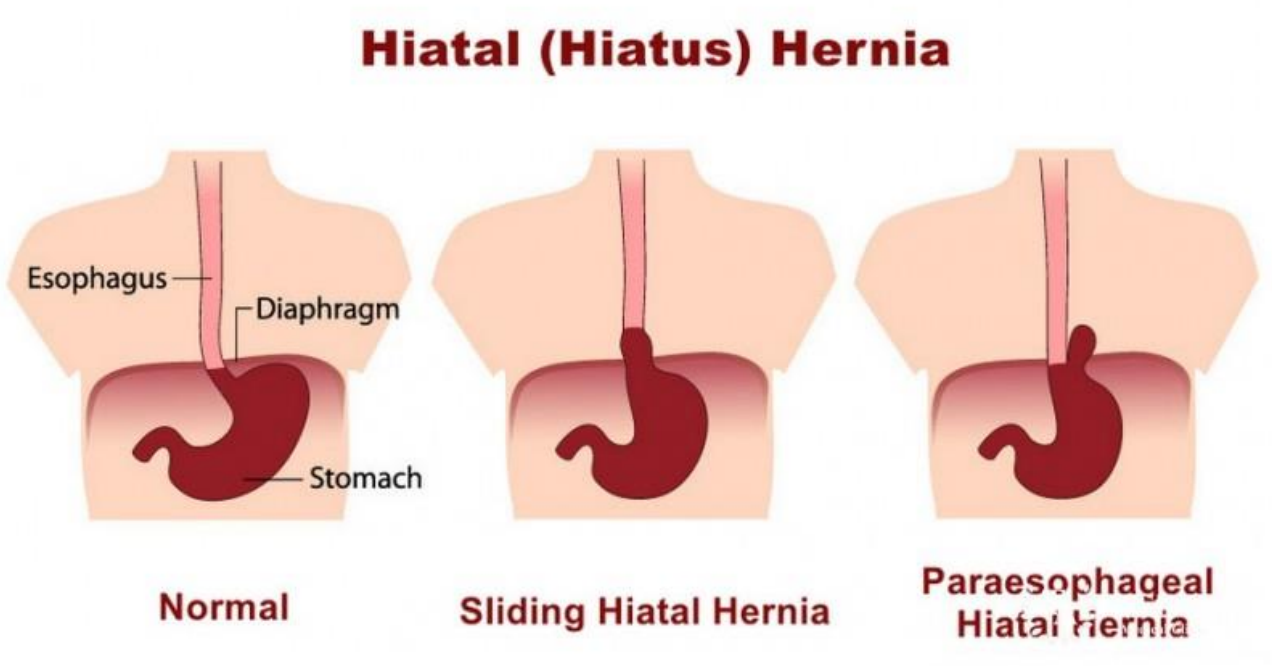
ROYAL METROPOLITEN UNIVERSITY

Department of Clinical Disciplines

DIAPHRAGMATIC HERNIA

EDUCATIONAL AND METHODOLOGICAL MANUAL



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The educational and methodical manual is devoted to diaphragmatic hernia. Objectives and tasks are spelled out in a form understandable to students. The presentation of the material is intended to provide students with a unified picture, since this material is based on a universally recognized academic structure in the world, starting with etiology / pathogenesis and ending with treatment / postoperative monitoring. In order to check the level of students' knowledge, control questions, as well as tests and situational problems are given.

The educational and methodical manual is written in English at the highest level and is intended for international students of the 7th semester of the Faculty of "Medical Science" of the RMU

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1. Introduction

Relevance. Diaphragmatic hernias account for about 2 % of hernias of all localizations. Their diagnosis is sufficiently specific and difficult, especially at the pre-hospital stage. This often leads to delayed operations, which is fraught with an increase in the number of postoperative complications and deaths [1].

The purpose of the lesson: to gain theoretical knowledge and acquire practical skills in the diagnosis of diaphragmatic hernias, to get acquainted with the main methods of surgical treatment.

Lesson objectives:

1. To consolidate the knowledge of the normal and topographic anatomy of the diaphragm.
2. Acquire the skills to evaluate the results of clinical, X-ray, ultrasound, and laboratory methods of examination of patients with various types of diaphragmatic hernias.
3. Master the classification of diaphragmatic hernias.
4. Find out the clinical manifestations of surgical complications of the main types of diaphragmatic hernias.
5. To study the methods of conservative and surgical treatment of diaphragmatic hernias. Learn the main indications for operations and the features of their implementation.

Requirements for the initial level of knowledge. To learn the topic, you need to repeat:

- from the course of normal anatomy, topographic anatomy and operative surgery: the structure of the diaphragm, the relative positions of the natural orifices of the diaphragm and its weak points;
- normal and pathological physiology: the main functions of the diaphragm, the causes of increased intra-abdominal pressure, the causes of impaired function of the cardiac pulp.

2. Definition

A diaphragmatic hernia is a developmental abnormality characterized by the presence of a congenital defect of the diaphragm, through which, in the prenatal period, the abdominal organs (loops of the intestine, stomach, spleen, sometimes part of the liver) move to the chest.

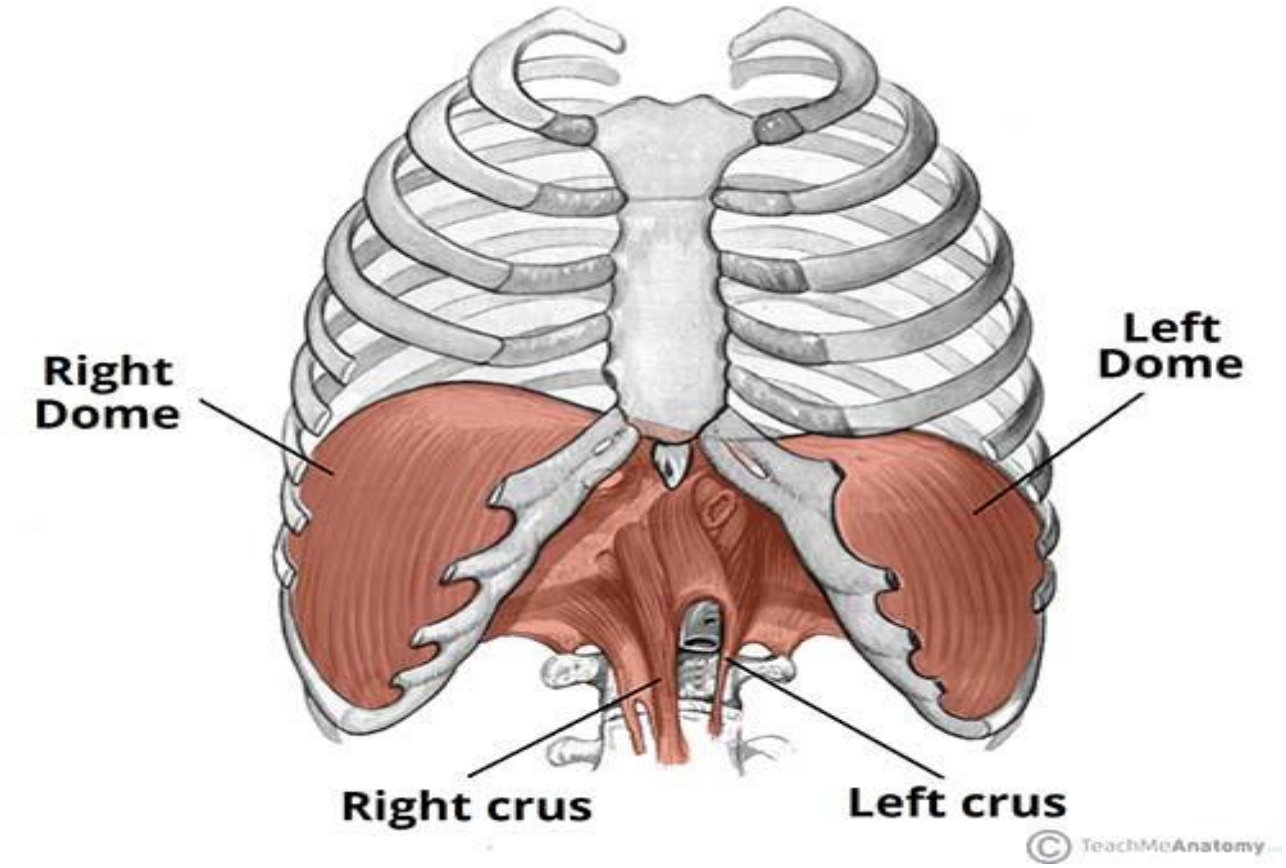

Fig. 2.1 Diaphragm

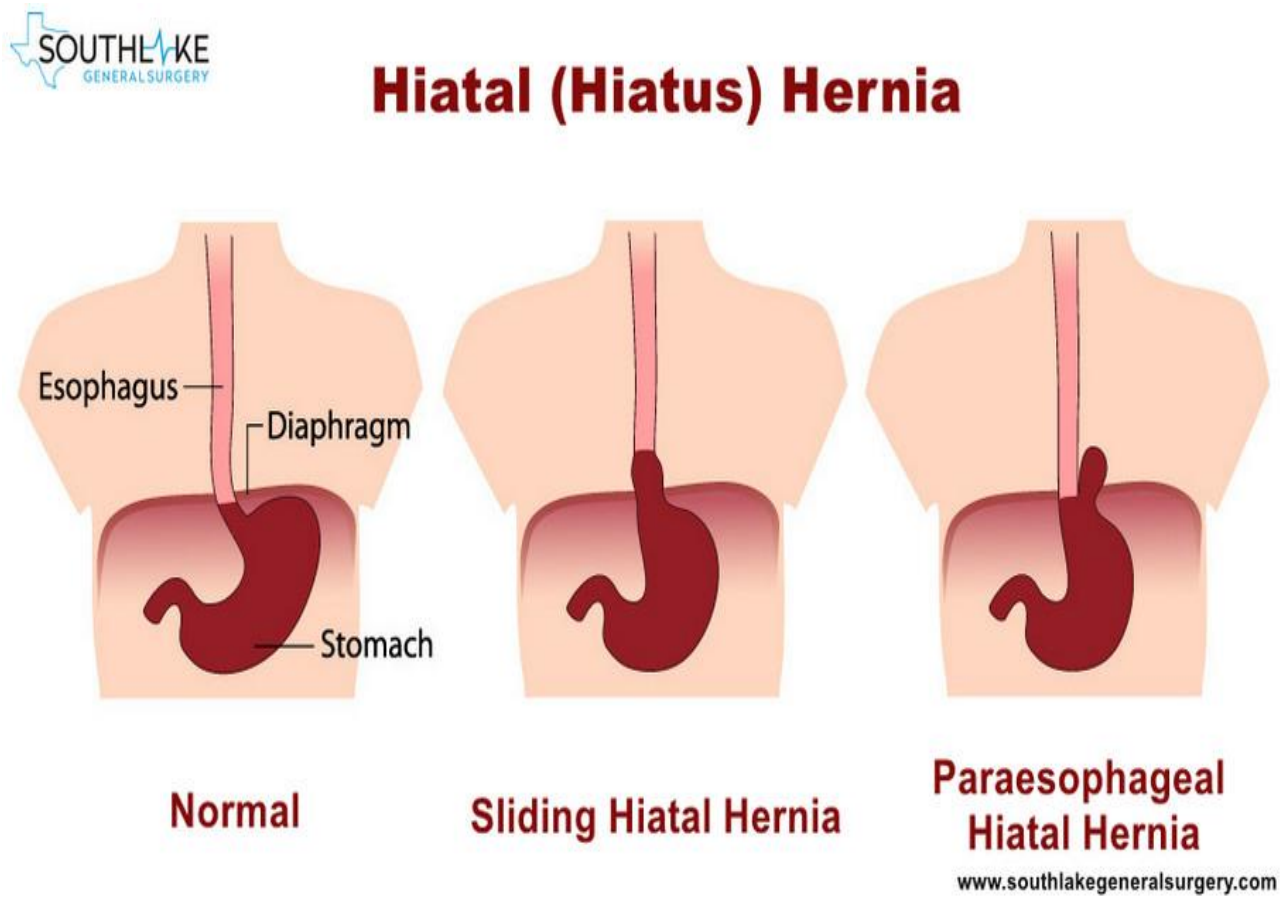

Fig. 2.2 Normal stomach versus hiatal hernia

3. Classification

The basis of all modern classifications is the classification of Akerlud (1926) and Sealy (1961). The authors identified three main types of hiatal hernias:

1. Sliding hernia. It occurs in almost 90 % of patients with esophageal hernias. In this case, the cardia lies above the esophageal opening of the diaphragm, which changes the ratio between the esophagus and the stomach, and the closing function of the cardia is sharply disrupted.

2. Paraesophageal hernia. It is noted in approximately 5 % of patients. It is characterized by the fact that the cardia does not change its position, and through the expanded opening, the bottom and the large curvature of the stomach come out.

3. Short esophagus. As an independent disease, it is rare and represents an abnormality of development. It is usually observed in combination with a sliding

hernia and is the result of spasm, inflammatory changes and scarring processes in the esophageal wall.

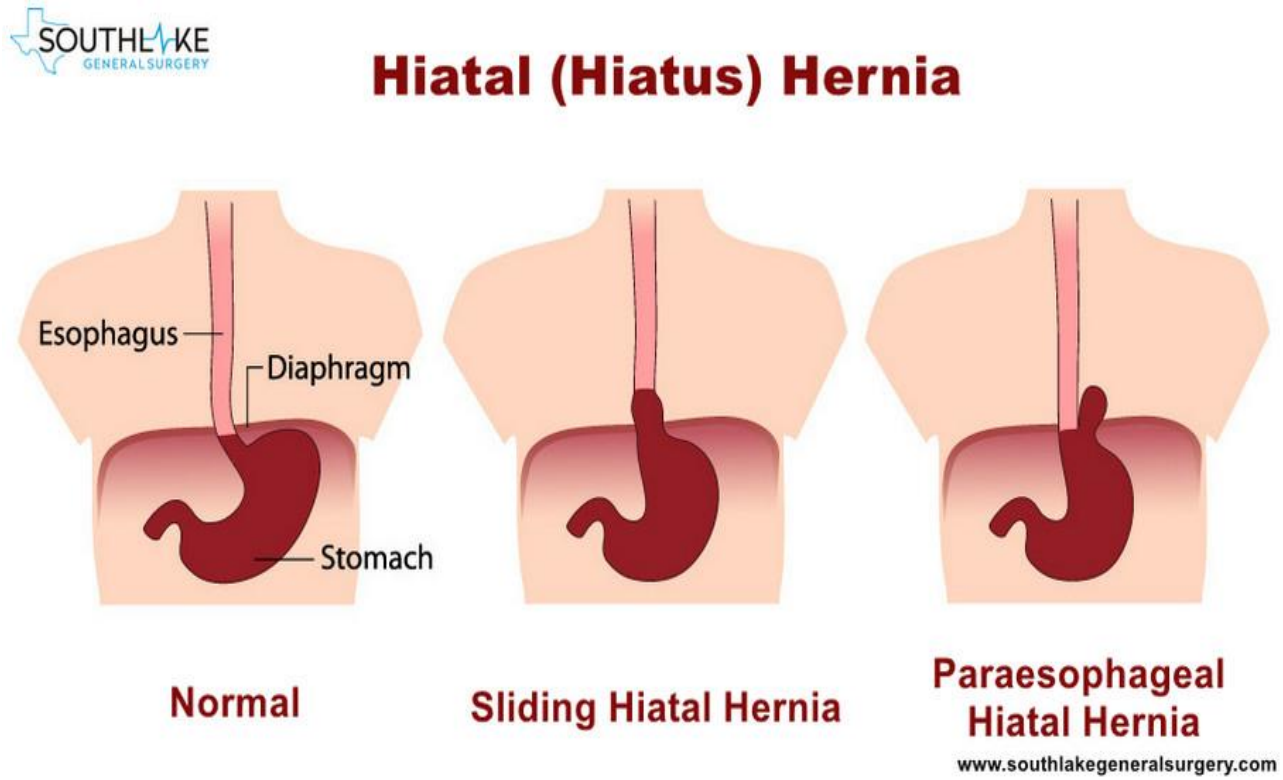

Fig. 3.1 Sliding hiatal hernia versus paraesophageal (rolling) hiatal hernia

3.1. Sliding hernia of the esophageal orifice of the diaphragm

Etiology and pathogenesis.

The appearance of a sliding hernia of the esophageal orifice of the diaphragm is facilitated by changes in the structure of the structures that form the esophageal opening, increased intra-abdominal pressure, and obesity.

When changing the configuration of the legs of the diaphragm forming the esophageal opening, weak areas are formed in it, mainly along the posterior semicircle. The tissues or organs embedded in them do not meet sufficient resistance, and there is a gradual expansion of the esophageal opening, its muscle and connective tissue structures. The fixing structures (esophageal-diaphragmatic membrane, gastro-hepatic and gastro-diaphragmatic ligaments)can be innately weakened or undergo age-related involutional changes and easily stretch, tear. Such changes in connective tissue structures occur due to poor nutrition, severe diseases.

A role in the formation of a hernia hiatal plays increased intra-abdominal pressure, which is observed in obesity, pregnancy (18% pregnant again find a hernia hiatal), ascites, prolonged cough, chronic lung diseases, vomiting, weight lifting.

Obesity, in addition to increasing intra-abdominal pressure, contributes to the deposition of fat in the retroperitoneal space behind the esophageal-gastric junction, which leads to the expansion of this zone.

Great importance is also attached to the weakening and stretching of the esophageal-diaphragmatic membrane, which in a healthy person prevents the displacement of the cardia upwards.

With an increase in intra-abdominal pressure, the size of the esophageal opening increases, through which the cardia moves into the thoracic cavity, the abdominal part of the esophagus shortens, and the angle of the Gis straightens. The movement of the cardia is facilitated by negative pressure in the thoracic cavity, the esophageal-diaphragmatic ligament is stretched, the lateral thrust on the esophageal wall increases, the function of the lower esophageal sphincter changes. As a result, the closing function of the cardia is sharply disrupted, favorable conditions are created for throwing gastric contents into the esophagus and the occurrence of reflux esophagitis. At the same time, spastic contractions of the esophagus or its cicatricial shortening that occur as a result of peptic esophagitis contribute to an increase in the fixation of the esophageal hernia. Thus, the hernia of the esophageal orifice of the diaphragm and reflux esophagitis mutually burden each other [2-4].

The clinical picture.

The clinical symptoms of sliding hernias of the esophageal orifice of the diaphragm are due to the insufficiency of the cardia apparatus and the resulting gastrointestinal reflux and peptic esophagitis.

The main symptoms are pain, regurgitation, heartburn, dysphagia, anemia. The most frequent and painful symptom is pain. It is usually localized in the lower third of the sternum, in the area of the xiphoid process and gives in the back, left shoulder, left arm. The frequency, intensity, and duration of pain in the same patient are different. In a number of patients, it is difficult to distinguish it from pain in angina or

myocardial infarction, and only an electrocardiogram can differentiate these diseases. However, in some cases, a hernia of the esophageal orifice of the diaphragm can cause spasm of the coronary vessels with the subsequent development of morphological changes in the heart muscle. Bergman (1932) described epiphrenal syndrome, characterized by retrosternal pain, a heart rhythm disorder caused by compression of the trunks of the vagus nerves in the esophageal opening of the diaphragm by the stomach exiting into the chest cavity.

Usually, the pain appears after lifting the weight, when the trunk is tilted forward (a symptom of "shoelaces", as defined by French authors), as well as under the influence of other factors that contribute to an increase in intra-abdominal pressure. In many patients, the pain increases after eating, in a horizontal position, at night. V. H. Vasilenko and A. A. Grebenev (1978) consider the leading moments in the occurrence of pain to be the peptic factor, muscle dyskinesia (esophagospasm) and stretching of the walls of the esophagus in gastro-esophageal reflux. N. N. Kanshin (1963) believes that the occurrence of pain in a herniated esophageal orifice of the diaphragm is associated with tension of the right vagus nerve and its ventral branch going to the ventral plexus.

The consequence of the insufficiency of the closing function of the cardia is the throwing of acidic gastric contents into the esophagus and heartburn. The latter is persistent and painful in nature and, like pain, often occurs in the horizontal position of the patient. Heartburn decreases after eating, taking dairy products, and butter, and increases after eating spicy food. In some patients, the ingested food returns to the oral cavity without vomiting.

Dysphagia in the initial stages of the disease usually occurs as a result of spasm of the lower segment of the esophagus, and in the later stages — due to the formation of peptic strictures of the esophagus.

A special symptom is episodic aphagia, noted by Rostlethwait (1979) in 17.5% of patients. It occurs suddenly, caused by eating and drinking liquids. During an attack, the patient is completely unable to swallow. The attack can last several hours.

There is pain, a significant amount of mucus is formed. Aphagia stops suddenly or decreases gradually.

Prolonged regurgitation of the gastric contents leads to the appearance of peptic esophagitis, which in turn contributes to the formation of erosions and ulcers of the esophagus.

Bleeding with the subsequent development of anemia occurs in 15-20 % of patients with a hernia of the esophageal orifice of the diaphragm. More often, the bleeding is hidden, and the only manifestation of the disease is progressive anemia. The sources of bleeding are usually erosions and ulcers of the esophagus and stomach.

In a number of patients, during sleep, gastric contents enter the respiratory tract, causing various pulmonary complications, which Paulson (1973) noted in 60% of patients with gastroesophageal reflux. These include cough, bronchitis, asthmatic bronchitis, pneumonia, hemoptysis, and shortness of breath. Cases of diffuse pulmonary fibrosis have been described (Mays et al., 1976).

Rare complications of hiatal hernia include invagination of the esophagus into the stomach, first described by Sarasin and Hoch (1951). In clinically pronounced cases of esophageal intussusception, there are attacks of pain in the epigastric region, dysphagia, increased salivation. In many patients, a hernia of the esophageal orifice of the diaphragm is combined with cholelithiasis, duodenal ulcer, etc. All this leads to a motley clinical picture and significant diagnostic difficulties.

3.2. Paraesophageal hernias

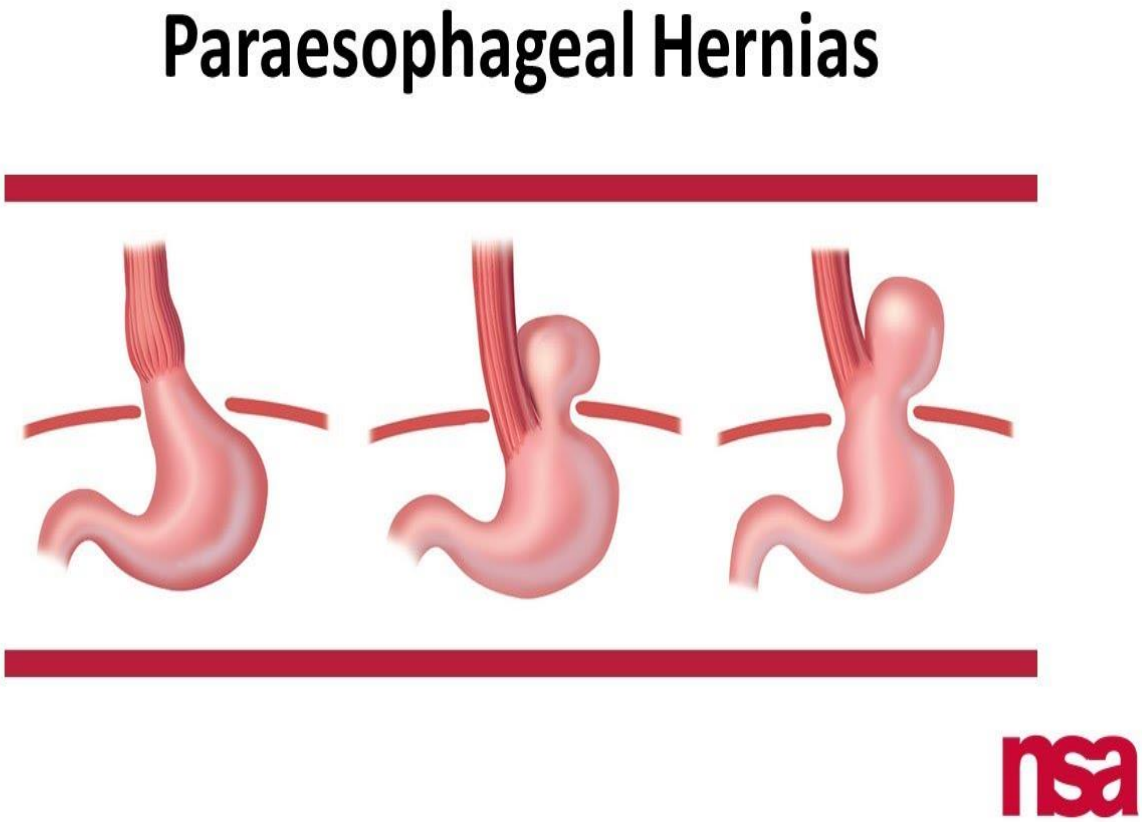

Fig. 3.2.1 Paraesophageal hernia

A paraesophageal hernia is a rarer pathology than a sliding hernia. According to Postlethwait (1979), it accounts for 15% of all cases of hiatal hernias.

In this case, the esophageal-gastric junction is located under the diaphragm, the esophageal-diaphragmatic ligament is well expressed and not stretched. The bottom of the stomach and the large curvature of the stomach are displaced into the chest cavity through the expanded opening of the esophagus. The contents of the paraesophageal hernia are covered on all sides by the peritoneum, i.e. there is a hernial sac. Sometimes the hernial protrusion is not located next to the esophagus, but is separated from it by fibromuscular fibers. With an increase in the size of the hernia, the cardia may shift to the mediastinum. In such cases, they talk about a combined hernia. In addition to the stomach, the contents of the hernial sac can be the small and large intestine, omentum and spleen. In an asymptomatic course, a paraesophageal

hernia may be accidentally diagnosed during an X-ray examination. In clinically pronounced cases, paraesophageal hernia is manifested by symptoms of compression or infringement of the fallen organs. Diagnosis is not very difficult. With a review X-ray, the intra-thoracic location of the gas bubble of the stomach is noted. Examination of the stomach and intestines with a contrast agent allows you to accurately determine the contents of the hernial sac. Due to the risk of increased hernia and the threat of infringement, paraesophageal hernias are subject to surgical intervention. The operation involves the closure of the hernial orifice. In addition, for large and combined hernias, Nissen fundoplication is performed.

3.3. Short esophagus

A short esophagus

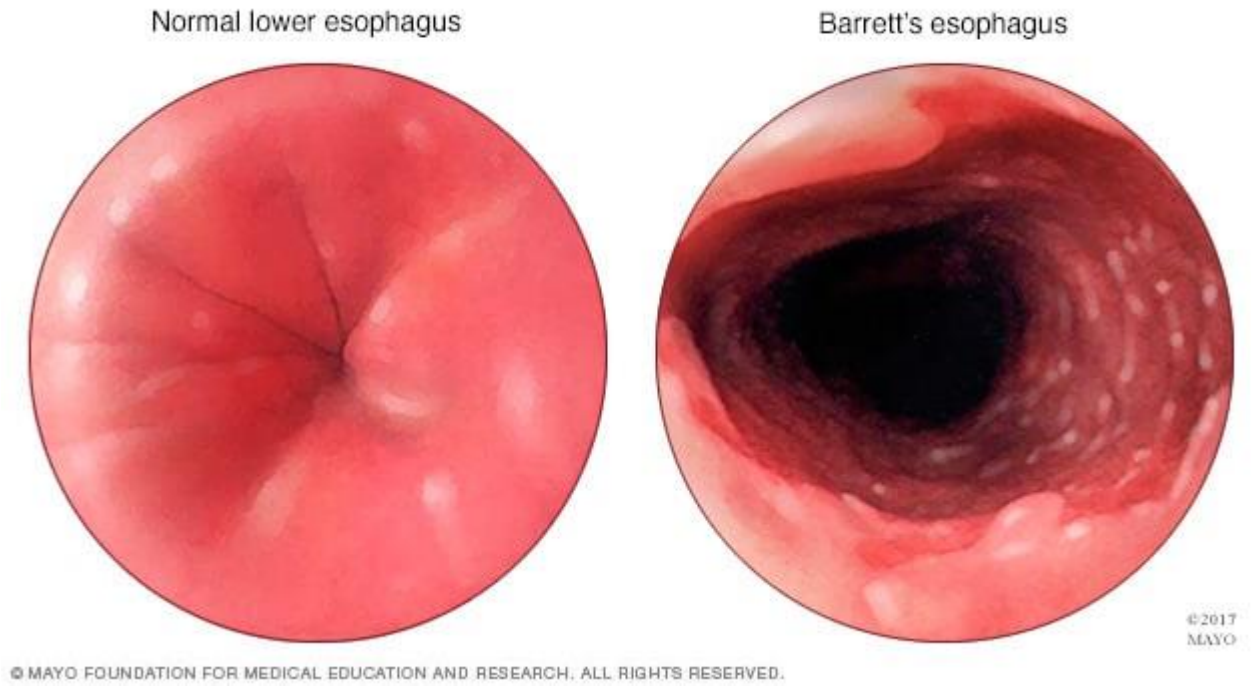

Fig. 3.3.1. Barret’s esophagus

can be congenital or acquired. Congenital is a developmental abnormality in which there is a delay in the descent of the stomach into the abdominal cavity. In this case, part of the stomach is located in the thoracic cavity and is devoid of peritoneal cover; its blood supply is carried out by vessels that depart directly from the aorta. Olson

and Harrington (1948) observed a congenital short esophagus in 9 (4 %) of 220 patients with hiatal hernia.

Acquired short esophagus is a consequence of severe peptic esophagitis. N. N. Kanshin and V. I. Chissov (1969) found congenital shortening of the esophagus in 10% of patients with a hernia of the esophageal orifice of the diaphragm. The authors distinguish two degrees of the disease: in the first degree, the cardia is fixed 4 cm above the diaphragm, in the second degree, the shortening of the esophagus is more pronounced. The final differential diagnosis is possible only during surgery. Clinically, a short esophagus is manifested by symptoms of severe reflux esophagitis. Surgical treatment is associated with difficulties in lowering the stomach into the abdominal cavity.

4. Diagnosis

The main diagnostic method, along with clinical data, is X-ray examination. With large fixed hernias, even with a review X-ray of the abdominal organs, it is possible to observe enlightenment and a horizontal fluid level against the background of the shadow of the heart.

A gas bubble with a horizontal liquid level in the lateral projection is particularly clearly visible. A study with a contrast agent allows you to finally detect the part of the stomach with typical folds of the mucous membrane located above the diaphragm. At the same time, there is also a gaping of the cardiac opening with the throwing of a contrast agent into the esophagus. Especially noticeable is the movement of the stomach above the level of the diaphragm. Insufficiency of the cardia is defined in the Trendelenburg position

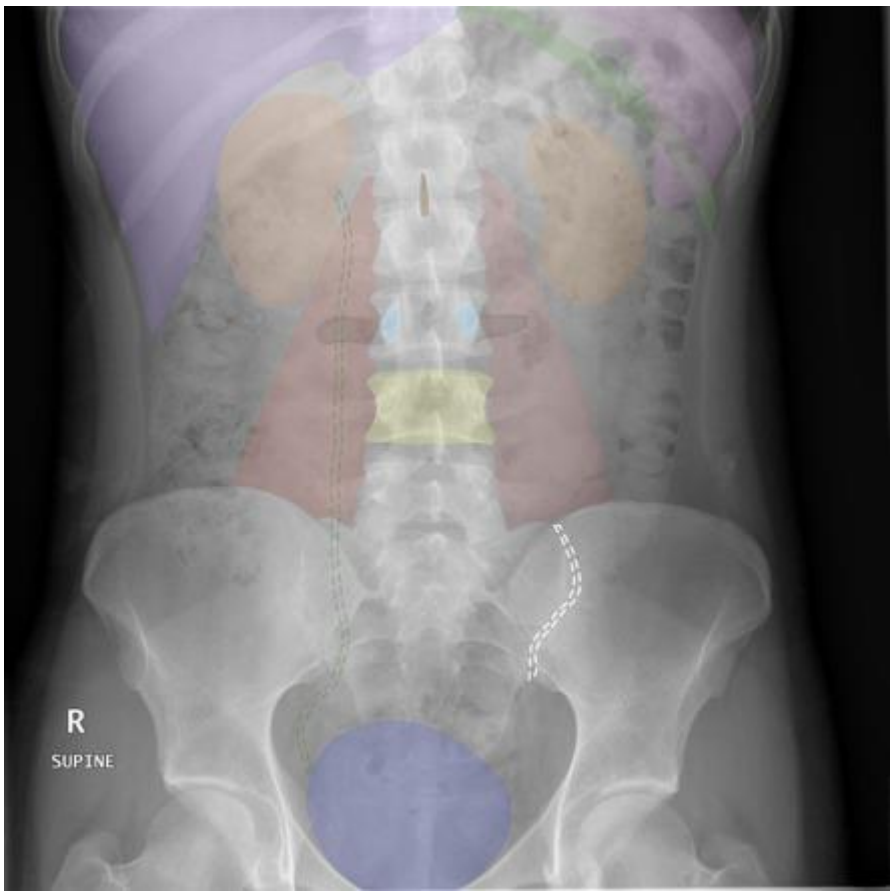

Fig. 4.1 X-ray of the abdominal organs

Fig. 4.2 Trendelenburg position

with dosed compression of the abdomen. This technique is mandatory in the diagnosis of small non-fixed hernias of the esophageal orifice of the diaphragm.

Indirect radiological signs include a decrease or disappearance of the gas bubble of the stomach, elongation and arcuate curvature of the supraphragmal esophagus. There are also manifestations of reflux esophagitis, hypokinesia and esophagospasm. The presence of more than four folds of the mucous membrane in the supradiaphragmal part of the esophagus indicates that they belong to the gastric mucosa. For the detection of reflux V. H. Vasilenko and A. L. Grebenev (1978) recommends the administration of cholinolytic and myotropic antispasmodics (atropine sulfate and methicine), which leads to an increase in cardia insufficiency.

When the esophagus is invaginated, there is a radiological symptom of "collar", described by G. I. Weinstein (1963). The walls of the stomach surrounding the esophagus resemble a collar worn around the neck.

Esophagoscopy

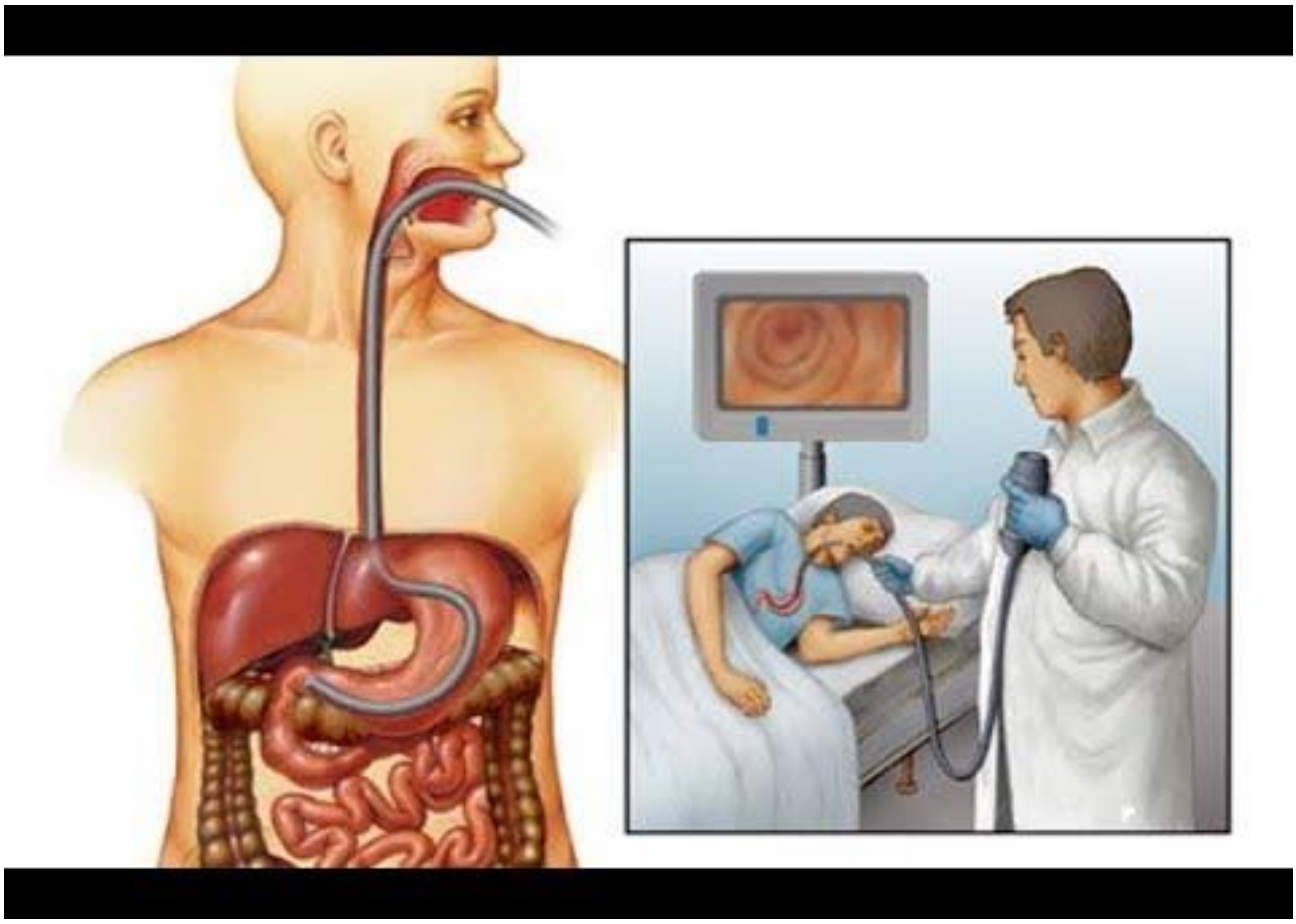

Fig. 4.3 Esophagoscope

It allows not only to accurately establish the diagnosis, but also to detect some details that are not available during X-ray examination. During esophagoscopy, the esophageal-gastric junction is examined above the diaphragm, the insufficiency of the closing apparatus of the cardia is diagnosed, and the gastric contents flow into the esophagus. The mucous membrane of the lower third of the esophagus is swollen, inflamed, and covered with superficial erosions. In the presence of peptic stricture, there is a narrowing of the lumen and shortening of the esophagus due to spasm and scarring of its wall. The diagnosis of a hernia of the esophageal orifice of the diaphragm is also confirmed by the data of esophagomanometry,

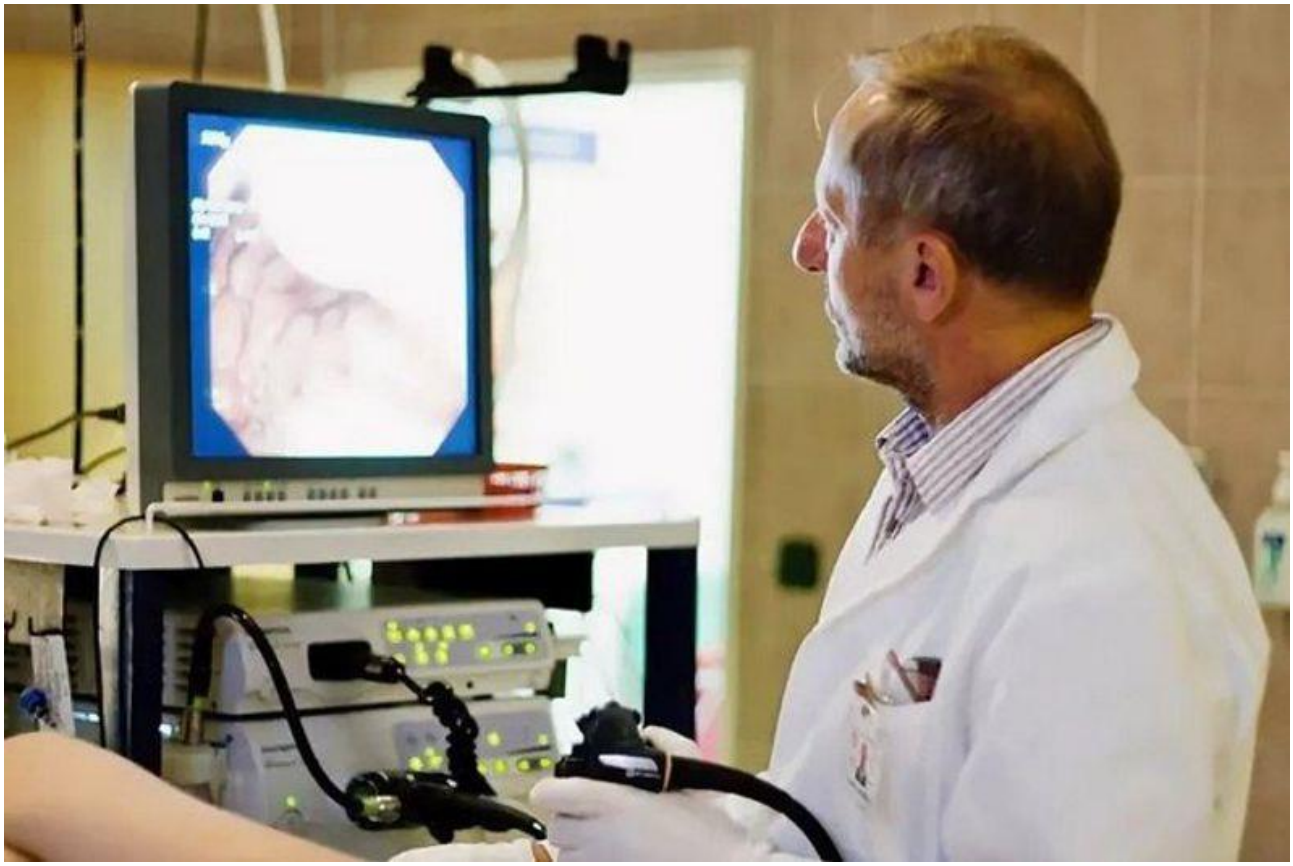

Fig. 4.4 Esophageal manometry

which determines the displacement of the zone of increased pressure up from the level of the diaphragm. To detect gastro-esophageal reflux, all the described tests are used. As a rule, the more pronounced the results of the tests, the more severe the phenomena of esophagitis [5-7].

5. Treatment

For small, asymptomatic hernias, treatment is not indicated. In the case of hernias that cause minor complaints of the patient, conservative treatment is recommended, aimed at reducing intra-abdominal pressure, eliminating constipation, prolonged coughing, and combating obesity. Prescribe drugs to reduce gastro-esophageal reflux, suppress the acid-peptic factor of gastric juice, eliminate esophagitis and esophageal motility disorders. Contraindicated: smoking, heavy physical activity, wearing tight belts, bandages that increase intra-abdominal pressure. The patient should sleep with the head end of the bed raised. Fractional meals are recommended. The diet should be mechanically, chemically, and thermally gentle. The last time the patient should eat 3-4 hours before bedtime.

Drug therapy consists of taking antacids (almagel, gefal, maalox, etc.), astringents (bismuth nitrate, vinylin). Combinations of these drugs are widely used, taking into account the severity of reflux esophagitis and concomitant diseases. In case of impaired motility of the esophagus and stomach, antispasmodic agents (papaverine hydrochloride, no-shpa), cholinolytic agents (atropine sulfate, platyphyllinehydrothartrate), as well as metoclopramide are used. The complex of treatment includes anabolic hormones, metabolic activators (methyluracil, pentoxil, etc.), vitamin preparations. Additionally, physiotherapy procedures are used (Scherbakov collar, electrophoresis with novocaine).

Surgical treatment is indicated in the presence of large hernias that do not respond to conservative treatment, peptic pain esophagitis with angina pectoris, severe dysphagia, bleeding, peptic esophageal stricture, severe regurgitation and pulmonary complications.

The first operations for a hiatal hernia were performed by Stoyanov (1901) and Don (1908). In operations for a sliding hernia of the esophageal orifice of the diaphragm, abdominal

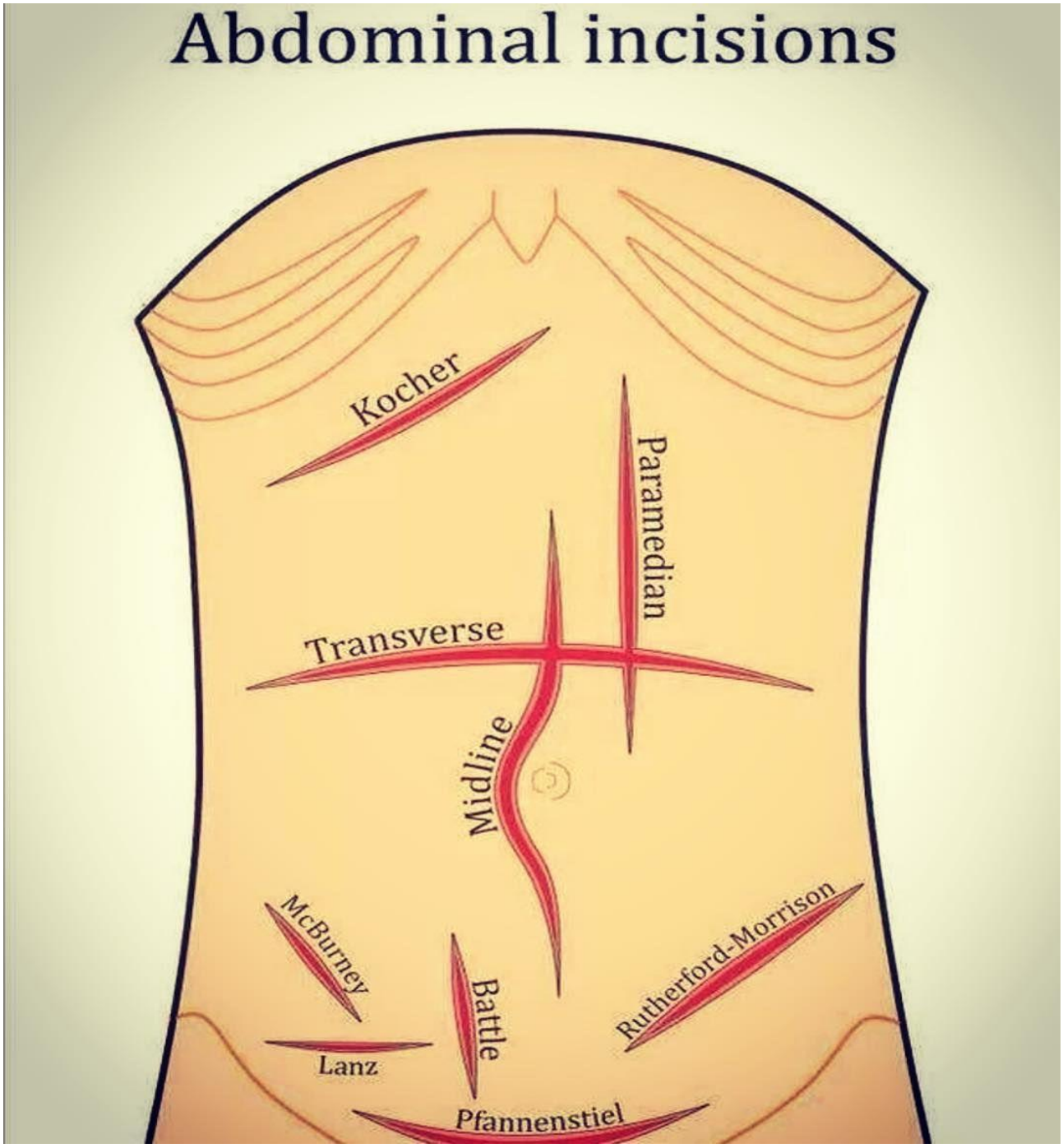

Fig. 5.1 Abdominal incisions and transpleural approaches are used.

Abdominal access

It is used in elderly patients, as well as in cases where there is a concomitant pathology from the abdominal organs (peptic ulcer, gallbladder stones, etc.). Its disadvantages include a large depth of the operating wound, which makes it difficult to expose the legs of the diaphragm and suture them. Transpleural access is indicated for relatively young, as well as obese patients. It provides greater freedom of manipulation, makes it possible to sufficiently mobilize, lower the esophagus into the

abdominal cavity, and restore the esophageal opening of the diaphragm. At the same time, this access makes it difficult to audit the abdominal organs.

A large number of surgical techniques used in the surgical treatment of hernias of the esophageal orifice of the diaphragm can be divided into the following groups:

1) narrowing of the esophageal orifice of the diaphragm and strengthening of the esophageal-diaphragmatic ligament;
2) gastrocardiac;
3) recreating the Gis angle;
4) fundoplication

Hill's operations

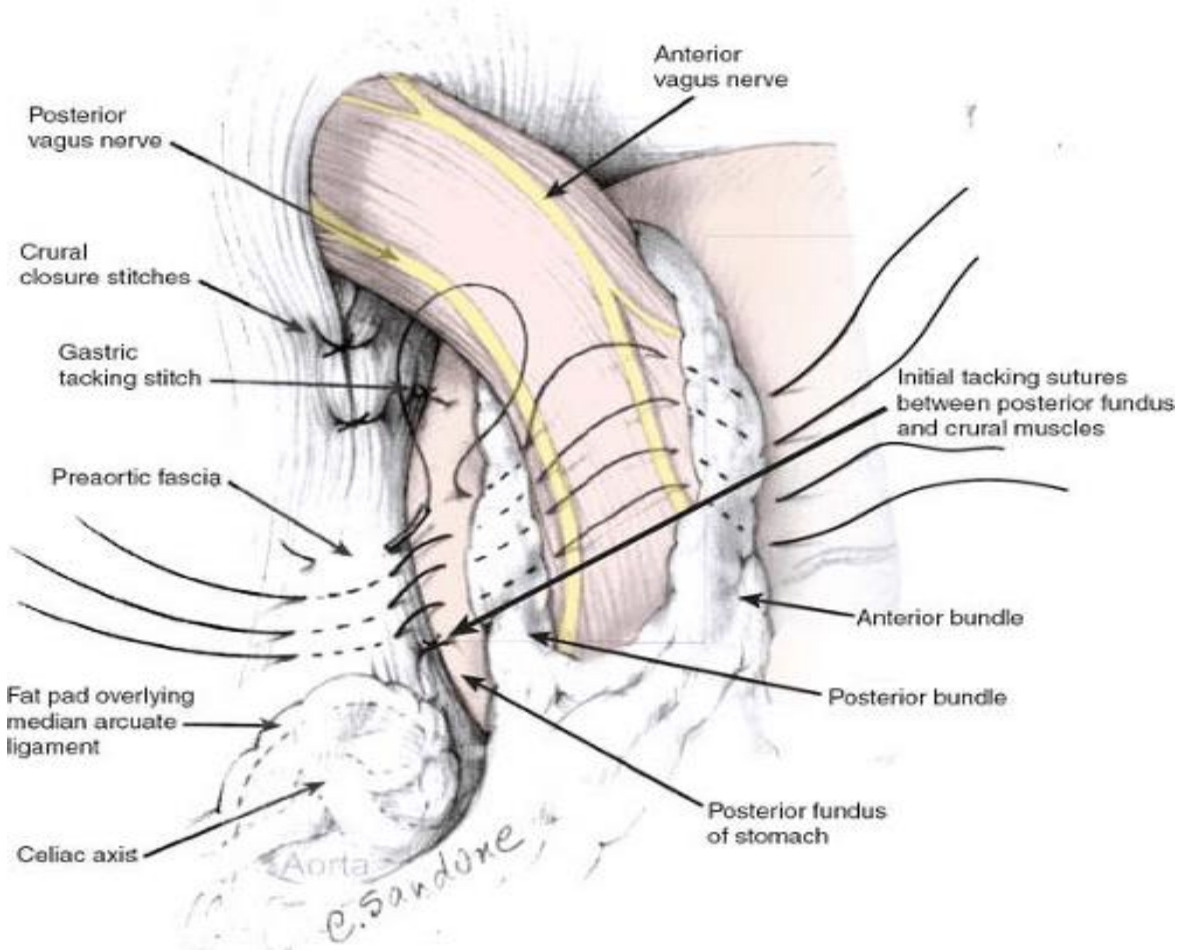

Fig. 5.2 Hill's operation

are currently the most common,

Nissen.

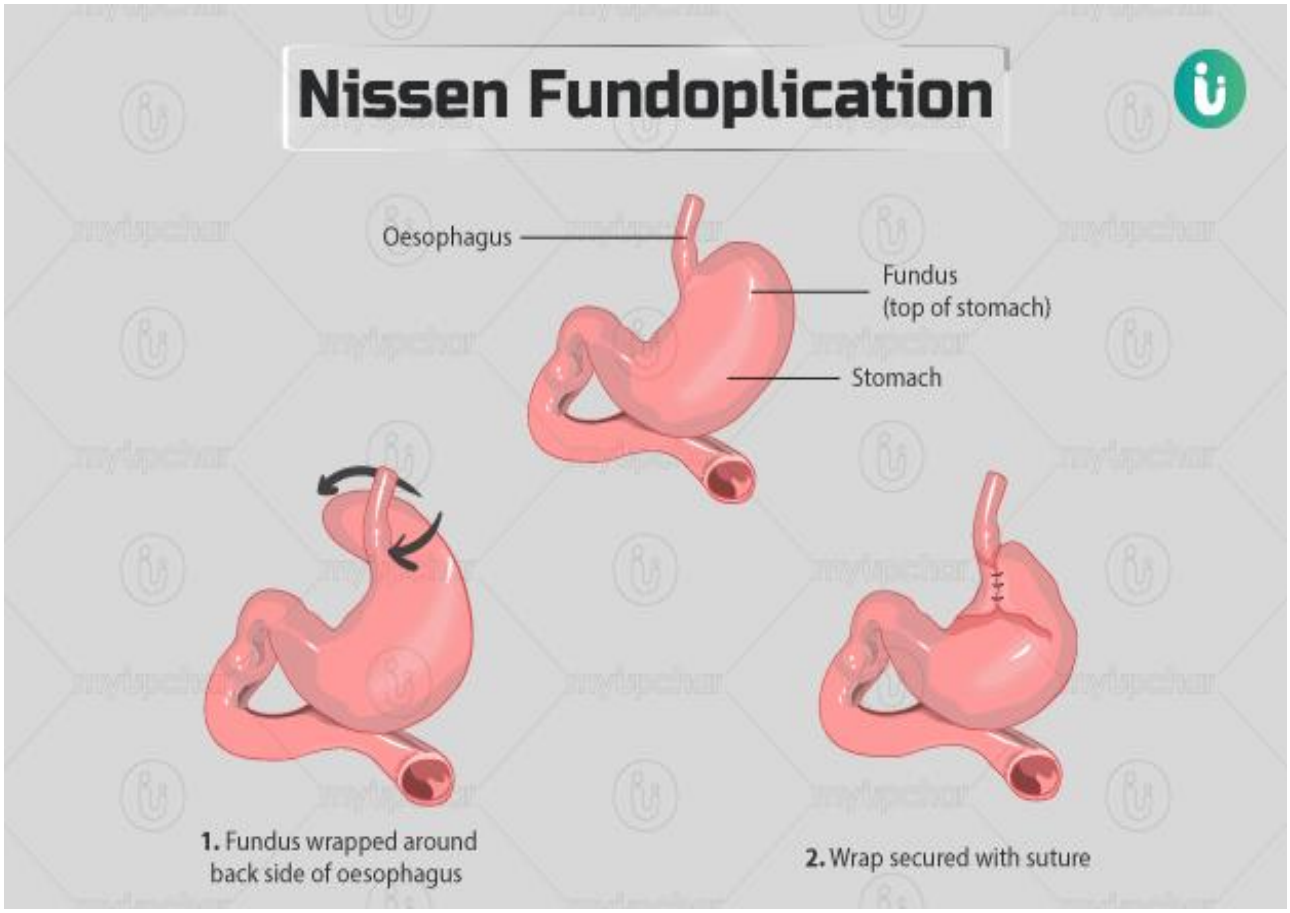

Fig. 5.3 Nissen fundoplication

Common to them is the strengthening of the esophageal sphincter mechanism and the restoration of the valve mechanism. As shown by the research of Henderson et al. (1947), the sphincter mechanism of the esophagus functions most effectively when the length of the abdominal part of the esophagus is 2.5-4 cm. Strengthening of the sphincter is provided by the circular envelopment of the distal esophagus by the upper part of the stomach. According to Siewert et al. (1974), the cuff created in this case has not only a mechanical effect on the sphincter zone. The muscles of the stomach floor are sensitive to hormonal influences, and their tone increases with the action of pentagastrin, which has a certain significance in the positive anti-reflux effect of fundoplication [8-15].

One of the first operations proposed for the treatment of sliding hernias of the esophageal orifice of the diaphragm was the Allison operation (1951). Currently, it is used less often, mainly in the form of various modifications.

Allison attached great importance to the implementation of the closing function of the cardia of the right leg of the diaphragm and the function of the esophageal-diaphragmatic ligament. The operation developed by him is aimed at strengthening these formations.

Allison operation technique

Perform left-sided thoracotomy on the seventh-eighth intercostal space. Separate the lung from the mediastinal pleura. The latter is dissected above the esophagus and the incision is extended for hernial protrusion. The esophagus is isolated from the surrounding tissues to the level of the inferior pulmonary vein. Expose the legs of the diaphragm and apply 3-5 provision stitches. In the upper seam, the wall of the esophagus is also captured. At a distance of 3 cm from the edge of the esophageal opening, the diaphragm is dissected and the abdominal cavity is opened. The esophageal-diaphragmatic ligament is protruded into the thoracic cavity with the fingers inserted through the incision into the abdominal cavity. After retreating 1 cm from the esophagus, the ligament is dissected, its excess is excised, and a thorough hemostasis is performed. The remains of the esophageal-diaphragmatic ligament on the esophagus are sewn with U-shaped sutures to the edges of the esophageal opening of the diaphragm, as a result of which the esophageal-diaphragmatic ligament is fixed to the lower surface of the diaphragm. After that, the stitches applied to the legs are tied and the esophageal opening of the diaphragm is narrowed so that it can pass the tip of the finger. The opening in the diaphragm is sutured, the pleural cavity is drained and sutured.

Subsequently, various modifications of this operation were proposed. They mainly concern the method of fixing the esophageal-diaphragmal ligament. Brain and Maynard (1968) believe that in sliding hernias of the esophageal orifice of the diaphragm, the esophageal-diaphragmatic ligament is sharply stretched and weakened. In this regard, a flap of the broad fascia of the thigh is used, which is fixed around the esophagus to the legs of the diaphragm. To the edges of the esophageal orifice of the diaphragm strengthened in this way, the remains of the esophageal-

diaphragmatic ligament are sewn. After that, the esophageal opening of the diaphragm is narrowed.

To strengthen the esophageal opening, Poilleux (1958) cuts the diaphragm anteriorly from the esophagus, cuts out a flap from it, which is held around the esophagus, stitches it to the diaphragm and sutures the hole in it. B. V. Petrovsky (1962) after suturing the esophageal opening, wraps the esophagus with a flap from the diaphragm, creating a kind of pulp to prevent reflux. Maurer and Keirle (1962), stitching the legs, for greater strength, capture the vertebral fascia in the suture.

The Allison operation can also be performed from the abdominal access. Sutures are applied to the legs and the remains of the esophageal-diaphragmatic membrane are sewn to the edges of the esophageal orifice of the diaphragm, restoring the angle of the Gis.

After Allison surgery, 10% of patients have recurrent hernias, and 25% have reflux symptoms. In this regard, at present, this operation is rarely used in its own form, it is an integral part of more complex operations.

6. Postoperative period

Postoperative dysphagia may be due to a mechanical cause (narrowing of the esophagus with sutures) or neuromuscular disorders of the lower third of the thoracic part of the esophagus. When suturing the legs of the diaphragm, it should be remembered that after tying the stitches, the surgeon's finger should easily pass through the esophageal opening. Dysphagia is more common after Nissen fundoplication, due to compression of the esophagus by the gastric cuff.

In the first days after the operation, many patients note a slowdown in the passage of food. There is also a violation of swallowing dense food. Unpleasant sensations usually disappear 1-2 months after the operation. The patient is recommended to chew food thoroughly, do not eat spicy dishes. In severe cases, they resort to booging.

Vicious fundoplication syndrome. Patients note an increase in the abdomen, a feeling of fullness of the stomach, rapid saturation, flatulence. Symptoms are less pronounced in patients who are able to regurgitate. Effective anti-reflux surgeries are known to limit the patient's ability to regurgitate and vomit, which exacerbates the symptoms caused by the accumulated gas. The patient should be warned that he will not be able to vomit and that if nausea and vomiting occur, he should immediately consult a doctor. In such cases, the use of a transnasal probe, parenteral administration of fluids, and the administration of sedatives are recommended.

The possibility of this complication should be kept in mind during the operation. Regurgitation depends on the size of the abdominal part of the esophagus. If its length exceeds 4 cm, difficulties with regurgitation and vomiting increase. Most often, the bloating syndrome is noted after the Nissen fundoplication.

Postoperative expansion of the stomach. In some patients, in the early postoperative period, a large amount of gas accumulates in the stomach, accompanied by tachycardia, shortness of breath, and a decrease in blood pressure. A sharp expansion of the stomach causes tension of the sutures and contributes to their eruption and relapse of the disease. It is necessary to carefully monitor and administer the gastric tube according to the indications.

Damage to the vagus nerves. Partial damage or compression of the vagus nerves in some patients causes food retention in the stomach and its expansion. In most cases, these phenomena go away on their own within 2 months after the operation and do not require treatment. If the stasis persists, pyloroplasty is performed.

Relapse of reflux or hernia. The probability of relapse is reduced with careful observance of the technique of the operation. Sufficient mobilization of the esophagus ensures the appropriate length of the abdominal part. Stitches should be applied carefully. Preparation for surgery includes antacid therapy and an elevated position in bed for 2 weeks.

Perforation of the esophagus or stomach is possible during esophagoscopy or bougie. If possible, suturing should be combined with anti-reflux surgery and the

elimination of narrowing. Damage to the esophagus and stomach is possible with deep sutures. With timely diagnosis, the sutures are removed and the wound is sutured. If the diagnosis is delayed, repeated intervention is required.

Bleeding. During abdominal operations, damage to the spleen is possible. To reduce this complication, it is recommended to bind 1-2 short gastric arteries.

Relapse of the stricture. If the stricture is easily the probing before surgery, resection of the narrowed area is superfluous. Perform intraoperative booging and antireflux surgery. With a buging stricture, resection of the narrowed area is indicated.

7. Complications of diaphragmatic hernias

Complications of sliding hernias of the esophageal orifice of the diaphragm include:

- peptic ulcer of the esophagus;
- Barrett's esophagus;
- ulcer of the hernial part of the stomach;
- Schatzki ring;
- panarelli esophagitis;
- peptic stricture of the esophagus.

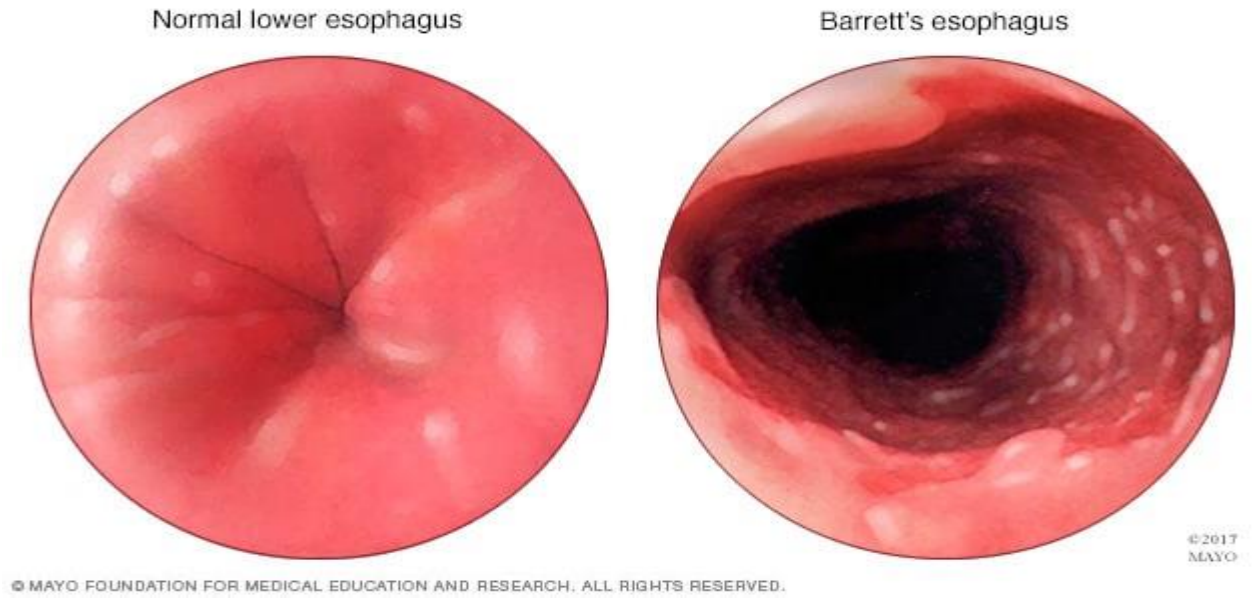

Fig.7.1. Barrett's esophagus

Fig. 7.2. Schatzki ring

In essence, all these complications are the result of reflux esophagitis, which is understood as an inflammatory process in the esophagus that develops as a result of throwing gastric or intestinal contents into it. In 90% of cases (Rosetti et al., 1971), reflux is caused by a sliding hernia of the esophageal orifice of the diaphragm. In addition, its occurrence contributes to the primary and secondary insufficiency of the lower sphincter of the esophagus. The latter is usually observed with prolonged vomiting, prolonged probing of the stomach, elongation or destruction of the sphincter. The development of reflux is caused by surgical interventions on the esophagus and stomach, which are accompanied by trauma or removal of the latter, tension of the ligamentous apparatus of the stomach, straightening the angle of the Gis. This is especially true for extensive gastric resections with gastroduodenal anastomosis according to Billroth-1. Contributing factors may also be esophageal varicose veins, scleroderma, tumors, chemical burns of the esophagus.

As an independent disease, reflux esophagitis was isolated by Quincke (1879). In the Russian literature, this pathology was first described by V. S. Rosenberg (1892). Allison (1946, 1951, 1956) worked a lot on solving this problem, and he

proposed the term "reflux esophagitis". The author emphasized the connection of the disease with hernias of the esophageal orifice of the diaphragm.

As shown by the studies of Ismail-Beigi et al. (1970-1974), in reflux esophagitis, a characteristic change in the multilayer flat epithelium of the esophagus is observed-thickening of the basal layer due to the loss of the surface layers of the epithelium under the influence of gastrointestinal juices.

In the pronounced stages, there are ulcers of the esophagus, located mainly longitudinally, according to the course of the folds of the mucous membrane, more often on the back wall. Ulcers can penetrate through all layers of the esophagus, penetrating into neighboring organs. In chronic cases of the disease, ulcers alternate with islands of regenerating epithelium, the wall of the esophagus is thickened, scarred, circularly narrowed and shortened along the length. Skinner and Belsei (1967) distinguish four degrees of severity of reflux esophagitis:

- I-hyperemia and swelling of the esophageal mucosa;
- II-the presence of superficial ulcers and fibrous overlays on the esophageal mucosa;
- III-chronic ulcers on the esophageal mucosa, fibrosis and shortening of the esophagus;
- IV-progressive fibrosis, accompanied by narrowing of the esophagus, the formation of penetrating ulcers of the esophagus.

Peptic ulcer of the esophagus occurs in 3-7 % of patients with hernias of the esophageal orifice of the diaphragm. It is formed as a result of throwing acidic gastric contents into the esophagus. Often, a peptic ulcer of the esophagus is combined with a duodenal ulcer, especially a stenotic ulcer. The characteristic complaints of patients include severe chest pain, often radiating to the heart and the interscapular region.

The pain is usually associated with eating. There is heartburn, which appears or increases in a horizontal position, especially during sleep. Oedema of the mucous membrane, spasm, scarring of the esophagus lead to dysphagia. Bleeding, vomiting, and weight loss are less common. X-ray and endoscopic diagnosis is often difficult due to the narrowing that occurs in the area of the ulcer. The ulcer is usually located on the back wall in the area of the esophageal-gastric junction. Conservative

treatment includes the entire range of measures used for sliding hernia of the esophageal orifice of the diaphragm. In the absence of an effect, surgical treatment is indicated due to the tendency of esophageal ulcers to penetration and malignancy.

8. Control questions

1. General characteristics of diaphragmatic hernias.
2. Classification of diaphragmatic hernias.
3. The main clinical symptoms of diaphragmatic hernias.
4. Diagnosis of diaphragmatic hernias.

9. Tests and problems

1. The manifestation of a sliding hernia of the esophageal orifice of the diaphragm is:

a) dysphagia,

b) frequent vomiting,

c) **frequent heartburn**,

d) weight loss,

e) none of the above.

2. Paraesophageal hernia is dangerous :

a) **infringement of the stomach**,

b) malignancy,

c) precardial pain,

d) none of the above,

e) all those named.

3. Hernias of the esophageal orifice of the diaphragm are most often manifested by:

a) severe bleeding,

b) light bleeding,

c) hypersecretion,

d) **pain after eating,**

e) asymptomatic course.

4. The main sign of a sliding hernia is :

a) the presence of hernial protrusion,

b) innate nature,

c) **one of the walls of the hernial sac is an abdominal organ partially covered by the peritoneum**,

d) penetration between the muscles and aponeurosis,

e) all of the above is true.

5. Most often, the formation of a sliding hernia involves :

a) the jejunum and ileum,

b) sigmoid and descending colon,

c) **caecum and bladder**,

d) omentum,

e) fat suspensions of the colon.

6. The patient is 54 years old, there are no complaints. At the dispensary X-ray examination of the stomach, a rounded lumen with a fluid level in the posterior mediastinum was found, and after taking the contrast, the location of the cardia above the diaphragm was revealed. What disease can be suspected in a patient?

a) cancer of the cardiac part of the stomach

b) relaxation of the diaphragm

c) **sliding hernia of the esophageal orifice of the diaphragm**

d) retrosternal Lorrean hernia

e) fixed paraesophageal hernia

7. A 40-year-old patient is concerned about pain behind the sternum in the xiphoid process, radiating into the scapula, belching, heartburn. Symptoms increased when the torso was tilted forward. The patient is suspected of having a sliding hernia of the esophageal orifice of the diaphragm. Which of the following diagnostic methods are necessary to confirm and clarify the diagnosis?

1) esophagogastroscopy

2) X-ray examination of the stomach in the Trendelenburg position

3) retrograde of pancreatico-cholangiography

4) the esophageal inominate .

5) Intragastric pH-metry?

a) 1, 3, 5

b) **1, 2, 4, 5**

c) 2, 3, 4, 5

d) 1, 2, 3, 5

d) 2, 3, 4, 5

8. Which of the following factors are indications for surgical treatment of hiatal hernias?

1) ineffectiveness of conservative treatment

2) development of inflammatory strictures of the esophagus

3) frequent bleeding from the esophagus

4) sliding hernias of the esophageal orifice of the diaphragm without complications

5) congenital short esophagus?

a) 1, 3, 4

b) 2, 3

c) 1, 2, 3

d) 4, 5

e) **1, 2, 3, 5**

9. In a 78-year-old patient, a sliding hernia of the esophageal orifice of the diaphragm was found during the examination. pH-metry revealed acidic gastro-esophageal reflux, which is associated with clinical symptoms. Which of the listed methods of treatment do you recommend to the patient?

1) frequent meals in small portions

2) elevated head position during sleep

3) taking antacids

4) administration of drugs that stimulate the secretion of the stomach

5) the vertical position of the body after eating?

a) 1, 4, 5

b) 2, 3, 4

c) 3, 4, 5

d) 1,3, 4

e**) 1, 2, 3, 5**

10. Under what conditions are X-ray sliding hernias of the esophageal orifice of the diaphragm detected?

a) in the standing position

b) in the semi-sitting position

c) **in the Trendelenburg position**

d) artificial hypotension of the duodenum

e) in the side position

11. Indicate the symptoms most often encountered in sliding hernias of the esophageal orifice of the diaphragm:

1) heartburn

2) pain behind the sternum

3) melena

4) intestinal obstruction

5) vomiting

a) **1, 2**

b) 2, 3

c) 3, 4

d) 4, 5

d) 1, 5

12. A 50-year-old patient suddenly developed acute dysphagia, accompanied by sharp pain behind the sternum. What is the possible cause of the following diseases?

a) intercostal neuralgia

b) angina pectoris

c) **pinched paraesophageal hernia**

d) reflux esophagitis

e) Lorrean hernia

13. The patient has heartburn and burning pains behind the sternum, pain in the left hypochondrium, radiating to the heart and to the left shoulder blade. Most often they occur when leaning forward after eating. When X-ray examination of the esophagus is not expanded, shortened, straightened, barium from it enters a hemispherical gas bubble with thin walls, located above the diaphragm, and then fills the elongated stomach with rough folds. Your conclusion

a) achalasia of the esophagus

b) diaphragmatic hernia Bogdalek

c) cancer of the esophagus with a transition to the stomach

d) **sliding hernia of the esophageal orifice of the diaphragm**

e) paraesophageal hernia of the esophageal opening

14. A 36-year-old patient notes the appearance of chest pains that radiate to the left half of the chest and are accompanied by difficult passage of food through the esophagus. ECG - reduction of the T wave, minor diffuse changes in the myocardium, sinus rhythm. When X-ray examination of the esophagus and stomach cardia without features, the gas bubble of the stomach in the form of an "hourglass", part of it is located above the level of the diaphragm. What is your diagnosis?

a) Lorrey-Morgagni diaphragmatic hernia

b) Bogdalek diaphragmatic hernia

c) **paraesophageal hernia of the esophageal orifice of the diaphragm**

d) subtotal sliding hernia of the esophageal orifice of the diaphragm

e) relaxation of the left dome of the diaphragm

15. The patient K. has heartburn and constant pain behind the sternum. When you tilt after eating, regurgitation occurs. According to x-ray examination cardiophorinae sliding hernia hiatal with the location of the cardia and the fundus of the stomach at 8 cm above the diaphragm and a shortening of the esophagus. With esophagoscopy, signs of reflux esophagitis. What treatment tactics will you choose for this patient?

a) conservative treatment in a polyclinic at the place of residence

b) conservative treatment in a therapeutic hospital at the place of residence

c) conservative treatment in a surgical hospital

d) **surgery in a surgical hospital**

e) spa treatment in combination with prolonged use of mineral water "Jermuk"

16. A 43-year-old patient complains of pain behind the sternum and a burning sensation that increases after eating a lot, drinking carbonated water and lying down. In the standing position, the pain and burning sensation are reduced. In blood tests-moderate hypochromic anemia.

What disease would you consider?

a) chronic gastritis

b) duodenal ulcer

c) **hiatal hernia with reflux esophagitis**

d) stomach cancer

d) epertully diverticulum of the esophagus

17. Surgical treatment is necessary when:

1) sliding hernia of the esophageal opening of the diaphragm

2) large paraesophageal hernia

3) reflux-esophagitis

4) insufficiency of cardiac pulp

5) shortened esophagus

a) 1, 2

b) 2, 3

c) 3, 4

d) 4, 5

e) **2, 5**

18. What recommendations will you give to a patient with reflux esophagitis on the basis of a hernia of the esophageal orifice of the diaphragm?

1) fractional meals in small portions

2) high position of the head end of the body in bed during sleep

3) taking antacids

4) reception of cerucal

5) do not go to bed after eating

a) 2, 3, 4

b) 1, 2, 5

c) 3, 4, 5

d) 1, 3, 5

e) **everything is correct**

19. A 55-year-old patient complained of heartburn, acid belching, and pain behind the sternum. Heartburn increases after eating and in a lying position.

What instrumental studies are needed to clarify the diagnosis and differential diagnosis with peptic ulcer disease?

a) ultrasound of the abdominal cavity

b) **computed tomography of the abdominal cavity**

c) conventional radioscopy of the stomach

d) **stomach x-ray in the Trendelenburg position and esophagogastroscopy**

e) laparoscopy

20. What recommendations will you give to a patient with reflux esophagitis on the basis of a hernia of the esophageal orifice of the diaphragm?

a) fractional meals in small portions;

b) the high position of the head end of the body in bed during sleep; c) taking antacids;

d) reception of cerucal;

e) do not go to bed after eating. Choose the correct combination of answers:

1. b, c, d;

2. a, b, d;

3. C, g, d;

4. a, B, d;

5. **everything is correct.**

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