragm. Parasternal hernias are much less common; frenocardial hernias are essentially casuistry.

Diaphragmatic paresis is a separate nosological form of the disease and therefore is not included in this classification.

Diaphragmatic - pleural hernias can be both true and false. Often they are left-handed. False hernias on the right are very rare. True hernias can occupy a limited part of the diaphragm, but are of considerable size and complete. In the latter cases, when there is a high standing of the entire dome of the diaphragm with the absence of a muscular layer, this type of diaphragmatic hernia is called relaxation of the diaphragm. With false hernias, the defect in the diaphragm is most often slit-like and located in the costal-vertebral region (Bogdalek's hernia). Due to the absence of a hernial sac in these types of diaphragmatic hernias, the abdominal organs move into the chest cavity without restriction, which often leads to chest tension syndrome. A similar situation, of course, is also observed in true hernias, when there is a complete protrusion of the diaphragm.

Parasternal hernias usually have a hernial sac and are divided into retrosternal and retrosternal costal. These hernias penetrate into the chest cavity through a section of the diaphragm thinned in the anterior section (Larrey's fissure). A hernia, located more to the right of the sternum, is called Morgagni's hernia by some authors.

A phrenopericardial hernia is a false hernia with a defect located in the tendon of the diaphragm and the pericardium adjacent to it. Through this defect, the intestinal loops can move into the pericardial cavity, sometimes there can be the opposite effect - dislocation of the heart into the abdominal cavity.

Hernias of the esophageal opening of the diaphragm are always true and are divided into two large groups - paraesophageal and esophageal. Paraesophageal is characterized by the displacement of the stomach up next to the esophagus. With esophageal esophageal-gastric junction located above the level of the diaphragm. In this case, the degree of displacement of the stomach can be different and even change depending on the position of the child and the volume of filling of the stomach.

The severity of the condition and the severity of clinical manifestations are determined not only by the degree and volume of the displaced organs into the chest cavity, but also by the combined malformations. With diaphragmatic-pleural hernias, underdevelopment of the lungs, heart defects, central nervous system and gastrointestinal tract are often noted. Particular severity is determined by the degree of underdevelopment of the lungs and those morphological and functional disorders in them that lead to circulatory disorders in the pulmonary circulation with the development of hypertension and the occurrence of a right-hand shunt with blood shunting at the level of the arterial duct or intracardiac. Shunting of blood in the lungs due to functioning fetal communications is not excluded. Children with such severe malformations are often stillborn or die shortly after birth.

Clinic. Each type of diaphragmatic hernia has a rather specific symptomatology, although two leading symptom complexes can be distinguished: cardiopulmonary disorders observed in diaphragmatic-pleural hernias accompanied by intrathoracic tension, and gastroesophageal reflux in hiatal hernias.

With false diaphragmatic-pleural hernias or true ones with a significant bulging of the sac into the pleural cavity, when almost the entire intestine moves there, clinical signs of respiratory failure are detected early. Shortness of breath, cyanosis develop immediately after birth or after a few hours. The skin and mucous membranes are dark blue and even cast-iron in color. Acute respiratory failure progresses very quickly. On examination, in addition to cyanosis, attention is drawn to the asymmetry of the chest with swelling on the side of the lesion (usually on the left) and the absence of excursion of this half of the chest. A very characteristic symptom is a sunken navicular abdomen. Percussion over the corresponding area of the chest is determined by tympanitis, with auscultation - a sharp weakening of breathing. Heart tones (with a left-sided hernia) are almost not defined on the left, loud on the right, which indicates a shift of the heart to the healthy side. Sometimes through the chest wall it is possible to listen to the peristalsis of the displaced loops of the intestines and the splashing noise.

With smaller hernias, clinical manifestations are less pronounced, respiratory disorders in the form of cyanosis and shortness of breath are more often observed with anxiety, screaming, feeding, or changing the position of the child. Sometimes deterioration in the condition occurs in children of toddler and even school age among seemingly complete health, when the stomach wall is infringed in the hernial orifice or its volvulus. At the same time, the child complains of indefinite pain in the abdomen, nausea, vomiting appear, anxiety gradually increases.

With true small diaphragmatic hernias, especially with a protrusion of a limited part of the diaphragm on the right, when the content is an intruding area of the liver, there are no clinical symptoms. Children are no different from healthy ones,

they develop well, keeping up with their peers. With such hernias localized on the left, despite the absence of visible clinical manifestations, there is some displacement of the heart with its rotation, which can cause hidden cardiovascular disorders. To identify them, functional loads and additional research methods should be carried out.

With parasternal hernias, the symptoms are not pronounced and unstable, they are more often detected in children of toddler and school age, when they begin to complain of painful, unpleasant sensations in the epigastrium. Sometimes there is nausea and even vomiting. Respiratory and cardiovascular disorders in this type of hernia are not typical. In almost half of all cases, children do not complain. By the method of percussion and auscultation, it is possible to determine tympanitis and weakening of heart tones in this zone.

With hiatal hernia, especially in the esophageal form, the clinical manifestations are associated with the presence of gastroesophageal reflux resulting from dysfunction of the cardiac esophagus. There is a syndrome called reflux esophagitis. In the paraesophageal form, the symptoms of the disease are often associated with the presence of gastroesophageal reflux, and depend on a violation of the evacuation of food from the stomach, its inflection, volvulus, trauma; possible cardiovascular disorders due to displacement and compression of the heart. Sometimes paraesophageal hernias are detected by chance during x-ray examination.

Diagnosis of diaphragmatic hernia is not always easy. The leading importance should be given to X-ray examination. Diaphragmatic-pleural hernias are characterized by ring-shaped enlightenments over the entire left half of the chest, which usually have a spotted pattern; the transparency of these cavities is more pronounced towards the periphery. The variability of the position and shape of the areas of enlightenment and darkening is characteristic, which can be seen when comparing two radiographs obtained at different times.

The displacement of the organs of the mediastinum and the heart depends on the number of intestinal loops prolapsing into the chest cavity. In newborns and children in the first months of life, the displacement is so significant that it is not even possible to determine the shadow of the collapsed lung.

It is difficult to distinguish a false diaphragmatic hernia from a true one, especially if the pleural cavity is filled with intruding intestinal loops. Usually, with true hernias, it is possible to radiographically trace the upper contour of the hernial sac, which delimits prolapsed intestinal loops in the chest cavity.

If the patient's condition allows and there are difficulties in differential diagnosis with diseases such as polycystic lung or limited pneumothorax, the gastrointestinal tract should be contrasted with a barium suspension. At the same time, it is clearly established which part of the intestine is located in the chest cavity. Sometimes gastric catheterization is sufficient. Such manipulation can to some extent alleviate the patient's condition, since decompression of the stomach occurs.

When a true hernia is located on the right, its contents are usually part of the liver, therefore, radiographically, the shadow of the hernial protrusion will have a dense intensity, merging in the lower sections with the main shadow of the liver, and the upper contour of the hernia will be spherical, i.e., it gives the impression of having a dense rounded lung tumor, adjacent to the diaphragm. For **differential**

diagnosis, computed tomography and diagnostic pneumoperitoneum can be used, in which air accumulates in the hernial sac, which makes it possible to distinguish a hernia from other formations.

With parasternal hernia of the diaphragm, a semi-oval or pear-shaped shadow is revealed with large-mesh annular enlightenments projected onto the shadow of the heart in direct projection. In the lateral projection, the shadow of the hernia seems to be wedged between the shadow of the heart and the anterior chest wall. Radiologically, it is not possible to distinguish parasternal hernia from phrenopericardial hernia. To establish the contents of parasternal hernias, an X-ray contrast study of the gastrointestinal tract with a barium suspension is performed. It is better to start with an irrigography, since the contents of a hernia are most often the transverse colon.

The radiographic picture of hernias of the esophageal opening of the diaphragm depends on their shape. With paraesophageal hernias in the chest cavity to the right or left of the midline, a cavity with a liquid level is detected, while the gas bubble of the stomach located in the abdominal cavity is reduced or absent. Contrast study with located in the abdominal cavity, reduced or absent. A contrast study with a barium suspension reveals an hourglass-type stomach, the upper part of which is located in the chest cavity, and the lower part is in the abdominal cavity, and the barium suspension can overflow from one part of the stomach to another. Esophageal hernia, as a rule, can only be detected by contrasting the gastrointestinal tract.

Treatment of congenital diaphragmatic hernias is operative. The exception is asymptomatic small hernias, localized on the right, when the contents are part of the liver. The urgency of treatment is determined by the severity of symptoms of respiratory failure and cardiovascular disorders.

Usually, with false diaphragmatic-pleural or true large hernias, respiratory and cardiovascular disorders are so pronounced (even in newborns) that a rather lengthy preoperative preparation is required, which consists in decompression of the stomach with a catheter, nasopharyngeal intubation, transferring the child to artificial ventilation of the lungs with the creation of positive pressure on exhalation, which should be minimal - no more than 20 cm of water column; otherwise, pneumothorax may develop. Eliminate metabolic disorders. Infusion and drug therapy should be adequate and aimed at improving the rheological properties of blood and restoring homeostasis. It is very important to use drugs that reduce pressure in the pulmonary circulation (galazolin, dopamine). It should be emphasized that children with such disorders do not tolerate transportation very well, so this therapy should be started in the maternity hospital and continued in special vehicles. Only after improvement of homeostasis, elimination of cardiovascular disorders and hypoxia, the child can be operated on.

The principle of surgical intervention is to bring organs down into the abdominal cavity, suturing the diaphragm defect in case of false diaphragmatic hernias and plastic surgery of the diaphragm in case of true hernias. Sometimes, with aplasia of the diaphragmatic muscles and the presence of only a pleural abdominal sheet, plastic material is used. The operation can be performed both through the

abdomen and through the chest cavity, but it is extremely important that there is no significant intra-abdominal pressure in the postoperative period, so decompression of the gastrointestinal tract is performed during the operation. In the postoperative period, a rather long nasopharyngeal intubation with artificial lung ventilation is carried out until hemodynamics and homeostasis improve.

The results of the operation are mainly related to the severity of the patient's condition at admission and the degree of underdevelopment of the lung. In addition, the quality of transportation and preparation of the newborn for surgery is of great importance. If, due to the severity of cardiovascular and respiratory disorders, children are forced to be delivered to clinics on the first day after birth, then the prognosis is unfavorable in more than 50% of cases.

I. Curation of patients on the topic - 15 minutes
II. Participation in the dressing room and operating room - 20 minutes;
III. Implementation of practical skills - 15 minutes:

PRACTICAL SKILLS

TRACHEOSTOMY

(in children, the lower tracheostomy is predominantly used)

- indications: 1) Violation of the patency of the upper respiratory tract (trauma of the larynx, pharynx, trachea, tumors, inflammatory processes that stenose the upper respiratory tract), 2) increasing tracheobronchial obstruction, 3) paralysis of the respiratory muscles, 4) the need for prolonged mechanical ventilation;
- check the readiness of the necessary instruments and medicines: a tracheostomy tube, 2 scalpels - one for cutting the skin, the other (narrow) for cutting the trachea, 2 Farabef hooks, 2 single-pronged hooks, Trousseau dilator, a sufficient number of silk ligatures, Billroth clamps, sterile balls, napkins, 2% iodine solution, 70 gr. alcohol;
- explain to the patient's parents about the upcoming operation;
- check the availability and readiness of tools and materials;
- mucus is carefully aspirated from the upper respiratory tract and oxygen inhalation is adjusted;
- hand treatment (hand washing under running warm water with soap and a brush for 10 minutes, wiped with a sterile cloth and treated with 96% alcohol, nail beds with tincture of iodine), sterile gloves are put on;
- the patient is laid on his back with his head thrown back strictly along the middle axis of the body, a roller 12-15 cm high is placed under the shoulders;
- the surgeon stands on the right side of the patient;
- anesthesia: in children, endotracheal anesthesia is preferable;
- the surgical field is treated with tincture of 2% iodine and alcohol;
- the larynx is fixed with the thumb and middle fingers of the left hand;
- skin incision strictly along the midline of the neck from the level of the cricoid cartilage to the bottom to the jugular notch of the sternum;

- subcutaneous tissue and superficial fascia of the neck are dissected, hemostasis is performed, the edges of the wound are bred to the sides with blunt hooks;
- strictly along the midline, focusing on the trachea, the 2nd and 3rd fascia of the neck are stratified in layers, the exposed sternohyoid muscles are bluntly separated and parted to the sides and the fiber of the pretracheal space is opened;
- the isthmus of the thyroid gland in the upper corner of the wound is slightly pulled up (Fig. 1a);
- stupidly shifts and exfoliates the 4th fascia of the neck and the tracheal rings become visible;
- the trachea is fixed with a sharp single-toothed hook, slightly pulled up and strictly along the midline with a pointed scalpel 2 adjacent tracheal rings (4th and 5th) are pierced to a depth of no more than 0.5-0.6 cm in order to avoid puncture of the posterior wall of the trachea (Fig. 1b));
- two long silk handles (silk No. 3) are applied to the edges of the wound of the trachea in its membranous part;
- by pulling the handles to the sides, the edges of the wound of the trachea diverge and a tracheostomy tube is inserted into its lumen, the size of which should correspond to the diameter of the trachea (Fig. 21 c);
- snap holders are circled around the neck and tied;
- between the shield of the tube and the wound, a napkin and a tube are laid, fixed with the help of previously threaded ribbons, which are tied on the posterolateral surface of the neck;
- 1-2 silk sutures are applied to the skin wound in the upper corner of the wound;
- periodic suction of mucus, exudate from the trachea and bronchi is recommended.

Figure 19 (a, b, c). Stages of the lower tracheostomy.

- complications: damage to the esophagus, bleeding, asphyxia, subcutaneous emphysema, air embolism, insertion of a tube into the submucosal space, tracheoesophageal fistulas due to injury to the posterior wall of the trachea or pressure sore of the trachea.

IV. Big break - 40 minutes (11.50-12.30).

V. Practical lesson (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

LEARNING ASSIGNMENTS

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: Hypotrophy, vomiting, cyanosis, shortness of breath, regurgitation, pain, bleeding.

Tasks for groups

1. Is the funnel-shaped chest divided by shape? Cluster, SWOT table, Venn diagram for dyspnea and chart Why? and hierarchical diagram How?
2. What degrees are the funnel chest divided into? Compile a cluster, SWOT table, Venn diagram for the word strain and chart Why? and hierarchical diagram How?
3. What are the clinical signs of a funnel cell? Cluster, SWOT table, Venn diagram for the word pain and chart Why? and hierarchical diagram How?
4. Keeled ore cell is divided into: make a cluster, SWOT table, Venn diagram for the word "habitus" and make diagrams Why? and hierarchical diagram How?
5. Specify research methods for congenital anomalies of the chest organs. Cluster, SWOT table, Venn diagram for the word bronchoscopy and chart Why? and hierarchical diagram How?
6. According to the origin, bronchiectasis is divided into: make a cluster, SWOT table, Venn diagram for the word bronchography and make diagrams Why? and hierarchical diagram How?
7. Specify the causes of diaphragmatic hernia? Cluster, SWOT table, Venn diagram for the word hernia and chart Why? and hierarchical diagram How?
8. What complications are observed in pulmonary sequestration? Make a cluster, SWOT table, Venn diagram for the word bleeding and draw diagrams Why? and a hierarchical diagram How?
9. Specify the main causes of lobar emphysema. Make a cluster, SWOT table, Venn diagram for the word pneumothorax make diagrams Why? and hierarchical diagram How?
10. Will indicate the clinical signs of asphyxia infringement? Make a cluster, a SWOT table, a Venn diagram for the word cyanosis make diagrams Why? and hierarchical diagram How?

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	Task 1	Task 2	Task 3: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	Question 1	Question 2	Question 3	(3,0)
1						
2						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;
b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concept	V	+	-	?
Congenital anomalies and malformations of the chest and lungs (funnel-shaped and keeled chest, diaphragmatic hernias, lobar emphysema, congenital lung cysts, pulmonary sequestration, congenital bronchiectasis) clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where: V - corresponds to significant knowledge (information) about ...
- Exceptional knowledge of...
+ - is new information
? - incomprehensible or requiring clarification, additional information

CONCEPT TABLE

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located (recommendations, categories, various signs, etc.)						
	Dyspnea	Cyanosis	Cough	Deformity	Auscultation	Percussion	Chest X-ray
Pectus excavatum							
Keeled chest							
Diaphragmatic hernia							
Lober emphysema							
Congenital cyst of the lung							
Pulmonary sequestration							
Congenital bronchiectasis							

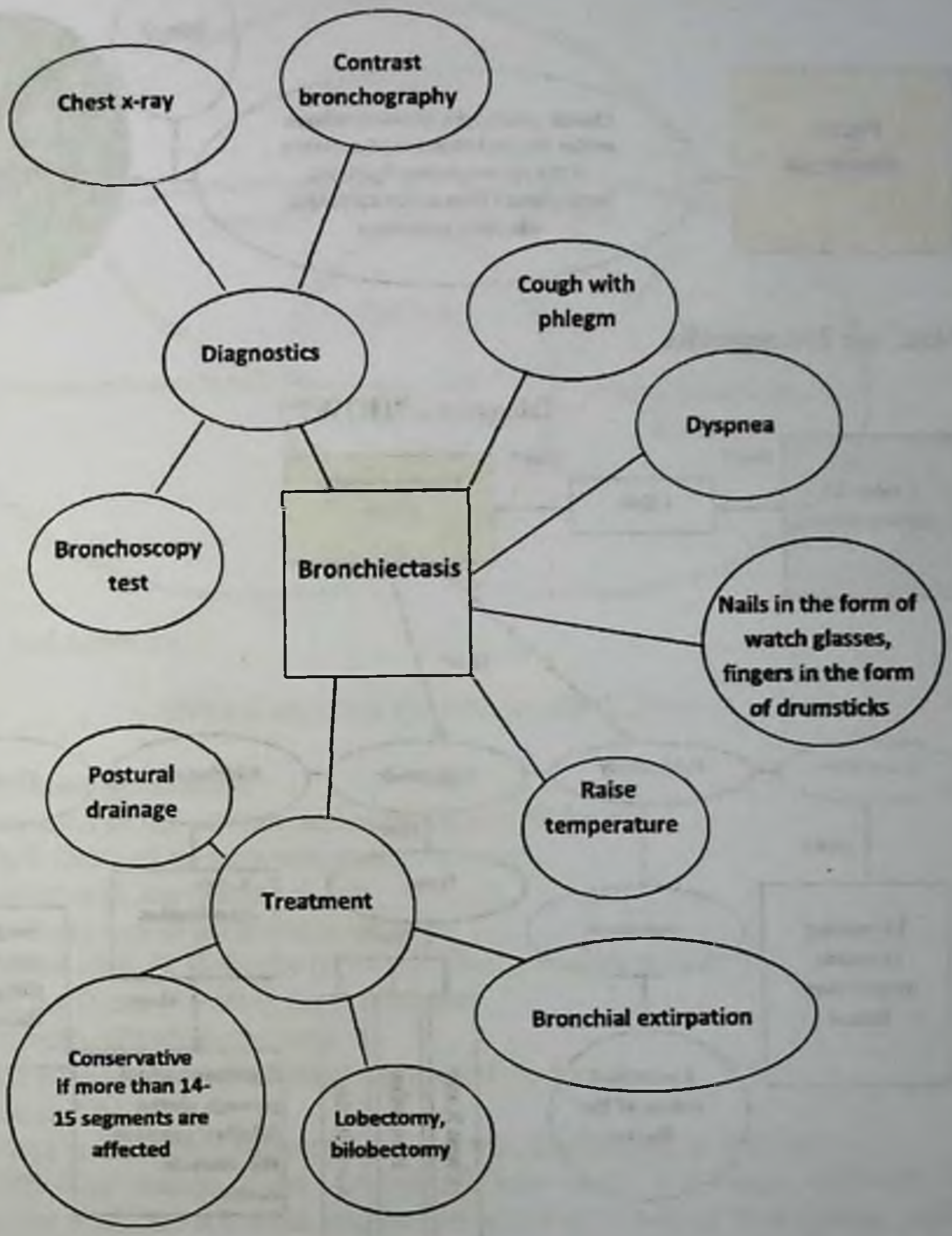
SWOT

Analytical table - SWOT

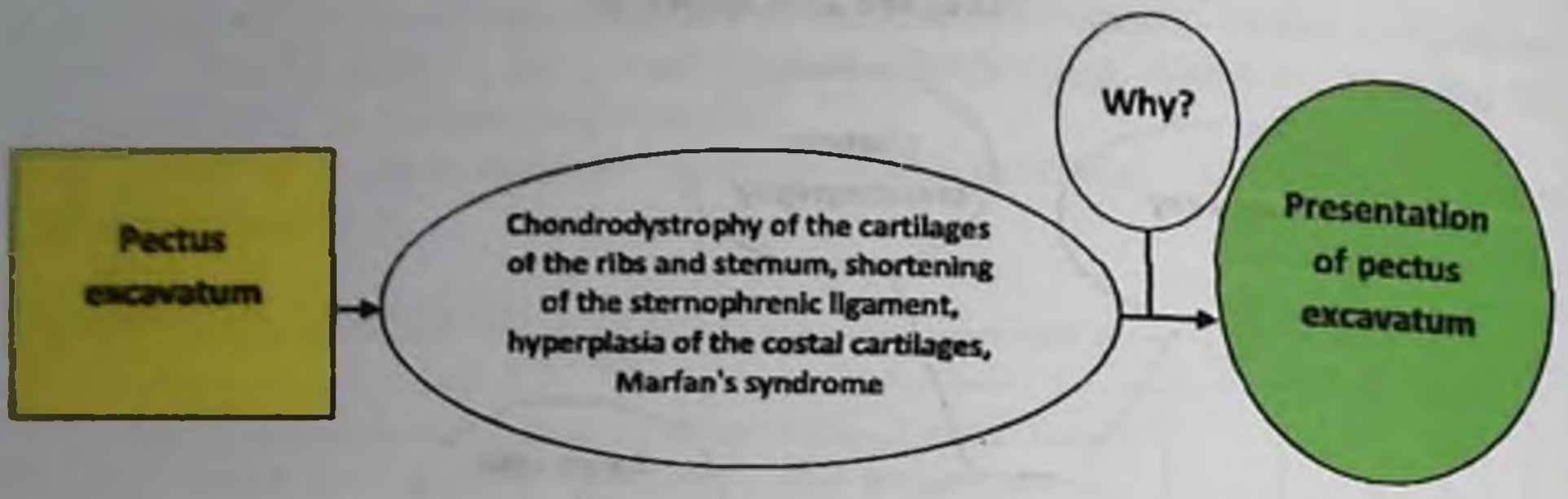
S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle).
Note: see 2nd appendix.

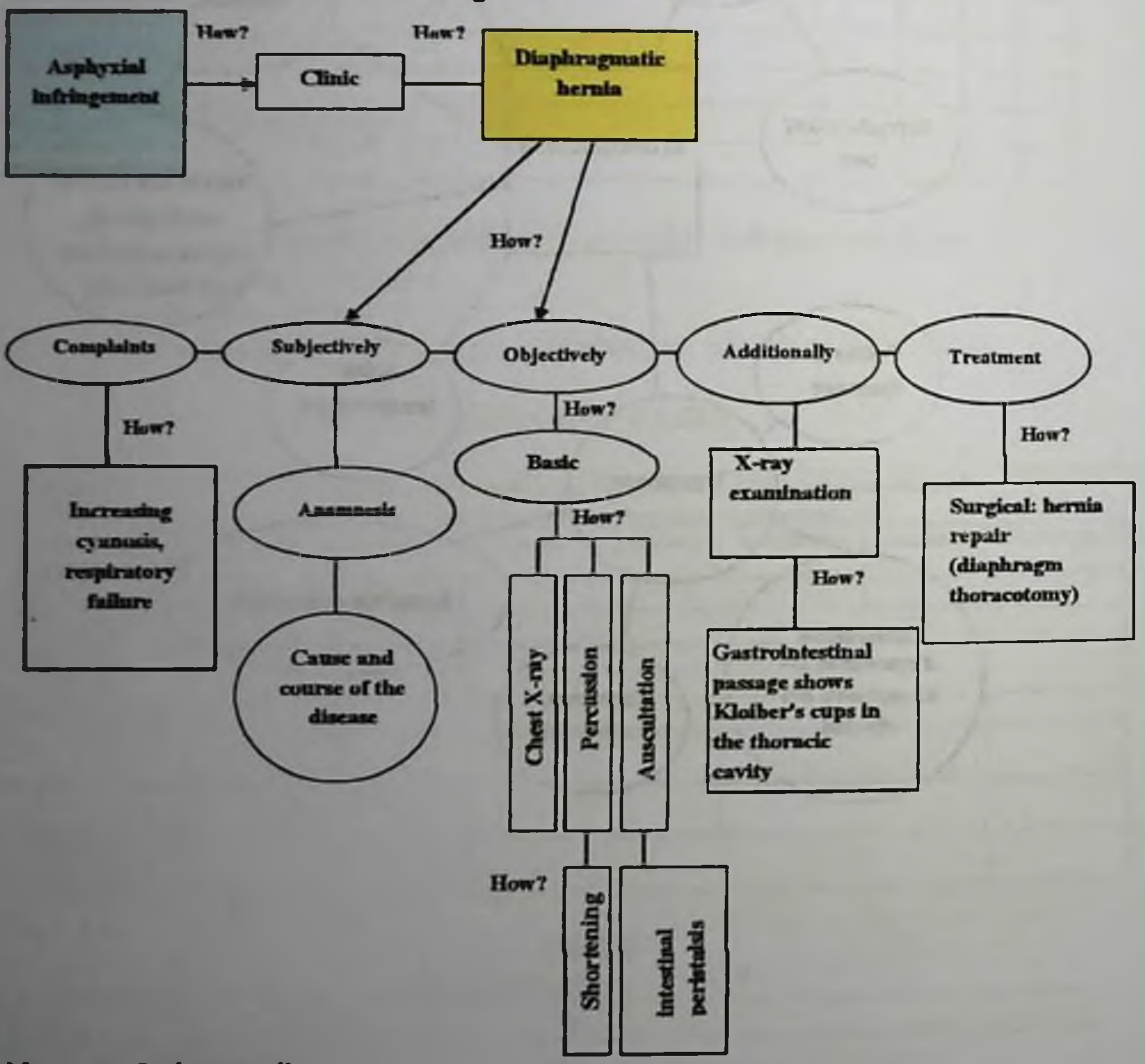


SCHEME "WHY?"



Note: see 2nd appendix.

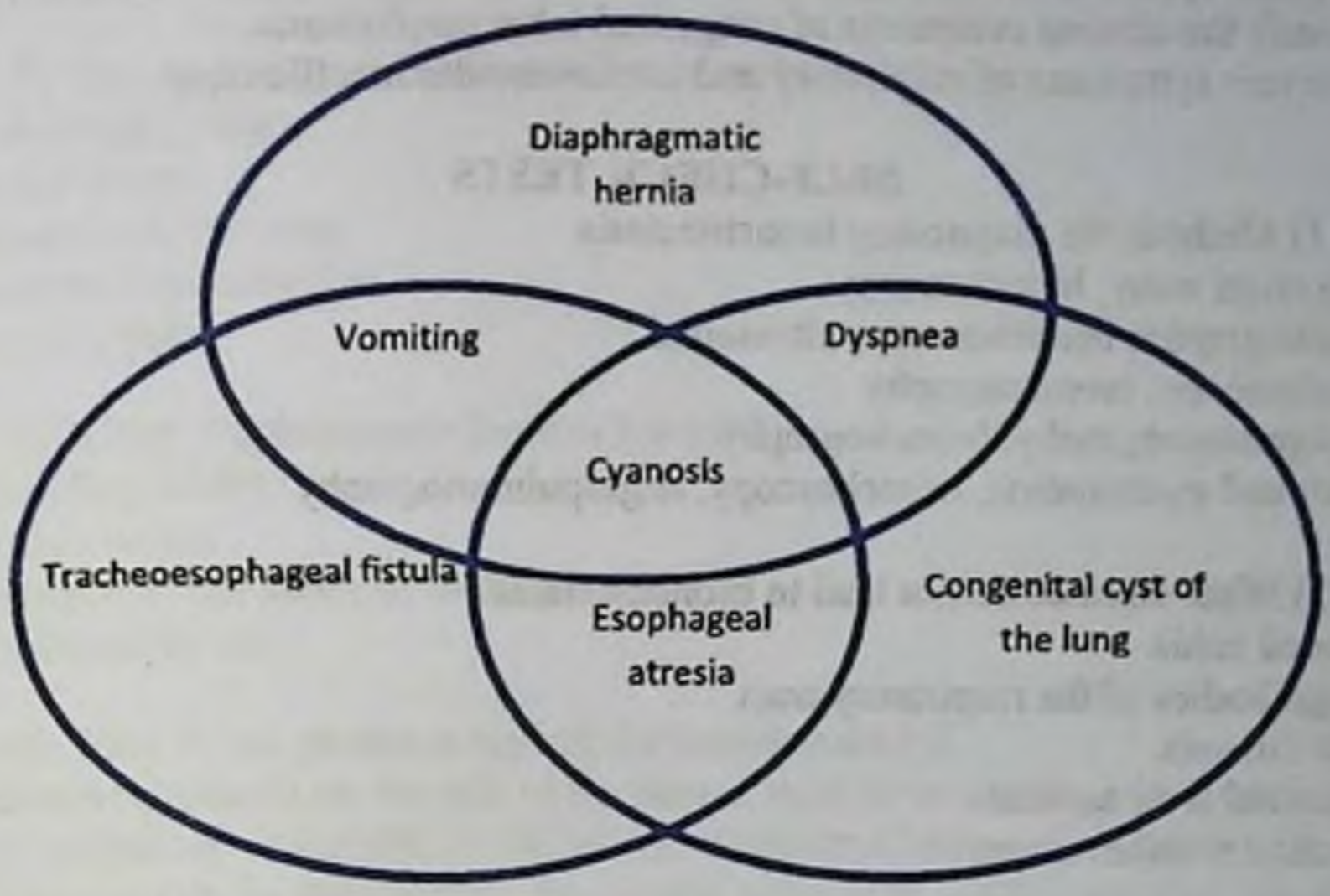
Diagrams "HOW?"



Note: see 2nd appendix.

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features



Note: see 2nd appendix.

INTERACTIVE GAME QUESTIONS:

1. Define pectus excavatum.
Rep. Retraction of the sternum and adjacent part of the ribs
2. Specify 3 forms of pectus excavatum.
Rep. symmetrical, asymmetrical, flat
3. Specify 3 degrees of pectus excavatum.
Rep. I-degree (1-0.7), II-degree (0.7-0.5), III-degree (less than 0.5)
4. Specify the forms of keeled chest deformity.
Rep. symmetrical and asymmetric
5. Indicate what hernias of the diaphragm itself are found.
Rep. True and false
6. Describe the difference between false and true diaphragmatic hernias.
Rep. With false hernias, there is a through hole in the diaphragm, and with true hernias, there is always a hernial sac, the role of which is played by a thinned section of the diaphragm.
7. Specify the clinical signs in newborns with false diaphragmatic hernia.
Rep. Periodic bouts of cyanosis and shortness of breath (asphyxial infringement), sunken abdomen, asymmetry of the chest.
8. What research is decisive in the diagnosis of all types of congenital diaphragmatic hernias?
Rep. X-ray examination

9. What explains the appearance of symptoms of previously undiagnosed lung cysts?
Rep. Small cysts that do not communicate with the bronchial tree.
10. Specify the clinical symptoms of congenital lobar emphysema.
Rep. Severe symptoms of respiratory and cardiovascular insufficiency.

SELF-CHECK TESTS

1) Methods for diagnosing bronchiectasis
1.plain chest x-ray, bronchoscopy
2.bronchography, bronchoscopy, ultrasound
3.bronchoscopy, bronchography
4. angiopulmonography, bronchography
5.ultrasound examination, bronchoscopy, angiopulmonography

2) What diseases do not lead to bronchiectasis?
1.repeated colds
2.foreign bodies of the respiratory tract
3.cystic fibrosis
4.congenital lung agenesis
5.bronchial malformations

3) Cause of false diaphragmatic hernia:
1. defects in the development of the diaphragm
2. through hole in the diaphragm
3. relaxation diaphragm
4. increased intra-abdominal pressure
5. the presence of a thinned section of the diaphragm

4) With what diseases is bronchiectasis differentiated?
1. chronic bronchitis, pleural empyema, pleurisy
2. lung abscess, lung atelectasis, chronic bronchitis
3. lung atelectasis, mediastinal emphesema, lung abscess
4. lung abscess, lung atelectasis, pleurisy
5. chronic bronchitis, mediastinal emphysema

5) Changes in the bronchi in bronchiectasis?
1. constriction of the bronchi
2. underdevelopment of the bronchi
3. cystic dilatation of the bronchi
4. limited gas bubble in the lungs
5. bronchial dilatation and pneumosclerosis

6) Type of bronchial changes not found in bronchiectasis:
1. cylindrical
2. baggy
3. cystic

4. conical
5. all of the above

7) The main method for diagnosing bronchiectasis?

1. survey radiography
2. bronchoscopy
3. radioisotope scanning
4. ultrasound examination
5. bronchography

8) Which diaphragmatic hernias are true

1. hernia Bogdaleko
2. Larrey's hernia
3. protrusion of the dome of the diaphragm
4. parasternal hernia

9) What X-ray picture is typical for bronchiectasis?

1. total enlightenment on the side of the lesion, mediastinal shift to the healthy side
2. total darkening on the side of the lesion, mediastinal shift to the healthy side
3. deformation of the lung pattern, heaviness, cellularity. Offset towards the lesion
4. the lung is collapsed, the intercostal spaces are sharply narrowed, the mediastinum is displaced to the healthy side
5. round formation with clear edges, the mediastinum is not displaced

10) What auscultatory findings are typical for bronchiectasis?

1. hard breathing, single wet and dry rales
2. creping, crackling rales (in the form of a "machine-gun burst")
3. pleural friction noise
4. weakened breathing
5. amphoric breathing

11) X-ray signs in false hernias proper aperture?

1. ring-shaped enlightenments in the form of cellular cavities against the background of the cardiac shadow
2. homogeneous darkening of the pleural cavity, shift of the mediastinum to the healthy side
3. ring-shaped enlightenments in the form of cellular cavities, mediastinal shift to the healthy side
4. total enlightenment of the pleural cavity, shift of the mediastinum to the healthy side
5. multiple cavities with liquid level

12) The diagnosis of lung agenesis is specified on the basis of

1. clinical picture
2. spirometry

3. bronchoscopy, bronchography
4. cytological examination
5. puncture of the pleural cavity

13) Specify the optimal method of treatment of the lobar cyst of the lung
1. conservative treatment
2. thoracocentesis according to Bulau
3. puncture and drainage of the cyst
4. resection of the area of the lung containing the cyst
5. pulmonectomy

14) The leading symptom of the decompensated form of lobar emphysema is
1. cough
2. cyanosis
3. hyperthermia
4. sputum discharge
5. vomit

15) The optimal treatment option for congenital lobar emphesema is
1. conservative treatment
2. puncture of the emphesematous lobe of the lung
3. pulmonectomy
4. removal of the affected lobe of the lung
5. thoracentesis according to Bulau

16) To the complication of pulmonary sequestration from-Xia
1. lung tissue atrophy
2. bleeding (pulmonary)
3. gap with the development of spontaneous pneumothorax
4. displacement of the mediastinal organs to one side
5. lung atelectasis

17) In case of pulmonary sequestration, in order to identify an additional vessel, it is necessary to perform
1. Plain X-ray of the chest
2.bronchography
3.aortography
4. ultrasound examination of the lung
5. bronchoscopy

18) Choose the most optimal treatment for bilateral bronchiectomy
1.conservative
2. pulmonectomy
3. bronchial resection
4. thoracocentesis with Bulau drainage
5.lobectomy

19) Percussion sound in bronchiectasis
1.lung sound
2.boxed
3.blunt
4.tympanic

20) With bronchiectasis, breathing that is not auscultated
1.vesicular
2.weak breathing
3. breathing "machine-gun fire"
4.wet and dry rales

21) The diagnosis of congenital lobar emphysema is made when
1. when puncturing the pleural cavity
2. when draining the pleural cavity
3. bronchoscopy, bronchography
4. tomography
5. inspection

22) Name the most rational approach for strangulated diaphragmatic hernia in a newborn
1.wide lateral thoracotomy
2. thoracotomy with vertical skin incision
3. thoracolaparotomy
4. laparotomy
5. laparotomy with transection of the left rectus muscle

23) What should be done after diaphragm repair for false diaphragmatic hernia
1. insert the decompression probe into the intestine
2. drain the pleural cavity followed by active aspiration
3. drain the pleural cavity followed by passive aspiration
4. prescribe a remedy that stimulates intestinal motility
5. carry out artificial ventilation of the lungs on the first day after surgery

24) The leading symptom of congenital diaphragmatic hernia is
1. respiratory disorder
2. indigestion
3. urinary disorder
4. disorder of the cardiovascular system
5. deformation of the chest

25) In the diagnosis of congenital diaphragmatic hernia, the most informative method is
1. Chest ultrasound

2.bronchoscopy
3. Plain X-ray of the chest
4. Plain X-ray of the abdominal cavity
5.contrast x-ray examination of the gastrointestinal tract

26) A characteristic sign of a hernia of the esophageal opening of the diaphragm
1. shortness of breath
2. vomiting with blood
3. vomiting with an admixture of bile
4.cough
5. heart failure

27) A characteristic sign of a false diaphragmatic hernia
1. convulsive syndrome
2.hyperthermic syndrome
3.respiratory failure
4. signs of intestinal obstruction
5. kidney failure

28) What form of diaphragmatic hernia requires emergency surgery
1.True diaphragmatic hernia
2. hiatal hernia
3.large true diaphragmatic hernia
4. False diaphragmatic hernia
5.Aperture relaxation

29) Diaphragmatic hernia is
1. movement of the lungs into the abdominal cavity
2. moving the mediastinal organs to the affected side
3. movement of the mediastinal organs to the healthy side
4. movement of the abdominal organs into the chest cavity
5. movement of the mediastinal organs into the abdominal cavity

30) In a newborn child with percussion, dullness over the right half of the chest, lack of breathing on the right, complete displacement of the mediastinal organs to the right are determined. Bronchoscopy reveals the absence of a bronchus. Make a diagnosis
1. lung hypoplasia
2. lung aplasia
3. lung agenesis
4.atelectasis
5. bulls

31) In a child aged 1 month. there is a lack of breathing on the right, a complete displacement of the mediastinal organs to the right. With bronchoscopy, the right main bronchus ends blindly. Make a diagnosis
1. lung hypoplasia
2. lung aplasia
3. lung agenesis
4.atelectasis
5.cystic hypoplasia

32) The examination revealed the absence of breathing on the right, dullness during percussion, displacement of the mediastinal organs to the right. On the P-gram, total darkening on the right with a shift of the mediastinal organs to the diseased side. Bronchoscopy shows narrowed, blindly ending lobar bronchi on the right. Make a diagnosis
1.bronchiectasis
2.agenesis
3. aplasia
4. lung hypoplasia
5.atelectasis

33) Urebenka aged 6 months. P-logical examination revealed cystic formation in the lung. The condition is satisfactory, there is no respiratory failure. Your tactics
1.wait and see
2.drainage of the cyst
3.surgical treatment
4.conservative treatment
5.sanatorium treatment

34) A patient with bronchiectasis of the lower lobe on the right has an exacerbation of the process in the lung. Prescribe a treatment
1.surgical treatment is indicated
2. surgical treatment is temporarily contraindicated
3.Surgical treatment is not indicated
4. Surgical treatment is contraindicated
5.sanatorium treatment

35) A long-lying foreign body was removed from the patient's respiratory tract. Bronchographic examination revealed bronchiectasis. Prescribe a treatment
1. surgery is temporarily not indicated
2.surgical treatment is indicated
3. Surgical treatment is contraindicated
4.Surgical treatment is not indicated
5.conservative therapy

36) The diagnosis of lung agenesis is specified on the basis of

1.clinical picture
2.spirometry
3.bronchoscopy, bronchography
4.Cytological examination
5.puncture of the pleural cavity

37) Specify the optimal method of treatment of the lobar cyst of the lung
1.conservative treatment
2. thoracentesis according to Bulau
3.Puncture and drainage of the cyst
4. resection of the area of the lung containing the cyst
5.pulmonectomy

38) With lobar emphesema, percussion is determined
1.dull sound
2. shortening of percussion sound
3.box sound
4.blunting
5. clear lung sound

39) The leading symptom of decompensated form of lobar emphysema is
1.cough
2.cyanosis
3.hyperthermia
4. sputum discharge
5.vomit

40) The best treatment option for congenital lobar emphesema is
1.conservative treatment
2. puncture of the emphysematous lobe of the lung
3.pulmonectomy
4. removal of the affected lobe of the lung
5. thoracentesis according to Bulau

Answers to tests for self-control

1-3, 2-4, 3-2, 4-5, 5-3, 6-5, 7-5, 8-3, 9-3, 10-1, 11-2, 12-3, 13-4, 14-2, 15-4, 16-2, 17-3, 18-1, 19-1, 20-1, 21-4, 22-1, 23-3, 24-1, 25-5, 26-2, 27-3, 28-4, 29-4, 30-3, 31-2, 32-4, 33-1, 34-2, 35-2, 36-3, 37-4, 38-3, 39-2, 40-4.

CHAPTER 3. CONGENITAL HIGH INTESTINAL OBSTRUCTION (PYLORIC STENOSIS, INTESTINAL ATRESIA, LEDD'S SYNDROME, INTERNAL ABDOMINAL HERNIAS, UMBILICAL AND EMBRYONIC HERNIAS), CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies: requiring surgical correction.

Learning objectives:

- Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;
- Developing students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;
- Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;
- Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;
- Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Location of the lesson: Department of Thoracic Surgery, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control: control questions, performance of educational tasks in groups.

Written control: control questions.

HERNIA OF THE UMBILICAL CORD

A hernia of the umbilical cord, umbilical hernia or embryonic hernia (omphacele) is a malformation in which, by the time the child is born, part of the abdominal organs is located extraperitoneally - in the umbilical membranes, consisting of amnion, Wharton's jelly and primary undifferentiated peritoneum.

In early embryogenesis, as a result of the mismatch of the "critical periods of development" of the intestine in the abdominal cavity, the latter cannot accommodate the rapidly increasing intestinal loops. Located extraperitoneally, in the umbilical membranes, they go through a temporary stage of "physiological embryonic hernia", and then, having completed the "rotation process", return to the growing abdominal cavity. If, as a result of a violation of the process of intestinal rotation, underdevelopment of the abdominal cavity or a violation of the closure of the abdominal wall, part of the organs remains in the umbilical membranes, the child is born with a hernia of the umbilical cord.

Depending on the time of stopping the development of the anterior abdominal wall, two main types of umbilical hernias are distinguished - embryonic and fetal.

With embryonic hernias, the liver does not have a fibrous membrane (glisson capsule) and fuses with the membranes of the umbilical cord.

The population frequency is 1:6000 newborns. The pattern of inheritance is presumably autosomal dominant and X-linked. Approximately 65% of children with embryonic hernias have combined malformations of the heart (tetralogy of Fallot), gastrointestinal tract, genitourinary system, Beckwith-Wiedemann syndrome.

Clinic and diagnostics. When examining a child, it is found that part of the abdominal organs is located in the umbilical membranes. The size of the hernial sac varies from small (2-5 cm) to gigantic - 15-20 cm (Fig. 20-21).

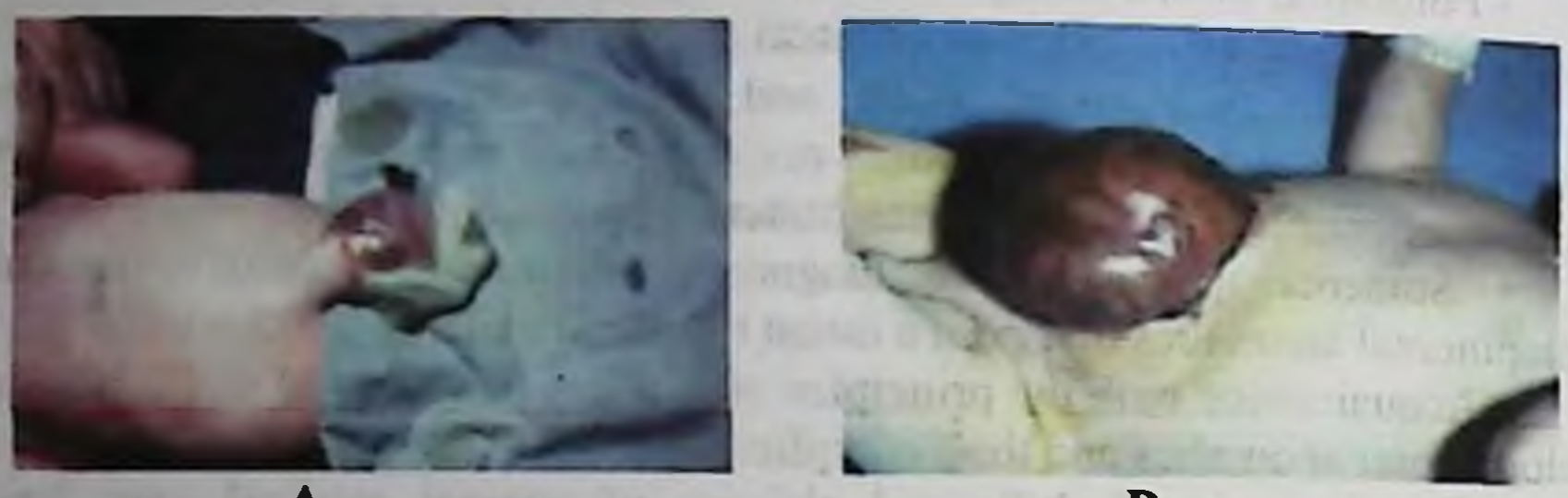


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Figure 20(a). Embryonic hernia of the umbilical cord of small sizes
Figure 21(b). Embryonic hernia of the umbilical cord of large sizes

The hernial orifice is an enlarged umbilical ring, the size of the defect of which ranges from 1-2 cm to a significant one. Depending on the size of the defect in the umbilical ring, the hernia can be elongated with a narrow gate or hemispherical. The umbilical cord passes into the top of the hernial sac, in which three umbilical vessels pass before entering the abdominal cavity. The contents of the hernial sac can be the intestines, stomach, liver. With a diaphragm defect, ectopia of the heart is observed (Fig. 22).

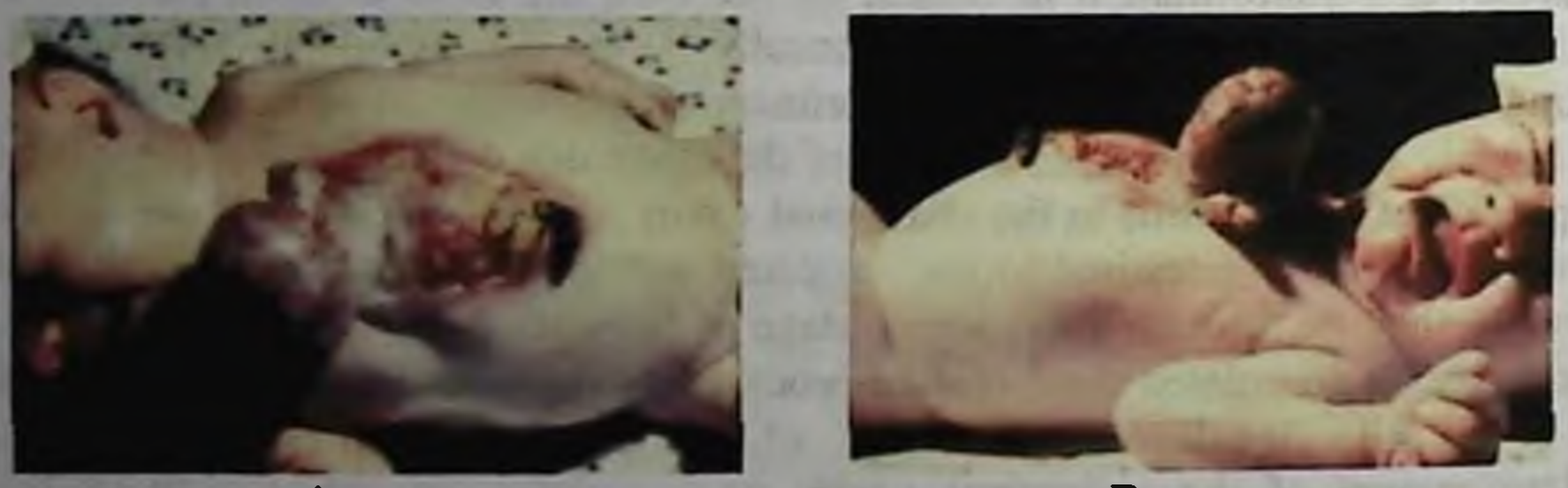

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Figure 22 (a, b). Diaphragmatic defect, ectopic heart

In the first hours after birth, the umbilical membranes that form the hernial sac are shiny, transparent, whitish in color. However, by the end of the first day, they dry out, become cloudy, then become infected and covered with fibrin deposits.

If measures are not taken to prevent and treat infected membranes, peritonitis and sepsis may develop. With thinning and rupture of the membranes, eventration of the internal organs occurs, peritonitis develops (Fig. 23).

According to the classification of the hernia of the umbilical cord are divided as follows: in size: small (up to 5 cm); medium (up to 10 cm); large (more than 10 cm); according to the condition of the hernial membranes: uncomplicated (unchanged hernial membranes); complicated (rupture of the membranes, their purulent fusion, intestinal fistulas).

Diagnosis of hernia of the umbilical cord is not difficult.

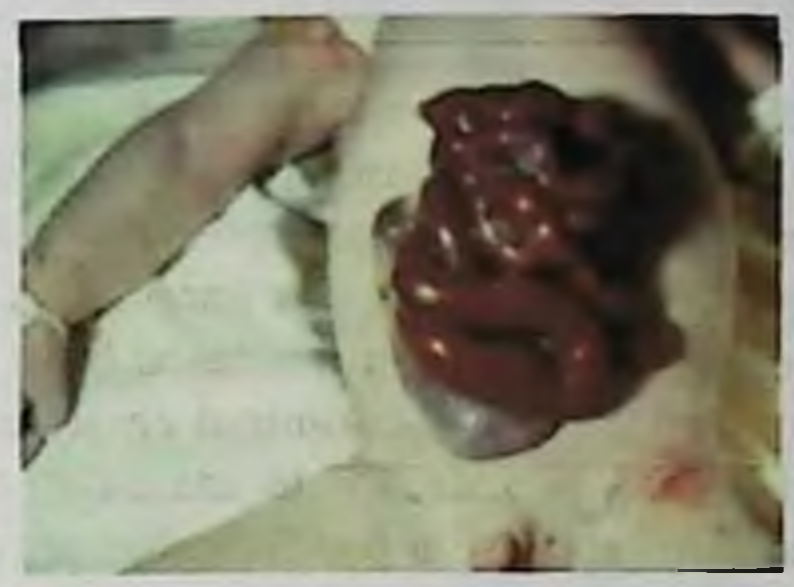


Figure 23. Rupture of membranes of embryonic hernia with eventration of internal organs

Treatment of children with hernias of the umbilical cord begins immediately upon diagnosis. Two methods of treatment are used: operative and conservative. Newborns with small and medium hernias with a well-formed abdominal cavity and the absence of aggravating factors (deep prematurity, birth trauma, sepsis) are subject to radical surgical intervention. The operation is reduced to excision of the umbilical membranes, reduction of the viscera and plastic surgery of the anterior abdominal wall.

Conservative treatment is indicated for children with large hernias, underdevelopment of the abdominal cavity, aggravated premorbid background. Immediately after birth, the shells are treated with 2% tincture of iodine, alcohol, 5% potassium permanganate solution, followed by the application of sterile dressings.

As a result of daily dressings, the membranes turn into a black scab, impervious to infection. As granulations appear, the coagulation scab is shed and marginal epithelialization begins.

During this period, dressings with drugs that stimulate regeneration are shown (iruksol, Shostakovsky's balm, solcoseryl, etc.). The hernial sac is gradually covered with epithelium, shrinks, decreases, the contents are partially immersed in the abdominal cavity. Complete epithelialization is observed after 2-2.5 months.

To reduce the time of conservative treatment, the method of gradual immersion of the internal organs into the abdominal cavity with gradual ligation from the bottom of the hernial sac is currently widely used, as shown in Figure 24. After conservative treatment, a ventral hernia is formed. It is eliminated surgically at the age of 2-5 years.

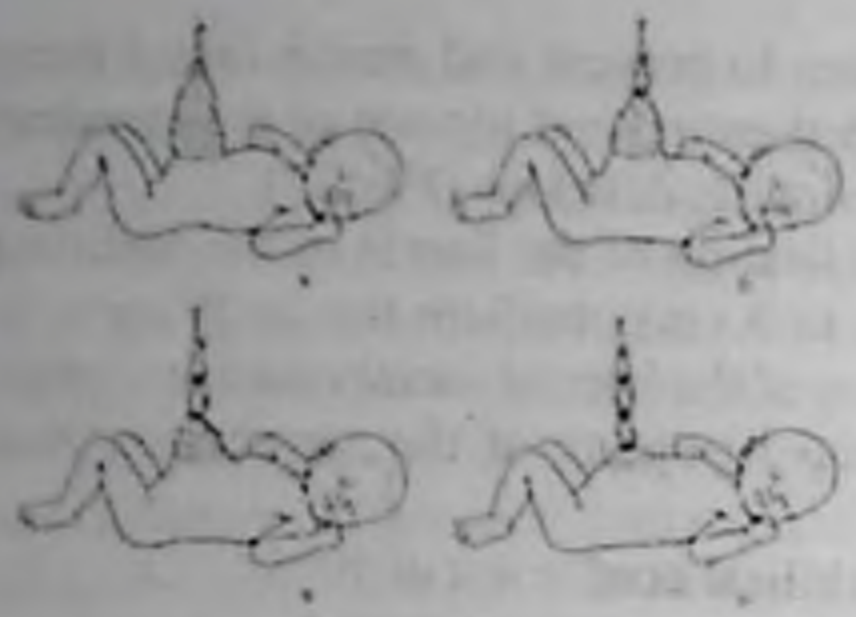


Figure 24. Conservative treatment

A functional test is preliminarily performed to determine the degree of compensation for the increase in intra-abdominal pressure when the hernia is reduced. If the pulse and respiration rate, blood gas parameters remain within the normal range, the hernia can be eliminated. With increased heart rate and shortness of breath, the operation is postponed until the abdominal cavity reaches a sufficient size. In the preoperative period, it is mandatory to massage the muscles of the abdominal wall, therapeutic exercises and use a bandage that prevents protrusion of internal organs.

The prognosis for hernias of the umbilical cord is always serious, especially in immature children with associated malformations.

Children successfully operated on in the neonatal period grow and develop normally in the future.

UMBILICAL HERNIA

An umbilical hernia - a defect in the development of the anterior abdominal wall - is quite common in children, especially in girls. The conditions conducive to its formation are the anatomical features of this area.

After the umbilical cord falls off, the umbilical ring closes. However, it closes tightly only in the lower part, where two umbilical arteries and the urinary duct pass in the embryo, which, together with the surrounding embryonic tissue, form dense connective, and then fibrous tissue. This gives the lower part of the scar tissue greater density. The upper section of the umbilical ring, through which only the umbilical vein passes, which does not have a sheath, is much weaker than the lower one. In addition, in some cases, the underdeveloped abdominal fascia closes it only partially. With underdevelopment of the fascia, as well as in areas where it is not dense enough, small defects are formed that contribute to the development of a hernia.

Under such anatomical conditions, the navel is a weak point of the anterior abdominal wall, predisposing to the formation of a hernia. In this case, various moments that increase intra-abdominal pressure are of great importance. Long-term diseases that cause a violation of muscle tone and tissue turgor also create favorable conditions for the formation of an umbilical hernia.

Clinic and diagnostics. An umbilical hernia is manifested by a protrusion of a rounded shape of different sizes. In a calm state and in the position of the child lying down, the hernial protrusion is easily reduced into the abdominal cavity, and then the umbilical ring is well palpated.

With large hernias, the skin over it is stretched and thinned, the child is restless, and parents often believe that the hernia causes pain to the child. The subjective sensations of the child depend on the form of the hernia. With a wide umbilical ring, when a hernial protrusion appears at the slightest disturbance of the child, but is also quickly and easily reduced, there is no reason to think that the contents of the hernia are injured and cause pain. With a small hole with rigid edges, there is every reason to worry the child.

Treatment for an umbilical hernia depends on its shape and the age of the child. In a significant number of cases in children in the process of growth, self-healing is observed, which usually occurs by 2-3 years. The closure of the expanded umbilical ring is promoted by massage and gymnastics, aimed at developing and strengthening the muscles of the anterior abdominal wall. Treatment begins at the age of 1 month with the child lying on his stomach for 1-3 minutes 5-6 times a day 15-20 minutes before meals. In this position, children strain their back muscles, trying to raise their heads, move their arms and legs, which helps to strengthen the overall tone and develop muscles, including the abdominals. In the future, it is advisable to use massage and a set of exercises prescribed by a methodologist for physiotherapy exercises. The mother can conduct massage and gymnastics.

After three years, the umbilical ring, as a rule, does not close on its own and one cannot count on self-healing. Surgical intervention - plastic closure of the umbilical ring is performed after the age of 5 years.

A hernia of the white line of the abdomen occurs due to small defects in the aponeurosis, located near the midline, between the navel and the xiphoid process. Often there are hernias located directly above the navel - paraumbilical. The umbilical ring is completely closed. With an external examination of a child, a paraumbilical hernia is difficult to distinguish from an umbilical one, but palpation of the hernial ring easily makes it possible to determine that it is located above the navel.

Clinic and diagnostics. Unlike an umbilical hernia, a hernia of the white line of the abdomen occurs mainly in older children. Hernial protrusion comes in different sizes. Often, only the preperitoneal tissue protrudes into the defect of the aponeurosis. In some cases, pain may occur, which is associated with the involvement of the parietal peritoneum, which forms the hernial sac, into the defect of the aponeurosis. Infringement of a hernia of the white line of the abdomen in children is an extremely rare occurrence.

Treatment. Hernias of the white line of the abdomen, including paraumbilical ones, do not show a tendency to spontaneous closure, so their treatment is only surgical. The operation is performed after the diagnosis is established.

CONGENITAL PYLORIC STENOSIS

The disease is based on a violation of the patency of the pyloric part of the stomach, due to a malformation of the pyloric sphincter in the form of a violation of its morphological structures (muscle fibers at the level of caveolae and myofibrils, their histochemical disorders and nerve elements). The disease is genetically heterogeneous. Sex-linked recessive and autosomal dominant inheritance has been described. Population frequency 0.5 - 3:1000. Male to female ratio 4:1.

Clinic and diagnostics. The first symptoms of the disease usually appear from the end of the 2nd - the beginning of the 3rd week. Initially, they notice vomiting with a fountain that occurs between feedings. The vomit is stagnant in nature, their volume exceeds the dose of a single feeding, they contain curdled milk with a sour smell. The child begins to lose weight, signs of dehydration appear, accompanied by a decrease in urination and scanty stools. In the acute form of the disease, symptoms develop rapidly - within a week. The symptoms of acute dehydration II-III degree and decompensated metabolic alkalosis predominate. In the subacute form, the symptoms develop gradually: regurgitation, single or double vomiting, which, becoming more frequent, leads to malnutrition. This form is not accompanied by severe water and electrolyte disturbances.

The diagnosis is confirmed by clinical, laboratory, instrumental and x-ray studies.

When examining a patient, attention is paid to the degree of development of malnutrition, exsicosis, when examining the abdomen - to swelling of the epigastric region, increased peristalsis of the stomach in the form of an hourglass (Fig. 25).

Figure 25. Hourglass symptom in pyloric stenosis

In some cases, it is possible to determine a hypertrophied pylorus by palpation. Laboratory data indicate blood clotting (decrease in BCC, BCP; increase in BCC, hemoglobin, hematocrit), hypochloremia, hypokalemia, metallic alkalosis.

An x-ray examination pays attention to an increase in the size of the stomach, the presence of a large level of liquid on an empty stomach, reduced gas filling of the intestinal loops (a - plain radiograph).

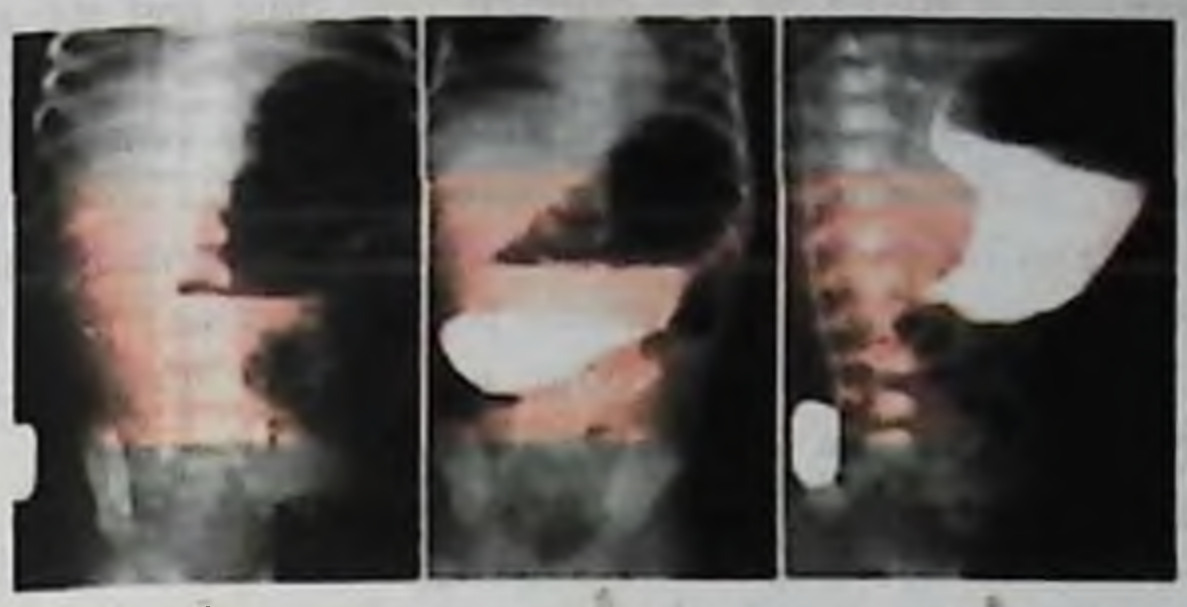


Figure 26 (a, b, c). X-ray contrast study of the stomach.

An X-ray contrast study is performed in a vertical position 30-40 minutes after the administration of a contrast agent (5% aqueous suspension of barium in breast milk in the volume of a single feeding). The segmenting peristalsis of the stomach and the absence of primary evacuation into the duodenum are visible (b). On the radiograph in the lateral projection, a narrowed pyloric canal is determined - a symptom of the "beak" (c) (Fig. 26).

All radiographs should be taken with the child upright. As a rule, no further examination is required.

Recently, **fibroesophagogastroscopy** has been used to diagnose pyloric stenosis.

At the same time, the expanded folded antrum of the stomach is visible, the lumen of the pyloric canal is sharply narrowed to the size of a pinhead, does not open when inflated with air (unlike pylorospasm).

Figure 27. Ultrasound picture of pyloric stenosis

In addition, fibroscopy makes it possible to examine the esophagus, to determine the severity of reflux esophagitis, which often accompanies pyloric stenosis. Ultrasound diagnostics is also possible (Fig. 27).

Differential diagnosis is carried out with pylorospasm, pseudopyloric stenosis (adrenogenital syndrome, salt-losing form - Debre-Fibiger syndrome), gastroesophageal reflux, duodenal stenosis above the major duodenal papilla.

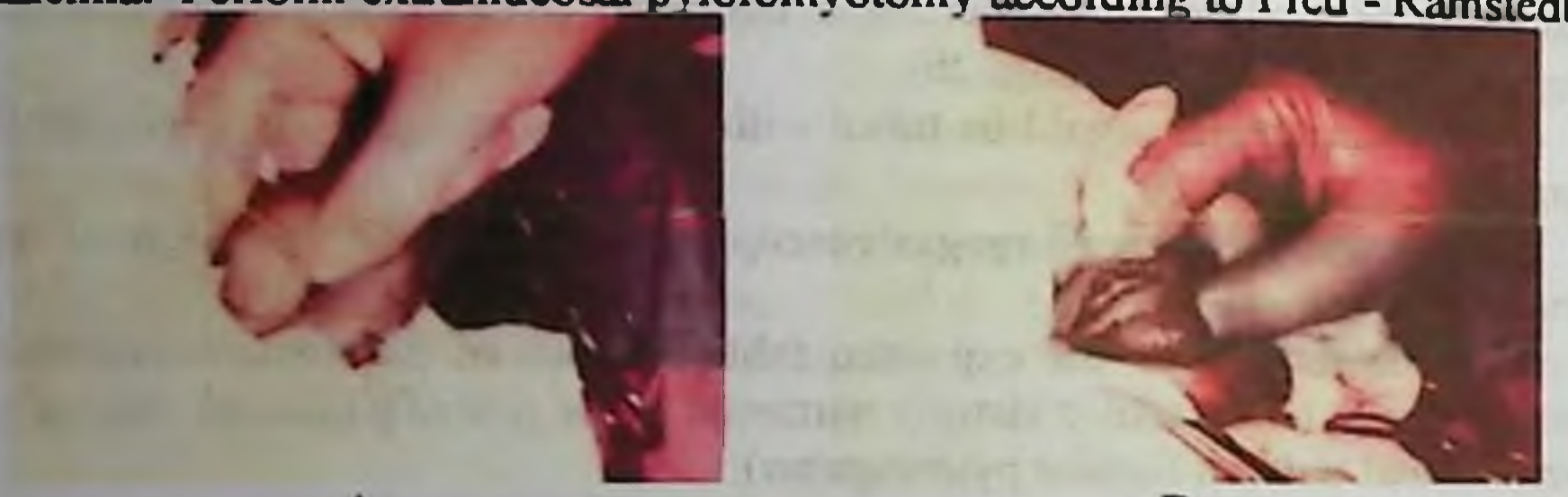
Differential diagnosis is based on the difference in time and the nature of clinical manifestations, laboratory data, X-ray and endoscopic picture.

With pylorospasm as a result of vegetative dystonia of the sympathetic type, the disease begins at birth; anti-spasmodic therapy and NMC treatment give a good effect. Endoscopically, the pylorus is well passable. The adrenogenital syndrome is characterized by an admixture of bile in the vomit, polyuria, periodically liquefied stools, hyperkalemia, hyponatremia, and metabolic acidosis. Endoscopically and radiographically, the pylorus is well passable.

Children with gastroesophageal reflux typically present with onset at birth, vomiting, and regurgitation when lying down. Endoscopically determined fibrinous-ulcerative esophagitis, gaping cardia, x-ray - the presence of gastroesophageal reflux.

For high partial intestinal obstruction of the duodenum, the appearance of symptoms from the first days of life is specific; x-ray revealed the presence of two levels of fluid in the stomach and duodenum, its expansion.

Treatment. Pyloric stenosis requires surgical treatment. The intervention is preceded by preoperative preparation aimed at correcting hypovolemia, alkalosis, and hypokalemia. Perform extramucosal pyloromyotomy according to Fred - Ramstedt.



A B

Figure 28 (a, b). Stages of pyloromyotomy according to Fred-Ramstedt

During the operation, the anatomical obstruction is removed and the pyloric patency is restored (Fig. 28).

3-6 hours after the operation, the child begins to drink 5% glucose solution, then 5-10 ml of milk after 2 hours. On the following day, the amount of milk is increased daily by 100 ml (10 ml per feeding). By the 6th day, the volume of feeding is increased to 60-70 ml with an interval of 3 hours, after which the child is transferred to normal feeding. In the first days after surgery, the deficiency of fluid, electrolytes, protein and other ingredients is replenished through infusion therapy and auxiliary parenteral nutrition, as well as the appointment of microclysters (5% glucose solution and Ringer-Locke solution in equal amounts of 30 ml, 4 times a day in warm form).

The prognosis is favorable. Children require dispensary observation for the purpose of further treatment of malnutrition, anemia, hypovitaminosis.

The second period lasts from the 10th to the 12th week of embryogenesis and consists in the return of the "middle" intestine to a sufficiently grown abdominal cavity, the intestine continues to rotate counterclockwise by another 90 °. If rotation is delayed at this stage, the baby is born with incomplete intestinal rotation. In this

case, the "middle" intestine remains fixed at one point at the place of origin of the superior mesenteric artery. The loops of the small intestine are located in the right half of the abdominal cavity, the blind - in the epigastric region, and the large intestine - on the left. With such fixation, there are conditions for the development of volvulus around the root of the mesentery and for the development of acute strangulation intestinal obstruction. The caecum, located in the epigastric region, is fixed by embryonic strands that compress the duodenum and cause its obstruction. The combination of compression of the duodenum with a volvulus of the "middle intestine" is regarded as **Ledd's syndrome** (Fig. 29).

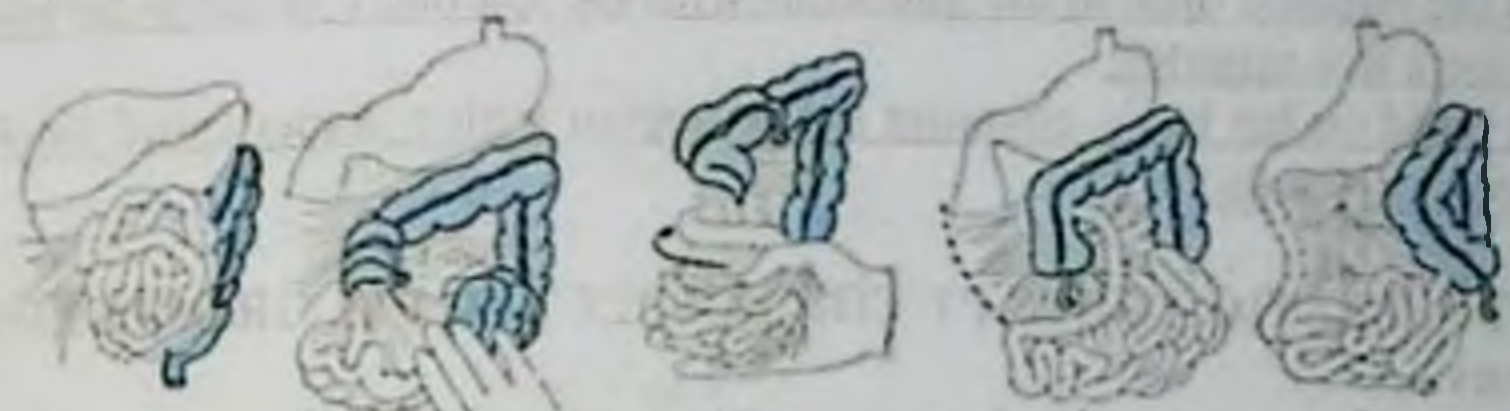


Figure 29 (a, b, c, d, e). Variants of incomplete bowel rotation.

Surgical treatment – Ledd`s operation.

I. Curation of patients on the topic - 15 minutes
II. Participation in the dressing room and operating room - 20 minutes;
III. Implementation of practical skills - 15 minutes:

PRACTICAL SKILLS

Probing and gastric lavage (see chapter 1)
Performing a cleansing enema

- indications: for the release of the intestine from feces, constipation, food poisoning, preparing the patient for operations, rectoscopy, colonoscopy, X-ray examination of the intestine, kidneys, ultrasound, before the introduction of drugs;
- explain to the patient's parents about the upcoming manipulation;
- check the readiness of the necessary tools and medicines: water at room temperature, a can with a soft tip, Esmarch's mug, vaseline oil;
- take the balloon in the right hand, release air from it and fill it with water (temperature 20-22 ° C), remove the air, slightly squeezing the balloon until liquid appears from the tip turned upwards. Lubricate the tip with Vaseline;

Figure 30. Stages of a cleansing enema.
Note: Required amount of water:

Newborn - 25-30 ml; For a baby - 50-150 ml; 1-3 years - 150-250 ml.
- lay the child on the left side, with the lower limbs pulled up to the stomach;
Note: lay the child under 6 months on his back and lift his legs up.
- spreading the buttocks of the child with 1 and 2 fingers of the left hand, placing the can with the tip up, carefully move it into the anus, directing it first to the navel, and then, having overcome the sphincters, parallel to the coccyx;
- slowly press the canister from below, inject water and, without opening it, remove the tip from the rectum (place the canister in the waste material tray);
- to hold the injected fluid in the intestines with the left hand, squeeze the buttocks of the child for a few minutes;
- lay the child on his back, covering the perineum with a diaper (until stool appears or the urge to defecate).

ANTI-SPASTIC THERAPY FOR SUSPECTED PYLOROSTENOSIS

Indications:

- differential diagnosis of pyloric stenosis from pylorospasm.

Necessary conditions and tools:

1. atropine or other neuroplegic agents (pipolphen, suprastin, etc.);
2. syringe;
3. pipette;
4. alcohol;
5. sterile cotton.

Technique:

1. We give a solution of atropine through the mouth, 2-3 drops (at the rate of 1-1.5 mg / kg) 3 times a day for 5-7 days (intramuscular administration of the drug is most rational);
2. Against the background of neuroplegic agents in patients with pylorospasm, there is a clear tendency to the disappearance of symptoms, while in patients with pyloric stenosis, signs characteristic of pyloric stenosis remain.

Below is a diagram showing the changes in symptoms during the use of neuroplegic agents.

Scheme

Piloric stenosis	*Pylorospasm*
The nature of vomiting	
Permanent, does not disappear with the use of neuroplegics	Unstable, against the background of the use of neuroplegics tends to disappear
Large portions, fountain	Small portions of regurgitation
Visible peristalsis of the stomach	
It is observed often, in the form of an hourglass. Does not disappear after treatment with neuroplegics	It is observed very rarely. After treatment with neuroplegics, it disappears.
Palpation data	
The gatekeeper is palpated	The gatekeeper is never palpable

Child's body weight	
Stable or slowly increasing	Increases, often rapidly

CONSERVATIVE TREATMENT OF UMBILICAL HERNIA

- explain to parents the essence of the treatment of umbilical hernia;
- climination of the causes associated with the release of a hernia;
- recommendations for general treatment (rickets, malnutrition, etc.);
- swaddling the baby;

Figure 31. Appearance of a patient with an umbilical hernia.

- put the child on the stomach for 2-3 minutes (this achieves regular abdominal exercises, which contributes to the narrowing of the umbilical ring);
- carry out a light massage of the anterior abdominal wall with careful stroking along the rectus muscles and around the navel clockwise;
- application of an adhesive bandage;
- the hernia is reduced on both sides of the navel;
- the skin is collected in folds;
- fix it in this position with a wide strip of adhesive tape;
- the patch is changed no more than once every 7-10 days;
- in parallel, therapeutic exercises are carried out;
- the child is bathed daily.

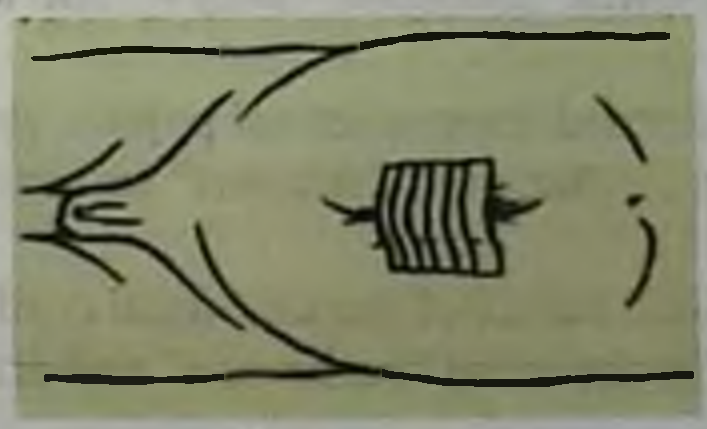


Figure 32. Applying an adhesive bandage for an umbilical hernia

IV. Big break - 40 minutes (11.50-12.30).

V. Practical lesson (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

LEARNING ASSIGNMENTS

Appendix 1

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and frequent participation in assignments, description of assignments;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in group evaluation;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure your responses to questions.

1. What is included in the observed studies?
2. Laboratory and instrumental research.

Give possible concepts: Hypotrophy, vomiting, cyanosis, shortness of breath, regurgitation, pain, bleeding.

Appendix 2

Tasks for groups

1. Specify the radiographic sign of congenital pyloric stenosis? Compile a cluster, SWOT table, Venn diagram for the word vomiting and draw up "Why?" diagrams. and a hierarchical "How?"
2. Specify tactics in case of damage to the mucosa of the pyloric part of the stomach during the operation of pyloromyotomy? Compile a cluster, SWOT table, Venn diagram for the word "hypotrophy" and draw up diagrams of "Why?" and a hierarchical "How?"
3. Specify the types of congenital intestinal obstruction. Compile a cluster, SWOT table, Venn diagram for the word "peristalsis" and draw "Why?" and a hierarchical "How?"
4. Specify the signs of high intestinal obstruction? Compile a cluster, SWOT table, Venn diagram for the word "dyspnea" and draw "Why?" and a hierarchical "How?"
5. What type of surgery is performed for congenital pyloric stenosis? Compile a cluster, SWOT table, Venn diagram for the word "stenosis" and draw "Why?" and a hierarchical "How?"
6. Specify the types of embryonic hernia of the umbilical cord? Compile a cluster, SWOT table, Venn diagram for the word "peritonitis" and draw "Why?" and a hierarchical "How?"
7. Specify the signs of congenital pyloric stenosis? Compile a cluster, SWOT table, Venn diagram for the word "habitus" and draw "Why?" and a hierarchical "How?"
8. Specify complications after pyloromyotomy? Compile a cluster, SWOT table, Venn diagram for the word "pain" and draw diagrams of "Why?" and a hierarchical "How?"

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	Task 1	Task 2	Task 3: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	Question 1	Question 2	Question 3	(3,0)
1						
2						
3						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received b) contributes to the formation of the ability to link previously mastered information with new

Rules for compiling an INSERT table:

Concepts	V	+	-	?
Congenital high intestinal obstruction (pyloric stenosis, intestinal atresia, Ledd's syndrome, internal abdominal hernias, umbilical and embryonic hernias), clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where: V - corresponds to the existing knowledge (information) about ...

-contradicts existing knowledge about...

+ - is new information

? -incomprehensible or requiring clarification, addition information

CONCEPT TABLE

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs are located or symptoms of a disease. (recommendations, categories, various signs, etc.)						
	Vomiting	Bloating	Lack of stool	Temperature increase	Intestinal peristalsis	Hypotrophy	R-graphy picture
Pyloric stenosis							
Intestinal atresia							
Ledd's syndrome							
Intra-abdominal hernias							
Embryonic hernia of the umbilical cord							

SWOT

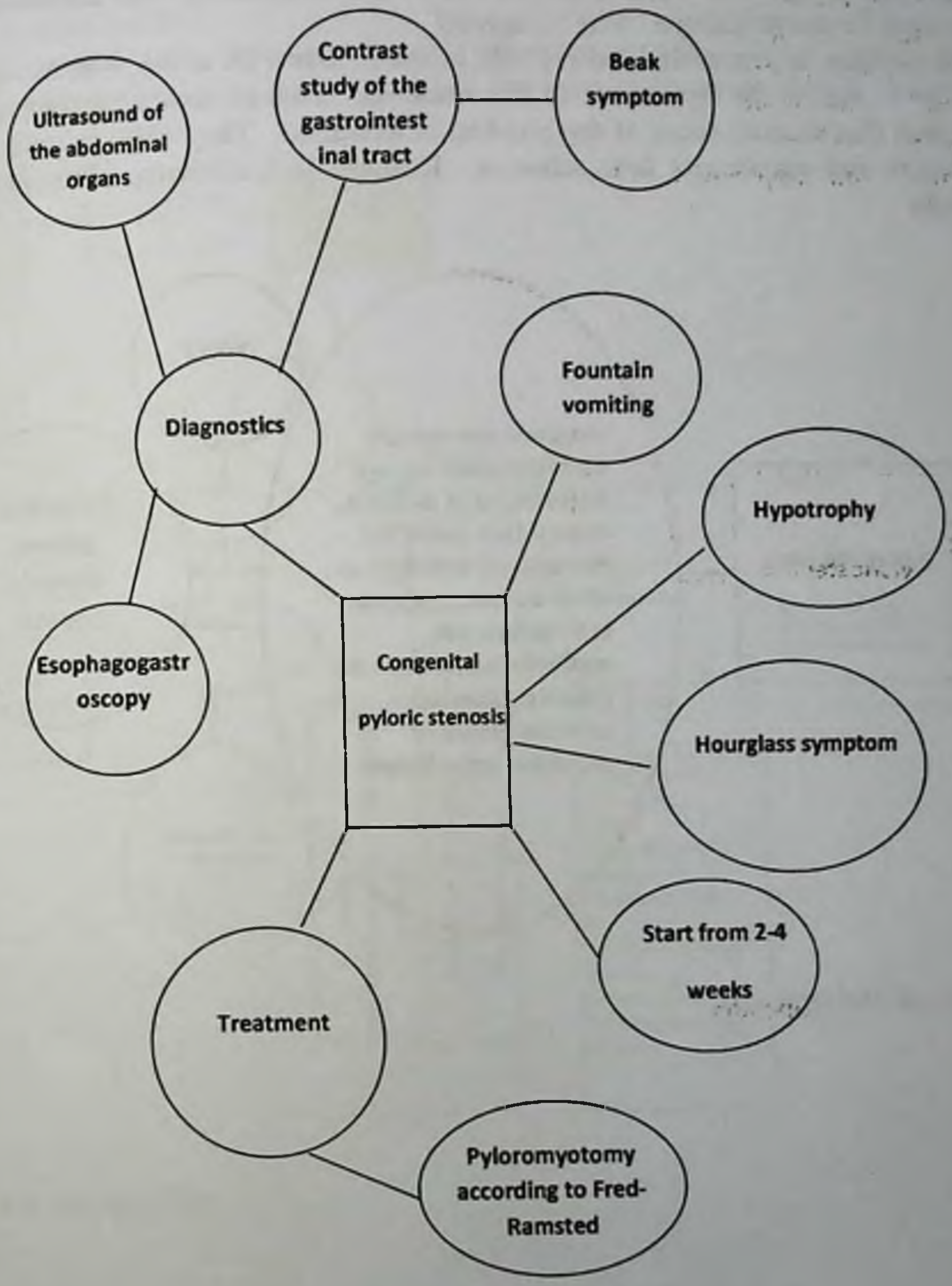
(homework or SIW: for creative thinking after lectures or practical exercises)

Analytical table - SWOT

S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle)

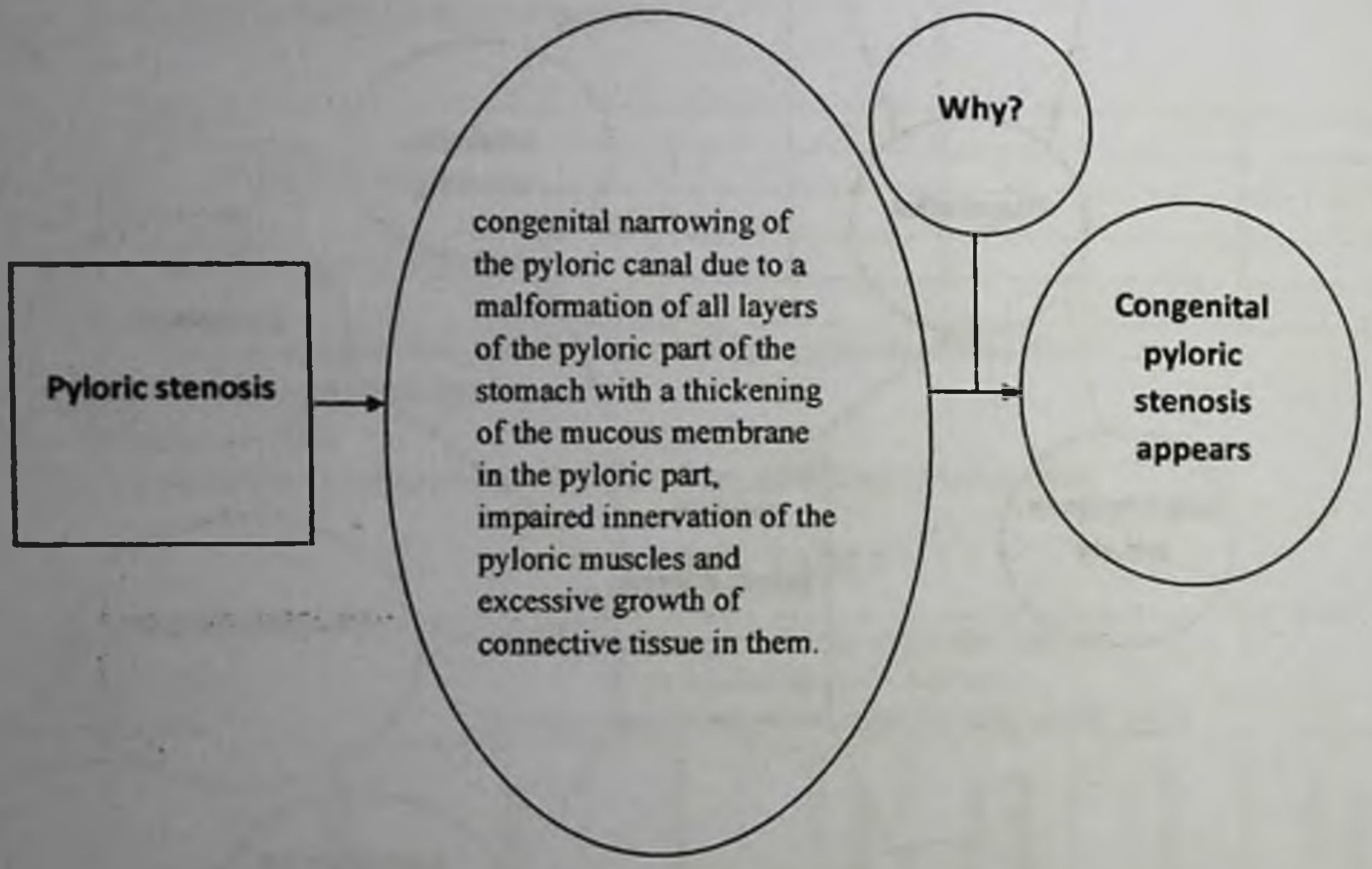


Note: see 2nd appendix.

SCHEME "WHY?"

This is a whole chain of reasoning to identify the root cause of the problem. Develops and activates systemic, creative, analytical thinking. Get acquainted with the rules for constructing a "Why" diagram?

The problem is formulated individually in pairs. Draw an arrow with the question "Why"? And write the answer to this question. This process continues until the original (but hidden) cause of the problem is identified. They unite in mini-groups, compare and supplement their schemes. Reduced to a common. Presentation of results

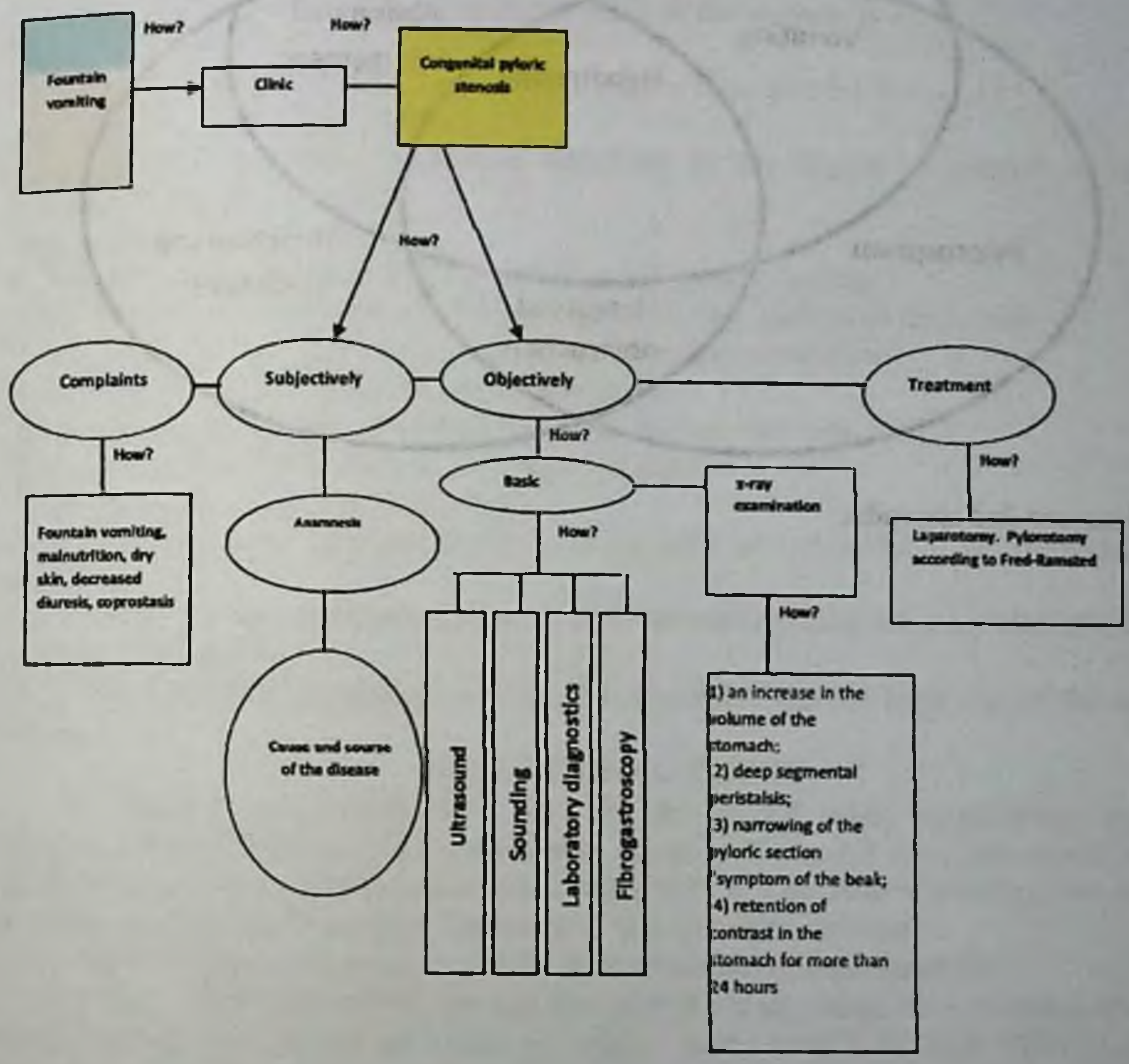


Note: see 2nd appendix.

RULES FOR CONSTRUCTING THE "HOW" DIAGRAM

When solving a problem, in most cases you do not need to think about "What to do?". The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

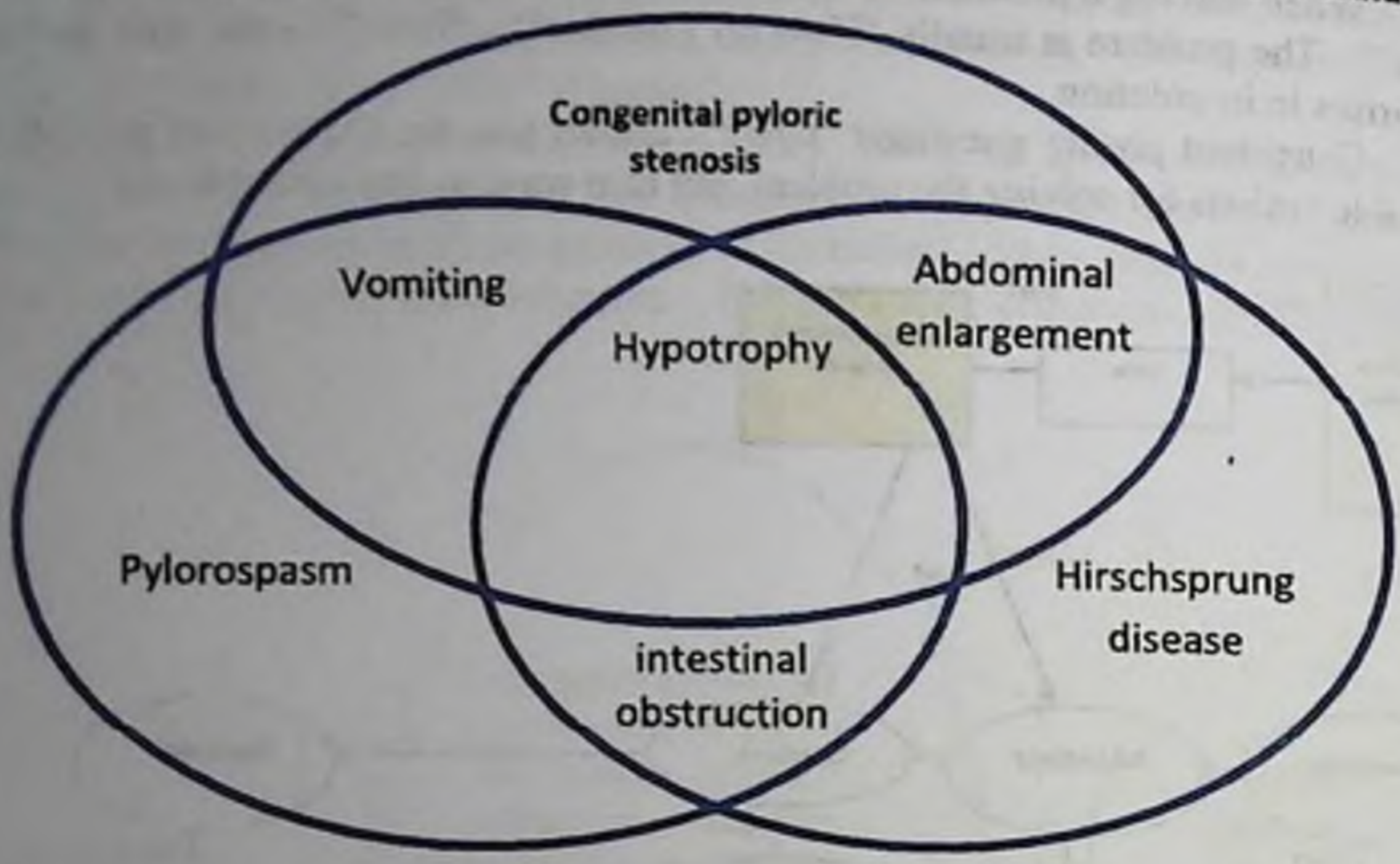
Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them;



Note: see 2nd appendix.

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features



Note: see 2nd appendix.

INTERACTIVE GAME QUESTIONS:

1. Name 4 groups of causes that are the causes of congenital intestinal obstruction.
Rep. Malformations of the intestinal tube, malformations of the intestinal wall, intestinal rotation disorders, malformations of other abdominal organs.
2. What is Ledd's syndrome?
Rep. The combination of compression of the duodenum with a volvulus of the "middle intestine".
3. Congenital intestinal obstruction by the level of the obstacle is - ....
Rep. High and low.
4. Congenital intestinal obstruction downstream will be divided into -....
Rep. Acute, chronic and recurrent
5. Congenital intestinal obstruction according to the degree of closure of the intestinal lumen is divided into - ....
Rep. Full and partial.
6. Specify 2 main symptoms of congenital intestinal obstruction.
Rep. Absence of meconium stool and vomiting with pathological impurities
7. Specify the X-ray sign of congenital high intestinal obstruction.
Rep. Two levels of fluid in the upper abdomen.
8. Specify the X-ray sign of congenital low intestinal obstruction.
Rep. Multiple levels of fluid in the upper abdomen.
9. What is congenital pyloric stenosis?
Rep. Malformation of pyloric sphincter in the form of a violation of morphological structures.
10. Indicate the first symptom and the time of its manifestation of congenital pyloric stenosis, and its nature.
Rep. Vomiting fountain and appears towards the end of the 2nd beginning of the 3rd week.

SITUATIONAL TASKS

1. The boy is 1 month old. Sick for the second week, regurgitation first appeared, then vomiting in a fountain that occurs 4-5 times a day, rare urination. Body weight at birth 3400 g, on examination - 3500 g. The child is lethargic, the cry is weak, in the epigastric region "peristalsis" is determined "by eye".

A presumptive diagnosis, a plan for their examination and treatment?

2. In the first week of life, the girl first started regurgitation, then vomiting after each feeding, the amount of vomit is small. Body weight at birth 3100 g, on examination 3400 g. The general condition is satisfactory, but the child is restless, noisy. Skin integuments of physiological color, during physical examination from the organs of the chest and abdomen without pathological changes, with X-ray contrast examination - evacuation of the contrast agent from the stomach occurs after 15 minutes. and ends within 3 hours.

Presumptive diagnosis, examination plan and treatment?

3. A newborn 4 hours after birth developed vomiting with an admixture of bile. After feeding, vomiting intensified and became indomitable. You are a micropediatrician, when examining a child, you found adynamia, a weak cry, dry skin, retraction of the fontanel and eyeballs: the abdomen is involved in breathing.

soft, sunken in the lower sections and somewhat swollen in the epigastrium, gravish meconium came out only twice in small portions. The drop in body weight per day was 200 g.

Presumptive diagnosis. What is your tactic?

4. A 1.5-month-old girl was transferred from the district hospital. diagnosed with pyloric stenosis. From the anamnesis 2 weeks ago, intermittent vomiting with a fountain mixed with bile, diarrhea, adynamia, refusal to eat, weight loss appeared. The condition of the girl is moderate, lethargic, pale, the skin is dry, the abdomen is swollen in the epigatrium, there is swelling of the mammary glands, pubic hairiness.

Do you agree with the diagnosis? If you do not agree, then your assumptions and a further plan for examining the child.

5. Counseling patients in the children's department of the district hospital, you found a boy at the age of 6 weeks, who, with an established clinical and radiological diagnosis of congenital hypertrophic pyloric stenosis for 10 days, receives antispasmodic, infusion and restorative therapy. According to the pediatrician, the child's condition improved somewhat.

What are your recommendations?

6. A 2-month-old child was admitted to the emergency room with complaints of stool and gas retention, abdominal distention, and vomiting twice. Difficulties in passing gases and stools are noted from birth. Currently, cleansing enemas and the introduction of a gas outlet tube do not provide relief.

Presumptive diagnosis, additional research methods, treatment tactics?

7. Parents with a 10-month-old child, who has had difficulty passing stool since birth, applied for a consultation. Appetite is reduced. The child is pale, capricious, body weight is 8000 g. The chest is short, the abdomen is enlarged in diameter, flattened. The wall of the abdomen is flabby, loops of intestines filled with feces are palpable.

Your assumptions, the plan of examination of the child?

8. A 5-year-old child was delivered to the emergency room of the hospital with complaints of abdominal pain and stool retention for 3 days. Physical examination of the chest revealed no pathology. The abdomen is soft, painful on palpation, there are no symptoms of peritoneal irritation.

Preliminary diagnosis with your activities?

9. In a 6-year-old child with chronic constipation, during a preventive examination in the abdominal cavity above the womb, you found a round, mobile, painless tumor of test consistency, 8x6x5 cm in size.

Your assumptions, tactics?

10. Describe the basic principles of conservative therapy for Hirschsprung's disease.

SELF-CHECK TESTS

1) Surgical treatment for pyloric stenosis is provided by the method:

1. Duhamel-Bairov
2. Wangensten
3. Frede-Ramstedt
4. Wankelman

5. Petrivalsky

2) A characteristic symptom for pyloric stenosis in a contrast study research institutes of the gastrointestinal tract:
1.after 20 min. contrast in the stomach
2. after 1 hour in the stomach and intestines
3.after 12 hours in the stomach and small intestine
4. after 6 hours in the stomach
5.after 24 hours in the stomach

3) Symptom characteristic of pyloric stenosis:
1. vomiting from birth
2. frequent vomiting
3.fantastic vomiting
4.presence of bile in vomit
5. change in the nature of vomiting within a week

4) X-ray symptom characteristic of pyloric stenosis:
1.uniform darkening of the abdominal cavity
2. Kloiber bowls 2 pieces
3.Multiple Cloiber bowls
4. increase in the size of the stomach
5.presence of fluid in the stomach on an empty stomach

5) In a contrast study, non-characteristic X-ray
a sign of pyloric stenosis is:
1. Symptom of communicating vessels
2.constasta depot in the stomach and duodenum 12
3.contrast retention in the stomach
4.narrowing of the pyloric canal (in an oblique position)
5.enlargement of the stomach

6) With giant hernias of the umbilical cord, treatment is carried out:
1.conservative
2. radical plate of the anterior abdominal wall
3.ventral hernia creation
4. alloplasty of anterior abdominal wall defect
5.treatment is not carried out

7) Causes of a hernia of the umbilical cord:
1. violation of the normal growth of intestinal loops
2. violation of the development of embryogenesis in the first weeks of intrauterine life
3. Violations of embryogenesis in the last months of intrauterine life
4.excessive enlargement of the liver

5.increased intra-abdominal pressure

8) How are hernias of the umbilical cord classified according to the condition of the membrane
1.compensated, decompensated
2.acute, chronic
3. uncomplicated, complicated
4. not infected, infected
5. with eventration and without eventration of organs

9) When does vomiting begin in pyloric stenosis
1.from birth
2. one year after birth
3. one month after birth
4.2-3 weeks after birth
5.after 6 months

10) Operation used for pyloric stenosis
1.pyloroplasty
2.pyloromyotomy
3.gastro-duodenal anastomosis
4.gastrostomy
5. gastrojejunostomy

11) The main clinical symptoms of congenital intestinal obstruction
1.vomiting blood, absence of meconium, bloating, hyperthermia, intoxication
2. vomiting, lack of meconium, bloating, exsicosis, toxicosis
3.vomiting, bloody stools, bloating, intoxication
4.abdominal pain, diarrhea, vomiting
5. no stool, vomiting with blood, bloating

12) The main causes of congenital intestinal obstruction
1.malformation of the intestinal wall, violation of the rotation of the intestine, compression of the intestines by other organs
2.malformation of the intestinal tube, malformation in the intestinal wall, violation of the rotation of the intestine, compression of the intestine by other organs
3.violation of intestinal rotation, violation of the development of the abdominal wall
4. violation of the rotation of the intestine, compression of the intestine by other organs
5. malformation of the intestinal wall, violation of the rotation of the intestine

13) Diagnosis of congenital intestinal obstruction includes:
1.analysis, palpation, percussion, gastric probing, rectal examination, abdominal radiography
2. palpation, percussion, gastric probing, passage of the gastrointestinal tract
3.blood biochemistry, palpation, percussion, auscultation, stool analysis

4. palpation, recursion, gastric probing, rectal examination, abdominal radiography, passage of the gastrointestinal tract
5.analysis, ultrasound, rectal examination, percussion

14) X-ray sign of congenital intestinal obstruction
1.free gas in the abdomen
2. Kloiber bowl
3. intestinal pneumatosis
4.mute belly
5.Sickle symptom

15) Clinic of pyloric stenosis:
1.Fountain vomiting, hourglass symptom, weight loss
2. constipation, fever, gushing vomiting, weight gain
3.anemia, dehydration, regurgitation, oliguria
4. vomiting with bile, diarrhea, loss of weight
5. polyuria, fountain vomiting, hourglass symptom

16) With contrast radiography of the gastrointestinal tract, pyloric stenosis is characterized by
1. Kloiber bowls
2.contrast retention in the stomach for more than 24 hours
3.contrast delay in duodenum 12
4.fast evacuation of contrast from the stomach
5.reducing the size of the stomach, rapid evacuation of the contrast from the stomach

17) Anatomical border between congenital high and low intestinal obstruction
1.between the stomach and duodenum
2. middle part of the duodenum
3. initial section of the jejunum
4.ileocecal angle
5. transverse colon

18) Val's symptom with intestinal obstruction is characterized by
1. the presence of an empty ampoule of the rectum when viewed with a finger
2. auscultatory determination of the symptom of "falling drop"
3.visible intestinal peristalsis through the abdominal wall
4. the presence of local flatulence in the abdomen
5. the presence of fluid levels on the survey P-gram of the abdominal cavity

19) Symptoms of intestinal obstruction in newborns may consist of the following except:
1.stool retention
2. visible peristalsis of the intestine
3.bloating

4.melena
5.no vomiting

20) What do the 2 levels on the plain radiograph indicate?
1.jejunal atresia
2. acute form of Hirschsprung's disease
3. atresia of the pyloric canal
4.complete congenital obstruction of the duodenum
5. arterio-mesenteric obstruction

21) X-ray sign of acute congenital low intestinal obstruction
1. the presence of two gas bubbles and two levels of liquid, darkening of the lower half of the abdominal cavity
2.free gas under diaphragm dome
3. intestinal pneumatosis
4.presence of multiple liquid levels
5.distended stomach, no gas in bowel loops

22) An operative method for the treatment of duodenal atresia
1.imposition of a T-shaped anastomosis
2.duodeno-duodenoanastomosis
3.duodenostomy
4. gastrojejunostomy
5. Operation Mikulich

23) In which case, with congenital intestinal obstruction, the preoperative period should be short in order to avoid complications (rupture of the intestinal wall)
1.membrane of the pyloric stomach
2.atresia of the distal duodenum
3.atresia of the proximal duodenum
4. annular head of the pancreas
5. atresia of the distal part of the small intestine

24) A characteristic sign of congenital low intestinal obstruction
1. vomiting from birth
2.vomiting bile and intestinal contents
3. sunken belly
4. swelling of the anterior abdominal wall
5. copious discharge of flatus and meconium

25) High congenital intestinal obstruction includes
1. ileal atresia, annular pancreas, embryonic adhesions
2.duodenal atresia, meconium ileus, coprostasis
3.atresia of the distal jejunum, volvulus of the "midgut", intussusception of the intestine
4. atresia of the proximal end of the jejunum, aberrant vessel, Ledd's syndrome

5. atresia of the duodenum, valve of the pyloric part of the stomach, disease Irasek-Sulzer-Wilson

26) The leading link in the etiology of pyloric stenosis:
1.intrauterine infection and subsequent scarring of the pyloric channel
2.congenital deficiency of parasympathetic nerve formations and congenital pyloric stenosis
3. Hyperplasia of the pylorus circular muscle and malformation of the parasympathetic ganglia
4.hyperplasia of the longitudinal muscle of the pylorus and hypertrophy of the mucosa of the pyloric canal
5. hypertrophy of all muscle layers and abnormal innervation of the pylorus parasympathetic nerves

27) Time of onset of clinical symptoms of pyloric stenosis
1. the first day after birth
2. second week of life
3. third week of life
4. fourth week of life
5.after 1 month life

28) Leading clinical symptom of pyloric stenosis
1. shortness of breath
2.anxiety
3.vomit
4.convulsions
5. cyanosis

29) What is the characteristic of stool in pyloric stenosis
1.sparse, regular dark greenish color
2.constant constipation, scanty
3. plentiful, undigested
4.frequent, liquid, offensive
5.watery

30) Quantitative characteristics of vomiting in pyloric stenosis
1. poor regurgitation
2.regurgitation profusely
3.vomiting a fountain, more drunk milk
4. Vomiting is smaller in volume than the child sucked out for 1 time
5. indomitable vomiting

Answers to tests for self-control

1-3, 2-3, 3-3, 4-4, 5-1, 6-1, 7-3, 8-4, 9-4, 10-2, 11-2, 12-2, 13-4, 14-2, 15-1, 16-2, 17-3, 18-3, 19-4, 20-4, 21-4, 22-2, 23-3, 24-2, 25-5, 26-5, 27-2, 28-3, 29-1, 30-3.

CHAPTER 4. LOW CONGENITAL INTESTINAL OBSTRUCTION (MECONIUM ILEUS, HIRSCHSPRUNG DISEASE, DOLICHOSIGMA, ANORECTAL MALFORMATIONS, UMBILICAL FISTULAS, DOUBLE INTESTINES) CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

• Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;

• Development of students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;

• Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;

• Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;

• Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Location of the lesson: department of emergency and purulent surgery, operating room, computer room, training room

Monitoring and evaluation: oral control, control questions, performance of educational tasks in groups.

Written control: control questions.

ANORECTAL MALFORMATIONS

Malformations of the anorectal region occur with a frequency of 0.25 - 0.66:1000. The most common variants of the defect are shown in the figure.

Combined malformations (heart, urinary system, gastrointestinal tract, musculoskeletal system, central nervous system) occur in almost 30% of cases.

Anorectal defects are often observed in the following syndromes: caudal regression, VACTER, Opitz, Opitz - Fries, with chromosomal abnormalities 4p, 13q, etc. They occur in the ratio of male and female sexes 1:2.

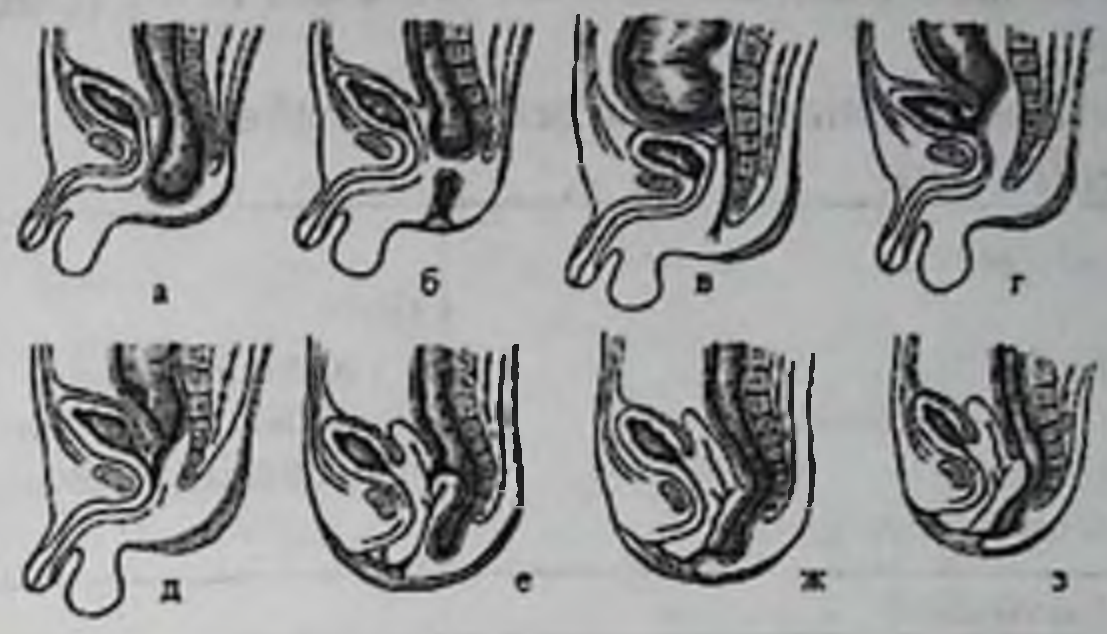


Figure 33. Scheme of variants of anorectal defects

In the first weeks of intrauterine life in an embryo, the anus (final) intestine opens along with the canal of the primary kidney into one common cavity - the cloaca, which is closed by a cloacal membrane. At the 4th week, the cloaca is divided by a descending septum from the mesoblast into two tubes. The anterior forms the bladder and ureters, and from the posterior, which is the continuation of the final intestine, the rectum with the anus is formed. From the 5th week, the ectoderm approaches the outer surface of the anal membrane and an anal fossa is formed, deepening towards the intestine. The process of perforation of the anal membrane ends by the 8th week of embryogenesis.

The occurrence of anorectal malformations depends on the stage at which there was a violation of normal embryogenesis. Violations of the formation and division of the internal cloaca cause the following types of defects: a) preservation of the cloaca; b) rectovesical fistula; c) rectovaginal fistula; d) rectovestibular fistula; e) atresia of the anus without a fistula; f) rectourethral fistula (Fig. 33).

Stopping development at the next stage leads to the birth of a child with an imperforated anal membrane or anal stenosis. Underdevelopment of the perineum causes ectopia of the anus and the formation of a covered anal opening with a perineal fistula.

In embryogenesis, the external sphincter of the anus develops independently. However, if we take into account that by the time the urorectal septum is formed, the fibers of the sphincter of the cloaca intersect at the height of the central core of the perineum, then in the absence or severe insufficiency of the rudiment of the primary perineum, the bundles of the external sphincter are incorrectly laid. With the most pronounced anorectal malformations, there is an absence or a sharp underdevelopment of the external sphincter.

In 1970, at the International Congress of Pediatric Surgeons in Melbourne, a classification was adopted, which was based on the relationship of the rectum to the muscles of the pelvic floor, in particular the puborrectal muscle. There are three groups of anomalies: high, medium, low. In the first case, agenesis and atresia of the rectum with or without a fistula are implied; the blind end of the intestine is located above the muscles of the pelvic floor. The second group includes defects in which the blind end of the intestine is located at the level of the pelvic floor. The third

group consists of variants when the intestine is located in the center of the loop of the pubic-rectal muscle.

Melbourne classification of anorectal anomalies

High (supralevator)

1. Anorectal agenesis *Boys:* *a) without a fistula;* *b) with a fistula - rectovesical, rectourethral.* *2. Rectal atresia (boys, girls).*	Girls: a) without a fistula; b) with a fistula - rectovesical, rectocloacal, rectovaginal.

Middle (intramedial)

1. Anal agenesis *Boys:* *a) without a fistula;* *b) with a fistula - rectobulbar.* *2. Anorectal stenosis (boys, girls).*	Girls: a) without a fistula; b) with a fistula - rectovestibular.

Low (translator)

1. Boys and girls: a) covered anus - simple; b) anal stenosis	
2. Boys: a) anterior perineal anus; b) recto-perineal fistula	Girls: a) anterior perineal anus; b) rectovestibular fistula; c) vulvar anus; d) anovulvar fistula; e) rectovestibular fistula

Each anatomical form has its own characteristics.

Atresia of one opening is easily recognized during the initial examination: the anus is absent.

Figure 34. Appearance of patients with anal atresia

In all cases, it becomes necessary to determine the height of atresia, i.e., the ratio of the intestine to the levator muscles, which in newborns lie at a depth of 2 cm from the skin of the anal region. Low atresia means options when the blind end of

the intestine is located at a depth of up to 2 cm from the skin, and under medium and high atresia - when the blind end is located at a great depth. Clinically, from the side of the perineum, some features can be noted that make it possible to assess the height of atresia. With high atresia, the perineum is reduced in size, underdeveloped, the ischial tubercles are brought together, and the coccyx is often absent. At the site of the anus, the skin is most often smooth. The "push" symptom is negative (a jerky movement is applied with the index finger in the projection of the external sphincter; if the intestine filled with meconium is located near the perineum, then the researcher's finger feels a counterblow, while the symptom is considered positive) (Fig. 34).

If for some reason the examination of the child after birth was not carried out, then by the end of the day the newborn begins to worry, profuse regurgitation and vomiting of gastric contents, then bile and intestinal contents appear. The abdomen becomes sharply swollen, stretched bowel loops are visible. Meconium and gases do not depart. A picture of low intestinal obstruction develops.

In order to determine the height of atresia, an invertogram according to Wangensteen is performed (Fig. 35-36).

A radiopaque object (for example, a coin) is glued onto the projection area of the anus, after which a survey image is taken in a lateral projection in the position of the child upside down.

The height of the atresia is judged by the distance between the gas bubble in the atrezirovanny intestine and the mark on the perineum. This study should be performed 16 - 18 hours after birth, otherwise the gas does not have time to reach the atrezed intestine and you can get a false result.

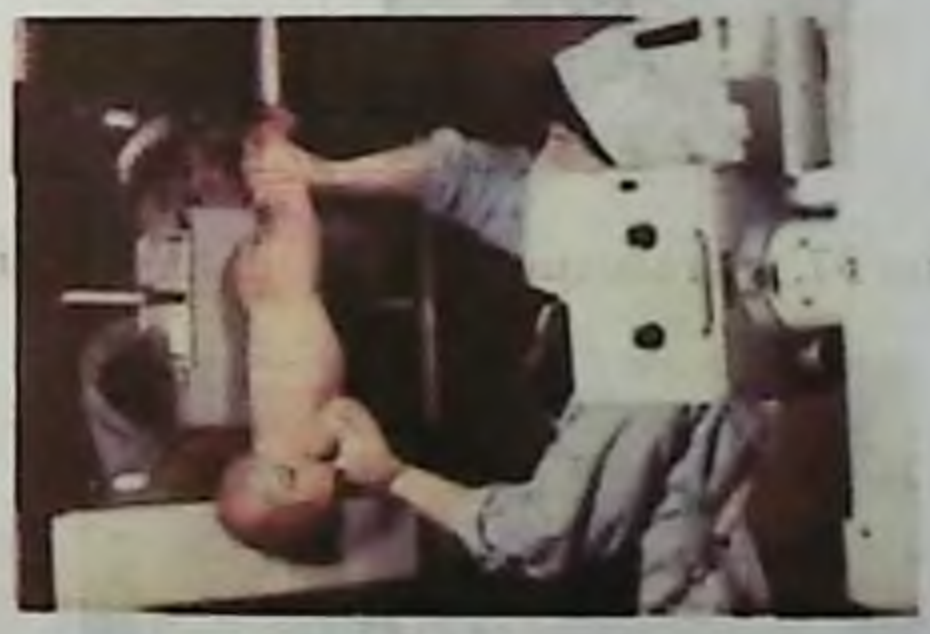


Figure 35. X-ray method according to Vangistin

In doubtful cases, X-ray contrast studies are used. In the projection of the anus, the perineum is punctured by immersing the needle to a depth of 2 cm and, under the control of the x-ray screen, a 10-15% solution of verografin is injected. If the needle enters the intestinal lumen, then the latter is clearly contrasted.

With high atresia, the contrast agent infiltrates the tissue.

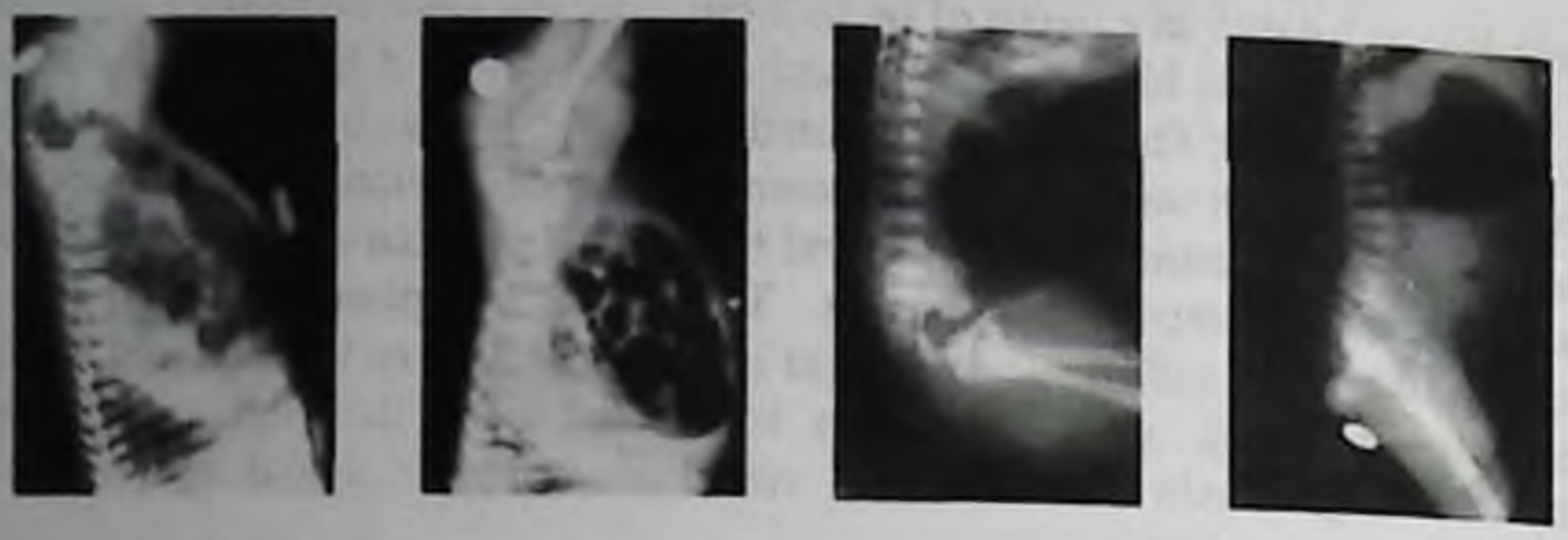


Figure 36. Invertograms according to Vangistin in the lateral projection.

Low and high forms of atresia

Currently, in order to determine the level of atresia, ultrasound scanning of the perineum has been widely used (Fig. 37).

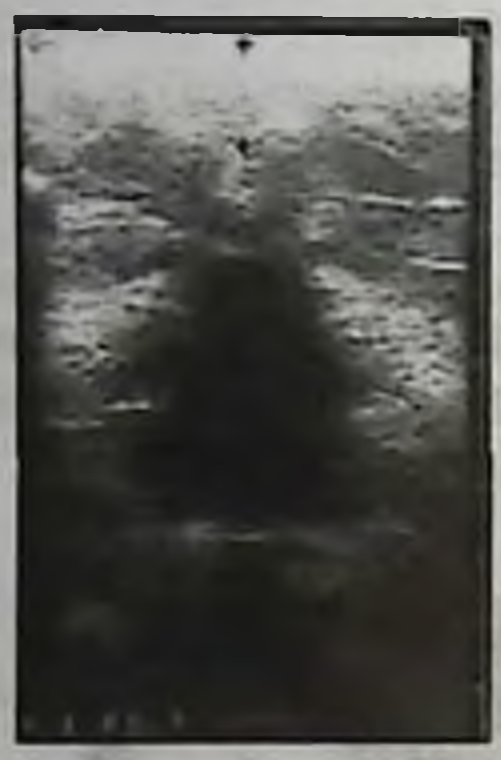


Figure 37. Ultrasound picture of anal atresia

Figure 38. Electromyography of the external sphincter

The presence, location and usefulness of the external sphincter is determined using electromyography performed with needle electrodes from four points (Fig. 38).

The high frequency of combined malformations requires an ultrasound examination of the kidneys and heart, checking the patency of the esophagus and stomach.

Atresia of the anus and rectum with a fistula into the urinary system is the most severe form of the defect. It occurs almost exclusively in boys and, as a rule, with high forms of atresia. In the first day of life, the defect in the clinical course does not differ from the fistulous forms. By the end of 2 days, the child develops a picture of low intestinal obstruction, since fistulas with the bladder and urethra are more often narrow and impassable for meconium.

When examining a child, in some cases it is possible to detect the release of meconium from the external opening of the urethra. It is difficult to judge the location of the fistula. Most often, in almost 94% of cases, there is a rectourethral fistula with a membranous or prostatic part of the urethra. In these cases, the discharge of meconium from the urethra is insignificant and may not be associated with urination. Meconium is ejected at the beginning of the act of urination almost unchanged, and the last portions of urine, as a rule, are transparent. Passage of gases through the urethra is observed outside of urination.

In cases where the fistula opens into the bladder, meconium constantly mixes with urine and stains it green. When urinating, urine is intensely colored green, especially its last portions.

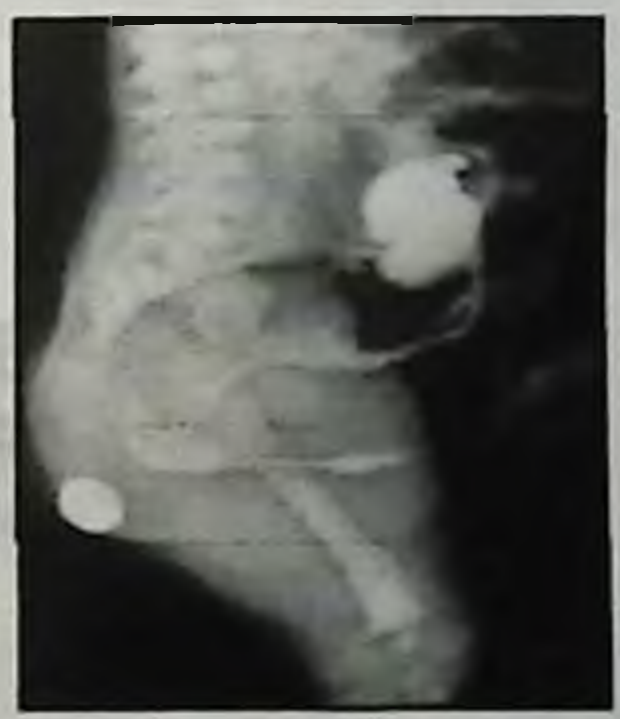


Figure 39. Contrast urethrocystography in lateral projection

The listed signs can be expressed to varying degrees and even be absent, since the diameter of the fistulous opening varies. According to B. V. Parin, wide fistulas with severe symptoms account for 18%, fistulas of medium width with variable clinical manifestations - 41%, narrow, "asymptomatic" fistulas - 41%

The diagnosis is clarified radiographically using urethrocystography. Under the control of the screen, a catheter is immersed into the initial section of the urethra to a depth of 1–2 cm, through which a 10–15% solution of verografin is injected. The picture in the lateral projection shows the flow of the contrast agent into the rectum (Fig. 39).

A fistula into the reproductive system is characteristic mainly for girls. It usually opens on the eve of the vagina in the region of the posterior commissure, less often in the vagina.

The clinical picture of atresia with a fistula into the reproductive system largely depends on the location and diameter of the fistula. The main sign of an anastomosis is the release of meconium, and then feces and gases through the genital slit from the first days of life, the anus is absent. If the fistula is short and wide enough, more or less regular independent stools are noted in the first months of life. When switching to artificial feeding, the stool becomes less frequent, constipation increases.

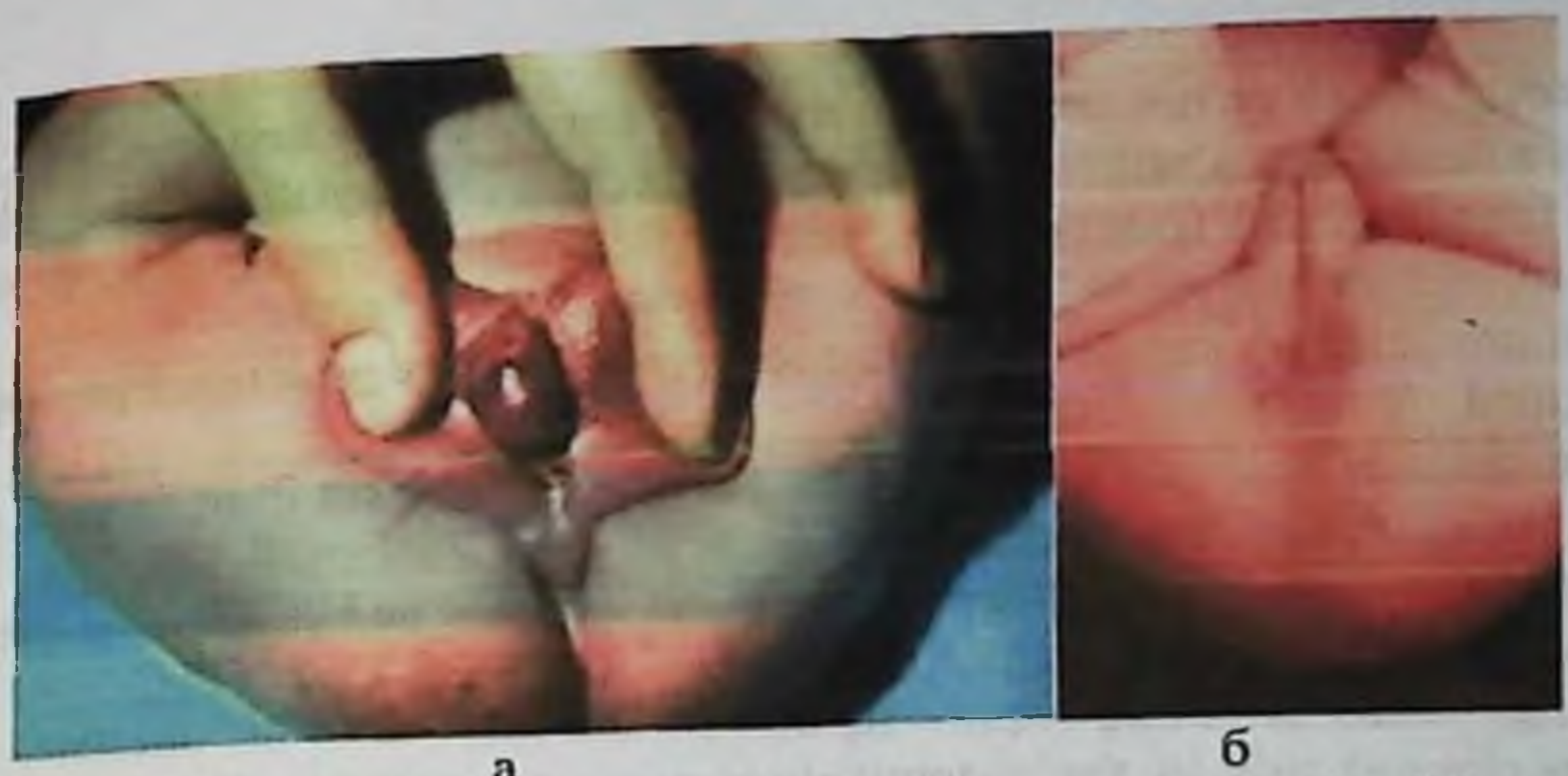
With atresia with a fistula into the vagina, the fistulous opening, as a rule, is narrow, located above the hymen. In girls with a vaginal fistula, intestinal contents are constantly excreted through the opening, which creates the conditions for ascending infection. Insufficient self-emptying of the intestine and the impossibility of conducting enemas due to the high location of the fistula lead to the early appearance of fecal obstruction, chronic intoxication with progressive deterioration.

In rectovestibular fistulas, atresia is usually classified as low, in cases of rectovaginal fistula, atresia is always high and is usually accompanied by infantilism of the external genital organs.

Fistula of the perineum is observed in boys more often than in girls. In girls, the perineal fistula is short and wide. In boys, the length and width of the fistula vary greatly; the external opening can open in the immediate vicinity of the anus, in the anterior portion of the external sphincter, at the root of the scrotum, and even in the penis. Depending on the anatomical variant, a clinical picture of complete or partial intestinal obstruction is possible (Fig. 40).

a b

Figure 40 (a, b). Appearance of a patient with an atresia of the anus with a fistula on the perineum



а б

Figure 41 (a, b). Appearance of a child with perineal ectopia of the anus

An ectopia of the anus is a condition when the anus, which has all the signs of a normal one (opens well, contracts and functions normally), is located in an unusual place - close to the genitals (Fig. 41).

There are perineal and vestibular ectopia. True ectopia must be **differentiated** from fistulous forms of atresia, since the latter are unable to provide full function and require surgical correction. Differences lie in the visual detection of contractions of the external sphincter or using electromyography. With ectopia, it contracts around the anus, and with fistulas, the contraction of the fibers of the external sphincter is observed outside it. With ectopia of the anus, functional abnormalities are not detected.

Congenital narrowing of the anus and rectum are most often localized at the site of transition of the endodermal part of the intestine to the ectodermal, i.e. in the region of the scallop line of the anal ring. The shape and extent of the stricture is variable. Sometimes it is a thin membrane, in other cases it is a dense fibrous ring. The length of the narrowing ranges from a few millimeters to 2 - 4 cm.

In the neonatal period and the first months of life, congenital strictures are usually not clinically manifested, since liquid feces freely pass through the constriction. With sharp degrees of stenosis, a child has constipation from the first days, feces are excreted in the form of a narrow ribbon. With the introduction of complementary foods, constipation becomes more pronounced. The child is restless, bloating progresses, poor appetite, lag in body weight; secondary megacolon is formed.

Diagnosis of congenital narrowing of the anal canal is not difficult. A rectal digital examination reveals a pliable elastic ring in the constriction zone; sometimes with a sharp stenosis it is not possible to hold the tip of the finger. Clarify the diagnosis with the help of radiopaque examination of the rectum, colonoscopy.

Treatment. All types of atresia of the anus and rectum are subject to surgical treatment in a specialized department. Emergency surgery in the first 2 days of life is required for all types of complete atresia, as well as fistulous forms: rectourethral, rectovesical and, with small diameters, rectovaginal, recto-perineal. At the age of 1-3 months to 1-3 years, defects with fistulas in the reproductive system and perineum

are corrected, which do not cause symptoms of intestinal obstruction. Recently, there has been a desire for an earlier correction of congenital malformations, so that by the time of formation and fixation of the neuro-reflex cortico-visceral connections, an anatomical variant as close as possible to the norm can be achieved.

In low forms of atresia of the anus and rectum, one-stage perineal proctoplasty is performed.

In cases of moderate forms of atresia (height 1.5 - 2 cm from the skin of the perineum), sacro-perineal proctoplasty has proven itself well, allowing good mobilization, passing through the pubococcygeal ligament and the external sphincter of the intestine.

High forms of atresia require significant mobilization of the intestine, which can be performed only by the abdominal-sacroperineal method. The extensiveness and invasiveness of such an operation in a newborn require its division into two stages. In the first days of life in the left iliac region, an unnatural anus is applied along Mikulich to the sigmoid colon as close as possible to the atresia zone to eliminate intestinal obstruction. At the age of 2 months - 1 year, the second stage of the radical operation is performed. Such tactics allow not only to achieve the recovery of children, but also to obtain better functional results. After the operation, starting from the 10th - 14th day, prophylactic bougienage of the newly created anal canal is carried out with Hegar's bougie, gradually increasing from No. 8 to No. 11-12. Prophylactic bougienage for 2-2.5 months allows you to create a gentle scar at the junction of the intestine into the skin and avoid stenosis of the rectum. Bougienage is carried out daily for the first 1-2 weeks - in a hospital, and then at home by parents under weekly dispensary control.

All children with multiple malformations need medical genetic counseling and constant follow-up. Other concomitant defects are corrected in stages - kidneys, genital organs, heart, musculoskeletal system).

The prognosis of the disease, the functional result depends both on the severity of the defect and associated anomalies, and on the correctness of the chosen tactics of surgical intervention.

VITELLINE DUCT ANOMALIES

In the first weeks of intrauterine development of a person, the embryonic ducts function - vitelline and urinary, which are part of the umbilical cord. The first serves to nourish the embryo, connecting the intestines with the yolk sac, the second is the outflow of urine into the amniotic fluid.

At the 3-5th month of intrauterine life, reverse development of the ducts is observed. The urinary duct, in particular, completely atrophies and turns into a median ligament located on the inner surface of the anterior abdominal wall.

Various violations of the obliteration of the vitelline duct are possible. Depending on the extent and at what level the non-obliterated duct is preserved, they distinguish: 1) umbilical fistulas are complete and incomplete; 2) diverticulum of the ileum; 3) enterocystoma. Anatomical variants of this anomaly are shown in Figure 42.

Figure 42. Variants of vitelline duct obliteration disorder

Complete fistulas of the navel occur when the vitelline duct remains open throughout. In this condition, the contents of the ileum are excreted through the umbilical wound.

Clinic and diagnostics. In the case of a non-obliterated vitelline duct, at the birth of a child, attention is paid to an abnormally thickened umbilical cord and a somewhat dilated umbilical ring. The falling off of the umbilical cord is often delayed, and after this has happened, a fistulous opening with a bright mucous membrane and intestinal discharge is found in the center of the umbilical fossa.

Figure 43. Stages of the operation to eliminate a complete fistula of the navel

In cases where the fistula is wide and long enough, when the child is anxious, evagination of the intestine may occur, accompanied by intestinal obstruction. Early cutting off of the umbilical cord on the 2-3rd day of life in the case of a non-

obliterated vitelline duct is often complicated by the eventration of intestinal loops through a defect in the peritoneum in the umbilical fossa. The intestinal loop, restrained in the umbilical ring, may become necrotic.

The diagnosis of a complete fistula of the umbilicus is not difficult and, with a wide fistula, is made on the basis of characteristic secretions. Fistulography is a valuable diagnostic technique.

Treatment. The only way to treat complete fistulas of the navel is surgery, which, in order to avoid complications (evagination, infection, bleeding), is performed immediately after the diagnosis is established (Fig. 43).

The operation consists in excision of the fistulous tract all the way from the navel to the ileum by laparotomic access.

Incomplete fistulas of the navel are formed in violation of the obliteration of the distal vitelline duct and are observed much more often than complete ones.

Clinic and diagnostics. Scanty discharge from the umbilical fossa is characteristic, as a result of which children are treated for a long time about the "weeping navel". When an infection is attached, the discharge becomes purulent. Examination of the umbilical fossa reveals a punctate fistulous opening with scanty discharge among the non-abundant granulations. To confirm the diagnosis, a fistulous tract is probed. If the bellied probe can be carried out to a depth of 1-2 cm, the fistula diagnosis becomes undeniable.

A differential diagnosis should be made with the umbilical fungus, which is characterized by the growth of granulation tissue at the bottom of the umbilical fossa due to infection and delayed epithelialization.

Treatment of an incomplete fistula of the navel always begins with such conservative measures as daily baths with a weak solution of potassium permanganate, treatment of the fistula with a solution of hydrogen peroxide and 3% tincture of iodine; dressings with antiseptics (1% solution of chlorophyllipt). In case of ineffective conservative treatment, surgery is indicated.

ILEAL DIVERTICULUM (MECKEL DIVERTICULUM)

Under this name, pathology is known when the proximal part of the vitelline duct remains non-obliterated. The forms of the diverticulum are different. Usually, **the diverticulum** is located on the side of the ileum opposite the mesentery, 20-70 cm from the ileocecal angle and resembles a short appendix in shape. The diverticulum often has a conical (b) or cylindrical (a) shape. It can be soldered with a connective tissue cord (the remainder of the vitelline duct -c) to the mesentery, anterior abdominal wall or intestinal loops (Fig. 44).

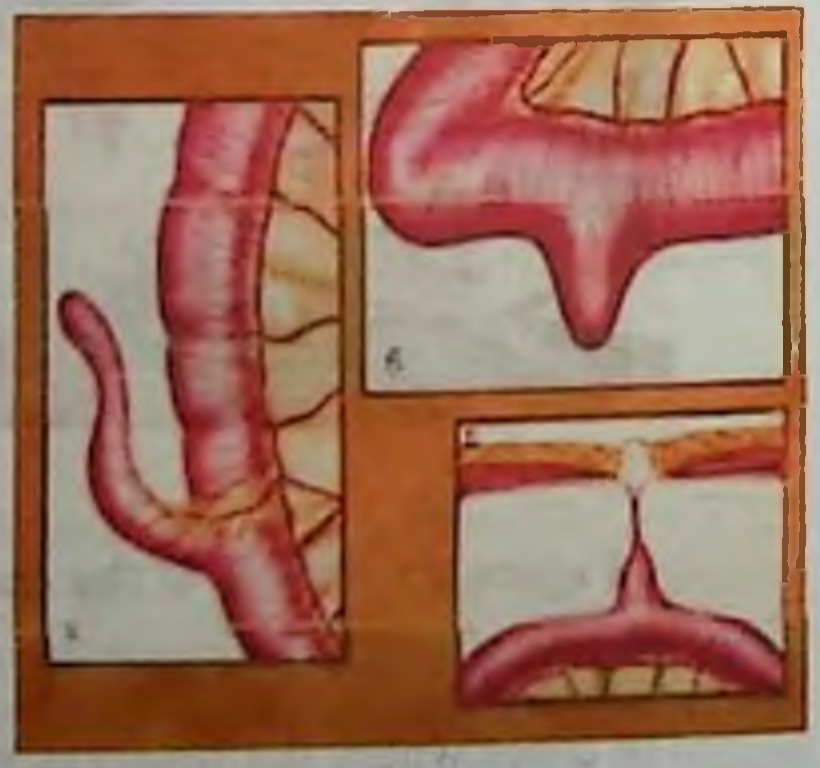


Figure 44. Variants of Meckel's diverticulum

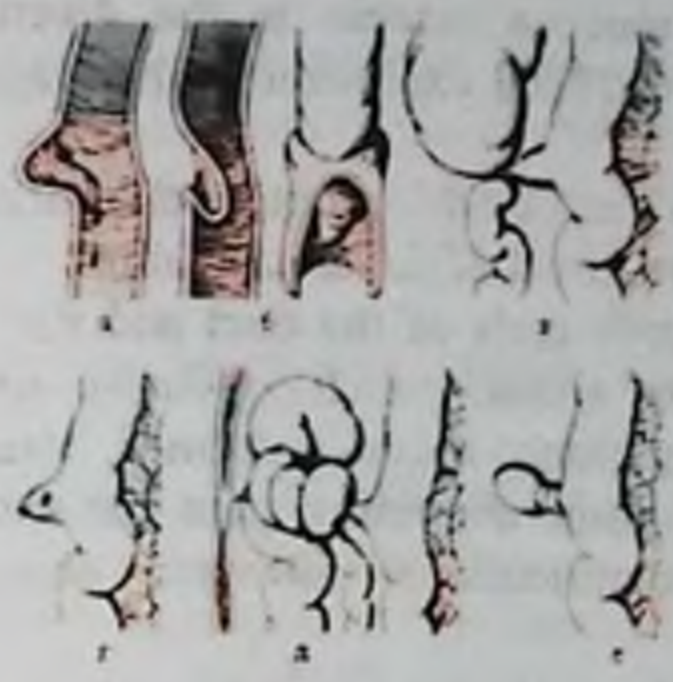


Figure 45. Complications of Meckel's diverticulum

Histological examination of the wall of the diverticulum in some cases reveals a dystopian mucosa of the stomach or duodenum. Less common is pancreatic tissue. Dystopia of atypical glandular tissue in the diverticulum is the cause of one of the complications - erosion of its wall and intestinal bleeding.

Clinic and diagnostics. An ilcal divcrticulum is most oftcn discovcrcd incidentally during a laparotomy undertaken for another reason or in connection with the development of complications, among which the most important are bleeding, inflammation (diverticulitis), intussusception and other types of intestinal obstruction (strangulation, volvulus).

Bleeding can occur acutely and be profuse, but chronic bleeding in small portions is also observed. Blood is found in the stool, which is dark brown in color. With massive bleeding, anemia quickly develops; bleeding can be repeated repeatedly. Diverticulitis occurs with symptoms similar to acute appendicitis (nausea, abdominal pain, fever, leukocytosis). It is almost impossible to distinguish between these diseases, therefore, in the absence of changes in the appendix during laparoscopy, it is necessary to revise the small intestine for about 70 cm from the ileocecal angle. In cases of belated diagnosis of diverticulitis, perforation occurs and peritonitis develops.

Intestinal intussusception, starting with a diverticulum, proceeds with typical symptoms (sudden onset, paroxysmal abdominal pain, vomiting, intestinal bleeding). The diverticulum is found on operation after disinvagination.

Intestinal obstruction can also be caused by torsion of the intestinal loops around the diverticulum, soldered to the anterior abdominal wall, or by their incarceration during fixation of the diverticulum to the mesentery or intestinal loops. The clinical picture is typical for intestinal obstruction. In a number of cases, the symptoms increase slowly and are accompanied by first partial and then complete intestinal obstruction.

Diagnosis of a diverticulum of an ileum causes great difficulties. It is most often thought of in cases of recurrent intestinal bleeding (Fig. 45). In a number of cases, a radioisotope study based on the local accumulation of a radiopharmaceutical,

which reveals the gastric mucosa ectopic in the diverticulum, allows a correct diagnosis to be made. For the final exclusion of the diagnosis, laparoscopy or trial laparotomy is used.

Bleeding diverticulum must be **differentiated** from intestinal angiomatosis.

Surgical **treatment** - removal of the diverticulum.

With obliteration of both ends of the duct and the remaining non-obliterated middle part, a closed cavity arises, which gradually stretches and fills with the secretion of the mucous membrane; **a cyst** is formed. Usually it is asymptomatic or children complain of an indefinite abdominal pain. In some cases, cysts lead to the development of serious complications (intestinal obstruction, infection of the contents).

Treatment is operative.

DOUBLING OF THE DIGESTIVE TRACT (ENTEROKISTOMS)

Enterocystomas are congenital hollow formations of a spherical or cylindrical shape of various sizes. They often have a joint wall with the intestine and common feeding vessels. The wall of such a cyst is formed by smooth muscles and has a mucous membrane of the gastric or intestinal type. In the case of the gastric mucosa, the fluid in the cyst is watery, clear, acidic, and when ulcerated, it is hemorrhagic. Cysts lined with intestinal epithelium contain mucus. Communication cysts with the digestive tract is rare. These cysts can form anywhere, but most often occur in the area of the ileo-jecal angle.

These malformations are often combined with other developmental anomalies, primarily with splitting of the vertebrae, spinal hernia and doubling of the genitourinary system.

Clinical picture

Enterocystomas in newborns or infants are manifested by symptoms of acute intestinal obstruction, associated either with volvulus of the intestinal loop, or with compression from the outside of the main lumen of the intestinal tube. Less commonly, enterocystoma can be detected by ultrasound of the fetus and newborn with the so-called palpable tumor syndrome of the abdominal cavity and retroperitoneal space.

Figure 46. Appearance of enterocystoma during surgery

Diagnostics
The diagnosis is established on the basis of x-ray examination and ultrasound.
Surgical treatment. As a rule, resection of the intestinal loop with enterocystoma is performed with the imposition of enteroenteroanastomosis (Fig. 46).
The prognosis is favorable.

MEGACOLON (HIRSCHPRUNG'S DISEASE)

Congenital enlargement of all or part of the colon (usually the sigmoid). According to modern views, based on microscopic examination data, the main changes are concentrated in the distal part of the sigmoid colon. Here, a deficiency or complete absence of cells of the Auebach plexus is found, the intestine does not peristaltize.

Figure 47. View of the abdomen in Hirschsprung disease

The clinical picture of the disease often manifests itself from the first days of life, but not later than two years of age. The main symptoms are constipation and an enlarged abdomen (Fig. 47). At first, when the baby receives mostly liquid food, with the help of cleansing enemas, it is possible to achieve regular bowel movements. Gradually, as the transition to solid food, constipation becomes more and more persistent, and the cleansing enema does not bring success. In these cases, the feces become dense and accumulate in the form of fecal stones.

A fecal stone clogs the intestinal lumen, resulting in symptoms of intestinal obstruction. Constipation is sometimes replaced by diarrhea.

Gradually, as the stool is delayed, the sigmoid colon expands greatly, the stomach swells, sharply increases in volume. When it is felt, an increased sigma and a characteristic sensation of doughy stool masses are determined, on which depressions remain from pressure with fingers.

Constant constipation leads to the development of fecal intoxication, which adversely affects the physical development of the child. He becomes pale, lags behind in weight and height, his appetite goes down.

Recognition of Hirschsprung's disease is based on the presence of underlying symptoms; the diagnosis is specified with the help of an X-ray examination, which can be performed in an outpatient clinic. After complete emptying of the intestines with a cleansing enema, 100-500 ml of barium suspension is injected through the

rectum. Instead of water, 1% sodium chloride solution is used to avoid a shock-like reaction associated with the absorption of toxic products contained in the intestine.

Figure 48. Irrigogram in Hirschsprung's disease

The X-ray picture is characterized by the presence of a narrowed part of the sigmoid colon, turning into a sharply expanded part (Fig. 48).

Treatment of Hirschsprung's disease is complex and requires perseverance and patience of the doctor and parents. In principle, surgical intervention is shown, which consists in resection of the aganglionic zone. The operation is performed at the age of 1 - 2 years, because small children find it difficult to tolerate. Before the operation, a complex of conservative measures aimed at combating constipation is carried out. It is important to achieve daily release of the intestines from feces.

The right diet plays a big role. It is necessary that the child takes coarse, mostly plant foods, which increase peristalsis.

A significant place in the complex of conservative measures is given to physiotherapy exercises. Every day, several times for 5 - 20 minutes, the patient's relatives massage his abdomen with wide circular movements in a clockwise direction. This stimulates peristalsis and pushes the intestinal contents mechanically to some extent. In addition, the abdominal press is strengthened. For older children, exercises that promote squeezing and "massaging" the colon (squats, flexion of the body, etc.) are recommended.

Drug treatment (laxatives) is best avoided. Instead, the child is given liquid vaseline, peach, sunflower oil, 1 teaspoon or 1 dessert spoon, depending on age, 2 to 3 times a day between feedings.

Some patients are better helped by hypertonic enemas from a 10% saline solution. The lack of effect of a conventional enema makes a siphon enema necessary, for which a 1% saline solution is used.

In severe cases, when there was a prolonged stool retention, symptoms of intestinal obstruction appeared, the child must be hospitalized.

Among the radical methods of treatment in children suffering from Hirschsprung's disease, the most common operations are Swenson-Hiatt-Isakov; Duhamel - Bairova; Soave - Lenyushkin; (fig.49).

a b

Figure 49. The main points of the operation: a) Svenson-Khiat-Isakov b) Duhamel-Bairov i) Soave-Lenyushkin

In order to be able to expand the stereotype of thinking, develop the dynamism of mental activity and intensify educational activity, the teacher uses new pedagogical technologies in the preparation of a general practitioner.

I. Curation of patients on the topic - 15 minutes
II. Participation in the dressing room and operating room - 20 minutes;
III. Implementation of practical skills - 15 minutes:

PRACTICAL SKILLS

CLEANING ENEMAS

- indications: for the release of the intestine from feces, constipation, food poisoning, preparing the patient for operations, rectoscopy, colonoscopy, X-ray examination of the intestine, kidneys, ultrasound, before the introduction of drugs;
- explain to the patient's parents about the upcoming manipulation;
- check the readiness of the necessary tools and medicines: water at room temperature, a can with a soft tip, Esmarch's mug, vaseline oil;
- take the balloon in the right hand, release air from it and fill it with water (temperature 20-22 ° C), remove the air, slightly squeezing the balloon until liquid appears from the tip turned upwards. Lubricate the tip with Vaseline;

Figure 50. Stages of a cleansing enema

Note: Required amount of water:

Newborn - 25-30 ml;

For a baby - 50-150 ml;

1-3 years - 150-250 ml

- lay the child on the left side, with the lower limbs pulled up to the stomach;

Note: lay the child under 6 months on his back and lift his legs up.

- spreading the buttocks of the child with 1 and 2 fingers of the left hand, placing the can with the tip up, carefully move it into the anus, directing it first to the navel, and then, having overcome the sphincters, parallel to the coccyx;

- slowly press the canister from below, inject water and, without opening it, remove the tip from the rectum (place the canister in the waste material tray);

- to hold the injected fluid in the intestines with the left hand, squeeze the buttocks of the child for a few minutes;

- lay the child on his back, covering the perineum with a diaper (until stool appears or the urge to defecate).

CARRYING OUT A SIPHON ENNEMA

- indications: removal of feces or toxic substances that have entered the intestines as a result of poisoning, the ineffectiveness of a cleansing enema;
- explain to the patient's parents about the upcoming manipulation;
- check the readiness of the necessary tools and medicines: water at room temperature or a weak solution of potassium permanganate or sodium bicarbonate, a can with a soft tip, an Esmarch mug, a rubber tube, vaseline oil;
- check the availability of the necessary tools, soft tip, funnel, rubber tube and sterilize them by boiling;
- lay the child on the left side, with the lower limbs pulled up to the stomach;
- carefully insert the end of the tube lubricated with petroleum jelly through the anus into the intestine to a depth of 20-30 cm;
- fill the funnel with water and raise it to a height of 50-60 cm above the bed, and then lower it to the level of the child's pelvis without removing the rubber tube from the rectum;
- repeat the procedure until clean wash water;
- Carefully remove the rubber tube.

Figure 51. Stages of a siphon enema

IV. Big break - 40 minutes (11.50-12.30).

V. Practical lesson (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

LEARNING ASSIGNMENTS

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: Hypotrophy, vomiting, cyanosis, shortness of breath, regurgitation, pain, bleeding.

Tasks for groups

1. Specify the anatomical forms of Hirschsprung's disease. Cluster, SWOT table, Venn diagram for the word "vomit" and chart Why? and hierarchical diagram How?

2. Specify the clinical signs of Hirschsprung's disease. Make a cluster, SWOT table, Venn diagram for the word "habitus" and draw diagrams Why? and hierarchical diagram How?

3. Specify the main features of the rectal polyp. Make a cluster, SWOT table, Venn diagram for the word "constipation" make diagrams Why? and hierarchical diagram How?

4. Specify the types of surgical intervention for Hirschsprung's disease. Compile a cluster, SWOT table, Venn diagram for the word "flatulence" and draw diagrams Why? and hierarchical diagram How?

5. Specify what complications may occur after surgery for anorectal defects. Make a cluster, a SWOT table, a Venn diagram for the word "fistula" make diagrams Why? and hierarchical diagram How?

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	Task 1	Task 2	Task 3: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	Question 1	Question 2	Question 3	(3,0)
1						
2						
3						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;
b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concepts	V	+	-	?
Congenital low intestinal obstruction (meconium ileus, Hirschsprung disease, dolichosigma, anorectal malformations, umbilical fistulas, duplication of the intestinal tract) clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where: V - corresponds to the existing knowledge (information) about ...
-contradicts existing knowledge about...
+ - is new information
? -incomprehensible or requiring clarification, addition information

CONCEPT TABLE

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located. (recommendations, categories, various signs, etc.)						
	Vomiting	Flatulence	Dyspnea	Abdominal enlargement	Auscultation	R-graphy of the abdomen	Hypotrophy
Meconium ileus							
Hirschsprung disease							
Dolichosigma							
Anorectal malformations							
Umbilical fistulas							
Duplication of the intestinal tract							

SWOT

(homework or independent work of the student: for creative thinking after lectures or practical classes)

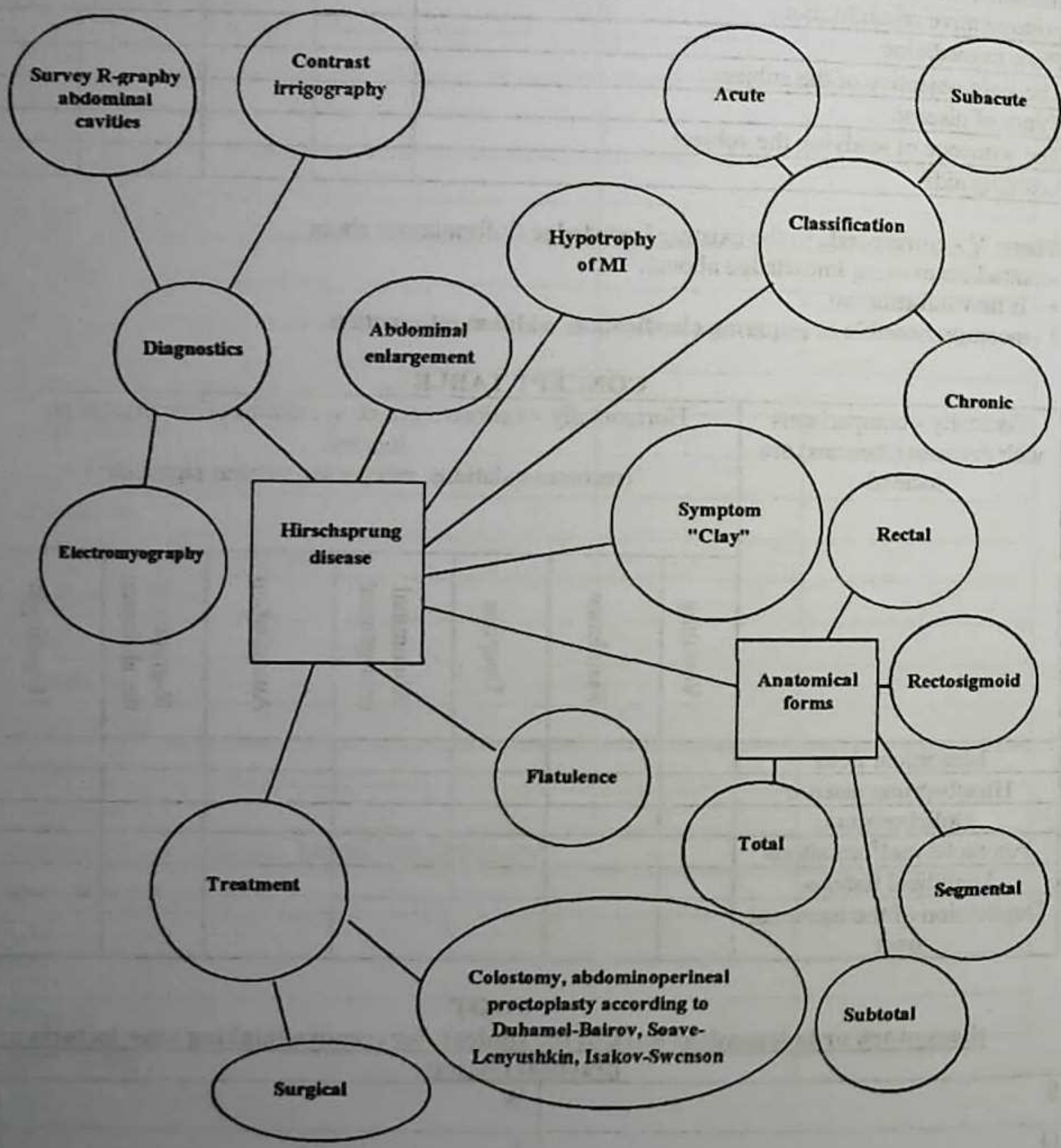
S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle)

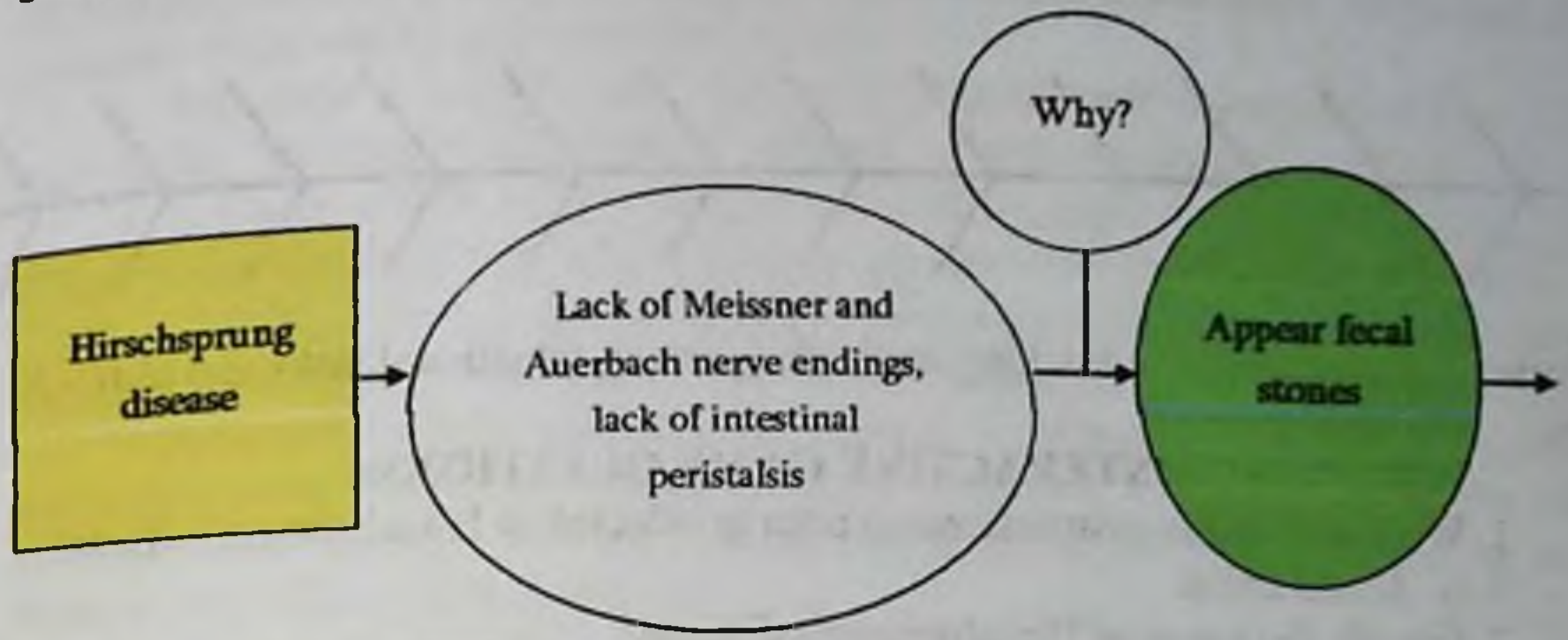
A way of mapping information - gathering ideas around a major factor to focus and make sense of the whole construct

Clustering technology: In the center of a blackboard or a large sheet of paper, a keyword or a topic title of 1-2 words is written. By association with the keyword, "satellites" are attributed to the side of it in smaller circles - words or sentences that are related to this topic. Connect them with lines to the "main" word. These "satellites" may have small satellites, and so on. Recording continues until the allotted time expires or until ideas are exhausted.



Note: see 2nd appendix.

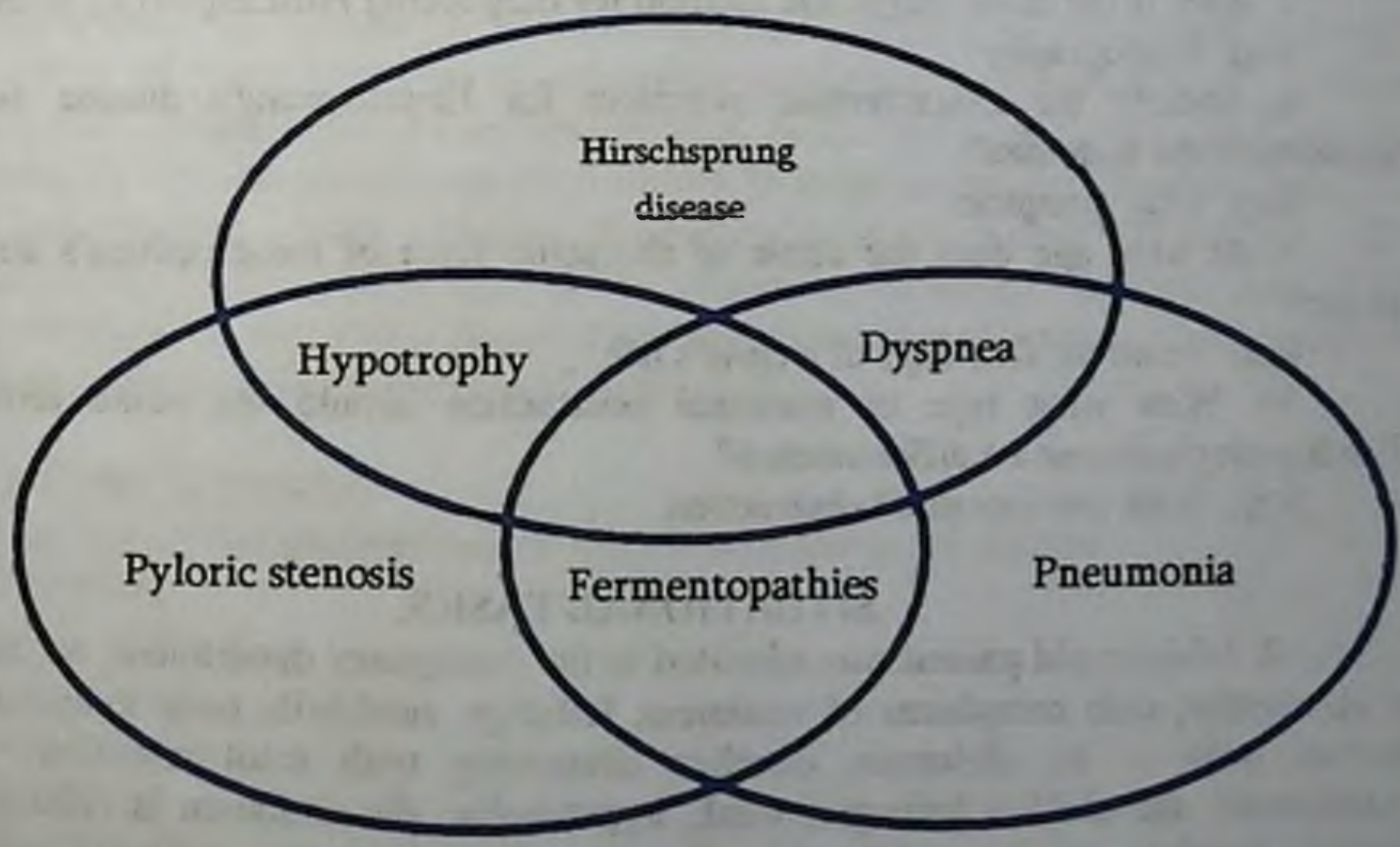
SCHEME "WHY?"



Note: see 2nd appendix.

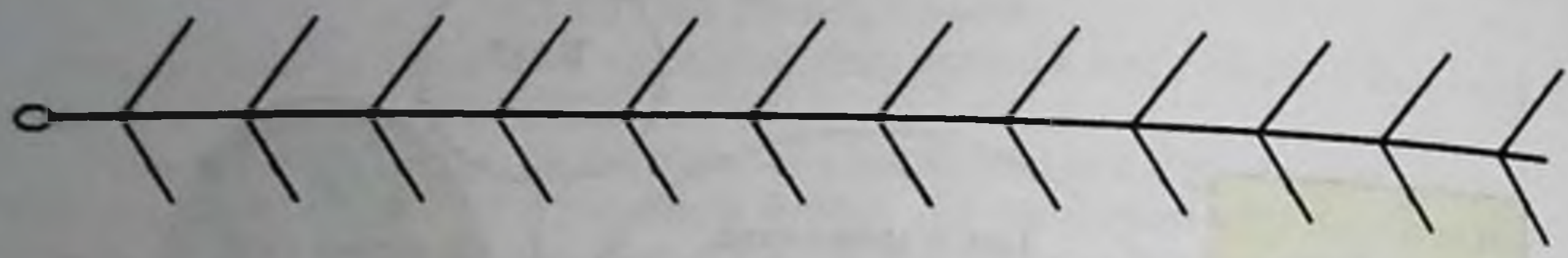
VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features



Note: see 2nd appendix.

SCHEME "FISH SKELETON"



3. Training with interactive teaching methods (games), situational tasks and tests - 20 minutes;

INTERACTIVE GAME QUESTIONS:

1. What part of the gastrointestinal tract is affected in Hirschsprung's disease

Rep. Distal colon

2. Specify the cause of Hirschsprung's disease?

Rep. Changes in the histostructure of the intramural nervous apparatus of the distal colon.

3. What is the main X-ray method for diagnosing Hirschsprung's disease?

Rep. Irrigography.

4. What is the change in the histostructure of the intramural nervous apparatus of the distal colon in Hirschsprung's disease?

Rep. Absence of Auerbach and Meissner ganglions.

5. What part of the colon is most often affected in Hirschsprung's disease?

Rep. Recto-sigmoid.

6. In what form of Hirschsprung's disease are symptoms of low intestinal obstruction manifested?

Rep. Severe or acute form of Hirschsprung's disease.

7. What is the main diagnostic method for diagnosing Hirschsprung's disease?

Rep. Irrigography.

8. Specify the characteristic symptom for Hirschsprung's disease during palpation of the abdomen?

Rep. Clay symptom.

9. At what age does the clinic of the acute form of Hirschsprung's disease appear?

Rep. From the first days of a child's life.

10. With what type of intestinal obstruction should the acute form of Hirschsprung's disease be differentiated?

Rep. With low intestinal obstruction.

SITUATIONAL TASKS.

1. A 3.5-year-old patient was admitted to the emergency department, according to her mother, with complaints of weakness, lethargy, subfebrile body temperature, periodic pain in the abdomen, diarrhea alternating with stool retention. On examination, the child is lethargic, weak, hypotrophic, the abdomen is enlarged, a smooth, painless, dense, mobile formation is palpated on the right side of the abdomen. What is your diagnosis, research methods and treatment tactics?

2. A 4-year-old child complains of bloating, lack of an independent act of defecation, the abdomen is enlarged, physical development lags. Clay symptom is positive. Your tactics and your diagnosis?

3. The child is 2 years old. Suffering from chronic constipation from the first days of life. Stool only after enema. What is your diagnosis and your tactics?

4. A 4-year-old child is admitted to the emergency department with symptoms of the decompensated stage of Hirschsprung's disease. Tactics of his treatment?

5. The child has a prolapse of the rectum only during the act of defecation and its slight spontaneous reduction. What is your diagnosis?

6. A 3-year-old child enters the admission department. Complaints according to the mother about the release of scarlet blood at the end of defecation. After a bowel movement, the mother sometimes notes "rectal prolapse," which is reset on its own. What is your diagnosis and tactics?

7. A 2-year-old child was admitted to the emergency department with complaints, according to the mother, of a delay in the discharge of feces and gases, an increase in the size of the abdomen. On examination: the child lags behind in physical development, the phenomena of intoxication and anemia are noted. What is your diagnosis and tactics?

8.Sick N. 4 years. Complaints, according to the mother, about the lack of independent stool, vomiting, bloating. On examination: the child is lethargic, adynamic, the skin is pale with a cyanotic tinge, the abdomen is swollen, the venous network is exprcssed on the anterior abdominal wall, the peristalsis of the swollen large intestine is contoured. What is your diagnosis, research methods and treatment tactics?

9. In a child, according to the mother, prolapse of the rectum is repeated often and occurs with every cry and straining of the child. On examination, you can see a sausage-shaped, cylindrical protrusion in the anus. What is your treatment strategy?

10. A 10-year-old patient is undergoing a clinical examination in the admission department. Complaints of paroxysmal pain in the abdomen, nausea and vomiting. Vomiting is not associated with food intake, in large quantities with an admixture of intestinal contents. After vomiting, the patient's condition does not improve. In an objective study, the asymmetry of the abdomen, bloating, intestinal peristalsis is accelerated, gases and stools do not go away. Character of vomiting, your diagnosis, methods of researches and tactics of treatment?

SELF-CHECK TESTS

1) What part of the gastrointestinal tract is affected in the disease Hirschsprung

1.pyloric stomach
2.12 duodenum
3.small intestine
4. rectum
5. distal colon

2) The newborn has an acute form of Hirschsprung's disease, what is your tactic?

1.Abdo-perineal proctoplasty
2.Folca catheter placement
3. colostomy on the left
4. colostomy on the right
5.resection of the aganlionic zone, end-to-end anastomosis

3) What is the cause of Hirschsprung's disease?
1.congenital underdevelopment of the muscular layer of the large intestine
2.presence of folds of the colon mucosa
3. long sigmoid colon
4. change in the histostructure of the intramural nervous apparatus of distal colon
5.congenital atony of the large intestine

4) The main X-ray diagnostic method of Hirschsprung's disease?
1. excretory urography
2. irrigography, irrigoscopy
3. survey radiography of the abdominal cavity
4. fistulography
5. retropneumoperitonium

5) At what disease is the Wangensten test performed?
1.pyloric stenosis
2. dolichosigma
3.atresia with fistula
4.ectopia anus
5.atresia of the rectum and anus

6) The newborn has an acute form of Hirschsprung's disease. Your tactics:
1.Abdominal-perineal proctoplasty
2. to carry out an operation on Duhamel-Bairov
3. colostomy on the right
4.conservative treatment
5. intestinal bougienage

7) With complete non-closure of the vitelline duct, there is often complication:
1. peritonitis
2.invagination
3.evagination
4.intestinal obstruction
5. intestinal paresis

8) When doubling the gastrointestinal tract, the passage of J.K.T. information-active is:

1.in the event of peritonitis
2. with cystic form
3. with diverticular form
4.When perforation occurs
5. when bleeding

9) Determine the treatment tactics for a high form of posterior atresia passage and rectum in a premature baby:
1. radical operation
2.conservative treatment
3. palliative, subsequently radical surgery
4.physiotherapy treatment
5. palliative surgical treatment

10) What is the cause of Hirgprung's disease?
1.congenital underdevelopment of the muscular elements of the large intestine
2. the presence of mucosal folds in its distal section
3.bends of the elongated sigmoid colon
4.congenital atony of the colon
5. absence of Auerbach and Meissner ganglions

11) Most often, which part of the colon is aganlionic with Hirschsprung's disease
1. ampoule department
2. perineum
3. initial part of the large intestine
4.recto-sigmoid
5. splenic angle of the large intestine

12) What cannot be the cause of megacolon
1. Hirschsprung's disease
2. hypovitaminosis of vitamin B1
3.anorectal malformations
4. idiopathic megacolon
5.prolapse of the rectum

13) A severe or acute form of Hirschsprung's disease manifests itself symptomatically
mami
1.High intestinal obstruction
2.low intestinal obstruction
3.Acute respiratory failure
4.cardiovascular insufficiency
5. neurotoxicosis

14) The main diagnostic method of research in diagnosing nose in Hirschsprung disease is
1.colonoscopy
2.sigmoidoscopy
3.irrigography
4. survey radiography of the abdominal organs
5.electromyography

15) The severity of the clinical symptoms of Hirschsprung's disease directly proportional
1. the degree of prematurity of the patient
2. the age of the patient
3. the duration of the disease
4.Length of the zone of agangliosis
5.Degree of intestinal expansion

16) What can be revealed during palpation of the abdomen, characteristic of Leznie Hirschsprung?
1. soreness throughout.the abdomen
2. soreness along the large intestine
3. soreness in the navel
4. "symptom of clay"
5. Tumor-like formation is determined

17) Acute form of Hirschsprung's disease, at what age does it appear?
1.from the first days of a child's life
2.up to one month old
3. from the third week of life
4.from the age of six months
5. from the age of one

18) An acute form of Hirschsprung's disease, with what type of intestinal obstruction need to be differentiated?
1.with intussusception
2. with obstructive intestinal obstruction
3. with acute high intestinal obstruction
4.Low ileus
5. with strangulation intestinal obstruction

19) Cause of secondary megacolon:
1.hemorrhoids
2.Anus fissures
3.presence of paraproctitis
4.polyps of the rectum
5. congenital or acquired cicatricial narrowing of the rectum

20) Operation not applicable for Hirschsprung's disease
1.by Soave
2.according to Swenson
3.according to Duhamel
4. according to Benson-Stone
5.by Rebake

21) What is not observed in duodenal atresia below the Vater nipple
1. vomiting with bile
2. distention of the epigastrium
3.vomiting blood
4. no vomiting
5. vomiting without bile

22) Clinical picture of intestinal atresia
1. repeated vomiting of bile, absence of meconium, bloating
2.vomiting bile, bloody stools, bloating
3. absence of vomiting, meconium retention, epigastric retraction
4.vomiting curdled milk, scanty stools, bloating in the epigastrium
5. single vomiting, loose stools, retraction of the abdomen

23) At what malformation is the absence of the anus and fecal discharge from the vestibule of the vagina:
1. atresia of the anus and rectum
2. vestibular ectopia of the anus
3. anal atresia with rectovestibular fistula
4. anal atresia with rectovaginal fistula
5.atresia of the rectum

24) A 2-year-old child has discharge from the umbilical fossa.
Causes may be malformations other than
1.fungus
2. non-closure of the urinary duct
3. Meckel's diverticulum
4. non-closure of the vitelline duct
5.intestinal fistula

25) A 3-year-old boy has a complete fistula of the umbilicus. Choose an operational tactic
1. preventive laparotomy, revision of the abdominal cavity, excision of the fistula
2. fistula excision, laparotomy, revision of the abdominal cavity
3.simple fistula excision
4.Diagnostic laparotomy
5. Cryotherapy during laparotomy and revision
26) A complete fistula of the navel was found in a child aged 1.5 years. Your tactics:

1.observation
2. cauterization with lapis
3.surgery
4.Adhesive sticker
5. cryotherapy

27) A sign characteristic of patients with a complete fistula of urachus
1.constant leakage of urine from the umbilical fossa
2. excretion of urine from the umbilical fossa, aggravated by urination
3. communication between the bladder and the umbilical fossa, detected by contrasting the fistula
4. caudal direction of the probe when probing the fistulous tract
5. all of the above

28) What is the reason for emergency surgical treatment for complete fistula of the yolk duct
1.infection of the fistula
2. bowel evagination
3. loss of intestinal contents
4.possible intestinal bleeding
5. none of the above

29) What is the reason for the discharge of urine from the navel
1.bladder exstrophy
2.full fistula of urachus
3.epispadias
4.posterior urethral valve
5.Bladder diverticulum

30) When does the reverse development of the vitelline duct occur in the embryonic period
1.in the first week
2.by the end of the first month
3.on the 2nd month
4.on the 5th month
5.by the time of birth

31) When the reverse development of the urinary duct occurs in the embryonic period
1.by the end of 1 month
2. at 2 months
3.at 3 months
4. at 4 months
5.at 5 months

32) Complete fistulas of the navel occur when:
1. the yolk and urinary ducts are obliterated throughout

2. obliteration of the ducts occurs only in the distal section
3. obliteration of the ducts occurs only in the proximal section
4. there is no obliteration of the ducts throughout
5. obliteration of the ducts occurs at both ends, and is absent in the middle

33) Incomplete fistulas of the navel occur as a result
1.Obliteration of the ducts throughout
2. obliteration of the ducts only in the distal section
3. obliteration of the ducts only in the proximal section
4.Obliteration of the ducts throughout
5. absence of duct obliteration in the middle section

34) The most valuable diagnostic method that allows you to accurately establish the diagnosis of a complete fistula of the navel is
1.visual inspection
2. fistulography
3.analysis of blood, urine and feces
4. Plain X-ray of the abdominal organs
5.ultrasound examination

35) The main method of treatment of complete fistulas of the navel is
1.drug
2. introduction of iodine into the fistulous tract
3.operation
4. cauterization of the fistulous tract with laser beams, followed by the introduction of antibiotics
5. cryodestruction of the fistula

36) Surgical treatment of complete fistulas of the navel should be performed
1.immediately after birth
2.after diagnosis immediately
3.if there are complications
4.Permanently after 5 years of age
5. at the discretion of the parents

37) Treatment is optimal for incomplete umbilical fistulas
1.drug
2.operative after diagnosis
3.laser therapy
4.introduction of cauterizing substances into the fistula
5. first conservative, in the absence of effect, surgical excision of the fistula

Answers to tests for self-control

1-5, 2-3, 3-4, 4-2, 5-5, 6-3, 7-3, 8-3, 9-3, 10-5, 11-4, 12-2, 13-2, 14-3, 15-4, 16-4, 17-2, 18-4, 19-5, 20-5, 21-4, 22-1, 23-3, 24-3, 25-2, 26-3, 27-1, 28-2, 29-2, 30-1, 31-5, 32-4, 33-2, 34-2, 35-3, 36-2, 37-5.

CHAPTER 5. CONGENITAL MALFORMATIONS AND ANOMALIES IN THE DEVELOPMENT OF THE KIDNEYS AND URINARY TRACT (AGENESIS, APLASIA, HYPOPLASIA, DEVELOPMENTAL ANOMALY, POSITION, QUANTITY, STRUCTURE AND RELATIONSHIPS, HYDRONEPHROSIS, URETEROHYDRONEPHROSIS) CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

• Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;

• Developing students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;

• Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;

• Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;

• Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Place of the lesson: Department of pediatric urology, operating room, computer room, training room

Monitoring and evaluation: oral control, control questions,
performance of educational tasks in groups.

Written control: control questions.

KIDNEY AGENESIA

The absence of an organ bookmark occurs with a frequency of 1 per 1000 newborns. Bilateral renal agenesis is observed 4 times less often than unilateral and predominantly in male fetuses (in a ratio of 3:1). Children with agenesis of both kidneys (arenia) are not viable and are usually stillborn. However, casuistic observations of rather long survival are described. This can be explained by a remarkable feature of the child's body, when other organs perform the function of an affected or completely failed organ. In this case, the function of excretion is carried out by the liver, intestines, skin and lungs.

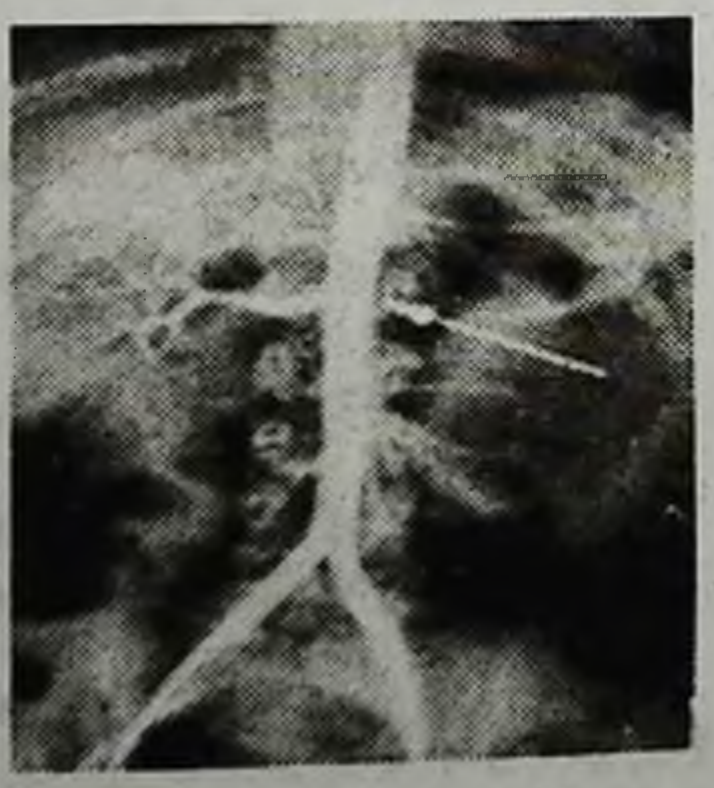


Figure 52. Renal angiography. Agenesis of the left kidney

Kidney agenesis is usually combined with the absence of the bladder, genital dysplasia, often with pulmonary hypoplasia, meningocele and other congenital malformations.

Clinic and diagnostics. Unilateral renal agenesis is associated with the absence of nephroblastema formation on one side. In this case, as a rule, there is no corresponding ureter, there is an underdevelopment of half of the bladder and often the genital apparatus. The only kidney is usually hypertrophied and fully provides the excretory function. In such cases, the anomaly is asymptomatic.

Suspicion of a solitary kidney arises from palpation of an enlarged painless kidney, however, the diagnosis can be made on the basis of an in-depth X-ray urological examination (excretory urography, cystoscopy, renal angiography) (Fig. 52).

With urography, the appearance of contrast on the side of agenesia is absent. Cystoscopy reveals the absence of a corresponding ureteral orifice and hemiatrophy of the bladder triangle. Angiography indicates the absence of a renal artery.

ADDITIONAL KIDNEY

The accessory kidney is an extremely rare anomaly. A little over 100 observations have been described to date. The formation of an additional kidney is associated with the budding of a site of a metanephrogenic blastema, and it is more often formed near the main one, located above or below it. The accessory (third) kidney is much smaller than the normal one, but has a normal anatomical structure. It is supplied with blood separately due to the arteries extending from the aorta. The ureter usually flows into the bladder by an independent mouth, but may be ectopic or communicate with the ureter of the main kidney. Cases of the blind termination of an ureter are described.

The accessory kidney should be distinguished from the upper segment of the double kidney. The difference lies in the fact that when doubling, the collecting system of the lower segment of the kidney is represented by two large cups, and the upper one by one. The segments of the doubled kidney are in intimate proximity and form an inextricable contour of the parenchyma. In the case of an additional kidney, its parenchyma is distant from the main kidney, and the collector system contains three cups, like the main one, only in miniature.

Clinic and diagnostics. An additional kidney will acquire clinical significance only with ectopia of the ureteral orifice or its damage due to an inflammatory, tumor or other pathological process.

The diagnosis can be made on the basis of excretory urography, retrograde pyelography, aortography.

Treatment for disease of the accessory kidney usually consists of nephrectomy due to its low functional value.

Kidney dystopia. This name is understood as an unusual location of the kidneys due to a violation in the embryogenesis of the process of their ascent. The frequency of anomalies is on average 1:800. kidney dystopia is more often observed in males.

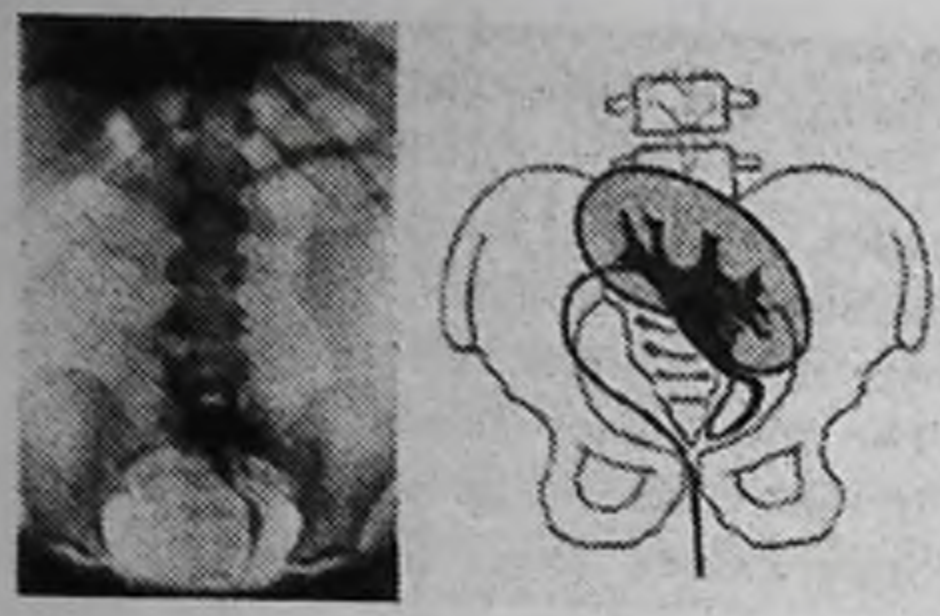


Figure 53. Excretory urography. Pelvic dystopia of the left kidney

Since the processes of ascent and rotation are interrelated, the dystopic kidney is turned outward, and the lower the dystopia, the more ventral the renal pelvis is located. A dystopic kidney often has a loose type of blood supply, its vessels are short and limit the displacement of the kidney.

The functional state of a dystopic kidney is usually reduced. The kidney, as a rule, has a lobular structure. Its shape can be very diverse - oval, pear-shaped, flattened and irregular.

There are high dystopia, low and cross.

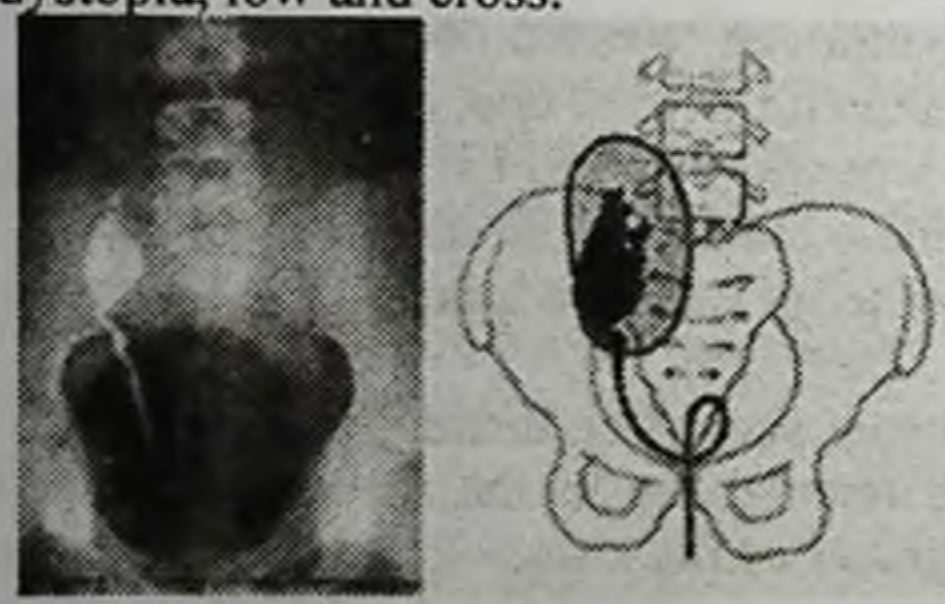


Figure 54. Retrograde pyelography. Pelvic dystopia of the right kidney

The intrathoracic kidney belongs to high dystopia. This is a very rare anomaly. To date, in the world literature, the number of its descriptions does not exceed 90. With intrathoracic dystopia, the kidney is usually part of a diaphragmatic hernia. The ureter is elongated, flows into the bladder.

Varieties of low dystopia are lumbar, iliac and pelvic.

With lumbar dystopia, the pelvis slightly turned anteriorly is at the level of the IV lumbar vertebra. The renal artery usually originates above the aortic bifurcation. The kidney moves to a limited extent.

Iliac dystopia is characterized by a more pronounced rotation of the pelvis anteriorly and its location at the level of Lv - SI. Compared with the lumbar-dystopic kidney, its medial displacement is noted. The renal arteries are usually multiple, originating from the common iliac artery or aorta at the bifurcation. There is practically no mobility of the kidney with a change in body position.

The pelvic kidney is located in the midline under the aortic bifurcation, behind and slightly above the bladder. May have the most bizarre shape. As a rule, it is hypoplastic to one degree or another. The vessels of the kidney are usually loose type, they are branches of the common iliac or various pelvic arteries.

A combination of pelvic dystopia with lumbar or iliac dystopia of the contralateral kidney is possible.

Cross dystopia is characterized by the displacement of the kidney contralaterally. In this case, as a rule, both kidneys grow together, forming an S- or I-shaped kidney. The vessels that feed the kidneys usually depart lower from the ipsi - or contralateral side. The frequency of cross-dystopia of the kidney is 1:10,000 - 1:12,000.

Bilateral cross-dystopia is described, which is extremely rare.

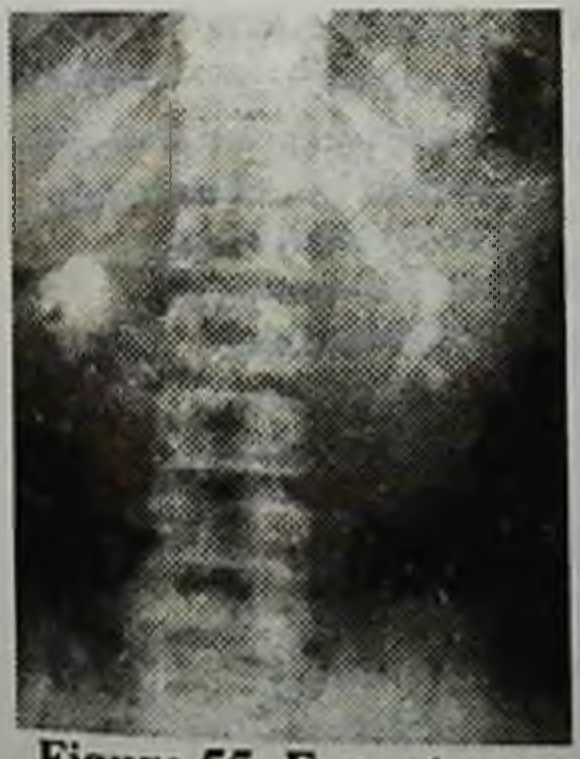
Clinic and diagnostics. With kidney dystopia, the clinical picture is due to the abnormal location of the organ. The leading symptom is pain that occurs with a change in body position, physical stress, flatulence.

With cross dystopia, pain is usually localized in the iliac region and radiates to the inguinal region of the opposite side. Since a dystopic kidney is affected by a pathological process (hydronephrotic transformation, calculosis, pyelonephritis) much more often than a normally located one, the symptoms of these diseases are often added. Intrathoracic dystopia with clinical manifestations and survey radiography data can simulate a mediastinal tumor.

With lumbar and iliac dystopia, the kidney is palpated in the form of a slightly painful, inactive formation.

Dystopia is usually detected with excretory urography, and in the case of a sharp decrease in kidney function - with retrograde pyelography (Fig. 53.54).

The characteristic signs of dystopia are noted: rotation and unusual localization of the kidney with limited mobility.



Often there are difficulties in the differential diagnosis of lumbar and iliac dystopia and nephroptosis, especially in cases of the so-called fixed nephroptosis, which. Like a dystopic kidney, it is characterized by low localization and low displacement of the kidney. However, on urograms with fixed nephroptosis, one can note the medial location of the pelvis and a tortuous long ureter (Fig. 55). Sometimes only renal angiography helps to distinguish between this condition, revealing a short vascular pedicle with dystopia and an elongated one with nephroptosis.

Figure 55. Excretory urography. Cross dystopia of the kidneys

Treatment. The attitude towards kidney dystopia is as conservative as possible. The operation is usually performed with dystopia complicated by hydronephrosis or calculosis. In cases of death of a dystopic kidney, a nephrectomy is performed.

Operational relocation of the kidney is extremely difficult due to the loose type of blood supply and the small caliber of the vessels.

HORSESHOE KIDNEY

Kidney fusion accounts for about 13% of all renal anomalies. There are symmetrical and asymmetric forms of fusion. The first include horseshoe- and biscuit-shaped, the second - S-, L- and I-shaped kidneys.

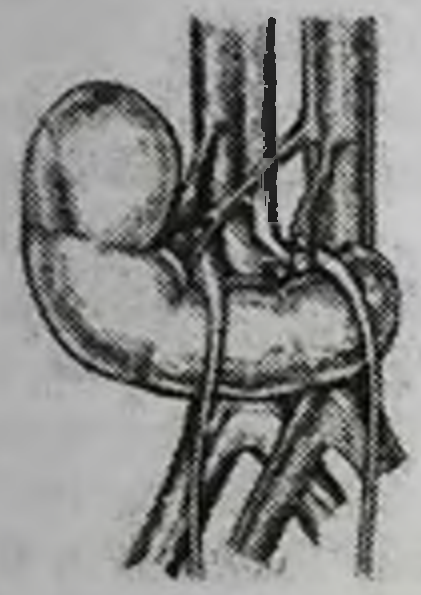


Figure 56. Horseshoe kidney

With a horseshoe-shaped anomaly of development, the kidneys grow together with the same ends, the renal parenchyma looks like a horseshoe. The occurrence of an anomaly is associated with a violation of the process of ascent and rotation of the kidneys. The horseshoe kidney is located lower than usual, the pelvis of the fused kidneys is directed anteriorly or laterally. Blood supply, as a rule, is carried out by multiple arteries extending from the abdominal aorta or its branches (Fig. 56).

More often (in 98% of cases) the kidneys grow together with the lower ends. At the junction of the kidneys there is an isthmus, represented by connective tissue or a complete renal parenchyma, often having a separate blood circulation. The isthmus is in front of the abdominal aorta and inferior vena cava, but may be located between them or behind them.

The anomaly occurs in newborns with a frequency of 1:400 - 1:500, and in boys it is 2.5 times more common than in girls.

The horseshoe kidney is often combined with other anomalies and malformations. Dystopic location, poor mobility, abnormal ureteral discharge and other factors contribute to the fact that the horseshoe-shaped kidney is easily exposed to traumatic impacts.

Clinic and diagnostics. The main clinical sign of a horseshoe kidney is Rovsing's symptom, which consists in the occurrence of pain when the trunk is extended. The appearance of a pain attack is associated with compression of the vessels and aortic plexus by the isthmus of the kidney. Often the pain is of an indefinite nature and is accompanied by dyspeptic symptoms.

A horseshoe-shaped kidney can be identified with deep palpation of the abdomen in the form of a dense sedentary formation. Radiologically, with good bowel preparation, the kidney looks like a horseshoe, convex facing down or up. The

contours of the kidney are most clearly detected during angiography in the phase of the nephrogram.

Treatment. Surgery for a horseshoe kidney is usually performed only with the development of complications. In order to identify the nature of the blood supply before the operation, it is advisable to perform renal angiography.

Galetoform kidney. Plano-oval formation located at the level of the promontorium or below. It is formed as a result of the fusion of two kidneys at both ends even before the start of their rotation. The blood supply of the gallet-shaped kidney is carried out by multiple vessels extending from the aortic bifurcation and randomly penetrating the renal parenchyma. The pelvis is located anteriorly, the ureters are shortened. The anomaly occurs with a frequency of 1:26,000.

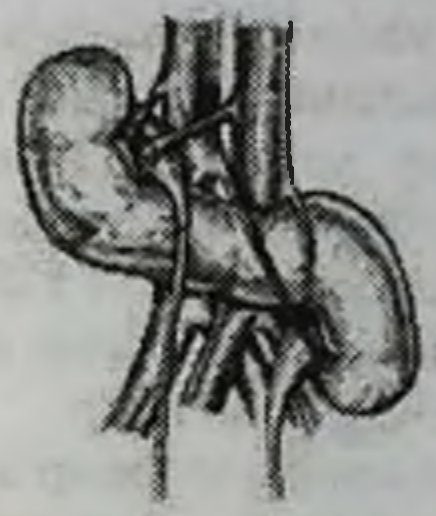


Figure 57. Galetoform kidney

Diagnosis is based on the data of palpation of the abdominal wall and rectal finger examination, as well as on the results of excretory urography and renal angiography (Fig. 57).

ASYMMETRIC FUSIONS.

Such forms account for 4% of all renal anomalies. They are characterized by the connection of the kidneys with opposite ends. In the case of an S-, L-shaped kidney, the longitudinal axes of the fused kidneys are parallel, and the axes of the kidneys forming the L-shaped kidney are perpendicular to each other. The pelvis of the S-shaped kidney is turned in opposite directions.

An L-shaped kidney occurs as a result of dystopia of one kidney, more often the right one, in the opposite direction. In this case, the kidneys grow together, forming a single column of the renal parenchyma with the pelvis located medially.

Adherent ectopic kidneys can compress neighboring organs and large vessels, causing intermittent ischemia and pain.

Diagnostics. Anomalies are detected by excretory urography and kidney scanning. If surgery is necessary, renal angiography is indicated. Surgical interventions on fused kidneys are technically difficult due to the complexity of the blood supply.

Aplasia of the kidney

Kidney aplasia should be understood as a severe degree of underdevelopment of its parenchyma, often combined with the absence of the ureter. The defect is

formed in the early embryonic period, before the formation of nephrons. There are two forms of kidney aplasia - large and small. In the first form, the kidney is represented by a lump of fibrolipomatous tissue and small cysts. Nephrons are not defined, there is no isolateral ureter. The second form of aplasia is characterized by the presence of a fibrocystic mass with few functioning nephrons. The ureter is thinned, has an orifice, but often does not reach the renal parenchyma, ending blindly. The aplastic kidney does not have a pelvis and a well-formed renal pedicle. The frequency of the anomaly ranges from 1:700 to 1:500. it is more common in boys than in girls.

Clinic and diagnostics. Usually, an aplastic kidney does not manifest itself clinically and is diagnosed in diseases of the contralateral kidney. Some patients complain of pain in the side or abdomen, which is associated with compression of nerve endings by growing fibrous tissue or enlarged cysts.

The detection of kidney aplasia is based on the data of X-ray and instrumental research methods. On a survey radiograph, in rare cases, cysts with calcified walls are found in place of the aplastic kidney. Against the background of retroperitoneally injected air, an aplastic kidney with good bowel preparation is visible on tomograms in the form of a small lump.

During aortography, the arteries leading to the aplastic kidney are not detected.

Aplasia should be differentiated from a non-functioning kidney, agenesis and hypoplasia of the kidney. To distinguish a kidney that has lost function as a result of pyelonephritis, calculosis, tuberculosis, or another process, retrograde pyelography and aortography allow (Fig. 58).

Agenesia is characterized by the absence of renal parenchyma anlage. In this case, as a rule, the ipsilateral (on the same side) genitourinary apparatus does not develop: the ureter is absent or represented by a fibrous cord or ends blindly, there is hemiatrophy of the vesical triangle, the testicle is absent, or not lowered. Differential diagnosis is helped by cystoscopy, which reveals, with aplasia of the kidney, in half of the cases the mouth of the corresponding ureter.

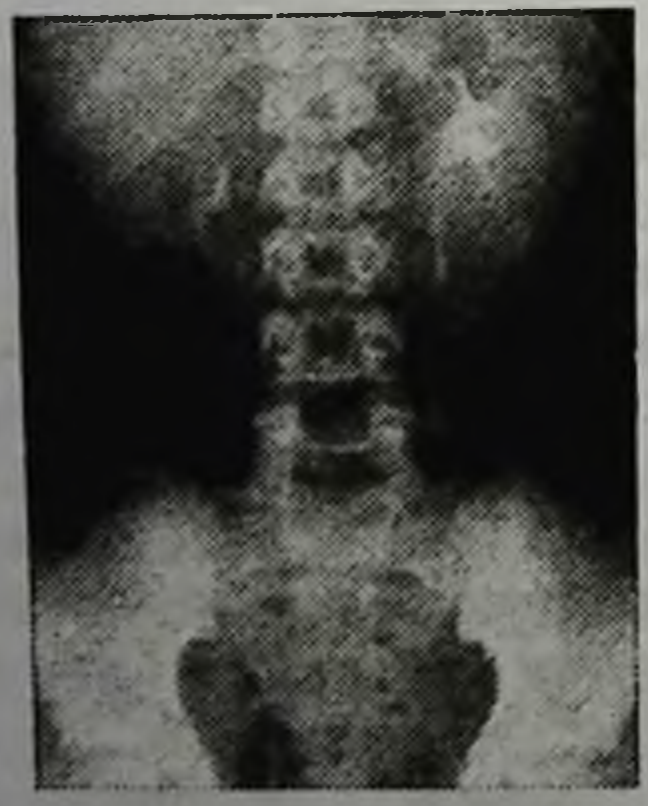


Figure 58. Excretory urography. Aplasia of the right kidney

A hypoplastic kidney is distinguished from aplasia by the presence of a functioning parenchyma, a ureter that is passable throughout, and visualization of the vascular pedicle during aortography.

Treatment. The need for therapeutic measures for kidney aplasia occurs in three cases: 1) with pronounced pain in the kidney area; 2) with the development of nephrogenic hypertension; 3) with reflux into a hypoplastic ureter. Treatment consists of performing a ureteronephrectomy (removal of the kidney and ureter).

HYPOPLASIA OF THE KIDNEYS

This is a congenital reduction of the kidney, mainly associated with impaired development of the metanephrogenic blastema as a result of insufficient blood supply. The anomaly occurs with approximately the same frequency as kidney aplasia.

A hypoplastic kidney macroscopically represents a normally formed organ in miniature. On the cut, the cortical and medulla layers are well defined. However, a histological examination reveals changes that make it possible to isolate preforms of hypoplasia:

- Simple hypoplasia;
- Hypoplasia with oligonephronia;
- Hypoplasia with dysplasia.

A simple form of hypoplasia is characterized only by a decrease in the number of calyces and nephrons. In the second form, a decrease in the number of glomeruli is combined with an increase in their diameter, fibrosis of the interstitial tissue, and dilation of the tubules. Hypoplasia with dysplasia is manifested by the development of connective tissue or muscle couplings around the primary tubules. There are glomerular or tubular cysts, as well as inclusions of lymphoid, cartilage and bone tissue. This form of hypoplasia, unlike the first two, is often accompanied by anomalies of the urinary tract.

Clinic and diagnostics. Unilateral hypoplasia may not manifest itself in any way throughout life, however, it has been noted that a hypoplastic kidney is often affected by pyelonephritis and often serves as a source of nephrogenic hypertension.

Bilateral renal hypoplasia manifests itself early - in the first years and even weeks of a child's life. Children lag behind in growth and development. Pallor, vomiting, diarrhea, fever, signs of rickets are often observed. There is a pronounced decrease in the concentration function of the kidneys. However, the data of biochemical blood tests remain normal for a long time. Blood pressure is also usually normal and rises only with the development of uremia. The disease is often complicated by severe pyelonephritis. Most children with severe bilateral renal hypoplasia die from uremia in the first years of life.

Treatment. In cases of unilateral hypoplasia complicated by pyelonephritis and hypertension, treatment is usually reduced to nephrectomy.

With bilateral renal hypoplasia, complicated by severe renal failure, only bilateral nephrectomy followed by kidney transplantation can save the patient.

HYDRONEPHROSIS

Hydronephrosis is a progressive expansion of the pelvis and calyces, resulting from a violation of the outflow of urine in the region of the ureteropelvic segment.

Causes of hydronephrosis can be anatomical, including ureteropelvic stenosis, fetal bands and adhesions, fixed kink of the ureter, high ureteral outlet, inferior pole vessel occluding the ureteropelvic segment, ureteral valve, and functional due to muscle dysplasia and nerve elements of the wall of the segment and impaired patency of the peristaltic wave in it.

Figure 59. Causes of congenital hydronephrosis

The most common cause of hydronephrosis in childhood is ureteropelvic stenosis. Its occurrence is associated with a violation of the process of recanalization of the ureter in embryogenesis. The consequence of antenatal inflammation are embryonic strands and adhesions, squeezing it from the outside or causing a fixed inflection. In some patients, the difficulty in emptying the pelvis is associated with additional (aberrant) lower polar vessels, the constant pulsation of which can lead to sclerotic changes in the wall of the ureter and impaired patency. High discharge of the ureter is a consequence of a congenital anomaly and leads to a preferential expansion of the lower part of the pelvis. One of the causes of hydronephrosis is the valves of the ureter, localized in the region of the ureteropelvic segment and either representing a fold of the mucous membrane, or they include all layers of the ureter (Fig. 59).

An interesting fact is that even with a pronounced block, the kidney remains functional for a long time. Save the kidney pyelorenal reflux. An increase in pressure in the pelvis leads to the flow of urine from the pelvis into the tubules. With severe obstruction of the ureter, rupture of the fornic zones is possible, while urine penetrates into the interstitial space, from where it is carried away through the venous and lymphatic vessels. But at the same time, pyelorenal refluxes lead to a deterioration in the blood supply to the parenchyma and lead to its replacement with scar tissue.

Urinary stasis and ischemia of the organ contribute to the addition of such a formidable complication of hydronephrosis as pyelonephritis, which occurs in 87% of patients.

Clinic and diagnostics. The main clinical manifestations of hydronephrosis are pain, changes in urine tests, and a symptom of a palpable tumor in the abdomen. Pain syndrome is noted in 80% of patients. The pains are varied in nature - from aching dull to bouts of renal colic. The frequency and intensity of pain are associated with the addition of pyelonephritis and / or stretching of the renal capsule against the background of a sharp violation of the outflow of urine. Pain is usually localized in the navel, only older children complain of pain in the lumbar region. Changes in urine tests are characterized by leukocyturia and bacteriuria or hematuria.

Quite often, difficulties arise in the differential diagnosis of hydronephrosis and hydrocalicosis, which is characterized by persistent expansion of the calyces with normal sizes of the pelvis and good patency of the ureteropelvic segment. The disease is the result of medullary dysplasia, accompanied by underdevelopment and thinning of the renal medulla. Diagnosis is assisted by excretory urography with delayed imaging and angiography (Fig. 60). With megacalicosis, the renal arteries retain a segmental structure, the diameter of the based trunks is normal, there is depletion and thinning of the vascular pattern in the areas where the cups are located.

Figure 60. Excretory urogram hydrocalicosis of the left kidney

Treatment of hydronephrosis is only surgical. Indications for surgery are established after confirmation of the diagnosis. The volume of surgical intervention is determined by the degree of preservation of renal function. If the kidney function is slightly reduced, a reconstructive plastic surgery is performed - resection of the altered ureteropelvic segment, followed by pyeloureterostomy (Hynes-Andersen-Kuchera operation). In the case of a significant decrease in renal function, it is possible to resort to a preliminary diversion of urine using a nephrostomy. With a subsequent improvement in renal function, detected using a radionuclide study, it is

possible to perform a reconstructive operation. If changes in kidney function are irreversible, the question of nephrectomy arises.

The postoperative prognosis of the disease largely depends on the degree of preservation of the kidney function and the activity of the pyelonephritic process. Dispensary observation of children who underwent surgery for hydronephrosis is carried out jointly by a urologist and a nephrologist. Control X-ray examination is performed at intervals of 6-12 months. Good patency of the ureteropelvic segment and the absence of exacerbations of pyelonephritis for 5 years make it possible to remove the child from the register.

MEGAURETHER

Megaureter (megadolichoureter, hydroureter, ureterohydronephrosis) - a significant expansion of the ureter caused by mechanical obstruction, vesicoureteral reflux or hypotension of its walls. Depending on the cause of development, obstructive megaureter, reflux ureter and ureteral achalasia are distinguished.

Obstructive megaureter develops against the background of stenosis in the region of the mouth of the ureter or ureterocele. Violation of the emptying of the ureter leads to its significant expansion and tortuosity (megadolichoureter), dilatation of the renal collector system, the rapid onset of urethritis and pyelonephritis. With a bilateral process, chronic renal failure develops quite early.

Refluxing megaureter is not so severe, but reflux, being a dynamic obstruction, over time causes the development of reflux nephropathy, slowing down of kidney growth, and sclerotic changes in the renal parenchyma. Joining pyelonephritis accelerates the process of scarring of the kidney.

Achalasia of the ureter is characterized by local dilatation of the ureter, limited to the distal or less commonly middle cystoid, without dilatation of the pelvis and calyces. Its cause is the immaturity of the neuromuscular structures of the ureter wall, which tend to mature (maturation), which can lead to self-healing.

Clinic and diagnostics. The manifestations of the megaureter are due to the course of chronic pyelonephritis. Parents note weakness, pallor, stunting of the child, unexplained rises in temperature. Urine is sometimes cloudy, in the analyzes - leukocyturia, bacteriuria, sometimes erythrocyturia. With exacerbations of concomitant cystitis, frequent and painful urination appears.

Cystoscopy often shows signs of chronic cystitis, narrowing or, conversely, gaping of the mouths of the ureters, their lateral displacement and deformation.

In the radionuclide study, a decrease in the accumulation and excretion of the radiopharmaceutical by the parenchyma and collecting system of the kidney is determined.

Treatment is a difficult task due to severe primary and secondary changes. With a very large expansion and tortuosity of the ureters, a nephrostomy is applied to unload them, and after 3-6 months, a resection of the terminal ureter is performed with reimplantation into the bladder using the antireflux technique. However, in 1/3 of patients, especially with bilateral megaureter, it is not possible to establish a

satisfactory passage of urine, and many of them become candidates for kidney transplantation.

The prognosis is slightly better in children with ureteral achalasia. If they develop pyelonephritis, then it usually proceeds benignly, and surgical intervention is not required. Over time, dilatation of the ureter decreases and spontaneous recovery may occur.

It is possible to equip a general practitioner with knowledge, to teach standard skills in the indicated professional field, to teach the skills of working with a patient, his relatives and friends, to teach rational tactics in solving medical and social problems only by non-traditional, active, problem-based learning, choosing methods that are adequate to the goals and objectives. To this end, it is proposed to conduct business games, solving situational problems.

I. Curation of patients on the topic - 15 minutes
II. Participation in the dressing room and in the operating room - 20 minutes;
III. Implementation of practical skills - 15 minutes:

PRACTICAL SKILLS

BLADDER PUNCTURE

Indications:

- acute urinary retention, if it is impossible to pass into the bladder with a catheter (anomaly in the development of the urethra in newborns, trauma to the urethra).

Preparation:

1. By percussion make sure that the bladder is full;
2. Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:

1. Dressing room or manipulation room;
2. Operating or dressing table;
3. Disposable syringe (5.0 ml) with a needle;
4. Alcohol;
5. Alcohol solution of iodine 2%;
6. Tweezers;
7. Sterile balls and wipes;
8. A strip of medical adhesive plaster;
9. Tray.

Execution technique (asepsis rules are observed):

1. Position of the patient on the back;
2. The suprapubic region is treated with iodine, then with alcohol;
3. Find the puncture point along the midline 0.5 - 1 cm above the symphysis;
4. Holding the needle strictly perpendicular to the surface to be punctured, a puncture is made until a characteristic sensation of failure is obtained;
5. A tray is placed under the stream of excreted urine;
6. When urine begins to be excreted in drops, slightly press on the suprapubic region (this achieves the most complete emptying of the bladder);

7. Hermetically close the blunt end of the needle and remove it;
8. The puncture site is smeared with iodine tincture and sealed with a strip of adhesive plaster.
a) needle insertion technique. b) puncture scheme.

Figure 61. Technique for bladder puncture

BLADDER CATHETERIZATION WITH SOFT CATHETER

Indications:
1. Acute urinary retention.
2. The need to check the patency of the urethra.
3. Taking urine for analysis.
4. Washing the bladder.
5. Introduction to the bladder of medicinal substances.

Preparation:
Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:
1. Dressing room or manipulation room.
2. Operating or dressing table.
3. Sterile soft urinary catheter of the appropriate diameter (for children, catheters No. 10-14 are most common).
4. Furacillin solution 1:5000.
5. Tray.
6. Sterile balls and wipes.
7. Vaseline oil.
8. Tweezers.

Technique for performing catheterization (asepsis rules are observed):
1. The position of the patient on the back with a slightly raised head, the legs are slightly bent at the hip and knee joints, abducted and turned outward.
2. Stand to the left of the patient, back to his back.
3. The opening of the urethra is washed with a solution of furacillin.
4. Check the patency of the catheter with furacillin solution.
5. Lubricate the end of the catheter with vaseline oil.
6. Place a tray between the thighs.
7. The head of the penis is held with the left hand.

8. Using tweezers, gently advance the catheter until urine appears.
9. Direct the stream of urine into the tray.
10. After emptying the bladder, carefully remove the catheter.

BLADDER CATHETERIZATION WITH A SOLID (METAL) CATHETER

Indications:

1. Acute urinary retention.
2. Inability to pass a soft catheter.
2. The need to check the patency of the urethra.
4. Taking urine for analysis.
5. Washing the bladder.
6. Introduction to the bladder of medicinal substances.

Preparation:

Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:

1. Dressing room or manipulation room.
2. Operating or dressing table.
3. Sterile solid (metal) urinary catheter of the appropriate diameter (for children, catheters No. 10-14 are most common).
4. Furacillin solution 1:5000.
5. Tray.
6. Sterile balls and wipes.
7. Vaseline oil.
8. Tweezers.

Technique for performing catheterization (asepsis rules are observed):

1. The position of the patient on the back with a slightly raised head, the legs are slightly bent at the hip and knee joints, abducted and turned outward.
2. Stand to the left of the patient, back to his back.
3. Check the patency of the catheter with furacillin solution.
4. The opening of the urethra is washed with a solution of furacillin.
5. Lubricate the end of the catheter with vaseline oil.
6. Take the catheter in your right hand.
7. Having placed the catheter parallel to the pupart ligament, its beak is inserted into the external opening of the urethra, the head of the penis is pushed onto the catheter until the beak is at the lower edge of the symphysis (the catheter is advanced without the slightest violence!).
8. Having determined the position of the beak with the left hand from the side of the perineum, direct it to the angle between the pubic bones.
9. With the right hand, the catheter is transferred downwards, they describe an arc of 1800 in the sagittal plane, while the beak slips through the membranous part of the urethra into the bladder.
10. Direct the stream of urine into the tray.
11. Remove the catheter, performing the techniques indicated in points 7-9 in reverse order.

Figure 62. Technique of bladder catheterization with a metal catheter

IV. Big break - 40 minutes (11.50-12.30).

V. Practical lesson (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

STUDY TASKS

Appendix 1

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: anuria, dysuria, ischuria, palpable tumor, pain.

Appendix 2

Tasks for groups

1. Specify 6 causes of congenital hydronephrosis? Make a cluster, SWOT table, Venn diagram for the word "anuria" and draw diagrams Why? and hierarchical diagram How?

2. Clinical signs of congenital hydronephrosis. Make a cluster, SWOT table, Venn diagram for the word "ischuria" and draw diagrams Why? and hierarchical diagram How?

3. Specify the clinical signs of kidney hypoplasia. Cluster, SWOT table, Venn diagram for the word "pain" and chart Why? and hierarchical diagram How?

4. What method of surgical intervention is used for congenital hydronephrosis?.Create a cluster, SWOT table, Venn diagram for the word "habitus" and draw diagrams Why? and hierarchical diagram How? Congenital short esophagus.

5. What are the main symptoms of congenital hydronephrosis? Compile a cluster, SWOT table, Venn diagram for the word "palpable tumor" and chart Why? and hierarchical diagram How?

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	**know "+", don't know "-"**	**learned "+", could not find out "-"**
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		

Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

Rules for compiling an INSERT table:

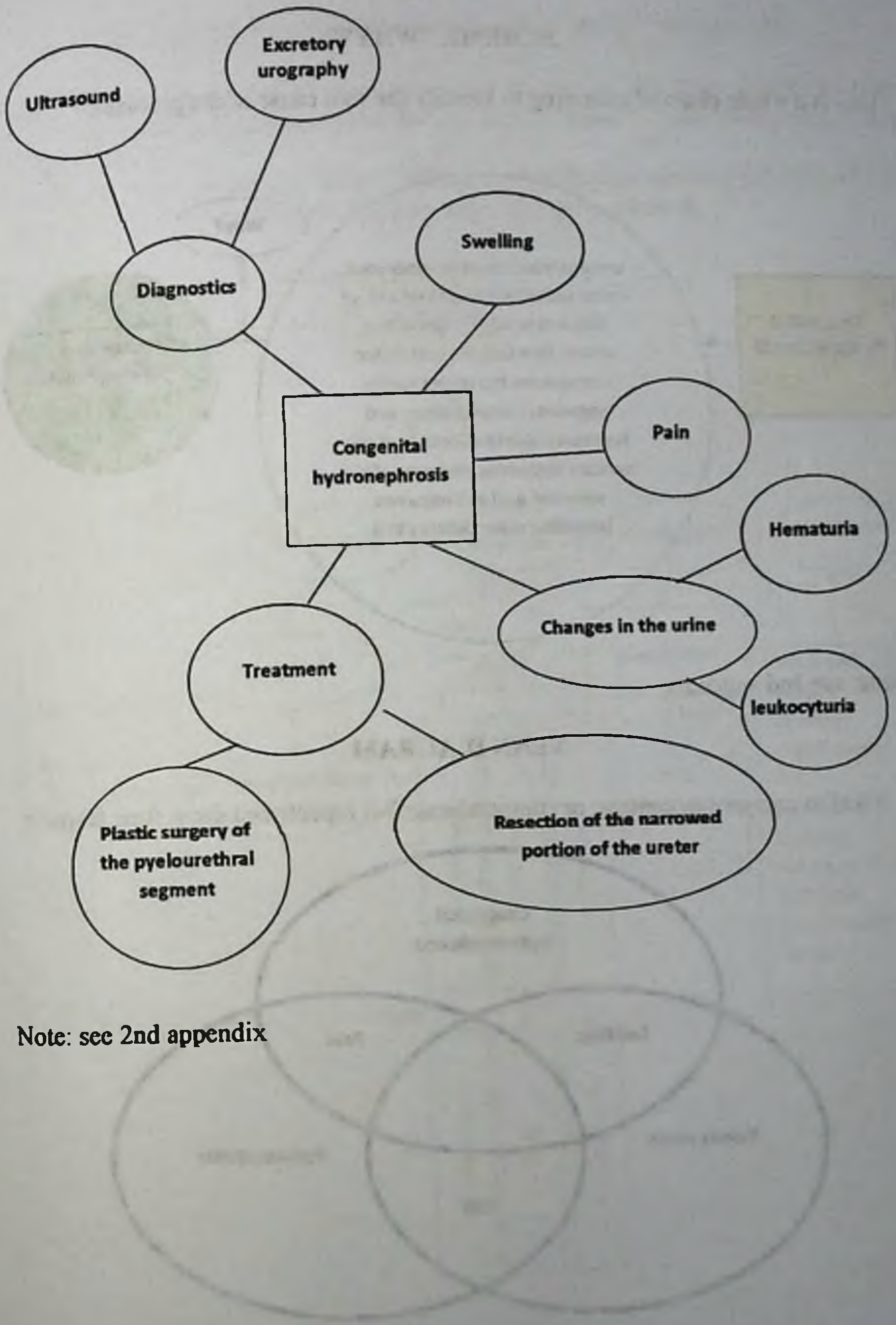
Table Insert

Concepts	V	+	-	?
Congenital malformations and anomalies in the development of the kidneys and urinary tract (agenesis, aplasia, hypoplasia, anomaly in development, position, quantity, structure and relationships, hydronephrosis, ureterohydronephrosis) clinic, diagnosis, treatment.				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where: V - corresponds to the existing knowledge (information) about ...
- contradicts existing knowledge about ...
+ - is new information
? -incomprehensible or requiring clarification, addition information

CLUSTER (Bunch, bundle)

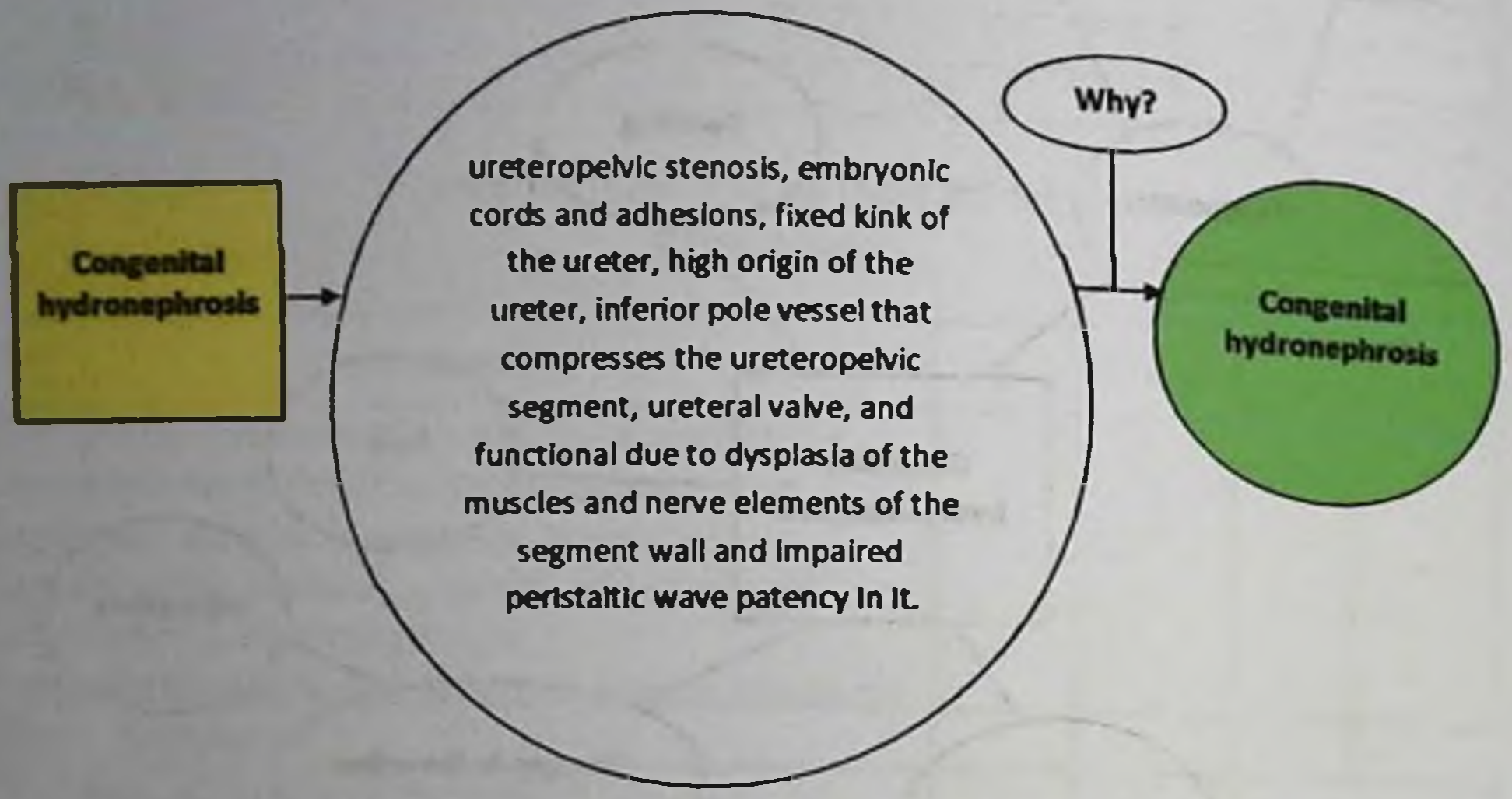
A way of mapping information - gathering ideas around a major factor to focus and make sense of the whole construct



Note: see 2nd appendix

SCHEME "WHY?"

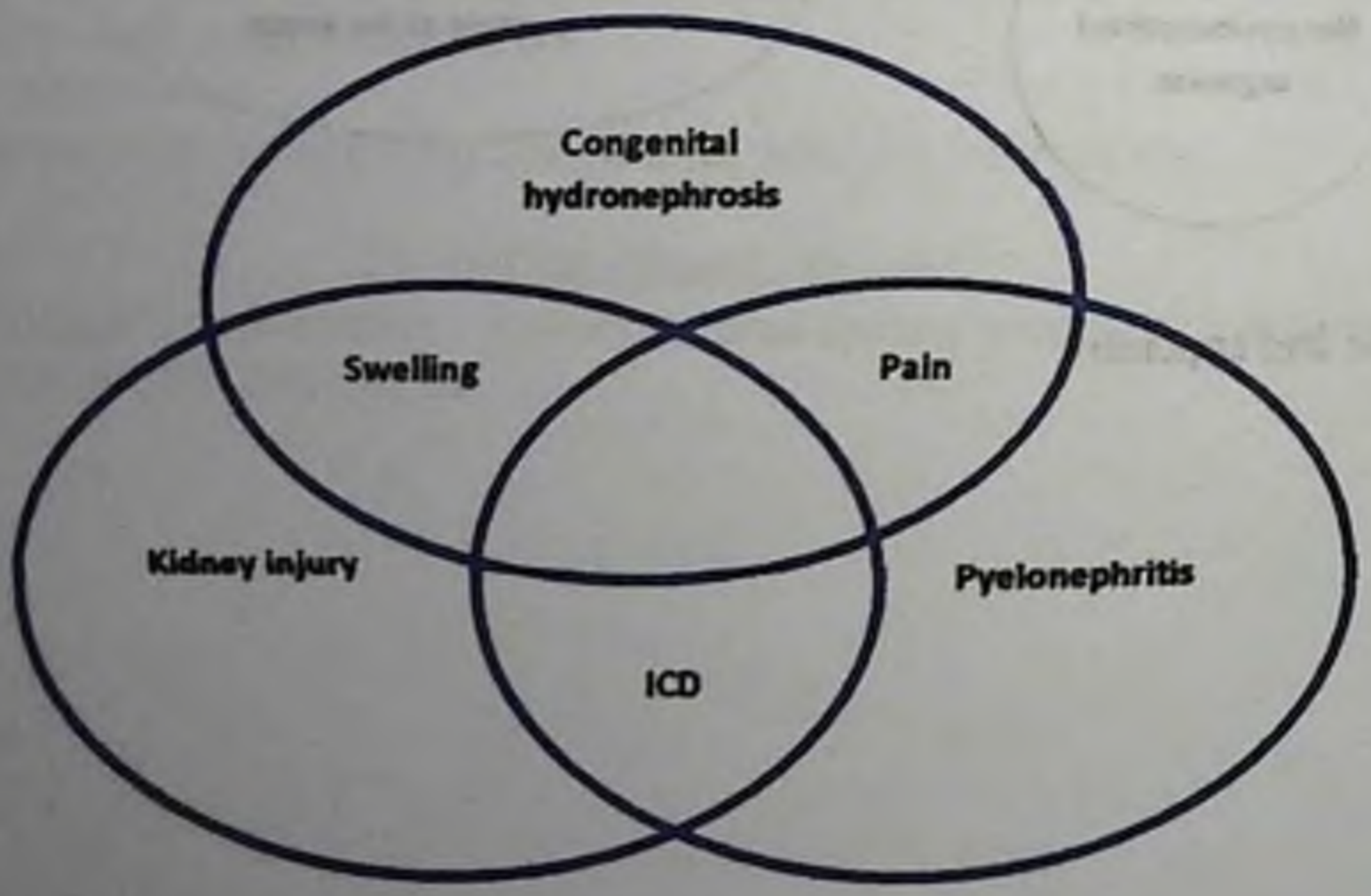
This is a whole chain of reasoning to identify the root cause of the problem.



Note: see 2nd appendix

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features

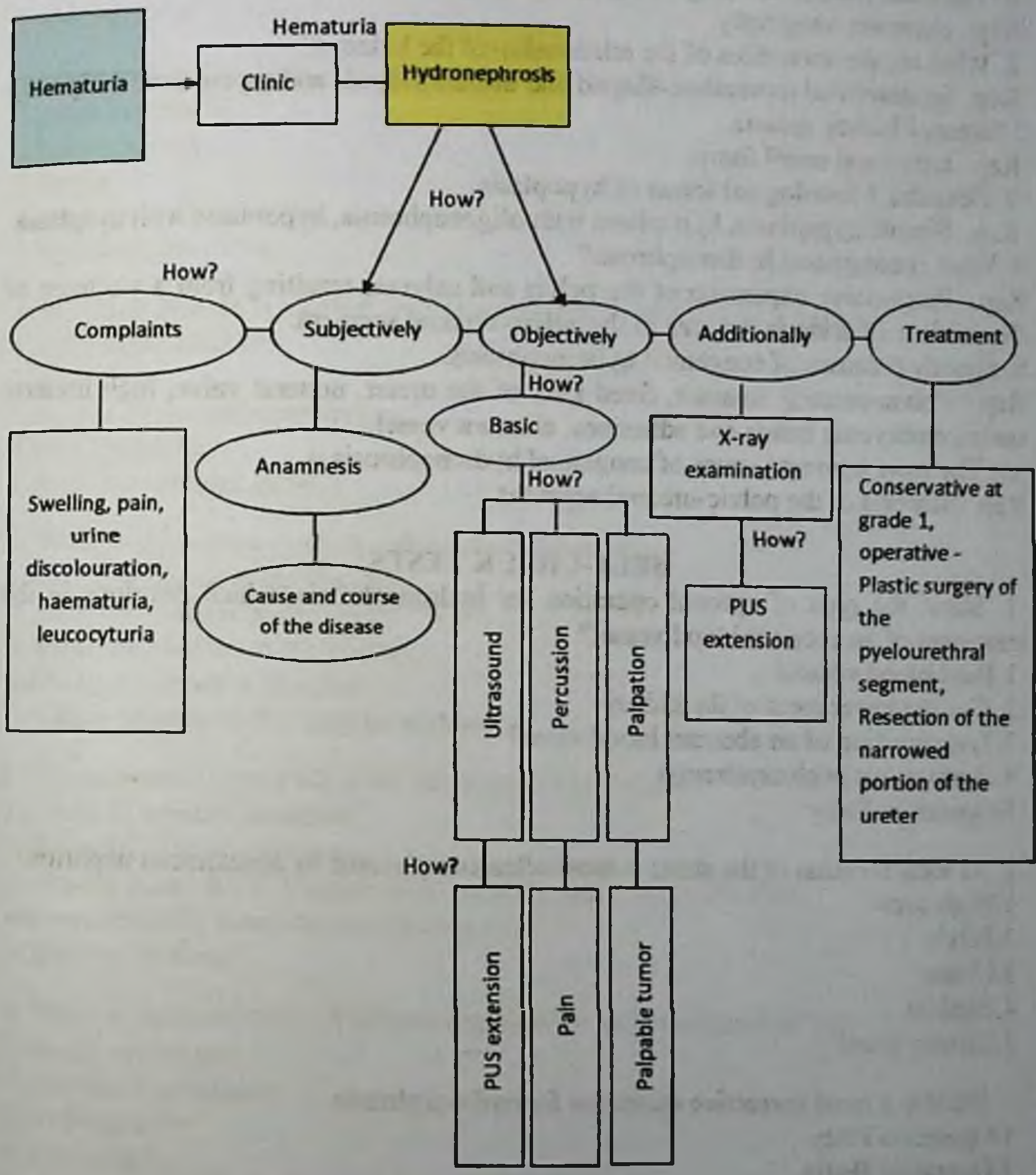


Note: see 2nd appendix

RULES FOR CONSTRUCTING THE "HOW" DIAGRAM

When solving a problem, in most cases you do not need to think about "What to do?". The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them;



Note: see 2nd appendix

Questions of interactive games:

1. What congenital malformations are usually associated with renal agenesis?
Rep. Lack of bladder, genital dysplasia, pulmonary hypoplasia, meningocele.
2. Specify 3 types of kidney dystopia.
Rep. High, low and cross.
3. Describe the varieties of low kidney dystopia.
Rep. Lumbar, iliac and pelvic.
4. The main method for diagnosing hydronephrosis:
Rep. excretory urography.
5. What are the anomalies of the relationship of the kidneys?
Rep. Symmetrical (horseshoe-shaped and biscuit-shaped) and asymmetric 6. Specify 2 forms of kidney aplasia.
Rep. Large and small forms.
7. Describe 3 histological forms of hypoplasia.
Rep. Simple hypoplasia, hypoplasia with oligonephronia, hypoplasia with dysplasia.
8. What is congenital hydronephrosis?
Rep. Progressive expansion of the pelvis and calyces, resulting from a violation of the outflow of urine in the area of the pelvic-ureteral segment.
9. Specify 6 causes of congenital hydronephrosis.
Rep. Pelvic-ureteral stenosis, fixed kink of the ureter, ureteral valve, high ureteral outlet, embryonic bands and adhesions, aberrant vessel.
10. The most common cause of congenital hydronephrosis is....
Rep. Stenosis of the pelvic-ureteral segment.

SELF-CHECK TESTS

1. Show the type of optimal operation for hydronephrosis, which develops in the treatment of an aberrant blood vessel?
1.Bind blood vessels
2. Cut the lower parts of the kidney
3.Transposition of an aberrant blood vessel
4. Antivenous pyeloureteremia
5.Operation Foley

2. At what location of the stone is most often complicated by apastomous nephritis?
1.High cups
2.Pelvis
3.Ureter
4.Bladder
5.Urinary canal

3. What is a good corrective operation for hydranephresis.
1.Operation Faley
2.Operation Benin
3.Operation Kuchera
4.cut extra blood vessels

5.ureterolysis.

4. What research method is considered the most informative for trauma to the urethra.
1. excretory urography
2. ascending urethrography
3.cystoscopy
4.uroflowmetry
5. cystography.

5. Under what condition is urgent cystoscopy required?
1.gross hematuria
2.kidney stones
3.anuria
4. acute urinary retention
5. hypertensive crisis

6. In which disease is a color test important for differential diagnosis?
1.neurogenic bladder
2.enuresis
3.ectopia of the adjacent urethra
4.total epispadias
5.posterior urethral valve.

7. With vesico-urinary reflux, where does the urine go.
1. from the ureter to the bladder
2. from the bladder to the ureter
3. from the bladder to the ureter
4.filling the ureter with urine
5. filling of urine in the bladder and ureter.

8. Vesicoureteral reflux what are the main clinical signs
1.Hours of urinary retention
2. frequent painful urination
3.without cause fever, discoloration of urine and pain in the side.
4.increased body temperature, anemia
5. urine with blood

9. What is the main method of investigation for vesicoureteral reflux.
1.survey urography
2. excretory urography
3.urethrography
4. cystography
5.cystoscopy
10. With vesicoureteral reflux, an indication for surgery is considered.
1.I-degree reflux

2. II-degree reflux
3. III-degree reflux
4.ureterohydronephrosis
5. pyonephrosis

11. As a result of the study, a stone was found in the left kidney and a complete absence of functions in the same kidney. Which method of treatment is considered correct:
1.conservative
2.nephrectomy
3.nephroureterectomy
4.nephrolithotomy
5.pyelolithotomy

12. A patient with grade III hydronephrosis is in a very serious condition, the kidneys are enlarged, the function is reduced, what is your treatment strategy.
1.nephrectomy
2.nephroureterectomy
3. Andersen-Kuchera operation
4. apply nephrostomy
5.conservative treatment

13. During an ultrasound examination of a urological patient, what can we not determine?
1. presence or absence of kidneys
2. kidney size
3. the presence of stones or tumors in the kidney
4. violation of the passage in the collection system of urine
5. kidney function

14. During excretory urography, the quality of R-graphy depends on:
1.child's age
2.kidney function
3.dose and type of contrast agent
4. the presence of a concomitant disease
5. position of the child

15. For antegrade pyelography, how is a contrast agent administered?
1.through the mouth
2. intravenously
3.through the ureter
4.intra-arterial
5. through nephrostomy tubes or by puncture method into the kidneys

16. When is infusion urography performed?
1. the presence of kidney stones, but without impaired function

2.decrease in kidney function
3. hydronephrosis I degree
4.chronic pyelonephritis with impaired renal function
5. the presence of a tumor with impaired renal function

17. What tactics is considered correct in acute urinary retention
1. increased diuresis
2. excretory urography
3.Puncture the bladder
4. introduction of solutions into the vessel
5.bladder catheterization

18. What signs are found on excretory urography in case of kidney rupture
1.decreased excretion of the contrast agent
2. accumulation of contrast agent in the renal pelvis
3.contrast agent enters the bladder within 7 minutes
4. passage of the contrast agent into the perirenal tissue
5.contrast retention in the lower part of the ureter

19. In boys, during cystography, an x-ray is taken in which projection?
1.front projection
2.rear projection
3.keep your foot high
4.side projection
5. the position of the child does not matter

20. In what type of exstrophy is it necessary to form the bladder from local tissues?
1.bladder diameter up to 4 cm, with papilomatous phenomenon
2. the bladder diameter is greater than 4 cm, and there is one polyp in the mucosa
3. the bladder diameter is more than 4 cm and there is papillomatosis in the mucous membrane
4. the bladder diameter is more than 4 cm and there is a valve in the right urethra on the distal part
5. the bladder diameter is more than 4 cm and the weight of the newborn is 1600 g

21. What age is considered optimal in the treatment of ectopic urethrocele
1. neonatal period
2. after diagnosing
3. one year after diagnosis
4. preschool age
5. up to 15 years

22. Phimosis is -
1. narrowing of the urethra
2. narrowing of the opening of the foreskin
3. narrowing of the external mouth

4. narrowing of the external urethra
5. narrowing of the opening of the foreskin, as a result of which it becomes impossible to expose the glans penis

23. Balanitis is -
1. Inflammation of the urethra
2. inflammation of the bladder
3. inflammation of the glans penis
4. inflammation of the foreskin and glans penis
5. inflammation of the foreskin

24. Balanoposthitis is
1.inflammation of the urethra
2.bladder inflammation
3.inflammation of the glans penis
4. inflammation of the foreskin and glans penis
5. inflammation of the foreskin

25. Types of phimosis
1. malnutrition, hypertrophy, cicatricial
2. hypertrophy, atrophy, cicatricial
3. atrophy, hypertrophy, cicatricial
4. scarred, scarless, hypertrophy
5. cicatricial, scarless, atrophy

26. What is the main treatment for balanoposthitis?
1. circumcision
2.physiotherapy methods
3.phytotherapy
4.local treatment
5.there is no correct answer

27. Paraphimosis is
1.constriction of the urethra
2. Narrowing of the opening of the foreskin
3. Narrowing of the external urethral orifice
4.narrowing of the internal mouth of the urethra
5. infringement of the glans penis by the foreskin

Answers to tests for self-control

1-1, 2-1, 3-3, 4-2, 5-4, 6-1, 7-2, 8-3, 9-4, 10-4, 11-4, 12-3, 13-4, 14-3, 15-5, 17-4, 18-5, 19-4, 20-1, 21-1, 22-2, 23-5, 24-5, 25-4, 26-4, 27-4, 28-5.

CHAPTER 6. CONGENITAL MALFORMATIONS AND ANOMALIES OF THE GENITAL ORGANS AND LOWER URINARY TRACT (VALVE AND STRICTURE OF THE URETHRA, VESICOURETERAL REFLUX, HYPOSPADIAS, EPISPADIAS, EXSTROPHY OF THE BLADDER, HEMATOCOLPOS), CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: the development of skills and abilities of clinical diagnostics, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

- Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;
- Development of students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;
- Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;
- Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;
- Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Location of the lesson: Department of Thoracic Surgery, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control, control questions, performance of educational tasks in groups.

Written control: control questions.

VESICOURETERAL REFLUX

Vesicoureteral reflux is the reflux of urine from the bladder into the ureters and the renal collecting system. This is one of the most common diseases in childhood, detected in 35-60% of patients with chronic pyelonephritis.

Vesicoureteral reflux causes a violation of the outflow from the upper urinary tract, which creates favorable conditions for the development of pyelonephritis (Fig. 63).

Why does reflux occur?

Normally, the mouth of the ureter is a valve, the closing force of which reaches 60-80 cm of water. Violation of the function of the vesicoureteral fistula can be congenital and acquired.

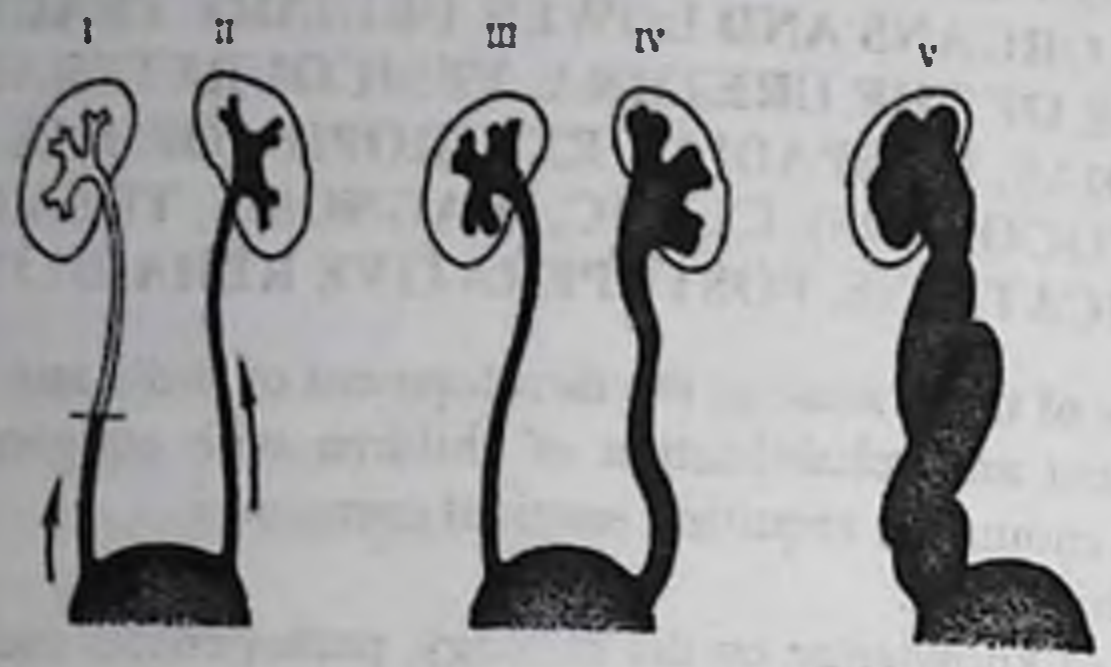


Figure 63. Variants of vesicoureteral reflux

Dysplasia of the closing apparatus, shortening of the intramural ureter, dystonia of the mouth are common causes of reflux. Among the causes of secondary changes in the mouths, one of the first places is chronic cystitis, which causes sclerotic changes in the ureterovesical segment, shortening of the intramural ureter and gaping of the mouth. In turn, chronic cystitis often occurs and is maintained by infravesical obstruction. A certain role in the genesis of vesicoureteral reflux is played by dysfunctions of the bladder, on the one hand, supporting cystitis, on the other hand, causing functional valve failure due to episodes of a sharp increase in intravesical pressure. The immaturity of the closing apparatus of the mouths is not excluded, the disappearance of which is possible with the growth of the child.

Vesicoureteral reflux, even in the case of a latent course of pyelonephritis, should be considered as a pathological condition, the result of which may be kidney shrinkage and the development of chronic renal failure or hypertension.

Clinic and diagnostics. Vesicoureteral reflux in children does not have a characteristic clinical picture. It is usually manifested by symptoms of pyelonephritis. Older children complain of pain in the lumbar region or after urination. When combined with cystitis or dysfunction of the bladder, complaints of dysuric disorders (pollakiuria, imperative urinary incontinence, urinary incontinence) or pain in the lower abdomen are possible.

Examination of the patient begins with clinical and laboratory methods. The presence of persistent leukocyturia, bacteriuria, accompanied by fever, intoxication, make one suspect pyelonephritis and require the exclusion of obstructive uropathy.

Ultrasound scanning, excretory urography do not provide reliable information in the diagnosis of vesicoureteral reflux and can only reveal the expansion of the collector system and the kidneys and ureter, sometimes suspect sclerotic changes in the renal parenchyma (compaction and thinning of it, smoothness of the fornic apparatus).

The main method for diagnosing vesicoureteral reflux is cystography. According to the height of the reflux of the contrast agent and dilatation of the collector system of the kidney and ureter, five degrees of reflux are distinguished. At grade I, reflux is noted only in the distal ureter, the diameter of the latter is not

changed. At the II degree, the contrast agent fills the radiologically unchanged pelvicalyceal system of the kidney. Grade III is characterized by a moderate expansion of the ureter, pelvis, smoothness of the fornic apparatus. At the IV degree, a pronounced dilatation of the renal collector system, an expansion of the ureter, which becomes tortuous, are revealed. At grade V, a sharp expansion of the collector system of the kidney and ureter is accompanied by the death of the renal parenchyma.

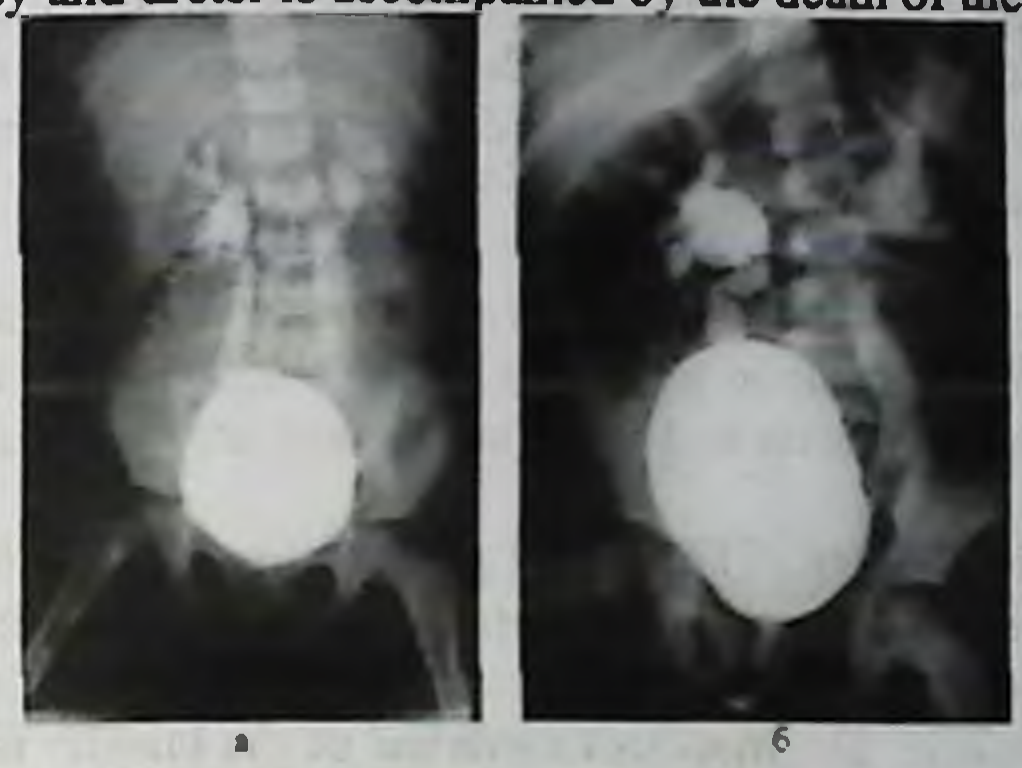


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Figure 64. Voiding cystography. Bilateral vesicoureteral reflux

According to the mechanism of occurrence, passive, active and mixed reflux are distinguished: reflux of urine into the upper urinary tract occurs both during passive filling of the bladder and at the time of urination (Fig. 64). The examination plan for patients with vesicoureteral reflux must include cystoscopy to exclude cystitis, uroflowmetry and cystometry to assess the urodynamics of the lower urinary tract, radioisotope study to quantify renal function.

Treatment of vesicoureteral reflux can be conservative or surgical. Conservative treatment is indicated for any degree of reflux and includes the following measures.

Treatment of pyelonephritis: antibacterial (taking into account the sensitivity of the pathogen), desensitizing, immunocorrective, herbal medicine.

Treatment of concomitant cystitis: local medication and physiotherapy.

Elimination of existing disorders of urodynamics at the level of the lower urinary tract.

The duration of conservative therapy is from 6 to 12 months. After the course of treatment, control cystography is performed. The effectiveness of conservative treatment for I-III degree of vesicoureteral reflux is 60-70%. In cases of persistence of reflux and recurrent course of pyelonephritis, the question of surgery is raised. The volume of surgical intervention is determined by the degree of reflux. With the first degrees of reflux (the diameter of the ureter is slightly changed), the Gregoire operation is performed - lengthening the intramural ureter without opening the bladder. In case of grade IV-V vesicoureteral reflux, resection of the distal ureter and neoimplantation into the bladder with antireflux protection are performed.

The prognosis is largely determined by the degree of preservation of renal function and the severity of the pyelonephritic process.

Clinical supervision of children suffering from vesicoureteral reflux or undergoing antireflux surgery is carried out by a urologist and a nephrologist.

BLADDER EXTROPHY

Exstrophy of the bladder is a severe malformation, manifested by the congenital absence of the anterior wall of the bladder and the corresponding section of the anterior abdominal wall. Bladder exstrophy is always accompanied by total epispadias and divergence of the bones of the pubic symphysis. This defect occurs in 1 out of 40,000 - 50,000 newborns, in boys 3 times more often than in girls.

The occurrence of exstrophy of the bladder refers to the first 4-7 weeks of intrauterine life.

Constant urinary incontinence, severe deformity of the external genitalia, the absence of an anterior abdominal wall with a split bladder bring severe physical and moral suffering to both patients and their parents and are the main complaints when contacting a doctor.

Clinic and diagnostics. The clinical picture of bladder exstrophy is specific: a bright red mucous membrane of the posterior wall of the bladder swells through a rounded defect in the anterior abdominal wall. The belly button is located above the upper edge of the defect. The mucous membrane of the bladder is easily vulnerable, often covered with papillomatous growths and bleeds easily. The diameter of the bladder plate is 3-7 cm (Fig. 65).

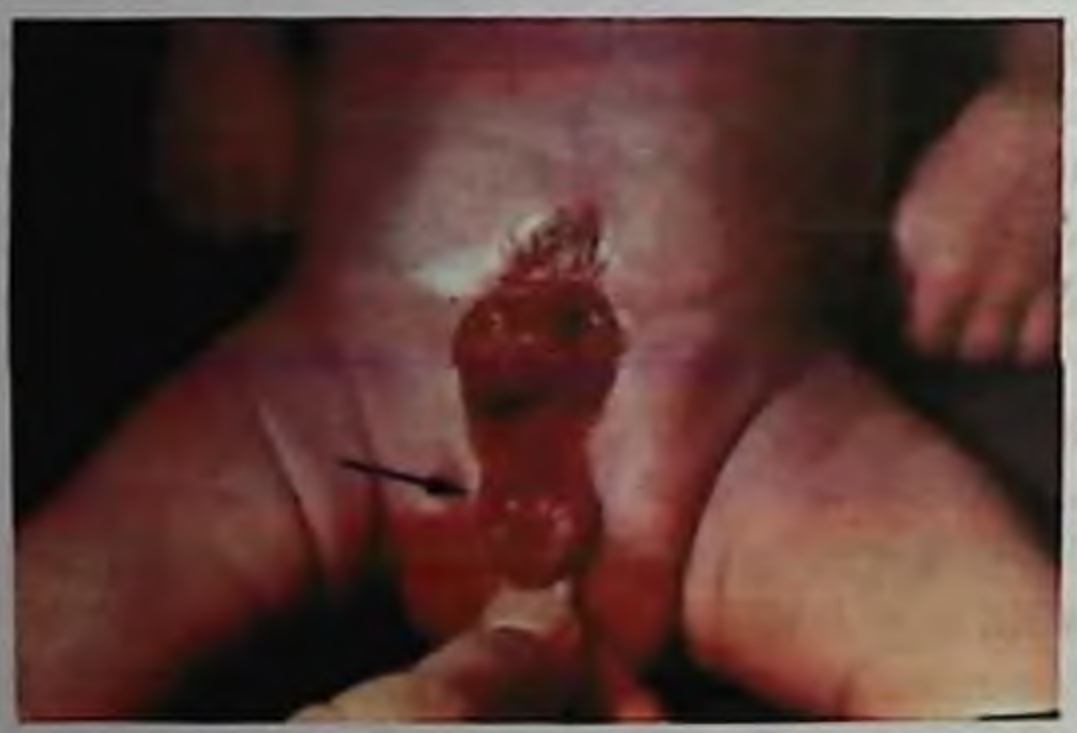


Figure 65. Appearance of a patient with bladder exstrophy

Over time, the mucous membrane scars. The mouths of the ureters open in the lower part of the bladder plate at the tops of cone-shaped elevations or are lost between the rough folds of the mucous membrane. Urine constantly flows out, causing maceration of the skin of the anterior abdominal wall, inner thighs and perineum. In boys, the penis is shortened, pulled up to the anterior abdominal wall, the split urethra is in contact with the mucous membrane of the bladder. The scrotum is underdeveloped, cryptorchidism is often observed. In girls, along with the splitting of the urethra, there are splitting of the clitoris, adhesions of the large and small labia. The anus is ectopic towards the front.

Often, bladder exstrophy is combined with inguinal hernia, rectal prolapse, and malformations of the upper urinary tract. Direct contact of the ureters with the external environment leads to the development of ascending pyelonephritis. Patients with exstrophy of the bladder are characterized by a "duck" gait due to the instability of the pelvic ring.

Treatment of exstrophy of the bladder is only surgical. In order to avoid the accession of ascending pyelonephritis, surgical intervention, if the child's condition allows, should be performed in the first 3 months. life. Subsequently, this facilitates the social adaptation of the child, as it relieves him of urinary incontinence.

There are three groups of surgical interventions for bladder exstrophy:

- Bladder plasty with local tissues;
- Diversion of urine into the intestines;
- Creation of an isolated bladder from a segment of the intestine.

Bladder plasty with local tissues should be performed during the neonatal period. With small sizes of the bladder plate (less than 4-5 cm in diameter), polypous degeneration of the mucous membrane of the bladder, as well as the serious condition of the child, this operation is not performed. It should be noted that even after the timely and thorough performance of reconstructive plastic surgery, 60-80% of patients still have partial or complete urinary incontinence, which makes it difficult for them to socially adapt.

The most widespread operations are aimed at diverting urine into the intestines. Urinary retention in these cases is due to the anal sphincter, so a preliminary assessment of the state of the sphincter using EMG is mandatory.

The third group of operations involves the creation of an isolated bladder from the intestine, where the ureters are transplanted with antireflux protection. The emptying of the artificial bladder is carried out 3-4 times a day by a catheter inserted by the patient himself.

INFRAVESICAL OBSTRUCTION

Infravesical obstruction is a collective term that includes a number of diseases that cause obstruction of the outflow of urine from the bladder. The most common of these are posterior urethral valves in boys, bladder neck sclerosis, meatal stenosis in girls, and detrusor sphincter dyssynergia.

Infravesical obstruction, causing a violation of the outflow of urine, leads to infection of the lower urinary tract and often underlies the development of cystitis, which in turn contributes to infection by the urinogenic route of the upper urinary tract and leads to the development of pyelonephritis. An obstruction to the outflow of urine causes a violation of the act of urination in the form of difficulty, pollakiuria, urinary incontinence.

During the pathological process with infravesical obstruction, three stages can be distinguished: at stage I, urination is difficult, but the bladder is completely emptied due to the working hypertrophy of the detrusor, which overcomes the resistance to urine outflow. In stage II, difficulty urinating remains, but the urine stream becomes sluggish, sometimes intermittent, residual urine appears, bladder

capacity increases due to a decrease in detrusor tone. In stage III, detrusor atony develops, the urine stream is practically absent, the child urinates in drops, urinary incontinence appears.

Clinic and diagnostics. The main complaints of patients with infravesical obstruction are difficulty urinating, often accompanied by urinary incontinence, incomplete emptying of the bladder. There is leukocyturia.

Voiding cystography is of great diagnostic value in boys for the detection of urethral valves. At the same time, the expansion of the posterior urethra is determined; below the obstacle, the urethra has normal dimensions. In Marion's disease, voiding cystography reveals elevation and expansion of the cervix, a filling defect in the area of its location, the urethra is not changed. In the diagnosis of meatal stenosis in girls, voiding cystography does not play a decisive role, since a wide urethra is a normal variant in them.

A certain place in the diagnosis of infravesical obstruction belongs to functional methods. A decrease in the volumetric flow rate of urine makes it possible to suspect this pathology. In stage I of the disease, direct cystometry, during which a sharp increase in voiding pressure is detected, also helps to make a diagnosis. The use of a comprehensive urodynamic study, including electromyography, makes it possible to diagnose detrusor sphincter dyssynergia. It is known that the detrusor and sphincter are in a reciprocal relationship: when the detrusor contracts, the sphincter relaxes, and vice versa. Due to various innervation disorders, this ratio may change: when the detrusor contracts, the sphincter does not relax or does not relax completely, i.e. dyssynergia occurs, clinically manifested as infravesical obstruction. An electromyographic study of the sphincter at the time of urination reveals an increase in its activity, which makes it possible to make a correct diagnosis.

When making a differential diagnosis, it must be remembered that difficulty urinating can also be observed with cicatricial phimosis, meatal stenosis in boys with a coronal form of hypospadias. These diseases can be ruled out already when examining a child. In other cases, the diagnosis is helped by the use of additional research methods.

Treatment of bladder outlet obstruction depends on the underlying cause. At valves of a back urethra carry out their endoscopic electroresection; with meatal stenosis in girls - bougienage of the urethra or dissection of the stenosis; in Marion's disease, a V-shaped plastic of the bladder neck is performed to eliminate the obstruction to the outflow of urine. With detrusor-sphincter dyssynergy, treatment is usually conservative and is aimed at normalizing the ratio of the work of the detrusor and sphincter.

The prognosis of the disease, if treatment is started in stage I, is more favorable. With treatment started late, the prognosis worsens, as a long-term correction of secondary changes is required, in particular myoneurogenic atony of the detrusor, and therapy for chronic cystitis.

Dispensary observation is carried out by a urologist and a nephrologist; its duration depends on the type of infravesical obstruction. In case of meatal stenosis in girls, in the absence of symptoms of cystitis, after a control bougienage, the child can be deregistered. With concomitant cystitis, the period of dispensary observation is

determined by inflammatory changes in the lower urinary tract. Dispensary observation of children in whom infravesical obstruction is combined with malformations of the upper urinary tract. It is carried out in the same way as for patients with chronic pyelonephritis.

HYPOSPADIA

Hypospadia is a malformation characterized by the absence of the lower wall of the urethra in the distal parts. The occurrence of this defect is associated with a violation of embryogenesis at the 7-14th week of pregnancy. In this period, the differentiation of the rudimentary epithelium ends and the urethral trough closes.

In terms of frequency, hypospadias ranks first among anomalies and malformations of the urethra: it occurs in 1 out of 400-500 newborns. The anomaly is the "privilege" of boys, although it is extremely rare, but it also occurs in girls (Fig. 66).

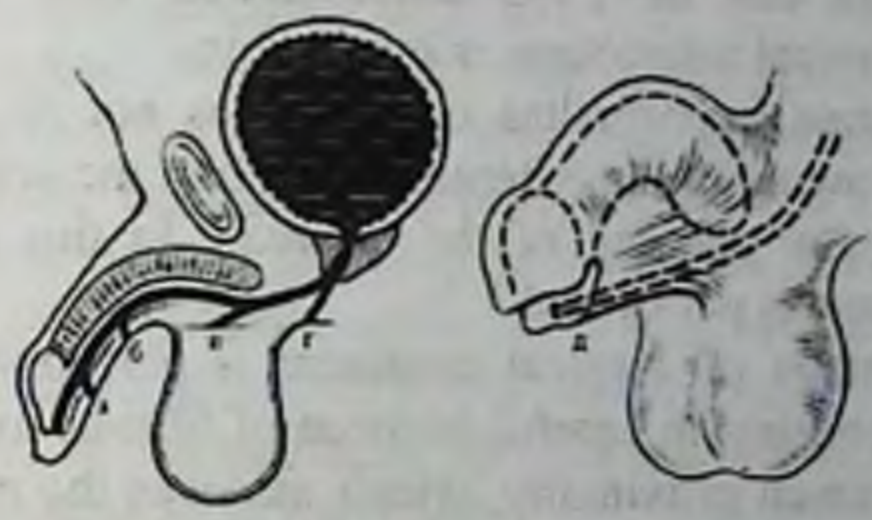


Figure 66. Variants of hypospadias

The capitate form of hypospadias is the most common and easiest malformation in which the opening of the urethra opens at the site of the frenulum of the penis. The foreskin is absent from the ventral side of the penis, and from the dorsal side, hanging in the form of an apron, does not completely cover the head. The penis is straight, sometimes there is a downward deviation of the head. With this form of hypospadias, narrowing of the external opening of the urethra or covering it with a thin film is often noted, which can significantly impede urination and lead to expansion and atony of the overlying parts of the urinary system.

Stem form. In this form of hypospadias, the opening of the urethra opens on the ventral surface of the shaft of the penis. The penis is deformed by fibrous bands running from the head to the hypospadic opening of the urethra, has the shape of a hook, which is especially noticeable during erection. Urination is carried out according to the male type, but at the same time the patient has to pull the penis to the stomach by the foreskin. The growth of corpora cavernosa is difficult, their deformation increases with age, erections are painful. Sexual intercourse with the stem form of hypospadias is possible, but if the urethral opening is located at the base of the penis, sperm does not enter the vagina.

Scrotal form. This form is accompanied by even more pronounced underdevelopment and deformation of the penis. The external opening of the urethra opens at the level of the scrotum, which is split and looks like a large labia. Urination is carried out while sitting, according to the female type. Sexual intercourse is usually impossible due to a sharp deformation of the penis.

Perineal shape. The appearance of the genital organs is drastically changed, which makes it difficult to determine the patient's gender. The penis is similar in shape and size to a hypertrophied clitoris, the scrotum is split in the form of labia. The opening of the urethra opens at the perineum, often there is a rudimentary vagina. With this form of hypospadias, more often than with other forms, one- or two-sided cryptorchidism is noted.

In addition to the forms described above, there is hypospadias, in which there is no dystopia of the urethral opening, but there is a pronounced deformation of the cavernous bodies of the penis. This is the so-called **hypospadias without hypospadias**. Synonyms: congenital short urethra, chorda type hypospadias. With this defect, the urethra can be 1.5-2 times shorter than the cavernous bodies. Erections are painful, sexual intercourse is impossible.

Treatment. Capitate hypospadias usually does not require treatment, unless accompanied by a narrowing of the external opening of the urethra or the presence of a membrane covering the opening of the urethra. In this case, a meatotomy or excision of the membrane is performed.

Usually the first stage of surgical treatment is performed at the age of 1.5-2 years. The operation consists in careful excision of fibrous tissues and displacement of the hypospadias foramen proximally, which achieves the maximum expansion of the cavernous bodies. An important point of the operation is the creation of skin reserves on the ventral surface of the penis for subsequent urethral plastic surgery. This is achieved by the exchange of triangular flaps according to A.A. Limberg or by moving the skin of the foreskin to the ventral surface of the penis.

The second stage of treatment - urethroplasty - is performed at the age of 5-13 years. About 150 methods of urethroplasty and various modifications are known, but the most common is the Duplay method - the creation of the urethra from local tissues. Recently, a single-stage operation has been widely used - straightening the penis and urethroplasty from sheets of the foreskin or skin of the dorsal surface of the penis on a vascular pedicle. This operation can be performed in children from 2-3 years of age. It should be noted that none of the many methods of urethroplasty for hypospadias is ideal, and often patients undergo repeated surgical interventions several times due to the formation of urethral strictures and fistulas.

EPISPADIUM

Epispadias - congenital splitting of the upper wall of the urethra in the distal section or throughout. The anomaly occurs in 1 in 50,000 newborns, in boys 5 times more often than in girls.

According to the degree of splitting of the urethra in boys, epispadias of the head, epispadias of the penis and complete are distinguished, in girls - clitoral

subsymphyseal and complete. Complete epispadias is observed 3 times more often than all other forms.

Epispadias of the head is characterized by flattening of the head, splitting of the foreskin from above, displacement of the external opening of the urethra to the coronal sulcus. Urination is usually not disturbed.

Epispadias of the penis is accompanied by an upward curvature of the penis. The head is split, from it along the back of the penis a strip of mucous membrane passes to the dystopian opening of the urethra, which has the shape of a funnel. Due to weakness or partial splitting of the sphincter of the bladder, many patients with coughing, laughing and physical exertion have urinary incontinence. When urinating, urine is sprayed, which forces patients to urinate while sitting, pulling the penis backwards by the remnants of the foreskin. Often, with this form of epispadias, nonunion of the bones of the pubic symphysis and a divergence of the rectus abdominis muscles are noted. The penis is shortened and pulled up to the stomach due to the divergence of its legs, attached to the pubic bones. In adult patients, this can make sexual intercourse extremely difficult.

Complete epispadias. With this form, the penis is underdeveloped, looks like a hook pulled up. Cavernous bodies are split, the entrance to the bladder has the shape of a funnel. There is complete urinary incontinence due to splitting of the sphincter ring. There is a large diastasis between the pubic bones, resulting in a "duck" gait. About 1/3 of patients suffer from concomitant malformations of the kidneys and ureters, cryptorchidism, testicular and prostate hypoplasia.

Epispadias in girls is characterized by less anatomical disorders, which often makes it difficult to diagnose at an early age.

Clitoral form. There is a splitting of the clitoris, the external opening of the urethra is shifted forward and upward. Urination is not disturbed. The anomaly is practically irrelevant.

Subsymphyseal episadia is manifested by complete splitting of the clitoris, the external opening of the urethra opens above it in the form of a funnel. There is complete or partial urinary incontinence.

Complete (total, retrosymphyseal) epispadias. The upper wall of the urethra is absent throughout, and the urethra takes the form of a gutter. The bladder neck and symphysis are split. Urine constantly flows out, causing maceration of the skin of the thighs.

Treatment. In epispadias, the goal of treatment is to achieve continence and create the missing urethra. In cases of epispadias of the penis, not accompanied by urinary incontinence, urethroplasty from local tissues has become most common.

In case of urinary incontinence, plastic surgery is performed on the bladder neck, among which in our country the method proposed by V.M. Derzhavin is most often used. In this case, the mouths of the ureters move anteriorly, and the muscles of the bladder triangle, almost circularly covering the neck of the bladder, act as a sphincter. The optimal time for the operation is the age of 4-6 years.

It is possible to equip a general practitioner with knowledge, to teach standard skills in the indicated professional field, to teach the skills of working with a patient, his relatives and friends, to teach rational tactics in solving medical and social

problems only by non-traditional, active, problem-based learning, choosing adequate goals and objectives of the methodology. To this end, it is proposed to conduct business games, solving situational problems.

I. Curation of patients on the topic - 15 minutes
II. Participation in the dressing room and in the operating room - 20 minutes;
III. Implementation of practical skills - 15 minutes:

PRACTICAL SKILLS

BLUNT EXPANSION OF THE FORESKIN

Indications:
1. Hypertrophic phimosis;
2. Atrophic phimosis.

Preparation:
Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:
1. Dressing room or manipulation room;
2. Soft surgical clip;
3. Button probe;
4. Vaseline oil.

Technique:
1. Position of the patient on the back;
2. Gently stretch the outer opening of the foreskin with a soft surgical forceps;
3. Produce retraction of the foreskin with separation of adhesions with a bellied probe;
4. Remove smegma with a damp cloth;
5. The head of the penis is thickly lubricated with vaseline oil;
6. Return the foreskin to its original position.

REDUCTION OF PARAPHIMOSIS

Preparation:
Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:
1. Dressing room or manipulation room;
2. Vaseline oil;
3. Gauze napkins.

Technique:
1. Position of the patient on the back;
2. Lubricate the head of the penis with vaseline oil;
3. Put a gauze pad under the thumbs and place them on the head of the penis;
4. Grasp the ring with the rest of your fingers and gradually push it over the head;
5. Push the head through the opening of the foreskin that has infringed on it.

Figure 67. Technique for spreading phimosis

IV. Big break - 40 minutes (11.50-12.30).

V. Practical session (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

STUDY TASKS

Appendix 1

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: Dysuria, pain, anuria, bleeding, hyperthermia

Appendix 2

Tasks for groups

1. Specify the types of hypospadias? Cluster, SWOT table, Venn diagram for the word "dysuria" and chart Why? and hierarchical diagram How?

2. Clinical signs of esophageal atresia. Cluster, SWOT table, Venn diagram for the word "burning" when urinating and chart Why? and hierarchical diagram How?

3. Specify the clinical signs of vesicoureteral reflux. Make a cluster, SWOT table, Venn diagram for the word "hyperthermia" and draw diagrams Why? and hierarchical diagram How? Chalazia of the esophagus.

4. What method of surgery is used for vesicoureteral reflux?.Create a cluster, SWOT table, Venn diagram for the word "habitus" and draw diagrams Why? and hierarchical diagram How? Congenital short esophagus.

5. What are the main symptoms of infravesical obstruction? Cluster, SWOT table, Venn diagram for the word "reflux" and chart Why? and hierarchical diagram How?

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	Task 1	Task 2	Task 3: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	Question 1	Question 2	Question 3	(3,0)
1						
2						
3						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	**know "+", don't know "-"**	**learned "+", could not find out "-"**
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		

Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;

b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concepts	V	+	-	?
Congenital malformations and anomalies of the genital organs and lower urinary tract (valves and urethral stricture, vesicoureteral reflux, hypospadias, epispadias, exstrophy of the bladder, hematocolpos), clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where:

V - corresponds to the existing knowledge (information) about ...

- contradicts existing knowledge about ...

+ - is new information

? -incomprehensible or requiring clarification, addition information

CONCEPT TABLE

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located. (recommendations, categories, various signs, etc.)						
	Dysuria	Hyperthermia	Pain	Bleeding	Pyuria	Palpation	X-ray picture
Urethral valve							
Urethral stricture							
Vesicoureteral reflux							
Hypospadias							
Epispadias							
Bladder exstrophy							
Hematocolpos							

SWOT

(homework or independent work of the student: for creative thinking after lectures or practical classes)

Analytical table - SWOT

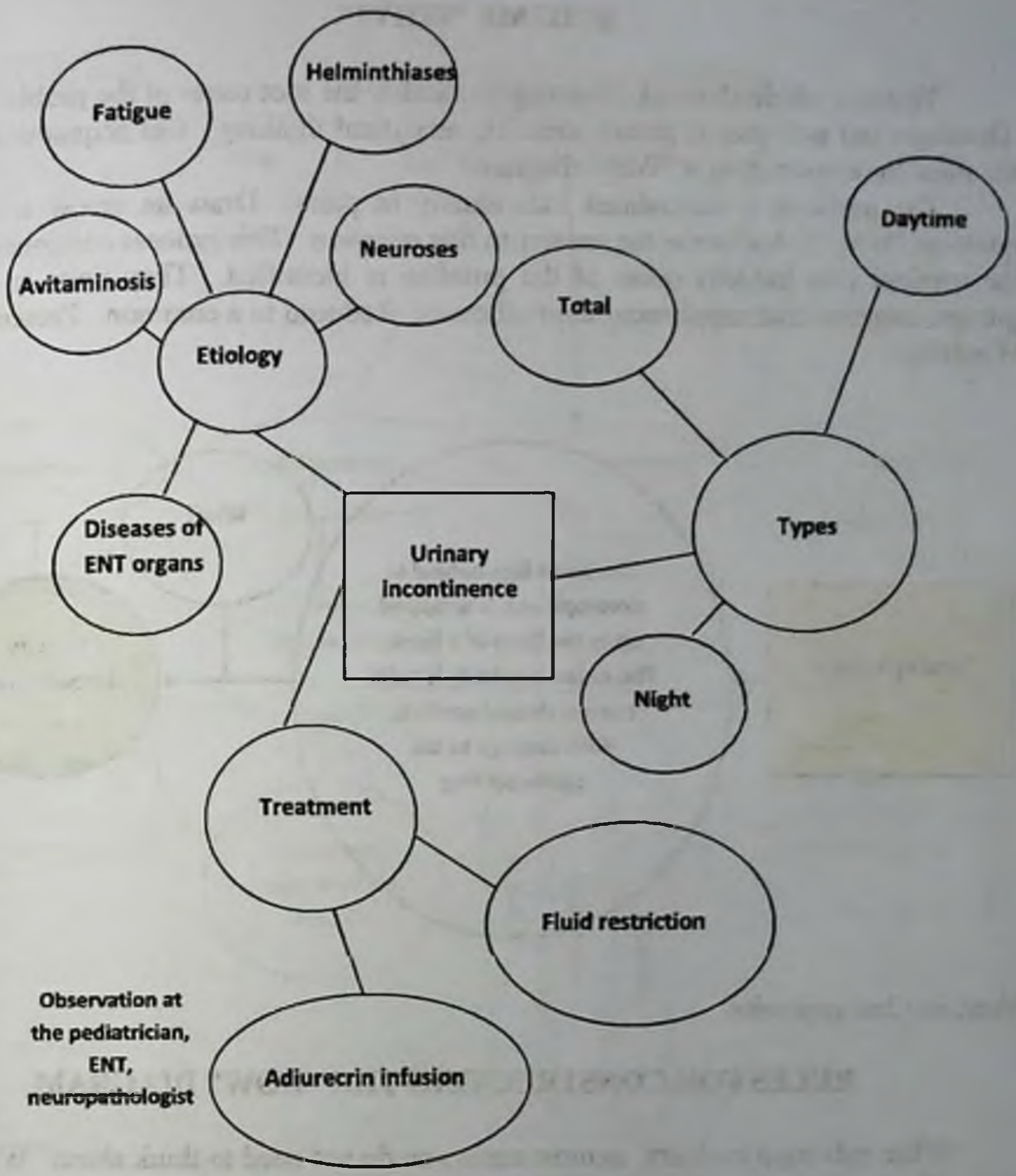
S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle)

A way of mapping information - gathering ideas around a major factor to focus and make sense of the whole construct

Clustering technology: In the center of a blackboard or a large sheet of paper, a keyword or a topic title of 1-2 words is written. By association with the keyword, "satellites" are attributed to the side of it in smaller circles - words or sentences that are related to this topic. Connect them with lines to the "main" word. These "satellites" may have small satellites, and so on. Recording continues until the allotted time expires or until ideas are exhausted.

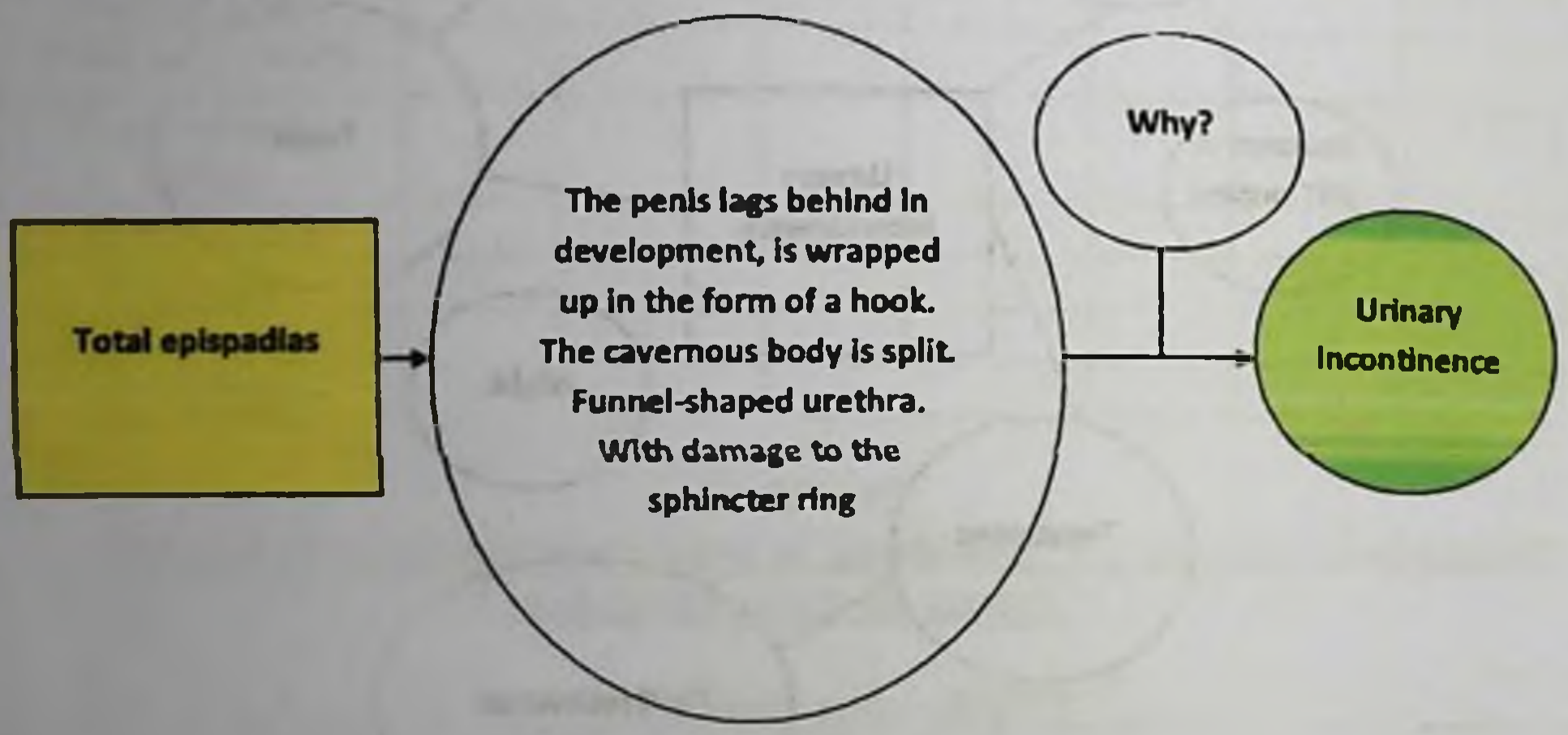


Note: see 2nd appendix.

SCHEME "WHY?"

This is a whole chain of reasoning to identify the root cause of the problem. Develops and activates systemic, creative, analytical thinking. Get acquainted with the rules for constructing a "Why" diagram?

The problem is formulated individually in pairs. Draw an arrow with the question "Why"? And write the answer to this question This process continues until the original (but hidden) cause of the problem is identified. They unite in mini-groups, compare and supplement their schemes. Reduced to a common. Presentation of results

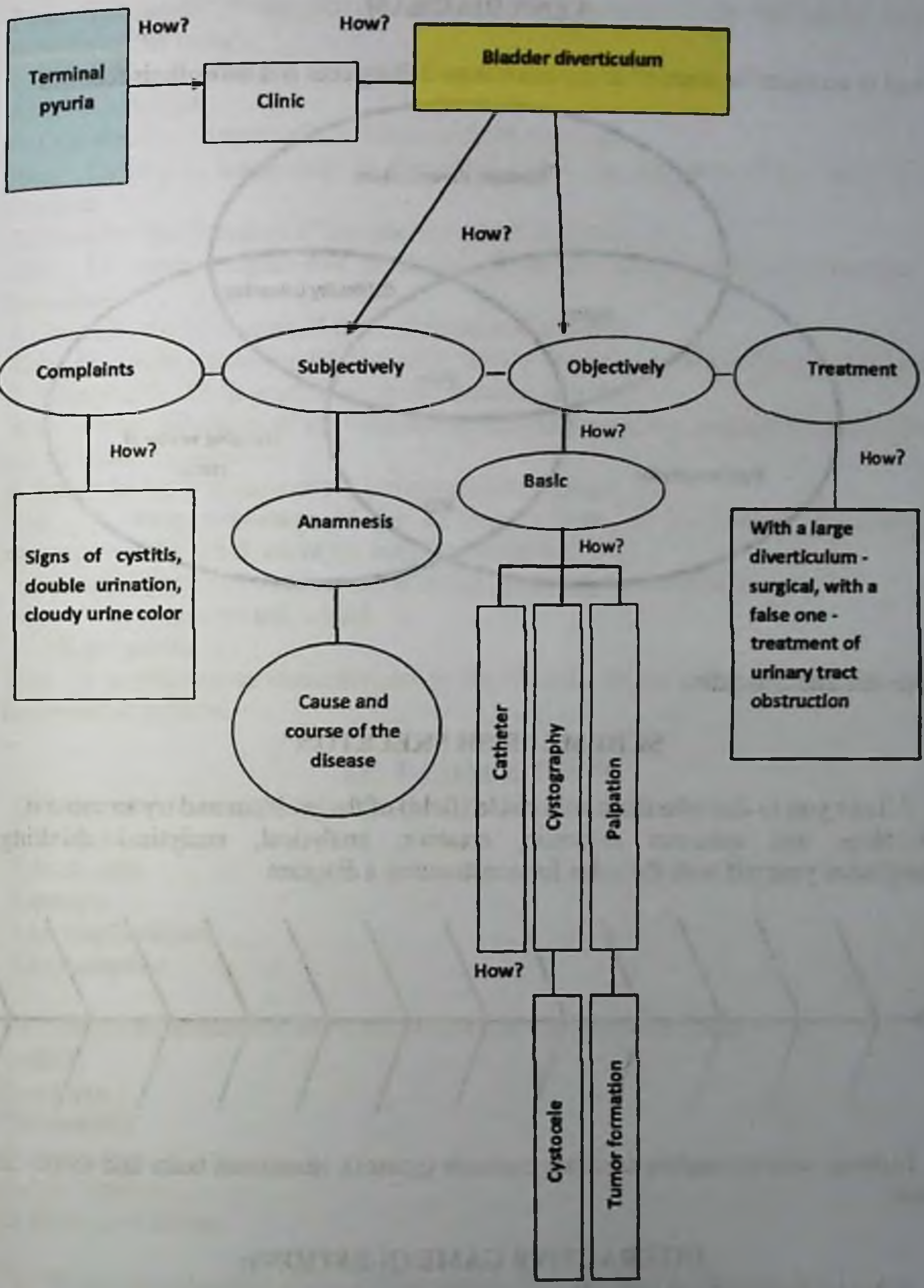


Note: see 2nd appendix.

RULES FOR CONSTRUCTING THE "HOW" DIAGRAM

When solving a problem, in most cases you do not need to think about "What to do?". The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

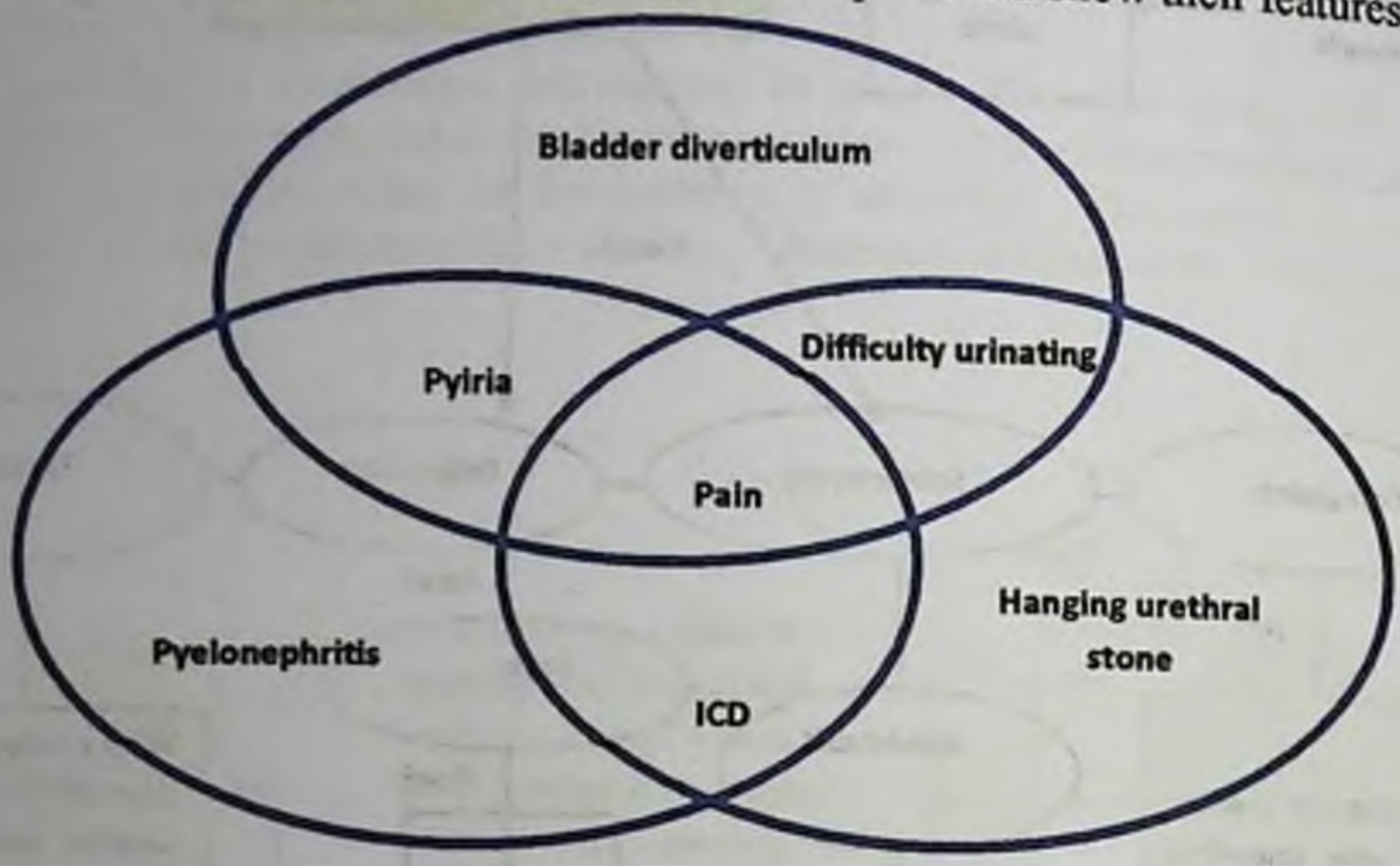
Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them;



Note: see 2nd appendix.

VENN DIAGRAM

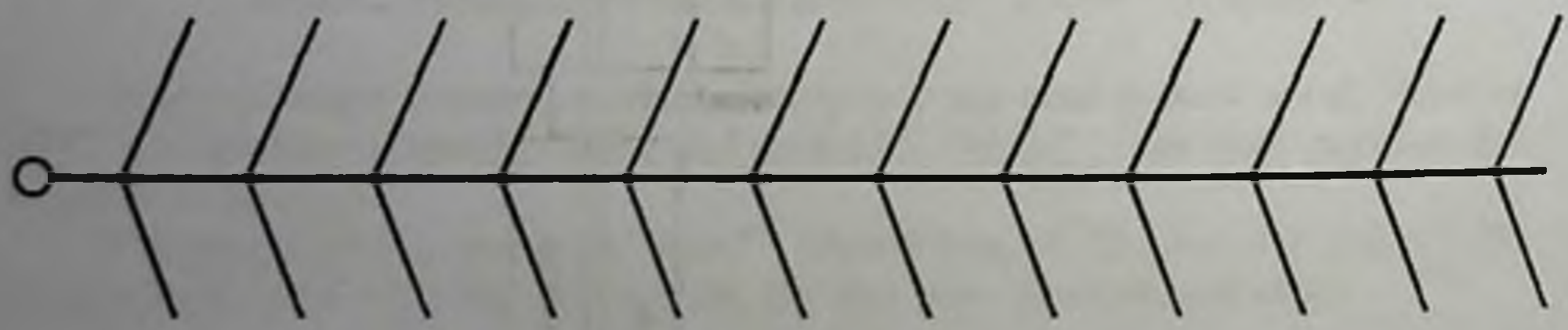
Used to compare or contrast or contraindicate 2-3 aspects and show their features



Note: see 2nd appendix.

SCHEME "FISH SKELETON"

Allows you to describe the whole circle (field) of the problem and try to solve it. Develops and activates systemic, creative, analytical, analytical thinking. Familiarize yourself with the rules for constructing a diagram.



3. Training with interactive teaching methods (games), situational tasks and tests - 20 minutes;

INTERACTIVE GAME QUESTIONS:

1. What is vesicoureteral reflux?

Rep. Reflux of urine from the bladder into the ureter and collecting system of the kidney.

2. List common causes of vesicoureteral reflux?

Resp. Dysplasia of the closure apparatus, shortening of the intramural ureter, dystonia of the mouth.
3. What study is the main one in the diagnosis of vesicoureteral reflux?
Rep. Cystography.
4. Describe the I degree of the vesicoureteral segment.
Rep. Casting is noted only in the distal ureter, the diameter of the latter is not changed.
5. Describe the II degree of the vesicoureteral segment.
Rep. The contrast agent fills the radiologically unchanged pyelocaliceal system of the kidney.
6. Describe the III degree of the vesicoureteral segment.
Rep. Moderate expansion of the ureter, pelvis, smoothness of the fornic apparatus.
7. Describe the IV degree of the vesicoureteral segment.
Rep. Severe dilatation of the collector system of the kidney, expansion of the ureter, which becomes tortuous.
8. Describe the V degree of the vesicoureteral segment.
Rep. A sharp expansion of the collector system of the kidney and ureter is accompanied by the death of the renal parenchyma.
9. Specify 3 forms of vesicoureteral reflux according to the mechanism.
Rep. Active, passive and mixed.
10. Hypospadias is...
Rep. A malformation characterized by the absence of the lower wall of the urethra in the distal sections.

SELF-CHECK TESTS:

1) Congenital absence of the anterior wall of the bladder is called
1.epispadias
2. exstrophy
3.ectopia
4.hermaphroditism
5.hypospadias

2) Congenital absence of the lower wall of the urethra in the distal parts called
1.ectopic
2.exstrophy
3.epispadias
4.hypospadias
5.hermaphroditism

3) What is hypospadias without hypospadias (hypospadias of the chorda)
1.back urethral valve
2.urethral diverticulum
3.dystopia of the urethra
4. severe deformation of the cavernous bodies

5.congenital urethral fistulas

4) Urinary incontinence is observed:
1. with trunk hypospadias
2. with scrotal hypospadias
3. epispadias head
4.epispadias of the total form
5.hypospadias without hypospadias

5) Form of urination with phimosis
1.fine jet
2.intermittent urination
3. urination drops
4. fan-shaped urination
5. urination with protrusion of the foreskin

6) Paraphimosis occurs
1. with hypospadias without hypospadias
2. with total hypospadias
3. with infravesical obstruction
4.exstrophy
5.when the foreskin is narrowed

7) Forms of hypospadias in boys:
1. capitate, stem, scrotal, perineal
2.complete, incomplete, total
3.full, clitoral, subsymphyseal
4.high, medium, low
5.full, partial

8) Which of the following malformations is always accompanied by complete urinary incontinence
1.total epispadias
2.perineal hypospadias
3. subsymphyseal epispadias
4.posterior urethral valve
5.ectopic urethrocelle

9) For what form of anomaly of the accessory ureter of a doubled kidney is the symptom of drip urinary incontinence typical?
1.ectopia of the orifice of the accessory ureter in girls
2.ectopia of the orifice of the accessory ureter in boys
3.ectopic urethrocelle
4. lateral cystic ectopia of the mouth
5.bilateral urethrocele

10) Specify the optimal time for performing meatotomy in case of hypospadias
1.1-2 years
2.3-5 years
3.6-8 years old
4.after diagnosis
5.in puberty

11) A rational way to eliminate urinary incontinence in total epispadias
1.Jung's operation
2.Operation Derzhavin
3.Lady's operation
4. Duplay operation
5. operation Rusakov

12) In what cases in case of exstrophy of the bladder should its plasty be done with local tissues
1. with a diameter of the mucous membrane of the bladder up to 4 cm with the absence of papilla
matous growths
2. with a mucous membrane diameter of more than 4 cm with one polyp
3. with a mucosal diameter of more than 4 cm with the presence of papillamatous growths
4. with a mucous membrane diameter of more than 4 cm and the presence of a valve of the distal section of the right ureter
5. with a mucous membrane diameter of more than 4 cm and a child's weight of 1600 gr.

13) Which of the following methods should be considered the method of choice in the surgical treatment of total epispadias
1. elimination of urinary incontinence by creating a mechanical obstacle
2. creation of an artificial sphincter of the bladder from the surrounding skeletal muscles
3. Creation of the bladder sphincter from local tissues
4.elimination of urinary incontinence by diverting to the intestine
5.urethroplasty

14) Which of the following research methods is the most reliable in the diagnosis of posterior urethral valves
1.cystoscopy
2.ureteroscopy
3. voiding cystourethrography
4. voiding cystourethro cinematography (telescopic)
5. polypositional cystography

15) In which of the listed forms of ectopia of the orifice of the accessory ureter, the function of the corresponding half of the kidney suffers the most
1.vaginal
2. perineal ectopia in girls
3.urethral
4.cervical ectopia of the orifice of the accessory ureter
5. prostatic urethral ectopia in boys

16) Which of the following malformations is always accompanied by urinary incontinence.
1.total episcadia
2.perineal hypospadias
3. subsymphyseal epispadias
4.posterior urethral valve
5.ectopic urethelecele

17) Which of the following operations is the method of choice with a giant ectopic ureterocele.
1. heminephroureroscopy
2. geminefroureterectomy with suction of the contents of the ureterocele
3. geminefroureterectomy with excision of the cyst membranes
4.ureteroureteroanastomosis
5.dissection of the ureterocele

Answers to tests for self-control

1-2, 2-4, 3-3, 4-4, 5-2, 6-5, 7-1, 8-1, 9-4,10-1, 11-2, 12-1, 13-2, 14-3, 15-4, 16-1, 17-3.

CHAPTER 7. MALFORMATIONS AND ANOMALIES IN THE DEVELOPMENT OF THE LIVER, BILE DUCTS AND PANCREAS (BUDD-CHIARI SYNDROME, CONGENITAL LIVER FIBROSIS, PORTAL VEIN THROMBOSIS, BILIARY ATRESIA) CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

- Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;
- Developing students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;
- Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;
- Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;
- Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Venue: Thoracic Surgery Department, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control: control questions,
performance of educational tasks in groups.

Written control: control questions.

PORTAL HYPERTENSION

Portal hypertension (PH) develops as a result of the simultaneous interaction of two factors: an increase in the outflow of venous blood from the portal system, on the one hand, and an increase in blood flow into the portal system, on the other.

From a physiological point of view, it is necessary to distinguish PG, in which the liver parenchyma is under the influence of high portal pressure (parenchymal form) from PG, in which high portal pressure does not directly affect the liver parenchyma (non-parenchymal form) (Fig. 68).

In nonparenchymal PH, the obstruction to blood flow is located up to the sinusoids of the liver. In this case, the liver function is practically not impaired, ascites and coagulopathy develop very rarely, bleeding from the veins of the cardia is tolerated by patients relatively easily, and the prognosis of the disease is generally good. In parenchymal PH, the obstruction to the portal blood flow is located behind the sinusoids of the liver. This leads to their structural and functional damage and deterioration of the blood supply to hepatocytes. As a result, the synthetic function of the liver is disturbed, there is a tendency to develop ascites, coagulopathy, intolerable esophageal bleeding and liver failure.

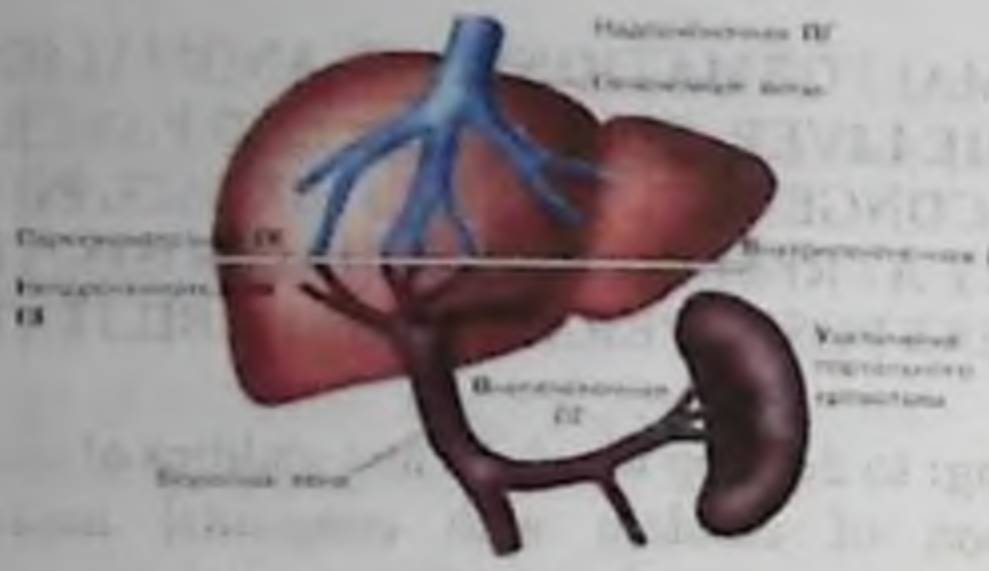


Figure 68. Anatomy of the portal system

Resistance to portal blood flow can be localized above the liver, inside and below the liver. From this point of view, all forms of PG are divided into suprahcpatic, intrahepatic and extrahepatic.

Suprahepatic PG. Violation of the venous outflow from the liver (Budd-Chiari syndrome) may occur as a result of a malformation or thrombosis of the inferior vena cava or thrombosis of the hepatic veins. PH and liver dysfunction develop as a result of venous congestion in the liver.

Intrahepatic PG. Any chronic liver disease that leads to fibrosis or cirrhosis can cause intrahepatic PH. In most variants of cirrhosis, regeneration nodes impede the outflow of blood from the sinusoids, leading to postsinusoidal obstruction. The most common causes of intrahepatic PH are postnecrotic cirrhosis after viral hepatitis, biliary atresia, Wilson's disease, alpha-1 antitrypsin deficiency, and others. As a rule, the development of portal hypertension is accompanied by signs of liver dysfunction - jaundice, ascites, delayed child development, etc.

PG in congenital liver fibrosis develops as a result of presinusoidal block. In this disease, the portal tracts increase due to the growth of connective tissue and the proliferation of the bile ducts. Since this type of fibrosis leads to the development of a presinusoidal block, the synthesizing function of the liver remains largely unchanged.

Extrahepatic PG. In the vast majority of children, this form of portal hypertension is the result of obstruction of the portal vein. In almost half of children with extrahepatic PH, umbilical vein catheterization, omphalitis, intra-abdominal infections, sepsis, or dehydration can be noted during the neonatal period. However, in half of the children, the exact etiological factor cannot be identified. Obstruction of the portal vein is accompanied by the development of a network of collaterals in the gates of the liver, called "cavernous transformation of the portal vein".

Extrahepatic PH is more common in children.

Clinic. Clinical manifestations of PG are largely of the same type and do not depend on its genesis. However, with each disease, a number of features can be noted that help to clinically identify the form of PG.

With extrahepatic PH, the first symptoms of increased portal pressure appear in early childhood. These include an increase in the abdomen, unexplained diarrhea, hyperthermia of unknown origin, splenomegaly, and the appearance of subcutaneous hemorrhages on the lower extremities. In a laboratory blood test, signs of

pancytopenia are found with a decrease in the number of erythrocytes, leukocytes and platelets below normal limits (hypersplenism). Sudden bleeding from the veins of the esophagus and cardia is often the very first manifestation of extrahepatic PH in apparently healthy children. In 80% of patients with extrahepatic PH, the first bleeding occurs in the first 6 years of life. Changes in the functional parameters of the liver, as a rule, are insignificant or absent. Ascites in children with extrahepatic PH appears only in the first days after bleeding.

With intrahepatic PH, the symptoms of increased portal pressure are superimposed on the clinical manifestations of liver cirrhosis and occur 5-7 years after viral hepatitis. In the clinical picture in patients with intrahepatic PH, symptoms of liver damage come first. Patients complain of weakness, fatigue, emaciation, abdominal pain, feeling of heaviness in the epigastric region, dyspepsia, increased bleeding. The size and consistency of the liver depend on the stage of the disease. In the initial stages, the liver is moderately enlarged, dense, its surface is smooth, in the later stages it is usually not enlarged, often even reduced, very dense, with a bumpy surface. In most cases, there is an increase in the spleen of varying severity with the development of signs of hypersplenism. In laboratory studies, a violation of liver function is detected - hyperbilirubinemia with a predominance of the direct fraction, a decrease in the amount of blood serum protein with a decrease in the albumin globulin coefficient, and a deterioration in the antitoxic function of the liver. However, the change in these indicators does not always go hand in hand with the development of portal hypertension, which is associated with a large compensatory capacity of the liver and the nonspecificity of the so-called liver tests. Manifestations of PG - ascites and bleeding from the veins of the esophagus and cardia - are noted, as a rule, when patients reach adolescence.

Diagnostics. The diagnosis of PH can be established on the basis of abdominal ultrasound and Doppler ultrasound of the visceral veins. Characteristic features of extrahepatic PH are cavernous transformation of the portal vein and normal liver structure. With parenchymal PH, the liver is compacted, the portal vein is well passable. With suprahepatic PG, obstruction of the hepatic veins or inferior vena cava is noted. Dopplerography in all forms of PH shows a significant decrease in the average blood flow velocity in the visceral veins. Parenchymal forms of portal hypertension are characterized by a hyperdynamic type of visceral circulation.

Esophagogastroduodenoscopy in children with PH reveals varicose veins of the esophagus and cardia of the stomach, as well as signs of hypertensive gastropathy. Veins of the esophagus and cardia are almost the only source of bleeding in children with PH. Bleeding from other veins of the gastrointestinal tract in children is extremely rare.

In doubtful cases or when planning surgical treatment, visceral angiography is necessary. Digital subtraction angiography provides the most complete information about the anatomy of the visceral veins.

Needle biopsy of the liver is indicated to determine the stage of cirrhosis or differential diagnosis of cirrhosis of the liver with other forms of parenchymal PH.

Treatment of children with acute esophageal bleeding includes: sedative therapy, a nasogastric tube for aspiration of gastric contents and infusion therapy with

crystalloid solutions and blood products in the amount of 50% of the required daily requirement.

The ideal way to treat portal hypertension has not yet been developed. The main objective of the surgical treatment of PG is the elimination and prevention of bleeding from varicose veins of the esophagus and stomach. Severe splenomegaly or marked hypersplenism may be a separate indication for manipulation of the spleen. In children with parenchymal PH, ascites resistant to conservative therapy may be an indication for surgical treatment.

Methods of treatment of PH differ significantly depending on the form of PH, the presence and severity of esophageal bleeding, as well as the level of preparation of the medical institution where the patient is undergoing treatment.

Modern methods of surgical treatment of PH in children include the implementation of various portosystemic anastomoses or operations that directly affect the varicose veins of the esophagus and stomach. Endoscopic sclerotherapy or endoscopic ligation of the veins of the esophagus and cardia is now widely used. To eliminate splenomegaly and hypersplenism, endovascular embolization of the organ parenchyma is currently used instead of splenectomy. Liver transplantation plays an increasingly important role in the treatment of end-stage liver cirrhosis.

Budd - Chiari disease (G.Budd, English therapist, 1808-1882; N. Chiari, Austrian pathologist, 1851-1916; synonymous with Chiari disease) - a violation of the outflow of blood from the liver, caused by primary obliterating endophlebitis of the hepatic veins, their thrombosis and subsequent occlusion and (or) malformations of the hepatic veins, characterized by liver damage and portal hypertension. The occurrence of eudophlebitis of the hepatic veins is promoted by injuries, disorders of the blood coagulation system, pregnancy, childbirth, and surgical interventions.

Violation of the outflow of blood from the liver, which occurs secondarily in a number of pathological conditions that are not associated with changes in the liver vessels themselves (peritonitis, tumors of the abdominal cavity, pericarditis, thrombosis, congenital stenosis or membranous lesions of the inferior vena cava, cirrhosis and focal lesions of the liver, migrating visceral thrombophlebitis, polycythemia, etc.) and manifested by the same symptoms, was called the Budd-Chiari syndrome, however, the question of the appropriateness of distinguishing between the disease and the Budd-Chiari syndrome remains controversial.

There are acute and chronic forms of the disease. In the acute form, it begins suddenly with intense pain in the epigastric region and right hypochondrium, vomiting, enlarged liver. If the cause of Budd-Chiari is the pathology of the inferior vena cava, patients experience swelling of the lower extremities, dilation of the saphenous veins in the abdomen and chest. The disease progresses rapidly, ascites develops within a few days, often having a hemorrhagic character. Ascites can be combined with hydrothorax, not amenable to treatment with diuretics. In the terminal stage, bloody vomiting joins. In the chronic form, which occurs in 80-95% of cases, the disease is asymptomatic for a long time or is manifested only by an enlarged liver. In the future, there are pains in the right hypochondrium, vomiting. At the height of the disease, the liver increases sharply, becomes dense, the formation of cirrhosis of the liver is possible, in some cases splenomegaly is noted. In the terminal

stage, the symptoms of portal hypertension are most pronounced - increasing ascites, bleeding from the dilated veins of the esophagus, hemorrhoidal veins. The outcome of Budd-Chiari may be severe liver failure, the disease may be complicated by thrombosis of the mesenteric vessels with the subsequent development of peritonitis.

The diagnosis of Budd-Chiari is based on the features of the clinical picture and the results of an instrumental study. The acute form can be suspected with the appearance of persistent intense abdominal pain, the rapid development of portal hypertension and liver failure. The sudden onset of severe abdominal pain, the appearance or rapid increase in signs of portal hypertension in patients with cirrhosis, liver tumors, polycythemia, etc. indicate a secondary violation of the outflow of blood from the liver. Changes in laboratory tests for Budd-Chiari, as a rule, are not characteristic. There may be leukocytosis, an increase in ESR, dis- and hypoproteinemia, a moderate increase in enzyme activity. Of great importance in the diagnosis are the results of lower cavography and liver phlebography.

Treatment in the absence of signs of liver failure is surgical, aimed at reducing portal hypertension. Patients impose a portocaval anastomosis or apply peritoneovenous shunting, with resistant ascites and oliguria - lymphovenous anastomosis. In case of stenosis or membranous fusion of the inferior vena cava, transatrial membranotomy, prosthetics of stenotic areas or bypass shunting of the inferior vena cava with the right atrium are performed.

Symptomatic treatment includes the appointment of drugs that improve metabolic processes in the liver cells (Essentiale, lipoic acid, legalon, etc.), diuretics, corticosteroids. According to the indications, antiplatelet agents and fibrinolytic agents (chimes, parmidin, fibrinolysin, heparin, etc.) are used.

The prognosis is unfavorable. In the acute form, patients die quickly, usually from hepatic coma or diffuse peritonitis. In the chronic form, life expectancy ranges from 4-6 months. up to 2 years, in some cases (especially after surgical treatment) - 10 years or more.

ATRESIA OF THE BILE TRUCKS

Atresia of the bile ducts is a rare malformation. From a morphological point of view, true atresia (violation of the formation of the lumen of the bile duets) is very rare. Most diseases of the neonatal period, accompanied by obstructive jaundice, refer to the concept of "cholangiopathy of the newborn". In the pathogenesis of these diseases lies the inflammatory process (usually viral etiology), transferred by the fetus in different periods of intrauterine life. The hepatocyte (fetal hepatitis) may be primarily affected, followed by impaired bilirubin excretion and bile formation. As a result, hypoplasia of the bile ducts and functional insufficiency develop. In some cases, the pathological process affects the endothelium of the bile ducts, causes stenosis or complete obstruction at different levels. Syndromal forms of cholangiopathy are described.

Clinic and diagnostics. Atresia of the bile ducts is characterized by jaundice, which appears, like the physiological jaundice of newborns, on the 3rd-4th day, but unlike it does not disappear, but gradually becomes more intense, acquiring a

greenish tint. The stool has been discolored since birth. It is important to note the persistent nature of this symptom. The presence of discolored stools is permanent, and within 10 days indicates atresia. Urine has the color of dark beer. By the end of the first month of life, an enlargement of the liver, and later the spleen, can be noted. In the later stages of the disease (by 5-6 months), the abdomen increases, the subcutaneous network expands, which is explained by the development of biliary cirrhosis of the liver due to a violation of the outflow of bile. Children rarely live beyond 1 year.

Figure 69. Options for atresia of the bile ducts

The detection of congenital atresia of the bile ducts is based on a correct assessment of the course of pregnancy, an early history of the child's life, the results of biochemical studies and puncture liver biopsy (Fig. 69).

Differential diagnosis should be carried out with prolonged physiological jaundice, hemolytic jaundice, liver damage with cytomegaly, toxoplasmosis, syphilis, congenital hepatitis of unknown etiology, blockage of the bile ducts by mucous and bile plugs.

With prolonged physiological jaundice of a newborn, the stool is usually overly colored due to the release of a large amount of thick bile. Urine is dark. In the blood, the amount of bilirubin is increased to moderate numbers, mainly due to the indirect, free fraction (with atresia of the bile ducts, the direct, bound fraction of bilirubin predominates in the blood). In addition, jaundice with physiological jaundice tends to decrease, while with atresia of the bile ducts, jaundice gradually increases.

With hemolytic jaundice in the blood, as with physiological jaundice, indirect bilirubin predominates. As a rule, there is a Rh conflict or a conflict in the ABO system. With pronounced forms, pronounced jaundice is characteristic, the child's condition is severe. If a replacement blood transfusion is not performed in a timely manner, kernicterus develops.

The greatest difficulty is the differential diagnosis of congenital atresia of the bile ducts, blockage of the bile ducts by mucous or bile plugs, and congenital giant

cell hepatitis. The clinical manifestations of these diseases, as well as changes in bilirubin metabolism in them, are largely identical and do not allow a correct diagnosis. Differential diagnosis of obstruction of the bile ducts is carried out by introducing through the mouth, and preferably through a probe into the duodenum, 5 ml of a 25% solution of magnesium sulfate 3 times a day for 2-3 days. The reduction of the biliary tract under the action of magnesium sulfate helps to push out the gall plugs to the recovery of the child.

Differential diagnosis of atresia of the bile ducts, congenital giant cell hepatitis and preoperative determination of the form of atresia are possible only through the use of special instrumental research methods - ultrasound scanning, laparoscopy, puncture liver biopsy. Ultrasound examination pays attention to the density of the liver parenchyma, indicating the severity of cirrhosis, as well as the presence or absence of the gallbladder and the degree of its underdevelopment, the expansion of the external and internal hepatic ducts. During laparoscopy, the external bile ducts, the condition of the liver tissues are examined. The absence of the gallbladder and ducts indicates atresia of the bile ducts. In congenital giant cell hepatitis, the gallbladder is formed correctly, sluggish, stretched, filled with transparent, slightly colored bile. Under the control of a laparoscope, a puncture biopsy of the liver is performed. Histological examination of the obtained area of the liver parenchyma allows us to clarify the nature of the damage to the liver cells and the state of the intrahepatic bile ducts.

Treatment of atresia of the bile ducts is surgical, the operation is performed up to 1.5-2 months of age. In the presence of atresia at the level of the common bile or hepatic duct and suprasthenic expansion, a hepatico- or choledochojejunostomy is performed on an isolated loop of the jejunum with Roux-en-Y anastomosis. With severe hypoplasia of the external bile ducts, the Kasai operation is performed, which consists in isolating the fibrous plate deep in the hilum of the liver, where numerous small-diameter bile ducts open, and anastomosing them with an isolated loop of the intestine according to the method described above (Kasai portoenterostomy operation).

The prognosis is serious, as the phenomena of hepatitis and cirrhosis of the liver are progressing.

CYST OF THE COMMON BILE DUCTS

Primary cysts of the common bile duct are caused by thinning or absence of the muscular wall and its replacement with connective tissue. Secondary expansion of the common bile duct is usually explained by a malformation that forms during the period of reverse development of the solid stage of embryogenesis (in the period of 3-7 weeks). The arising kinks, stenoses or valves of the final section of the common bile duct lead to its expansion, thinning of the wall and stagnation of bile. Isolated expansions of only the common bile duct are characteristic without involvement of the cystic duct and the wall of the gallbladder in the process, since the latter is laid from the outgrowth of the hepatic diverticulum and numerous hepatic ducts of the proximal biliary system open into its duct. The distal parts of the biliary system are

formed in parallel with the development of the secretory system of the liver. A single system of bile ducts is formed as a result of the merger of the proximal and distal sections, which, until the moment of connection, develop independently (Fig. 70).

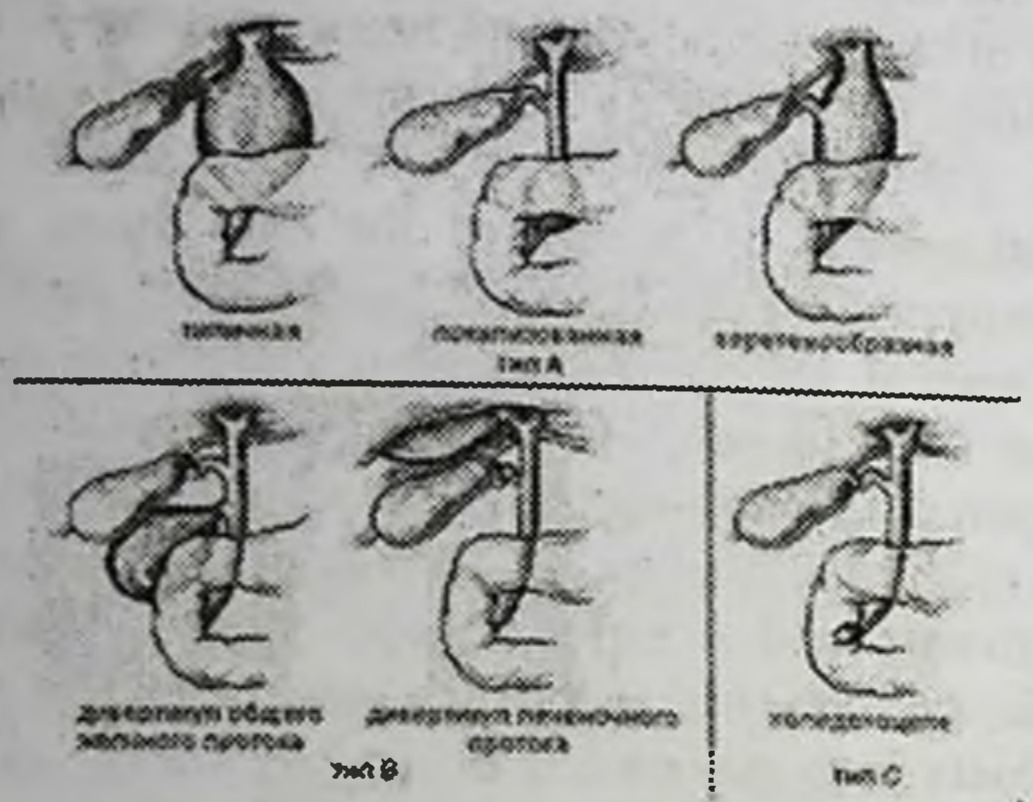


Figure 70. Causes of common bile duct cysts

Clinic and diagnostics. The clinical picture of the expansion of the common bile duct is characterized by a triad of symptoms: recurrent pain in the epigastric region or in the right hypochondrium, interspersed with jaundice, and the presence of a tumor-like formation on the right at the edge of the liver. The severity of symptoms depends on the size of the cyst, the age of the child, violations of the passage of bile. As a rule, in older children, pain is paroxysmal in nature, there is a feeling of fullness, nausea. The manifestations of jaundice are moderately expressed (icterus of the sclera, a decrease in the color of the stool, a darker color of the urine). The increase in jaundice is accompanied by an increase in abdominal pain, a temperature reaction (cholangitis phenomena), an increase in discoloration of the stool, while the urine acquires an intense dark color. During the period of exacerbation in the region of the lower edge of the liver on the right, it is often possible to palpate a dense painless tumor-like formation with fairly clear boundaries. The size of this formation may vary over time. It depends on the severity of the narrowing of the outlet section of the common bile duct and the violation of bile evacuation. During the period of exacerbation, a blood test reveals leukocytosis, mainly neutrophilia, a characteristic shift of the white blood formula to the left. In biochemical blood tests, a picture characteristic of obstructive jaundice is found. When the cyst is emptied into the duodenum, the pain syndrome quickly decreases, the manifestations of cholestasis are gradually leveled, including the normalization of blood biochemical parameters.

Diagnosis of cystic enlargement of the common bile duct is based on anamnesis data, clinical manifestations of the disease (the most important symptom is the frequency of obstructive jaundice clinic) and objective research methods. The latter include an ultrasound examination of the abdominal organs, in which a cystic formation with clear boundaries is determined in the projection of the common

hepatic duct. A radionuclide study with technetium reveals an increase in the accumulation of the radiopharmaceutical in the dilated cystic duct.

X-ray contrast study - a survey radiography of the abdominal organs - sometimes allows you to identify a cyst of the common bile duct (with large sizes - up to 8-10 cm in diameter), pushing the transverse colon and duodenum. When radiography of the stomach and duodenum with barium, the deformation of the latter due to compression by the cyst is visualized much more clearly. Cholegraphy is often ineffective due to impaired bile excretion. The most informative method for diagnosing a common bile duct cyst is retrograde cholecystocholangiography, which allows filling the cyst through the major duodenal papilla and determining not only its size, but also its topographic and anatomical relationships with other organs. An objective diagnostic method is also laparoscopy.

Differential diagnosis is carried out with diseases accompanied by jaundice: infectious hepatitis, liver cysts (parasitic and non-parasitic), cholelithiasis, malignant tumors of the abdominal cavity. Differential diagnosis with infectious hepatitis is based on the determination of hepatitis markers, the absence of cystic formation in the hilum of the liver, and the results of laboratory tests. Liver cysts increase in size over time, they are inseparable from the liver (ultrasound scanning), do not cause cholestasis clinics, have positive specific reactions to clarify the parasitic (Echinococcus) nature of the cyst.

The diagnosis of malignant tumors of the abdominal cavity and retroperitoneal space is clarified by the rapid growth of the tumor, the progressive deterioration of the general condition of the child, the palpation determination of a tuberous undifferentiated tumor, and special research methods: urography, pneumoperitoneum. retropneumoperitoneum. In doubtful cases, diagnostic laparoscopy and tumor biopsy are performed, followed by histological examination of the material.

Treatment of a cyst of the common bile duct is only surgical - complete excision of the cyst with the formation of a biliodigestive anastomosis of an isolated loop of the jejunum according to Roux. Prevention of ascending cholangitis is carried out by creating an antireflux mechanism in the isolated jejunum. Performing a radical operation before the development of cirrhosis of the liver gives favorable results.

It is possible to equip a general practitioner with knowledge, to teach standard skills in the indicated professional field, to teach the skills of working with a patient, his relatives and friends, to teach rational tactics in solving medical and social problems only by non-traditional, active, problem-based learning, choosing methods that are adequate to the goals and objectives. To this end, it is proposed to conduct business games, solving situational problems.

PRACTICAL SKILLS

Palpation of the abdomen in surgical diseases
Indications:
- Surgical diseases of the abdominal organs.
Preparation:

1. The doctor's hands should be dry, clean, warm, nails cut short.
2. Tell the child's parents about the upcoming manipulation.
3. It is necessary at the beginning to get in touch with the child, distract his attention with a conversation, a toy.

Necessary conditions, tools:

1. Well lit room.
2. Couch or table for swaddling newborns.
3. In some cases, in order to obtain more accurate data, the child must be given a cleansing enema before palpation, which frees the colon from feces.
4. The position of the child during the examination (lying on his back, on a dense surface, the legs of the subject should be bent at the hip and knee joints at an angle of approximately 45 degrees, arms along the body, head on a flat surface, but not on a pillow), in a row cases, palpation is carried out in a special position of the child (on the side, standing).

Technique:

1. **Superficial palpation** is a gentle, sliding pressure with the tips of the folded second to fifth fingers of a slightly bent palm (it practically lies on the abdominal wall) along the surface of the abdomen in the "counterclockwise" direction.

1.2. Palpation begins with:
- sigmoid colon
- descending
- transverse colon
- ascending

departments of the large intestine, then in the epigastric region, hypochondrium, in the navel, flanks and hypogastric region.

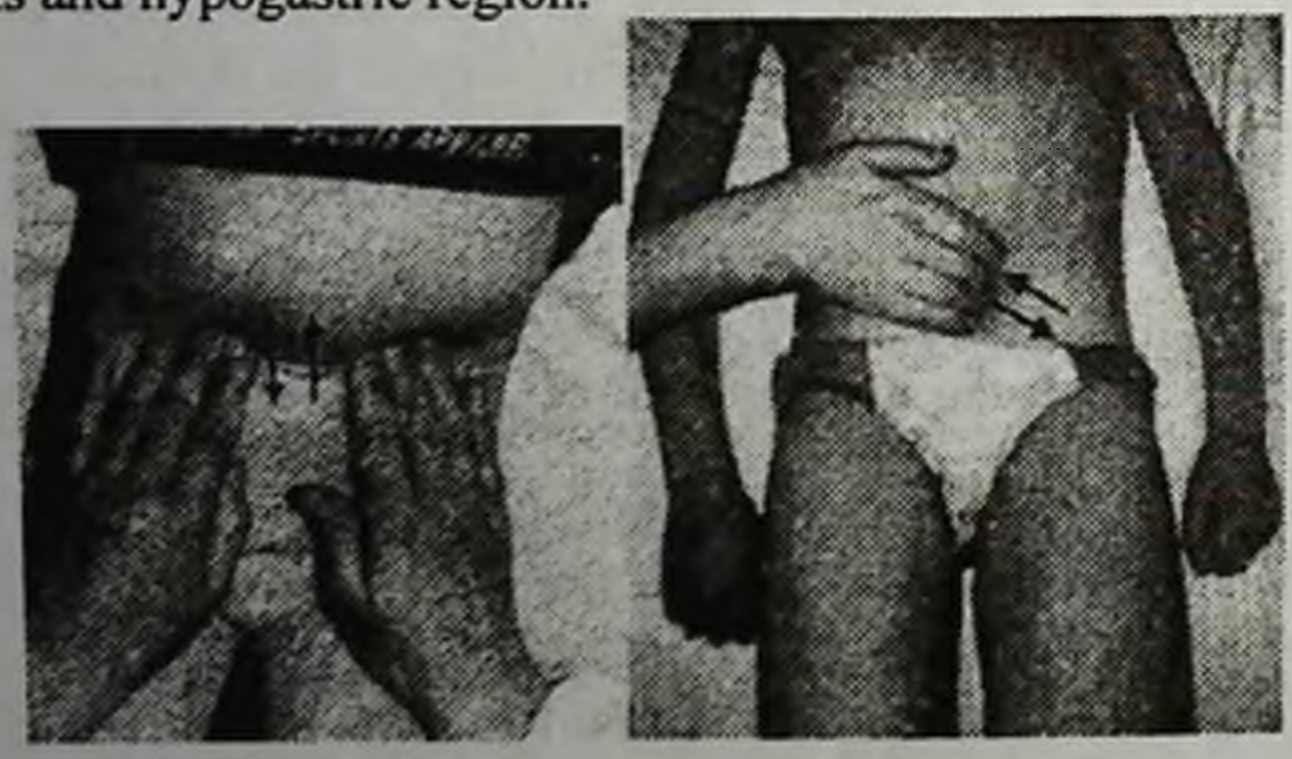


Figure 71. Technique of superficial and comparative palpation of the abdomen

1.3. Criteria for evaluation. With superficial palpation, the following signs are determined:
- sensitivity
- soreness
- tension (defans) of the abdominal wall "board-shaped stomach"
- dimensions of internal organs

- bloating
2. **Deep palpation** according to the Obraztsov-Strazhesko method.
2.1. with one hand it is desirable to support the body from the back;
2.2. with the fingers of the other hand, placing the palm perpendicular to the organ or edge being palpated, the skin is somewhat pulled away from the organ (in this case, a small skin fold is formed);
2.3. then the fingers are carefully immersed (preferably during exhalation) deep into the direction of the abdominal cavity and the back wall of the organ;
2.4. Evaluation criteria (each body has its own indicators):
- localization
- form
- soreness
- dimensions
- density and surface condition
- mobility
- rumbling
3. **Bimanual palpation method**, in which the abdomen is palpated with one hand, and the other hand supports the body in the opposite place from the back:
3.1. When examining organs located in the right half of the abdominal cavity, the left hand is located on the lower back on the right and with careful movements brings the organs closer to the right hand, which is used for palpation.
3.2. However, it is violated if the doctor knows about pain in some part of the abdominal cavity - this place **(Attention!)** Is examined last;

Figure 72. Areas of the anterior abdominal wall

When describing palpation data, the localization of the identified signs is indicated, for which the anterior abdominal wall is conditionally divided **into 9 sections by lines** (see figure.)

Visually, the lines are drawn as follows:
- 2 horizontal - along the lower edges of the X ribs on both sides and between the anterior superior iliac spines;
- 2 vertical lines - along the outer edges of the rectus abdominis muscle.

The resulting three upper parts (in Figure 1-3) - the right hypochondrium, the epigastrium itself (the epigastric region) and the left hypochondrium - together form **the epigastric region.**

The three middle parts (in Figure 4-6) - the right flank (right lateral region), the umbilical region and the left flank (left lateral region) - are **the mesogastric region.**

The three lower parts (in Figure 7-9) - the right iliac, suprapubic, and left iliac regions - form **the hypogastric region.**

Conducting a contrast study of the gallbladder (cholecystography)

Indications:

- diseases and malformations of the gallbladder.

Contraindications:

1. Children under 1 year old;
2. Decompensation of liver function;
3. Intolerance to iodine preparations;
4. Hyperthyroidism, thyrotoxicosis;
5. Acute cholecystitis.

Preparation:

Tell the child's parents about the upcoming manipulation.

Necessary conditions, tools and medicines:

1. Contrast agent (bilitrast, at the rate of 0.05 g per 1 kg of body weight);
2. X-ray equipment.

Technique:

1. In the evening, the patient is given a drink of bilitrast;
2. Before going to bed, the patient is given a cleansing enema;
3. 12 hours after giving the contrast on an empty stomach, cholecystography is performed (the position of the patient is standing).

Note: if it is necessary to determine the contractile function of the gallbladder, a second picture is taken 1 hour after giving a choleretic breakfast (two raw yolks)

Figure 73. Contrast cholecystocholangiogram

IV. Big break - 40 minutes (11.50-12.30).

V. Practical lesson (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

STUDY TASKS

Appendix 1

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: Hypotrophy, vomiting, icterus, pain, bleeding.

Appendix 2

Tasks for groups

1. Specify the types of portal hypertension in children? Cluster, SWOT table, Venn diagram for the word "vomit" and chart Why? and hierarchical diagram How?
2. Clinical signs of portal hypertension in children. Create a cluster, SWOT table, Venn diagram for the word "icteric" and draw diagrams Why? and hierarchical diagram How?
3. Specify the clinical signs of liver cirrhosis in children. Cluster, SWOT table, Venn diagram for the word "bleeding" and chart Why? and hierarchical diagram How?
4. What method of surgical intervention is used for Budd-Chiari syndrome? Make a cluster, SWOT table, Venn diagram for the word "habitus" and draw charts Why? and hierarchical diagram How?
5. What are the main symptoms of Budd-Chiari syndrome? Make a cluster, SWOT table, Venn diagram for the word "regurgitation" and draw diagrams Why? and hierarchical diagram How?

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;

b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concepts	V	+	-	?
Malformations and anomalies in the development of the liver, bile ducts and pancreas (Budd-Chiari syndrome, congenital liver fibrosis, portal vein thrombosis, biliary atresia) clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where:

V - corresponds to the existing knowledge (information) about ...

- contradicts existing knowledge about ...

+ - is new information

? -incomprehensible or requiring clarification, addition information

CONCEPT TABLE

-provides a comparison of the studied phenomena, concepts, views, topics.
- vertically is what is to be compared (views, theories)
-horizontally - various characteristics for which comparison is made

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located. (recommendations, categories, various signs, etc.)						
	Jaundice	Pain	Belly enlargement	Vomiting	Ultrasound of the abdominal organs	Increased blood pressure	Bleeding
Budd-Chiari Syndrome							
Atresia of the biliary tract							
Cirrhosis of the liver							
FibroCholangioCystosis							
Portal vein thrombosis							

SWOT

(homework or independent work of the student: for creative thinking after lectures or practical classes)

Analytical table - SWOT

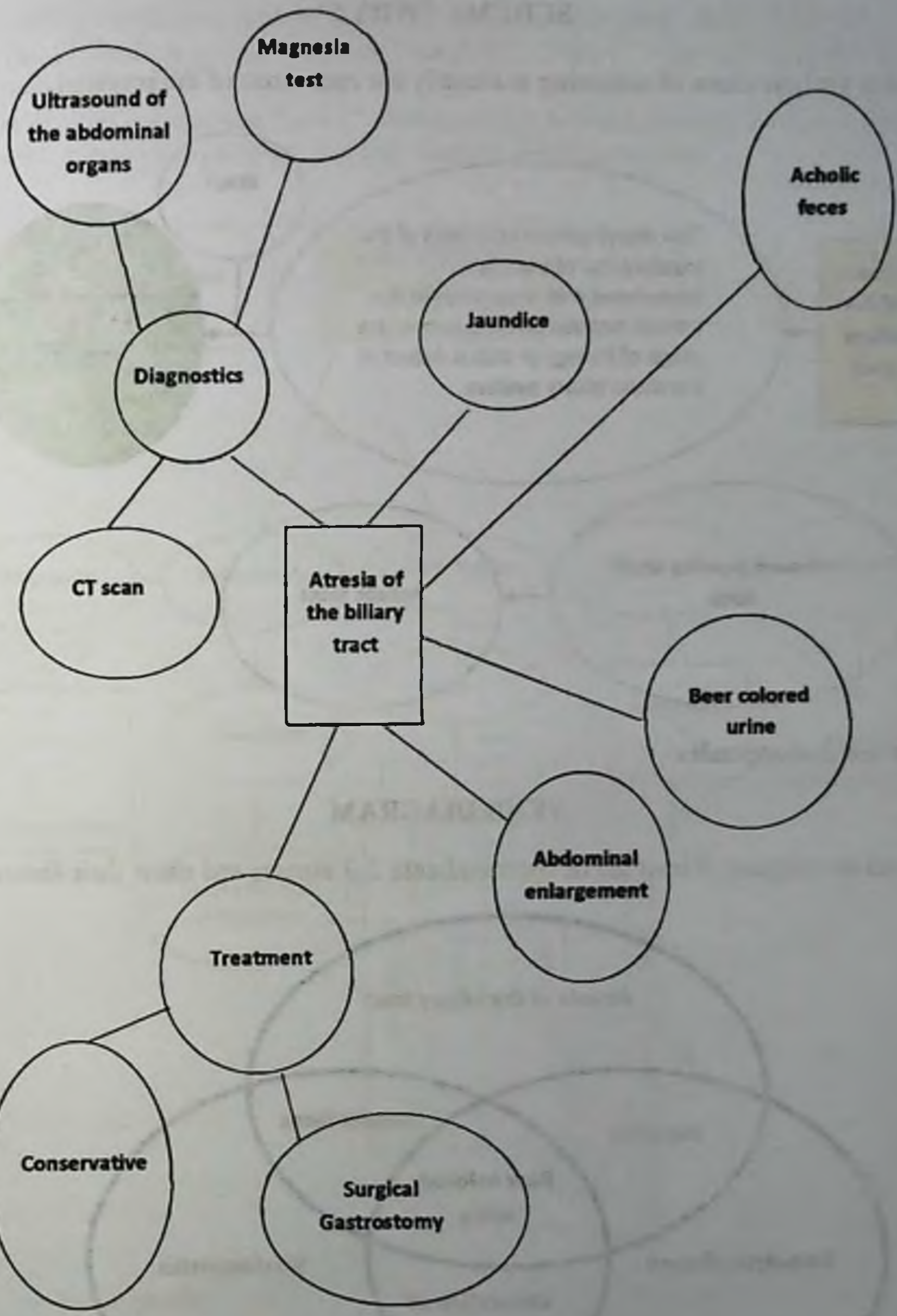
S	W
O	T

Note: see 2nd appendix.

CLUSTER (Bunch, bundle)

A way of mapping information - gathering ideas around a major factor to focus and make sense of the whole construct

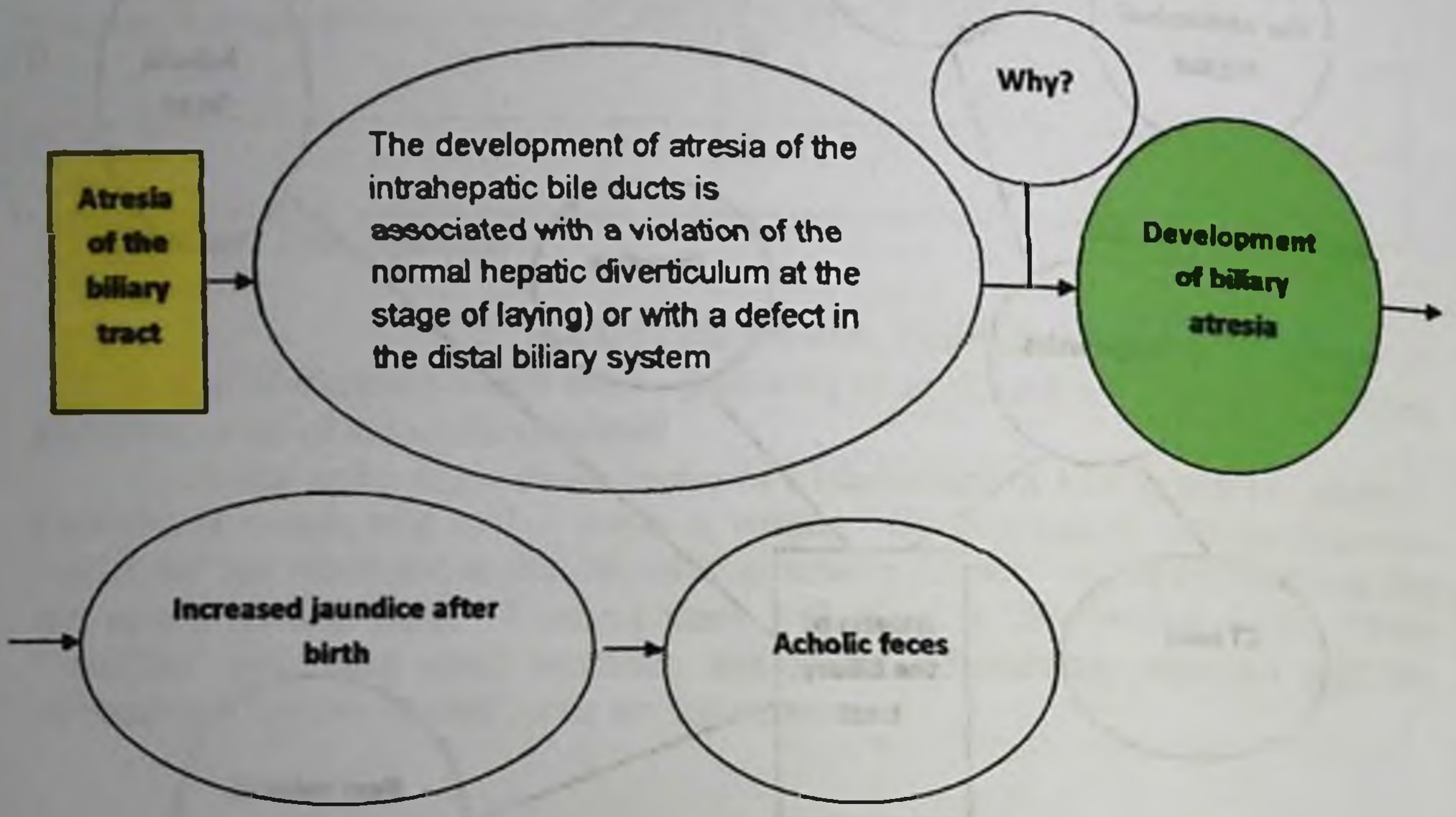
Clustering technology: In the center of a blackboard or a large sheet of paper, a keyword or a topic title of 1-2 words is written. By association with the keyword, "satellites" are attributed to the side of it in smaller circles - words or sentences that are related to this topic. Connect them with lines to the "main" word. These "satellites" may have small satellites, and so on. Recording continues until the allotted time expires or until ideas are exhausted.



Note: see 2nd appendix

SCHEME "WHY?"

This is a whole chain of reasoning to identify the root cause of the problem.



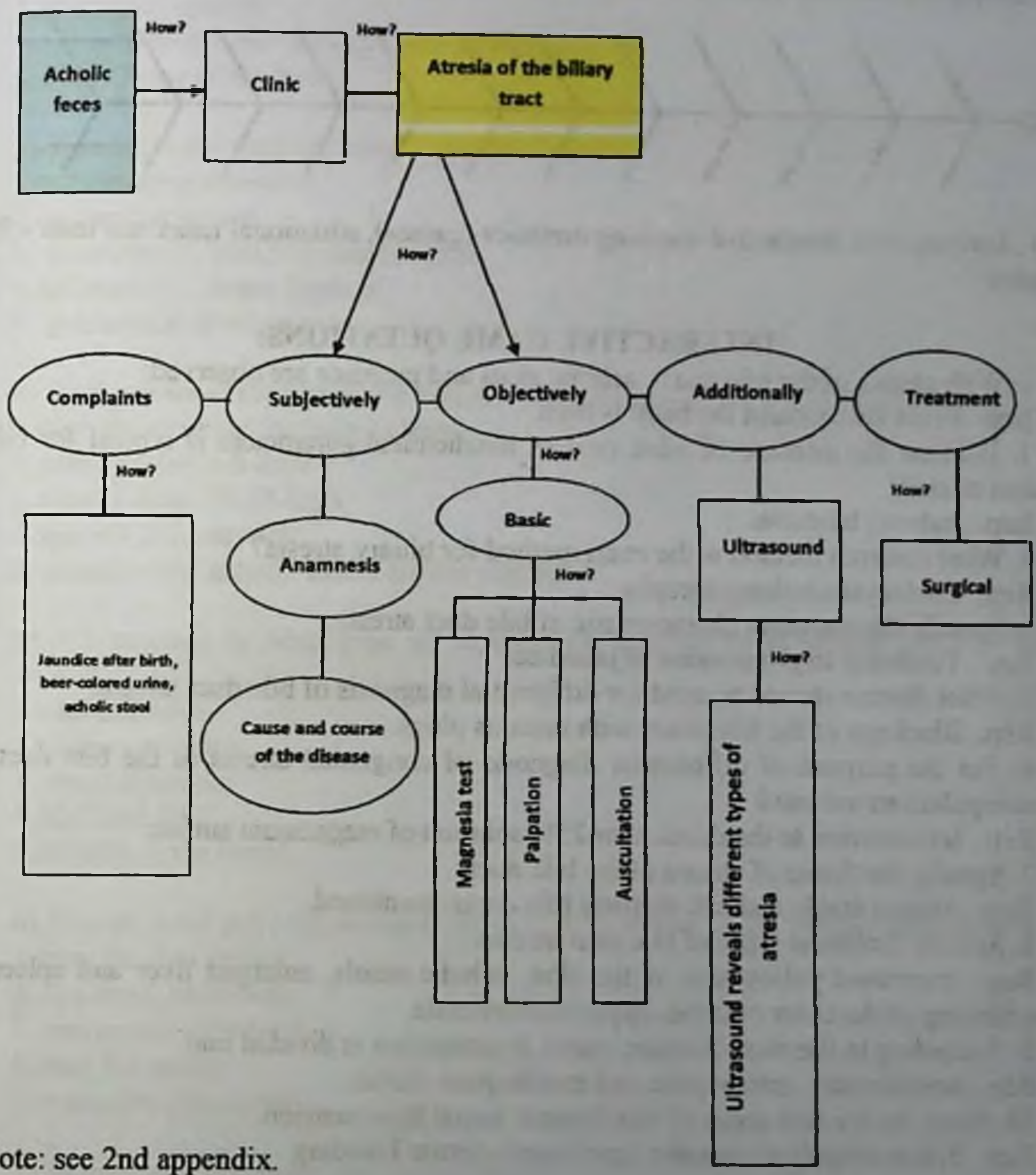
Note: see 2nd appendix.

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features

When solving a problem, in most cases you do not need to think about "What to do?". The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

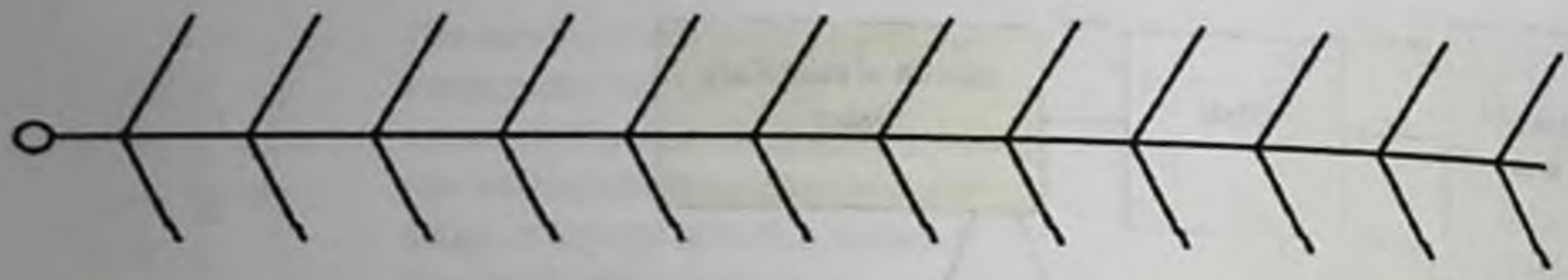
Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them:



Note: see 2nd appendix.

SCHEME "FISH SKELETON"

Allows you to describe the whole circle (field) of the problem and try to solve it. Develops and activates systemic, creative, analytical, analytical thinking. Familiarize yourself with the rules for constructing a diagram.



3. Training with interactive teaching methods (games), situational tasks and tests - 20 minutes;

INTERACTIVE GAME QUESTIONS:

1. With atresia of the bile ducts, acholic stool and jaundice are observed:
Rep. From the moment the baby is born.
2. Indicate the increase of what type of biochemical parameters is typical for bile duct atresia?
Rep. Indirect bilirubin.
3. What research method is the main method for biliary atresia?
Rep. Cholecystocholangiography.
4. Specify the symptom characteristic of bile duct atresia:
Rep. Tendency to progression of jaundice.
5. What disease should be used for differential diagnosis of bile duct atresia?
Rep. Blockage of the bile ducts with mucous plugs.
6. For the purpose of differential diagnosis of congenital atresia of the bile ducts, manipulations are used:
Rep. Introduction to the duodenum 25% solution of magnesium sulfate.
7. Specify the forms of atresia of the bile ducts.
Rep. Atresia inside and extrahepatic bile ducts, combined.
8. Specify 5 clinical signs of bile duct atresia.
Rep. Increased yellowness of the skin, acholic stools, enlarged liver and spleen, reddening of the color of urine, hyperbilirubinemia.
9. According to the classification, portal hypertension is divided into:
Rep. suprahepatic, intrahepatic and extrahepatic forms.
10. Hurry up the first signs of extrahepatic portal hypertension.
Rep. Splenomegaly or massive esophageal-gastric bleeding.

SELF-CHECK TESTS:

1) Symptom uncharacteristic for intrahepatic portal hypertension:
1. liver enlargement
2. enlarged liver and spleen
3. shrinkage of the liver and spleen
4. unchanged liver and spleen

5.nosebleed

2) Portal hypertension diagnostic method:
1. liver rheography
2. cchography of the liver
3.splenoportography
4. splenoportography with splenomanometry
5. Plain X-ray of the liver

3) Treatment not used for portal hypertension:
1.conservative treatment
2.surgical treatment
3. omentopexy, portocal anastomosis
4.splenectomy, artery ligation
5. splenorenal anastomosis

4) With atresia of the bile ducts, acholic stools and jaundice are observed:
1.from the moment the baby is born
2.starting from 4-5 days
3.starting from 10-15 days
4.appears at a later date
5. jaundice and acholic stools are not observed

5) An increase in what type of biochemical parameters is typical for bile duct atresia?
1.total bilirubin
2.indirect bilirubin
3. direct bilirubin
4.ALT and AST
5.urobilin in the blood

6) Acholic stool and yellowness of the skin with atresia of the biliary tract appears
1.from the first days
2. one week after birth
3. one month after birth
4.after 2-3 weeks
5. 6 months after birth

7) Intrahcpatic bilc ducts arc formcd from:
1. cranial bile duct
2. elements of the renal lobules
3.round ligament of the liver
4.glison capsule
5. elements of the peritoneum

8) Extrahepatic bile ducts are formed from:
1. cranial bile duct
2. elements of the renal lobules
3.round ligament of the liver
4.glison capsule
5. elements of the peritoneum

9) Clinical manifestations of atresia of the bile ducts develops through:
1.first days after birth
2.1 month after birth
3.3 month after birth
4.5 month after birth
5.9 month after birth

10) Select a symptom characteristic of bile duct atresia.
1.excessive staining of the stool
2. increase in the amount of AST, ALT
3.increase in the amount of direct bilirubin
4. tendency to progression of jaundice.
5.reducing the size of the liver, spleen

11) Differential diagnosis of bile duct atresia should be
to carry out with the following diseases.
1. peritonitis
2.sepsis
3. blockage of the bile ducts by mucous plugs
4.cirrhosis of the liver
5.diaphragmatic hernia

12) For the differential diagnosis of congenital artesia of the biliary
moves apply the following manipulations.
1. laparocentesis
2. introduction into the duodenum of 25% magnesium sulfate solution
3. survey radiography of the abdominal cavity
4.Diagonal laparotomy
5.X-ray tomography

13) At what age is it better to operate a child for atresia of the bile ducts.
1.up to 1.5 months
2.up to 3 months
3.up to 6 months
4.up to 8 months
5.up to 12 months

14) Potral hypertension syndrome is manifested by the following symptoms.

1. hyposplenism
2.myocardial hypertrophy
3.early onset of arthritis
4.pulmonary bleeding
5. bleeding from the veins of the esophagus, rectum

15) Classification of portal hypertension /G.M. Grozdov and M.D. Patsiora/ includes.
1.sclerosing form
2.intrahepatic form
3.biliary form
4. icteric form
5. hemorrhagic form

16) Most often, collateral blood flow in portal hypertension develops according to:
1.arterio-venous shunts
2.gastroesophageal pathway
3.caval-caval anastomosis
4. anastomoses between the renal veins
5. capillary anastomoses

17) There is the following form of bile duct atresia
1.atresia of the bile ducts of the right lobe
2.atresia of the intrahepatic bile ducts
3. atresia of the proximal bile ducts
4. atresia of the distal bile ducts
5. atresia of the bile ducts of the left lobe

18) There are the following types of surgical treatment of atresia of the bile ducts.
1. resection of the liver lobe
2. anastomosis between the bile ducts and duodenum 12
3.imposition of interintestinal anastomosis
4.lithotripsy
5. laparocentosis

19) With portal hypertension, the following study is possible.
1. Esophagogastrography with barium lime
2. Plain X-ray of the abdominal cavity
3.bronchography
4.encephalography
5. duodenal sounding

20) Surgical interventions used to treat portal hypertension include:
1. resection of the stomach
2. resection of the liver lobe

3. operations aimed at removing ascitic fluid from the abdominal cavity
4. removal of the spleen
5. termination of connection between the veins of the stomach and esophagus

21) In case of esophageal bleeding, the following measures are necessary
1. application of a hemostatic tourniquet
2.emergency operation
3.Application of the Blackmore probe
4.clamping of a bleeding vessel
5.gastric sounding

22) The cause of the intrahepatic form of portal hypertension may be.
1.portal vein thrombosis
2. malformations of the portal vein
3.acute hepatitis
4. Obliterating phlebitis of the hepatic veins \ Chiari disease \
5.tumor in the area of the gate of the liver

23) The causes of the extrahepatic form of portal hypertension can be.
1.diaphragmatic hernia
2.liver injury
3.chronic hepatitis
4. Obliterating phlebitis of the hepatic veins \ Chiari disease \
5.tumor in the area of the gate of the liver

Answers to tests for self-control

1-5, 2-4, 3-3, 4-1, 5-1, 6-1, 7-1, 8-5, 9-1, 10-4, 11-3, 12-2, 13-1, 14-5, 15-2, 16-2, 17-2, 18-2, 19-5, 20-5, 21-3, 22-3, 23-5.

CHAPTER 8. MALFORMATIONS AND ANOMALIES IN THE DEVELOPMENT OF THE VAGINAL PROCESS OF THE PERITONEUM AND TESTICLES (INGUINAL HERNIA, HYDROCELE, CYST OF THE SPERMATIC CORD, NUKKA CYST, ANORCHISM, MONORCHISM, POLYORCHISM, CRYPTORCHIDISM, TESTICULAR ECTOPIA, VARICOCELE) CLINIC, DIAGNOSIS, TREATMENT, COMPLICATIONS, POSTOPERATIVE REHABILITATION

The purpose of the training: to develop the skills and abilities of clinical diagnosis, treatment and rehabilitation of children with congenital malformations and developmental anomalies requiring surgical correction.

Learning objectives:

- Formation of knowledge on the etiology, pathogenesis and clinic of the most common malformations and developmental anomalies in children;
- Development of students' skills and abilities of clinical examination and examination of a child with congenital malformations and developmental anomalies, including laboratory, radiation and instrumental research methods;
- Students mastering the diagnostic algorithm for malformations and developmental anomalies that pose a threat to a child's life;
- Acquaintance with the principles of surgical treatment of malformations and developmental anomalies and their complications;
- Development of skills and abilities of general medical care: based on treatment and diagnostic standards and protocols for postoperative rehabilitation of children with congenital malformations and developmental anomalies.

Location of the lesson: Department of Urology, Operating Room, Computer Room, Training Room

Monitoring and evaluation: oral control, control questions,

performance of educational tasks in groups.

Written control: control questions.

HYPOPLASIA OF THE TESTICULAR

Testicular hypoplasia develops as a result of impaired blood supply and is most often found in cryptorchidism. In the case of bilateral hypoplasia, endocrine disorders are noted. As a rule, children have adiposogenital obesity, sexual development is delayed.

In some cases, the anomaly is combined with micropenia, or "hidden penis".

Treatment is carried out by an endocrinologist.

Monorchidism is a congenital anomaly characterized by the presence of only one testicle. The occurrence of an anomaly is associated with a violation of

embryogenesis before the laying of the final kidney and gonad. Therefore, there is often a combination of monorchism and a solitary kidney.

With monorchism, along with the absence of the testicle, the epididymis and the vas deferens do not develop. The corresponding half of the scrotum is aplastic.

The diagnosis of monochism is competent only after unsuccessful searches for the testicle with a wide revision of the retroperitoneal space.

The congenital absence of one testicle with a normal second is usually not manifested by endocrine disorders and does not lead to infertility. However, in some cases, the only testicle is cryptorchid. Then the hypogonadism expressed in varying degrees can take place.

Treatment. With "pure" monorchism, the treatment consists in implanting a silicone testicular prosthesis into the scrotum. The operation is performed for cosmetic reasons in adolescents 12-14 years old. With hypoplasia of a single testicle, help consists in hormone replacement therapy.

Anorchism is the congenital absence of both testicles, due to the non-laying of the embryonic gonad. It is usually associated with bilateral agenesis or aplasia of the kidneys, but may be noted as an independent anomaly. With bilateral agenesis and aplasia of the kidneys, children are not viable. In extremely rare cases of anorchism as an independent anomaly, pronounced eunuchoidism, underdevelopment of the external genitalia, absence of the prostate gland and seminal vesicles are revealed. Secondary sexual characteristics do not develop.

Treatment is reduced to the appointment of hormones.

Polyorchism is an anomaly characterized by the presence of an additional (third) testicle. Usually it is reduced, hypoplastic, devoid of an appendage and is located in the scrotum above the main testicle. Extremely rare observations of an ectopic accessory testicle under the skin of the thigh, back, and neck are described.

Treatment consists in removing the accessory testicle, as it can be a source of malignant tumor development.

CRYPTORCHISM

Cryptorchidism refers to anomalies in the position of the testis, the occurrence of which is associated with a violation of the process of their lowering. In the fetus, the testicles are located retroperitoneally on the back wall of the abdomen. From the 6th month of intrauterine development, the testicles begin to descend following the gunter band. Having passed the inguinal canal, they descend to the bottom of the scrotum and are fixed there by the time the child is born. However, due to various reasons, the process of lowering is stopped or perverted. There is also evidence that the development of cryptorchidism is based on a delay in the differentiation of mesenchymal tissue.

In the presence of short vessels or obstructions along the inguinal canal, the testicle lingers at the entrance to it or in its lumen. In these cases, we are talking about true cryptorchidism. In other words, cryptorchidism is the thirst for the testicle on its way to the scrotum. If the testicle is located in the abdominal cavity, before

entering the inguinal canal, such retention is called abdominal. The retention of the testicle in the inguinal canal is called inguinal.

If in the process of lowering the testicle at the entrance to the scrotum there is an obstacle in the form of a connective tissue membrane, the conductor of the testicle paves the way in the subcutaneous tissue to the bosom, to the inguinal region, to the thigh or to the perineum. The location of the testicle in these areas is called ectopic testis. In other words, ectopia is the deviation of the testicle from the path to the scrotum. The forms of ectopy are determined by the location of the testicle.

Clinic and diagnostics. Identification of cryptorchidism and testicular ectopia is based on examination and palpation data. With ectopia, the testicle, in the form of an elastic, slightly painful formation, is palpated in the subcutaneous tissue. His mobility is limited. The corresponding half of the scrotum is flattened, underdeveloped. With cross dystopia in one half of the scrotum, two testicles are determined, located one above the other.

With bilateral true cryptorchidism, which is less common than unilateral, signs of sexual infantilism and hormonal dysfunction are often noted. Due to the fact that the vaginal process of the peritoneum with cryptorchidism almost always remains non-obliterated, patients have an inguinal hernia.

Treatment. An undescended testicle must be brought down into the scrotum. The operation is performed early due to the risk of various complications due to the abnormal location of the testicle. Based on these considerations, the operation of bringing down the testicle is performed at the age of 1-2 years.

With ectopia, the testicle is isolated from the surrounding tissues and lowered into the scrotum, fixing the membranes to the tunica dartos (Schüller's operation). In the case of cryptorchidism, bringing down and fixing the testicle - orchidopexy - is carried out in different ways, depending on the possibility of elongation of the testicular vessels. Sometimes at the first stage, the testicle can be fixed only in the outer inguinal ring or at the entrance to the scrotal-scrotal region.

In the case of severe endocrine disorders, hormonal treatment is carried out, which in some cases leads to testicular descent without surgery.

The prognosis for ectopic testis is usually favorable. With cryptorchidism, it depends on the degree of underdevelopment of the testicles. According to combined statistics, with unilateral cryptorchidism, only 40% of men have viable sperm, with bilateral cryptorchidism, men are usually infertile.

DROPSY OF THE MEMBRANES OF THE TESTICLES AND THE SPERMAL CORD

Dropsy of testicular membranes (hydrocele) and spermatic cord (funiculocele) are very common anomalies in children; their development is associated with non-closure of the vaginal process of the peritoneum and the accumulation of serous fluid in its cavity. In the absence of obliteration of the vaginal process, dropsy of the testicular membranes is formed in the distal section. If the process is obliterated in the distal section, and the proximal one remains open and communicates with the abdominal cavity, we are talking about a communicating dropsy of the spermatic

cord. In the case of non-obliteration of the entire vaginal process, a communicating dropsy of the membranes of the testis and the spermatic cord is formed. When the process is obliterated in the distal and proximal sections, and fluid accumulates in its middle section, they speak of a non-communicating dropsy of the membranes of the spermatic cord, or a cyst of the spermatic cord (Fig. 74).

Figure 74. Variants of dropsy of the testicles

In older children and adults, trauma and inflammation are the causes of hydrocele and funiculocele. When hit in the inguinal region, exudate can accumulate in the membranes of the spermatic cord, which does not resolve for a long time. In these cases, they speak of an acute cyst of the spermatic cord.

Clinic and diagnostics. Dropsy is characterized by an increase in half, and with a bilateral disease - the entire scrotum. With isolated dropsy of the testicle, the swelling has a rounded shape, the testicle is determined at its lower pole. Communicating dropsy is manifested by a soft elastic formation of an oblong shape, the upper edge of which is palpable at the outer inguinal ring. When straining, this formation increases and becomes more dense. Palpation of the swelling is painless. Diaphanoscopy reveals a characteristic symptom of translucence. With the valvular nature of the communication with the abdominal cavity, dropsy is tense, and can cause anxiety in the child. The cyst of the spermatic cord has a round or oval shape with clear contours. Its upper and lower poles are well defined.

Dropsy most often has to be differentiated from inguinal hernia. When the hernial contents are reduced, a characteristic rumbling is heard, immediately after the reduction, the swelling in the inguinal region disappears. With non-communicating dropsy, an attempt to reduce does not bring success. In the case of a message, the size of the formation in a horizontal position decreases, but more gradually than when the hernia is reduced, and without a characteristic sound. Great difficulties arise in the differential diagnosis of an acute cyst with an incarcerated inguinal hernia. In such cases, they often resort to surgical intervention with a preliminary diagnosis of "incarcerated inguinal hernia".

Treatment. Since self-healing is possible during the first 2 years of life due to the completion of the process of obliteration of the vaginal process, the operation is performed in children older than this age. With isolated and acquired dropsy of the testicular membranes, the Winkelmann operation is generally accepted, which consists in dissecting the membranes of the dropsy cavity and suturing them in a twisted position around the testicle and epididymis (Fig. 75).

With communicating dropsy, the Ross operation is used, the purpose of which is to stop communication with the abdominal cavity and create an outflow for the dropsy fluid. The vaginal process is ligated at the internal inguinal ring and partially removed, leaving a hole in the testicular membranes through which the dropsy fluid exits and is absorbed into the surrounding tissues. This operation is simpler than the Winkelmann operation, it is not accompanied by testicular trauma and gives a good effect.

Figure 75. Stages of the Winckelmann operation.

In children under 2 years of age, in case of tense dropsy of the testicular membranes, causing anxiety, the use of a puncture method of treatment is indicated. After evacuation of the dropsy fluid, a suspension is applied. Repeated puncture is performed as fluid accumulates. Suction of the liquid weakens the compression of the testicle and allows you to postpone the timing of surgical intervention.

INGUINAL HERNIA

Inguinal hernia is one of the most common surgical diseases in childhood. There is a predominantly unilateral inguinal hernia, and on the right 2-3 times more often. Inguinal hernias are observed mainly in boys, which is associated with the process of testicular descent. Acquired hernias are extremely rare, usually in boys over 10 years of age with increased physical activity and severe weakness of the anterior abdominal wall.

Due to the fact that hernias in children are usually congenital, they descend along the inguinal canal, entering it through the internal inguinal ring, i.e. are oblique. Direct hernias in children are observed as an exception.

The contents of the hernial sac in children are most often loops of the small intestine, at an older age - often the omentum. In girls, an ovary is often found in a hernial sac, sometimes along with a tube. When the colon has a long mesentery, the contents of the hernial sac may be the caecum. In these cases, the posterior wall of the hernial sac is absent (sliding hernia) (Fig. 76).

Figure 76. Variants of inguinal hernias

Clinic and diagnostics. Usually in a small child, sometimes already in the neonatal period, a protrusion appears in the inguinal region, which increases with crying and anxiety and decreases or disappears in a calm state. The protrusion is painless, has a rounded or oval shape. In the latter case, the protrusion descends into the scrotum, causing stretching of one half and leading to its asymmetry. The consistency of education is elastic. In a horizontal position, it is usually easy to set the contents of the hernial sac into the abdominal cavity. At the same time, a characteristic rumbling is clearly audible. After reduction of the hernial contents, the enlarged external inguinal ring is well palpated. At the same time, a positive "shock" symptom is detected when the child coughs.

In girls, the protrusion with an inguinal hernia has a rounded shape and is determined at the external inguinal ring. With a large hernia, the protrusion descends into the labia majora.

In older children, if the hernia does not come out constantly, straining, coughing, and examination after exercise are used. The thickening of the elements of the spermatic cord, the expansion of the inguinal ring, the positive symptom of the "shock" in combination with the anamnestic data make the diagnosis undoubted in these cases.

It is necessary to **differentiate** an inguinal hernia mainly with a communicating dropsy of the testicular membranes. With dropsy, the testicle is inside the formation, with a hernia - outside it. The edema tumor has a tugoelastic consistency, cystic character and is translucent. In the morning it is smaller and more flabby, in the evening it increases and becomes more tense.

Treatment. The only radical method of treating an inguinal hernia is surgical. Modern methods of anesthesia allow you to perform the operation at any age, starting from the neonatal period. According to relative contraindications in uncomplicated cases, the operation is transferred to an older age (6-12 months).

Strangulated inguinal hernia. A complication of an inguinal hernia is its infringement. In this case, the intestinal loop or omentum that has fallen into the hernial sac is compressed in the hernial orifice, and their blood supply and nutrition are disturbed. The cause of the infringement is considered to be an increase in intra-abdominal pressure, impaired bowel function, flatulence, etc.

Clinic and diagnostics. Parents usually indicate exactly the time when the child begins to worry, cries, complains of pain in the area of the hernial protrusion. It

becomes tense, sharply painful on palpation and does not retract into the abdominal cavity. Later, the pain subsides, the child becomes limp, there are nausea or vomiting, and stool retention may be observed.

Diagnosis of a strangulated hernia is based on history and physical examination. If there is a history of indications of an inguinal hernia, the recognition of infringement is usually not difficult. In children of the first months of life, it can be difficult to distinguish a strangulated inguinal hernia from an acute cyst of the spermatic cord, inguinal lymphadenitis. In doubtful cases, the doctor leans towards the diagnosis of strangulated inguinal hernia. Surgery resolves doubts.

Incarceration of an inguinal hernia in children has its own characteristics, consisting in better blood circulation of the intestinal loops, greater elasticity of the vessels and less pressure on the infringing ring. Despite the fact that self-reduction of a hernia is often observed in children, strangulation is a complication that requires urgent surgical intervention.

Treatment. In weak, premature babies or in the presence of therapeutic contraindications, it is considered acceptable to carry out conservative treatment in the first 12 hours from the moment of infringement, aimed at creating conditions for self-reduction of the hernia. For this purpose, a 0.1% solution of atropine and a 1% solution of promedol are administered, a warm bath is prescribed for 15-20 minutes, then the child is laid down with a raised pelvis. You should not try to set the hernia with your hands, as this may damage the strangulated organs.

In the absence of the effect of conservative treatment within 1.5-2 hours, an emergency operation is indicated.

VARICOCELE

Varicocele - varicose veins of the pampiniform plexus - occurs in boys mainly after the age of 9-10 years with a frequency of up to 15%.

Distinguish between idiopathic and symptomatic varicocele. The development of a secondary varicocele is due to compression of the outflow tract of blood from the testicle by some volumetric retroperitoneal formation.

Primary varicocele is formed, as a rule, on the left and has a rather complex genesis. As you know, the blood from the testicle flows through three veins: testicular, cremasteric and vein of the vas deferens. The last two flow into the iliac veins. The right testicular vein drains into the inferior vena cava, and the left into the renal vein. The left renal vein, approaching the inferior vena cava, is placed in the so-called aortomesenteric forceps and can be compressed, which leads to venous renal hypertension and difficulty in the outflow of blood through the testicular vein. Sometimes the renal vein is compressed by the abnormally passing testicular artery that passes through it.

Clinic and diagnostics. Very rarely, varicocele is found in young children. In the anamnesis of such patients, it is usually possible to identify a factor that caused a long-term violation of the outflow of blood from the testicle.

Sometimes varicose veins are noted on the right or on both sides. Varicocele only on the right is associated with an abnormal confluence of the right testicular vein

into the renal vein. Bilateral varicocele is due to the presence of intertesticular anastomoses, through which increased blood pressure in the left testicle is transmitted to the right side. After the treatment of the left-sided varicocele, the expansion of the right pampiniform plexus usually also disappears.

Children with varicocele, as a rule, do not complain, and varicose veins are detected during preventive examinations at school. Only older children sometimes notice a feeling of heaviness and some soreness in the left half of the scrotum.

Clinically, there are three degrees of varicocele:

I - the expansion of the veins above the testicle is determined only by palpation in the vertical position of the patient with tension in the abdominal muscles;

II - dilated and tortuous veins are clearly visible through the skin of the scrotum, in a horizontal position the veins collapse;

III - against the background of the dilation of veins determined by the eye, testiness and reduction of the testicle are detected by palpation (Fig. 77).

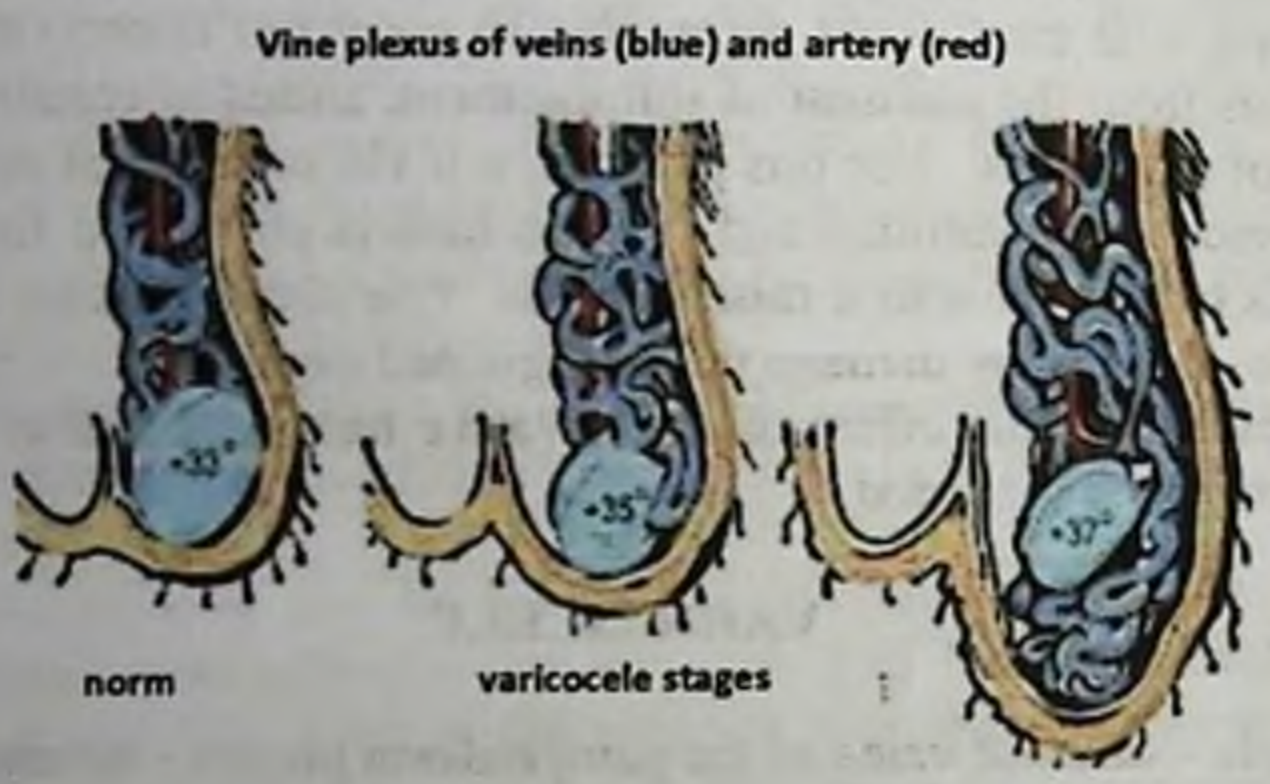


Figure 77. Stages of varicocele

With a varicocele that does not fall down in a horizontal position, studies are shown to detect a volumetric retroperitoneal formation.

Treatment. With an idiopathic varicocele, an operation is performed - ligation of the testicular vein in the retroperitoneal space or its thrombosis during angiographic examination. This stops the inverted blood flow from the kidney to the testicle and leads to the collapse of the varicose veins.

It is possible to equip a general practitioner with knowledge, to teach standard skills in the indicated professional field, to teach the skills of working with a patient, his relatives and friends, to teach rational tactics in solving medical and social problems only by non-traditional, active, problem-based learning, choosing methods that are adequate to the goals and objectives. To this end, it is proposed to conduct business games, solving situational problems.

I. Curation of patients on the topic - 15 minutes

II. Participation in the dressing room and in the operating room - 20 minutes;

III. Implementation of practical skills - 15 minutes:

CONSERVATIVE TREATMENT OF UMBILICAL HERNIA

- explain to parents the essence of the treatment of umbilical hernia;
- elimination of the causes associated with the release of a hernia;
- recommendations for general treatment (rickets, malnutrition, etc.);
- swaddling the baby;

Figure 78. Appearance of a patient with an umbilical hernia.

- put the child on the stomach for 2-3 minutes (this achieves regular abdominal exercises, which contributes to the narrowing of the umbilical ring);
- carry out a light massage of the anterior abdominal wall with careful stroking along the rectus muscles and around the navel clockwise;
- application of an adhesive bandage;
- the hernia is reduced on both sides of the navel;
- the skin is collected in folds;
- fix it in this position with a wide strip of adhesive tape;
- the patch is changed no more than once every 7-10 days;
- in parallel. therapeutic exercises are carried out;
- the child is bathed daily.

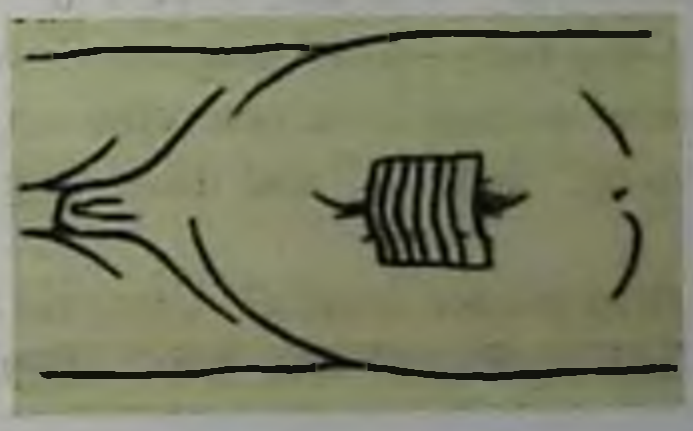


Figure 79. Applying an adhesive bandage for umbilical hernia

IV. Big break - 40 minutes (11.50-12.30).

V. Practical session (part 2) - 1 hour 35 minutes (12.30-14.05):

1. During classes, the use of electronic textbooks, video and photographic materials - 20 minutes;

2. UMM - 45 minutes

STUDY TASKS

Appendix 1

Group rules

Member of each group

- Respect for the thoughts of their comrades;
- Active and joint participation in tasks, manifestation of responsibility for the task;
- Can ask for help if necessary from comrades;
- Help your comrades in the group;
- Participate in the evaluation of the group;
- Must know the rules "In the same boat, a common fate - to be saved or drown"

Structure responses to questions.

1. What is included in subjective research?
2. Laboratory and instrumental research.

Give the following concepts: swelling, pain, palpable tumor, hernia

Appendix 2

Tasks for groups

1. Specify the types of testicular anomalies? Make a cluster, SWOT table, Venn diagram for the word "hypoplasia" and draw diagrams Why? and hierarchical diagram How?
2. Specify the clinical signs of cryptorchidism. Make a cluster, SWOT table, Venn diagram for the word "cryptorchism" and draw diagrams Why? and hierarchical diagram How?
3. Specify the clinical signs of "varicocella". Cluster, SWOT table, Venn diagram for the word "hernia" and chart Why? and hierarchical diagram How?
4. What method of surgical intervention is used for cryptorchidism? Make a cluster, SWOT table, Venn diagram for the word "habitus" and draw diagrams Why? and hierarchical diagram How?
5. What are the main symptoms of strangulated hernia? Compile a cluster, SWOT table, Venn diagram for the word "infringement" and draw diagrams Why? and hierarchical diagram How?

Diagnostic map of learning technology in the classroom

Evaluation indicators - the criterion was manifested in the training session:

Group	Task 1	Task 2	Task 3: (for each question 0.2 points)			Sum of points
	(1,0)	(1,4)	Question 1	Question 2	Question 3	(3,0)
1						
2						
3						

TABLE / X / Y - Students answer the questions "what do you already know about this topic?" and "what do you want to know?"; Allows you to conduct research work on the text, topic, section

Concept	know "+", don't know "-"	learned "+", could not find out "-"
Binary nomenclature:		
Etiology		
Pathogenesis		
Clinic		
Deontology		
Symptom		
Syndrome		
Disease		
Disease history		
Outpatient card		
Genetics		
Infection		
Diagnosis		
Instrumental examination of patients:		
Thermometer		
Phonendoscope		
Tonometer		
Iodolipol, barium sulfate		
Nasogastric tube		
Palpation		
Percussion		
Auscultation		
Anamnesis		
Examination		
General blood analysis, blood biochemistry		
General urine analysis		
ECG		
FCG		
EchoCG		
Chest X-ray		

INSERT TABLE

Insert table: a) provides systematization of information obtained during independent reading, listening to a lecture; confirmation, clarification, rejection, tracking the understanding of the information received;

b) contributes to the formation of the ability to link previously mastered information with new information.

Rules for compiling an INSERT table:

Concepts	V	+	-	?
Congenital malformations and anomalies of the vaginal process of the peritoneum and testicles (inguinal hernia, dropsy of the testicles, spermatic cord cyst, Nukka cyst, anorchism, monorchism, polyorchism, cryptorchidism, testicular ectopia, varicocele) clinic, diagnosis, treatment, complications, postoperative rehabilitation				
Place in medicine				
The main objective of the subject				
Types of disease				
The sequence of studying the subject				
Learning aids				

Where:

V - corresponds to the existing knowledge (information) about ...

- contradicts existing knowledge about ...

+ - is new information

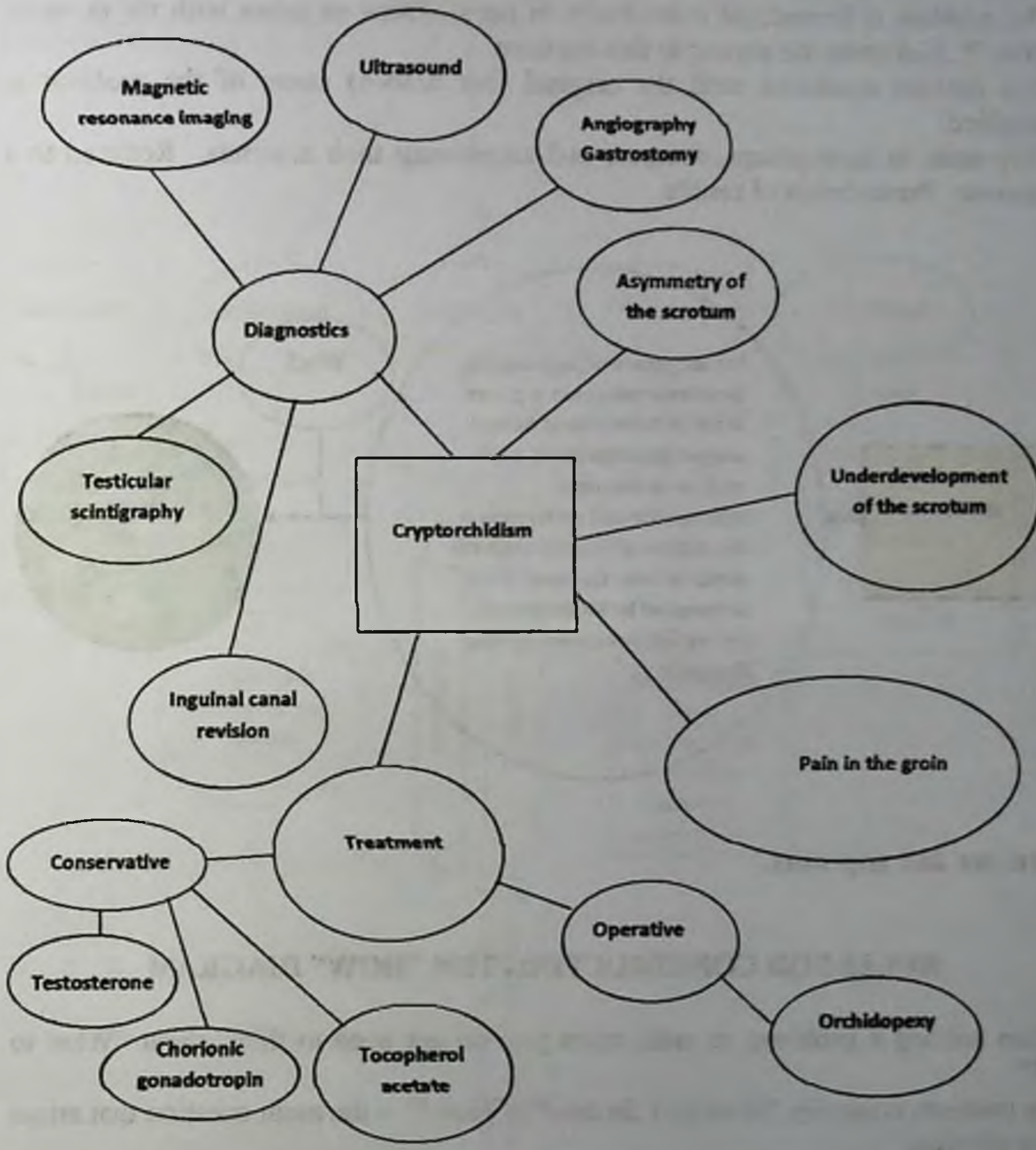
? -incomprehensible or requiring clarification, addition information

CONCEPT TABLE

Vertically - comparisons with diseases (theories) are located	Horizontally - various signs or symptoms of the disease are located. (recommendations, categories, various signs, etc.)					
	Swelling	Pain	Earthvorms	Diaphanoscopy	Palpation	Ultrasound
Inguinal hernia						
Dropsy of the testicles						
Cyst of the spermatic cord						
Cyst Nucca						
Anorchism						
Monarchism						
Polyorchism						
Cryptorchism						
Ectopic testis						
Varicocele						

CLUSTER (Bunch, bundle)

A way of mapping information - gathering ideas around a major factor to focus and make sense of the whole construct



Note: see 2nd appendix.

SCHEME "WHY?"

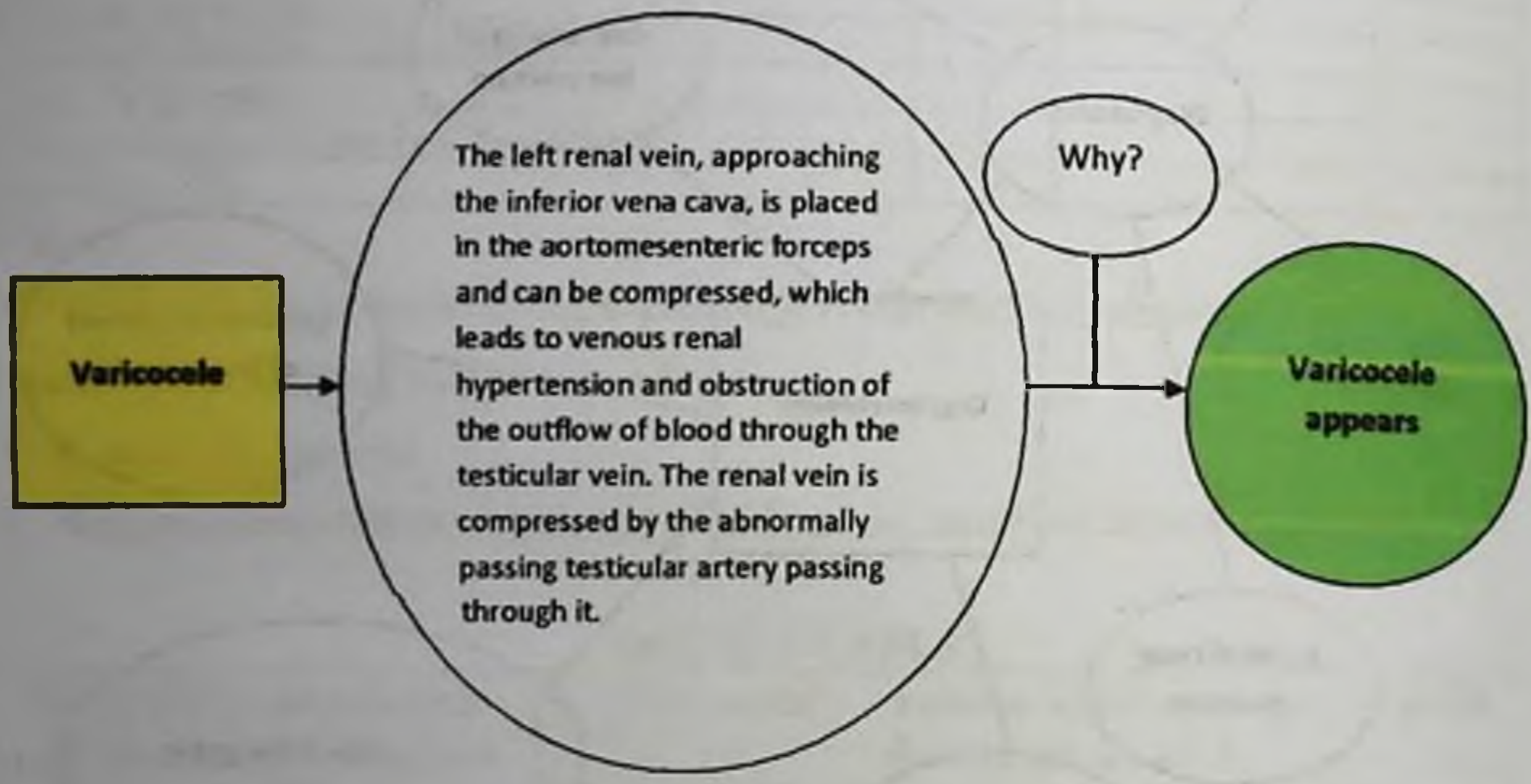
This is a whole chain of reasoning to identify the root cause of the problem.

Develops and activates systemic, creative, analytical thinking. Get acquainted with the rules for constructing a "Why" diagram?

The problem is formulated individually in pairs. Draw an arrow with the question "Why"? And write the answer to this question.

This process continues until the original (but hidden) cause of the problem is identified.

They unite in mini-groups, compare and supplement their schemes. Reduced to a common. Presentation of results



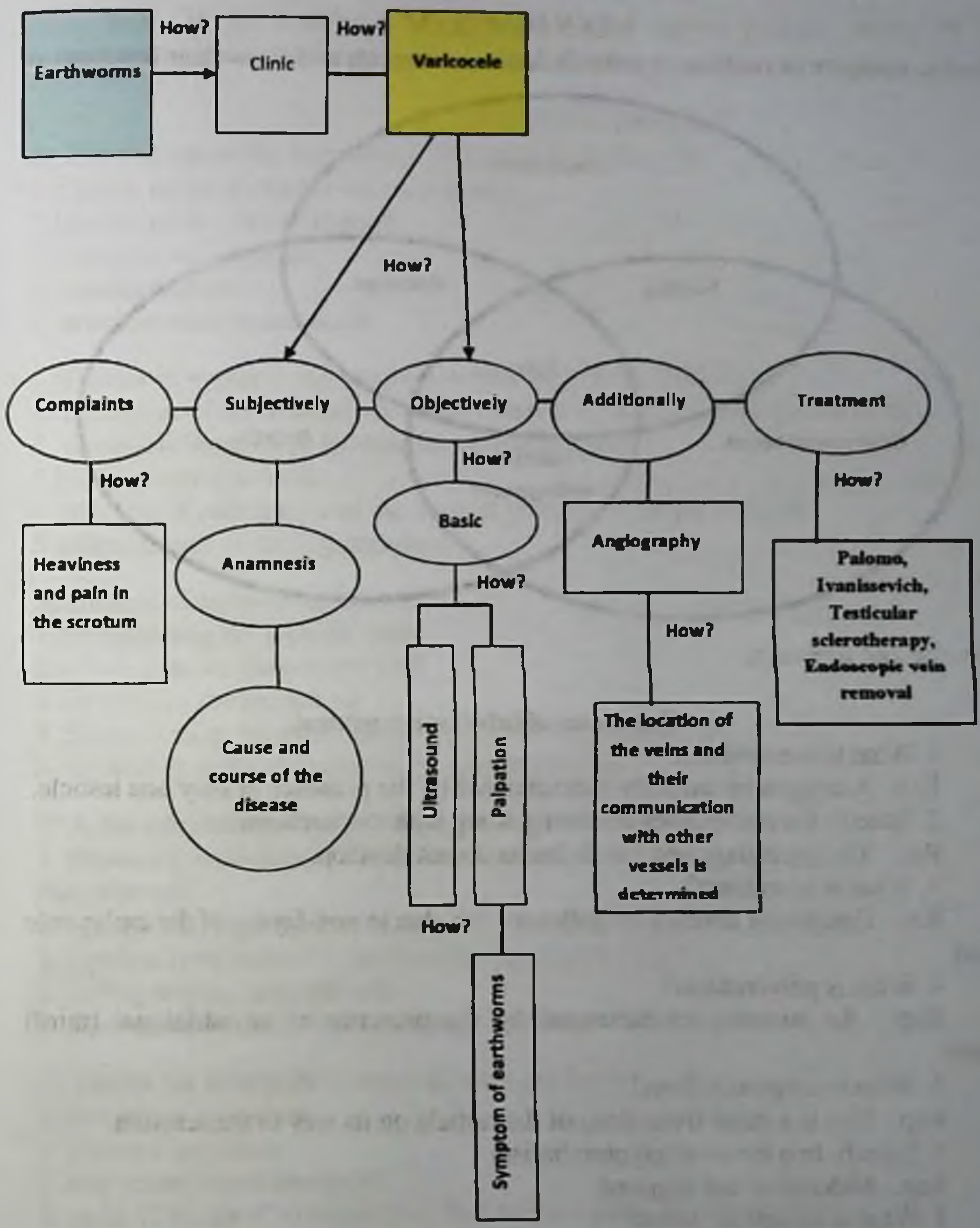
Note: see 2nd appendix.

RULES FOR CONSTRUCTING THE "HOW" DIAGRAM

When solving a problem, in most cases you do not need to think about "What to do?".

The problem is usually "How do I do this?". "How?" - the main question that arises in its solution.

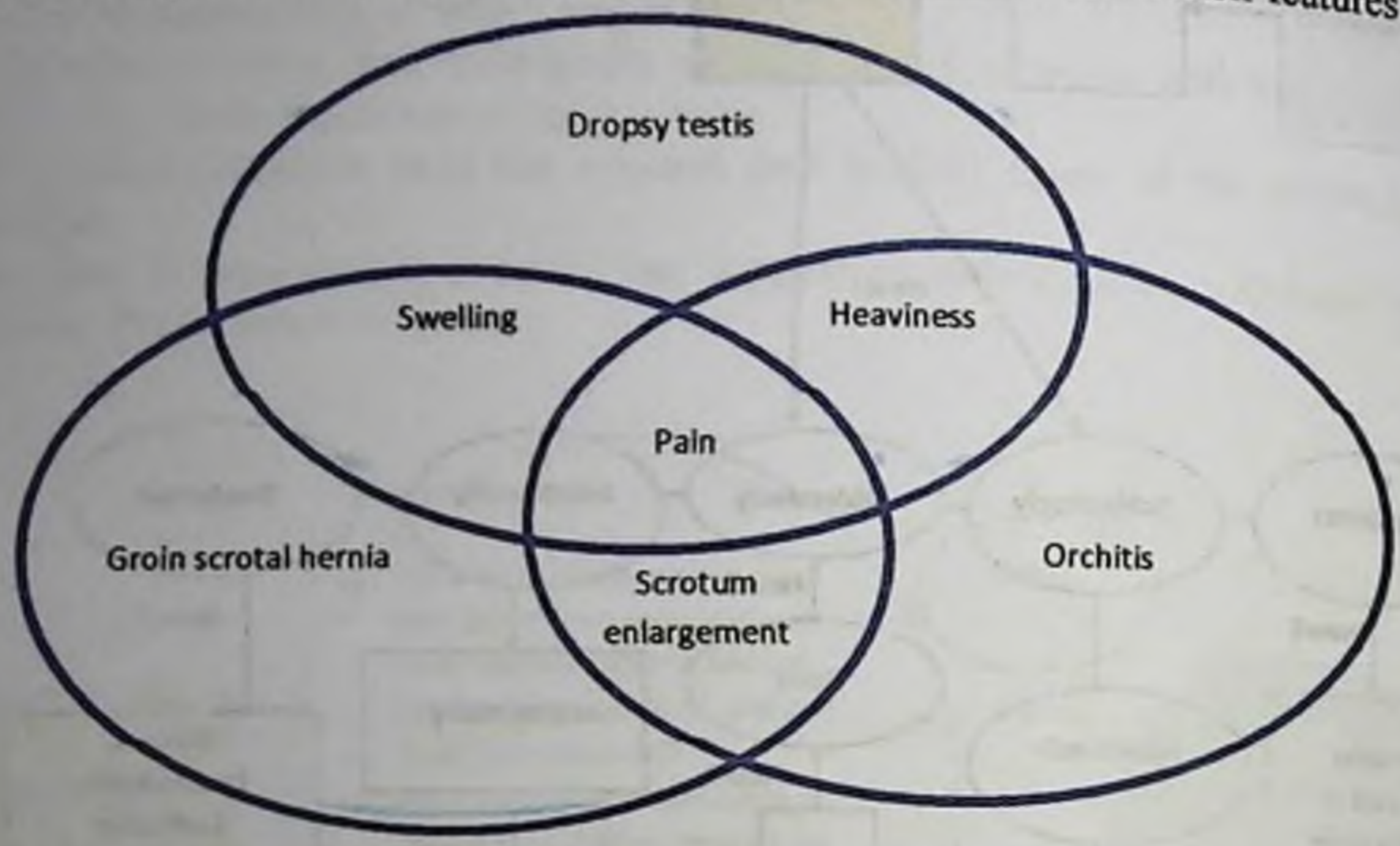
Consistent posing questions "how?" allows you to: Explore not only all the available options for solving the problem, but also ways to implement them;



Note: see 2nd appendix.

VENN DIAGRAM

Used to compare or contrast or contraindicate 2-3 aspects and show their features



Note: see 2nd appendix.

Questions of interactive games:

1. What is monorchism?

Rep. A congenital anomaly characterized by the presence of only one testicle.

2. Specify the pathologies occurring along with monorchism.

Rep. The appendage and vas deferens do not develop.

3. What is anorchism?

Rep. Congenital absence of both testicles, due to non-laying of the embryonic gonad.

4. What is polyorchism?

Rep. An anomaly characterized by the presence of an additional (third) testicle.

5. What is cryptorchidism?

Rep. This is a delay (retention) of the testicle on its way to the scrotum.

6. Specify two forms of cryptorchidism.

Rep. Abdominal and inguinal.

7. What is an ectopic testis?

Rep. Deviation of the testicle from the path to the scrotum.

8. Specify the forms of testicular ectopia.

Rep. The pubic, inguinal, femoral, perineal, cross.

9. What is the development of hydrocell and funicular cell?

Rep. Their development is associated with non-closure of the vaginal process of the peritoneum and the accumulation of serous fluid in its cavity.

10. Give a definition for dropsy of the testicles.

Rep. In the absence of obliteration of the vaginal process, dropsy of the testicular membranes is formed in the distal section.

SELF-CHECK TESTS:

1) The purpose of the Ivanisevich operation for varicocele
1.ligation of the testicular vein and artery
2.ligation of the testicular artery
3.testicular vein ligation
4. hemikastration
5. arteriovenous anastomosis

2) Causes of inguinal and inguinal-scrotal hernias in children:
1. expansion of the dimensions of the external opening of the inguinal canal
2. underdevelopment of the anterior abdominal wall
3.heavy physical activity
4.violation of obliteration of the vaginal process of the peritoneum
5.inflammation of the inguinal canal

3) Purpose of inguinal hernia repair:
1.strengthening the inguinal canal
2.---"---- anterior abdominal wall
3. removal of the hernial sac
4. Strengthening the external opening of the inguinal canal
5. separation of the elements of the spermatic cord

4) A disease similar to a cyst of the elements of the spermatic cord:
1. inguinal lymphadenitis, appendicitis, strangulated inguinal hernia, funicular cell
2. strangulated inguinal hernia, inguinal lymphadenitis
3. inguinal lymphadenitis, pneumonia, inguinal hernia
4. sliding hernia, funicular cell
5. swollen scrotum syndrome, strangulated inguinal hernia

5) Tactics for strangulated inguinal hernia in boys:
1.emergency operation
2. planned operation
3.only conservative treatment
4. up to 12 hours of strangulation, first conservative, then emergency operation
5.physiotherapy and antibiotic therapy

6) Symptoms of varicocele:
1. swelling and redness of the scrotum, testicular hypoplasia, varicose veins rhenium of the veins of the elements of the spermatic cord and testis
2. pain in the scrotum, fever, testicular hypoplasia
3. an increase in size in the corresponding half of the scrotum, hypoplasia

testicular gap, varicose veins of the elements of the seeds. cord
4.increased body temperature, swelling and pain in the scrotum, varicose expansion of the veins of the elements of the spermatic cord
5.vomiting, redness of the scrotum, an increase in the size of the testicle

7) Treatment of varicocele:
1.conservative
2.orchidopexy according to Petrivalsky
3.Winckelmann operation
4. testicular vein ligation according to Ivanisevich or testicular vein ligation arteries and veins according to Polomo
5. Ru-Krasnobaev operation

8) X-ray signs in false hernias proper aperture?
1. ring-shaped enlightenment in the form of cellular cavities on the background heart shadow
2.homogeneous darkening of the pleural cavity, mediastinal displacement on the healthy side
3. annular enlightenment in the form of cellular cavities, displacement mediastinum to the healthy side
4. total enlightenment of the pleural cavity, medial displacement healthy side
5.multiple cavities with liquid level

9) Varicocele occurs mainly:
1. on the left in boys over 10 years old
2. on the left in boys under 10 years old
3. on the right in boys over 10 years old
4. on the right in boys under 10 years old
5. on both sides in boys over 10 years old

10) Varicocele leads to:
1. to testicular atrophy
2. to the development of hypertension
3.to testicular hypoplasia
4.to disrupt spermatogenesis
5. to inflammatory diseases of the testicle and its appendages

11) A 12-year-old patient complains of pain in the left half of the scrotum. On examination, the left half of the scrotum is somewhat enlarged and sagging, the skin of the scrotum is thinned, the testicle is tilted anteriorly on palpation, behind the testicle there is a dense formation along the spermatic cord, moderately painful. Cremasteric reflex on the side of the lesion is weakened. What is your diagnosis?
1.torsion of the hydatid
2.testicular torsion

3.varicocele
4.hydrocell
5.funicular cell

12) Varicocele is more often observed on the left. Why?
1.flow of the left ovarian vein into the renal
2. insufficiency of the valvular apparatus of the testicular vein
3. pronounced reflux in the testicular vein
4.orthostatic stenosis of the renal vein
5.organic renal vein stenosis

13) Is it cryptorchidism?
1.delay of the testicle on its way to the scrotum
2. underdevelopment of the testicles
3. a developmental defect characterized by the absence of one or both testicles
4. deviation of the testicle from the path to the scrotum
5. malformation characterized by the presence of an additional testicle

14) Is it false cryptorchidism?
1. congenital absence of the testis
2.underdevelopment (hypoplasia) of the testis
3. the testicle is located in the abdominal cavity
4.during palpation, the testicle can be lowered into the scrotum
5. the testicle is located in the inguinal region in the subcutaneous tissue

15) Hydrocele is a disease, the occurrence of which is associated with:
1. with non-closure of the vaginal process of the peritoneum
2.with the process of lowering the testicle
3. with weakness of the anterior abdominal wall
4. with a violation of the outflow of blood from the testicle
5.with circulatory disorders of the testis

16) Dropsy of the testicles is
1. non-obliteration of the vaginal process from the distal section
2. non-obliteration of the vaginal process throughout
3. non-obliteration of the vaginal process of the peritoneum in the proximal section
4. obliteration of the vaginal process of the peritoneum in the distal and proximal sections
5. obliteration of the vaginal process of the peritoneum in the distal section

17) Communicating dropsy of the membranes of the testis and spermatic cord - is this?
1. non-obliteration of the vaginal process in the distal section
2. neobliteration of the vaginal process in the proximal section
3. non-obliteration of the vaginal process throughout

4. obliteration of the vaginal process in the distal and proximal sections
5. obliteration of the vaginal process in the distal section

18) Is it a cyst of the spermatic cord?
1. obliteration of the vaginal process in the proximal section
2. neobliteration of the vaginal process in the proximal section
3. neobliteration of the vaginal process in the proximal section
4. obliteration of the vaginal process in the distal and proximal sections
5. obliteration of the vaginal process in the distal section

19) A symptom characteristic of a hydrocele is:
1.symptom of "translucence"
3. cough symptom
2.fluctuation symptom
4. "click" symptom
5. "hourglass" symptom

20) Hydrocele is most often differentiated
1. with strangulated inguinal hernia
2. with testicular torsion
3.with torsion hydatitis
4. with acute orchitis
5.phlegmon of the scrotum

21) An acute cyst of the spermatic cord differentiates
1. with strangulated inguinal hernia
2. with testicular torsion
3.with hydatid torsion
4. with acute orchitis
5.phlegmon of the scrotum

22) Funiculocele is a disease that occurs due to
1. with non-closure of the vaginal process of the peritoneum
2.with the process of lowering the testicle
3. with weakness of the anterior abdominal wall
4. with detection of blood outflow from the testicle
5. with impaired testicular lymph flow

23) What is the condition of the vaginal process of the peritoneum with inguinal hernia
1.coated
2. not obliterated
3.partially obstructed
4.not related to the appearance of a hernia
5.filled with watery liquid

24) In which disease will be a positive symptom of a cough "thrust"

1.groin hernia
2. dropsy of testicular membranes
3. cryptorchidism
4. lymphadenitis
5. tumor

25) Varicocella is...
1.expansion of testicular veins
2.varicose veins of seminal corditis
3. swelling of the scrotum
4.dilation of the veins and arteries of the scrotum
5. varicose expansion of the artery of the spermatic cord

26) With what method of operation is it necessary to open the inguinal canal in a patient with inguinal-scrotal hernia
1.Martynov method
2. Petrivalsky method
3. Ru-Krasnobaev method
4. Czerny method
5. Spasokukotsky method

27) With the absence of one testicle in the scrotum, this ...
1.monorchism
2.anorchism
3.ectopic testis
4.agenesis
5. aplasia

28) Clinic of reducible inguinal-scrotal hernia:
1. swelling in the inguinal-scrotal region, a positive symptom of "cough", at rest, swelling increases
2. swelling in the inguinal-scrotal region, a positive symptom of "cough", at rest, swelling decreases
3. swelling in the inguinal-scrotal region, a positive symptom of "cough",
4. swelling in the inguinal-scrotal region in a calm state is not reduced
5. swelling in the inguinal-scrotal region, the symptom of "cough" is negative.

29) What is the main cause of a Nukka cyst?
1. Violation of obliteration of the inguinal diverticulum of the peritoneum
2.infection
3.injury
4. disproportion in the development of the circulatory and lymphatic systems of the inguinal region
5. violation of metabolic processes

30) In a 4-month-old child with a generally satisfactory condition, a formation in the inguinal region measuring 3x3 cm was noted. It was painless, limitedly mobile, densely elastic in nature, not decreasing in size when palpated. Select diagnostic method

1.diagnostic puncture
2.R-graphy or R-scopy
3.urgent operation
4. diaphanoscopy
5.blood and urine tests

31) Specify the main cause of dropsy of the testicular membranes and spermatic cord in children under the age of 1.5 years

1.injury
2.infection
3.violation of obliteration of the vaginal process of the peritoneum
4. disproportion in the development of the circulatory and lymphatic systems of the inguinal-scrotal region
5. violation of metabolic processes

32) What is the main cause of dropsy of the testicular membranes and spermatic cord in children over the age of 1.5 years

1.injury
2.violation of obliteration of the vaginal process of the peritoneum
3. decreased function of the cremaster muscle
4. violation of water-salt metabolism in the body
5.infection

33) With what nosogological form does the differential diagnosis of isolated dropsy of the testicular membranes begin?

1.varicocele
2.testicular tumor
3.groin-scrotal hernia
4.pathology of testicular suspensions
5.testicular torsion

34) With what nosological form does the differential diagnosis of an insular cyst of the spermatic cord begin?

1.polyorchia
2. strangulated inguinal hernia
3. cryptorchidism
4. inguinal lymphadenitis
5. acute appendicitis

Answers to tests for self-control

1-3, 2-4, 3-4, 4-2, 5-4, 6-3, 7-4, 8-2, 9-1, 10-3, 11-3, 12-1, 13-1, 14-4, 15-1, 16-2, 17-3, 18-4, 19-1, 20-1, 21-1, 22-1, 23-2, 24-1, 25-2, 26-3, 27-1, 28-2, 29-1, 30-4, 31-3, 32-3, 33-2, 34-3, 35-2.

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