American Journal of Biomedicine and Pharmacy
https://biojournals.us/index.php/AJBP
ISSN: 2997-7177

Esophageal Anomalies, Diverticula, Atresia, Stenosis, Achalasia, Causes and their Current Solutions

Ganjiyeva Munisa Komil qizi
3rd year student of the Faculty of Medicine, Karshi State University

Received: 2024, 15, Feb
Accepted: 2025, 21, Mar
Published: 2025, 16, Apr

Annotation: Esophageal developmental anomalies are disorders of the embryonic development of the esophagus, leading to the formation of an anatomically and histologically incorrect structure of the organ. This manifests itself as dysphagia and inability to accept enteral nutrition. Pathologies are often accompanied by respiratory symptoms: cough, varying degrees of shortness of breath. Aspiration pneumonia may develop. Diagnosis of esophageal developmental anomalies is made on the basis of clinical signs of developmental defects; radiological and endoscopic confirmation is required. Treatment is carried out using surgery, plastic surgery, and in some cases, intestinal tissue grafts.

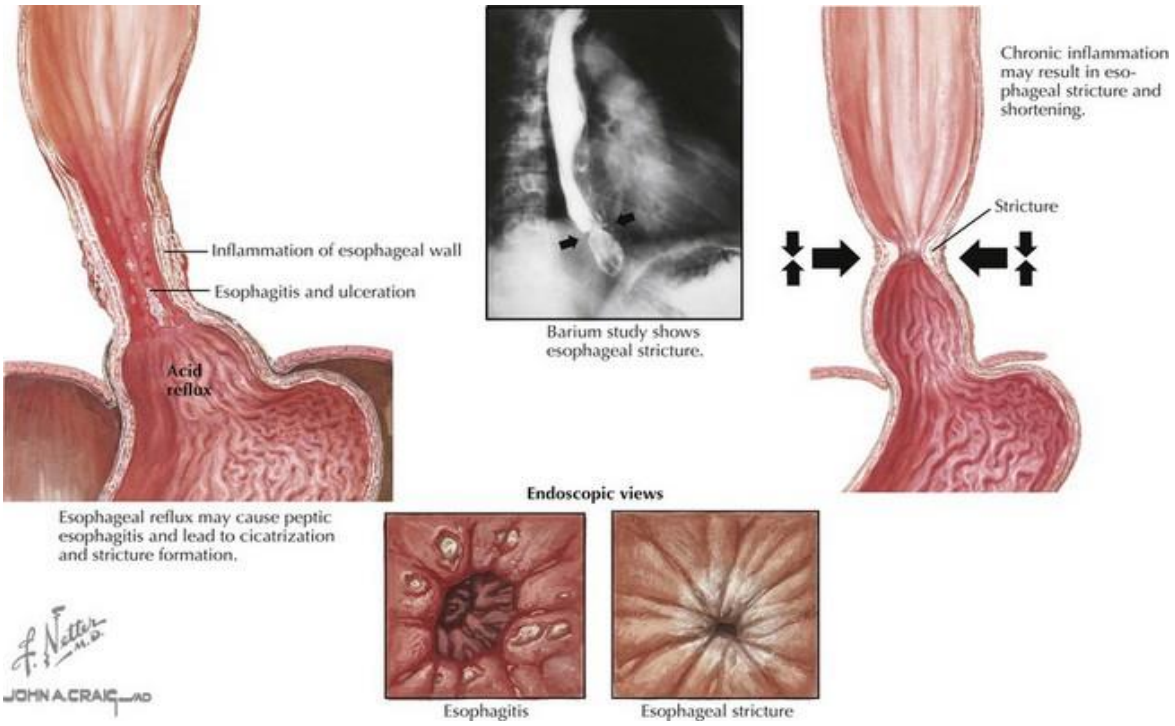
Keywords: Causes, Symptoms of esophageal anomalies, Diagnostics, Treatment of esophageal malformations, Prognosis and prevention.

Introduction: Developmental anomalies of the esophagus are rare among gastrointestinal tract defects. The incidence of congenital stenosis of the esophagus is 1 case per 20-50 thousand children. Congenital diverticulum is the most common defect, occurring with a frequency of 1 case per 2.5 thousand newborns. The relevance of pathologies in modern pediatrics is due to the need for early surgical intervention, which can only be performed in a specialized hospital. In case of late diagnosis, a fatal outcome is almost inevitable. There is a high risk of developing aspiration pneumonia, which complicates the course of developmental anomalies of the esophagus. In addition, several operations are often required, each of which poses a threat to the child's life.

The esophagus is formed from the primary intestine from the 4th week of embryonic development. During this period, the formation of the respiratory system organs occurs from it.

Violation of differentiation leads to the development of anomalies of the esophagus, which often also affect the upper respiratory tract. Infectious agents, including sexually transmitted ones, have a teratogenic effect on the fetus in the first trimester of pregnancy. Bad habits of the mother, chronic somatic diseases, acute respiratory viral infections, and radiation exposure (X-rays, radiation therapy) also lead to a violation of the correct location of the embryo.

Anomalies in the development of the esophagus are present from birth. Esophageal atresia is relatively rare, but has the most striking clinical signs. At the first feeding, foamy mucus is released from the nose. At the same time, signs of respiratory failure are added, since the defect is often accompanied by the formation of a tracheoesophageal fistula. Food gets into the respiratory tract, causing coughing, difficulty breathing and asphyxiation. The child quickly becomes cyanotic. Isolated tracheoesophageal fistula is extremely rare and is manifested by respiratory failure, always associated with feeding.

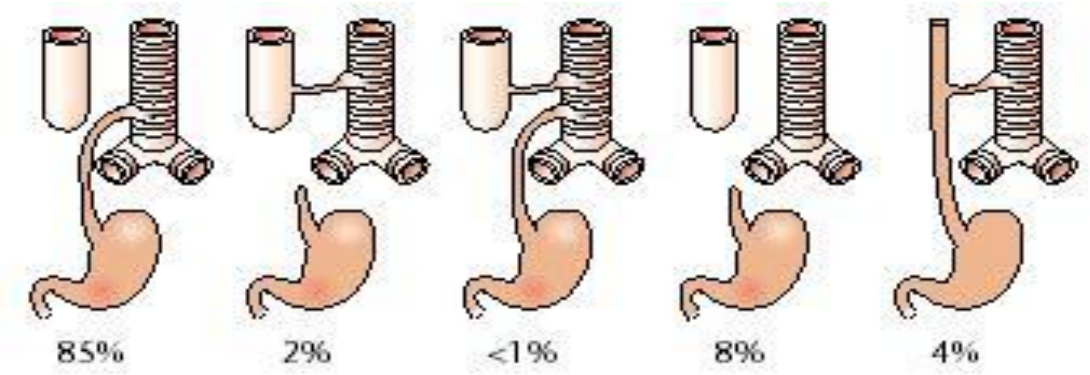


Among the developmental anomalies of the esophagus, complete or partial doubling of the organ is also common. When the lower part doubles, the stomach also doubles. When the accessory esophagus ends blindly, it is called congenital esophageal diverticula. Due to the accumulation of food in the blind sac, the defect manifests itself as dysphagia and regurgitation. Esophageal aplasia is one of the rare developmental anomalies of the esophagus. With this defect, the esophageal tissue is underdeveloped, so the prognosis for life is unfavorable. Congenital esophageal cyst is a submucosal formation that does not communicate with the main cavity and is manifested by dysphagia and other signs of stenosis.

Research methods and materials: Esophageal atresia is detected in the delivery room. Routine examination of a newborn includes examination of the esophagus; when the probe stops at a height of 8-12 cm from the teeth, the absence of its lumen is determined. Also, the pediatrician may suspect developmental anomalies of the esophagus, especially if there are signs of other defects in the respiratory system and heart. The basis of the diagnosis is a contrast X-ray examination. Bronchoscopic preparations should be used as a contrast medium, since tracheoesophageal fistula is often present, and barium sulfate can cause pneumonia.

If the esophagus is atretic in the middle part, the contrast medium does not pass into the stomach. There is no gas bubble in the stomach, except in cases where there is a lower tracheoesophageal fistula and a large amount of air enters the stomach from the respiratory tract. Esophageal stenosis is seen in the picture as a narrowing of the organ. The upper part of the esophagus is

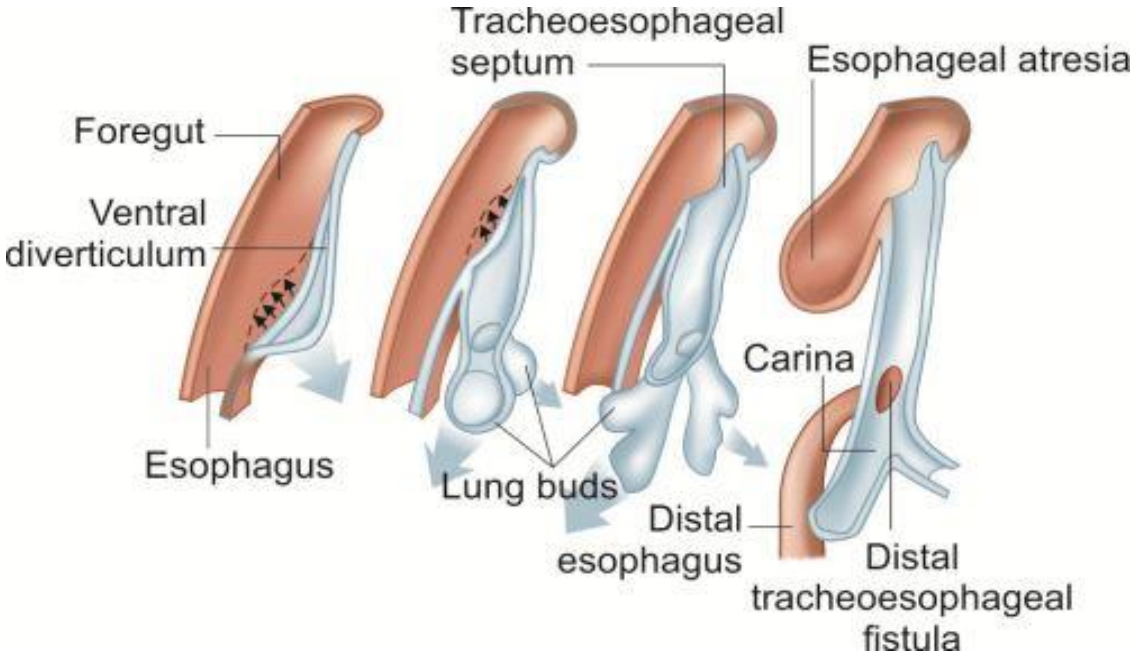
often dilated due to excess food masses formed during eating. Other malformations of the esophagus, such as diverticula and cysts, are also visible on radiographs. Endoscopic examination is performed according to indications to confirm stenosis and, if other pathologies are suspected, to visualize the mucosa.



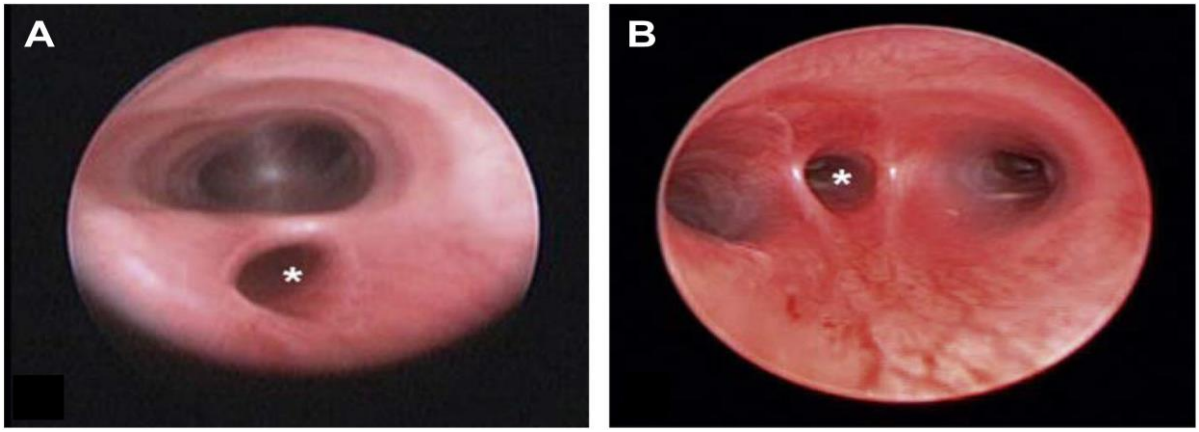
Anatomical variations of oesophageal atresia and tracheooesophageal fistula, indicating relative frequency

Treatment is surgical. If there is a suspicion of developmental anomalies of the esophagus, the child is transferred to a specialized surgical hospital. Tracheal intubation and artificial ventilation are performed. Surgery can be performed by open access or thoracoscopic method. In case of esophageal atresia, it is necessary to suture the fistula and create an anastomosis between the blind ends of the esophagus. If there is a defect in the middle part of the organ, the length of the ends is often insufficient to create a direct anastomosis, therefore, esophageal plastic surgery is performed using a part of the colon mucosa. Other developmental anomalies of the esophagus are also indications for surgical treatment.

The prognosis for esophageal atresia is usually favorable; 95-100% of children tolerate the operation well and lead a normal life. However, isolated atresia (without fistulas) is rare, and the presence of communication with the airways significantly increases the risk of developing aspiration pneumonia. The latter occurs in a short time and can lead to the death of the child. Prevention of developmental anomalies of the esophagus is possible during pregnancy and consists in preventing intrauterine infections, eliminating bad habits and timely treatment of existing somatic diseases.



Results: The disease is a long-studied surgical problem, ranking second among esophageal pathologies in adults and first among children. Stenosis due to eosinophilic esophagitis is more common in young adults and children. Middle-aged patients often consult specialists for strictures associated with acid reflux, iatrogenic or drug-induced esophagitis. However, the pathology is very rare and its prevalence is low: according to statistics, it is 1.1 per 10,000 people. Risk factors include gastroesophageal reflux disease, the presence of a hernia in the esophageal diaphragm, and previously documented cases of dysphagia. In addition, there is a history of peptic ulcer disease and chronic alcohol consumption. There is no clear relationship between gender and esophageal stenosis, but men are at higher risk of developing this condition than women. Accidental or suicidal ingestion of corrosive chemicals can cause burns of the gastrointestinal tract and respiratory tract. The circumstances of the incident and the chemical nature of the substance determine the extent of the injury and the toxicological risk. The early period following a chemical burn is associated with the possibility of laryngeal edema, perforation of the esophagus, stomach, and intestines, gastrointestinal bleeding, and pancreatitis.



Late effects of burns include pathological changes in the oral cavity, esophagus, stomach, or respiratory tract. In addition, the healing process ends with the formation of strictures in these organs, which leads to serious systemic consequences for the patient, including deterioration of the general condition, significant weight loss, malnutrition-related diseases, recurrent aspiration leading to respiratory tract infections, and possibly respiratory failure [6].

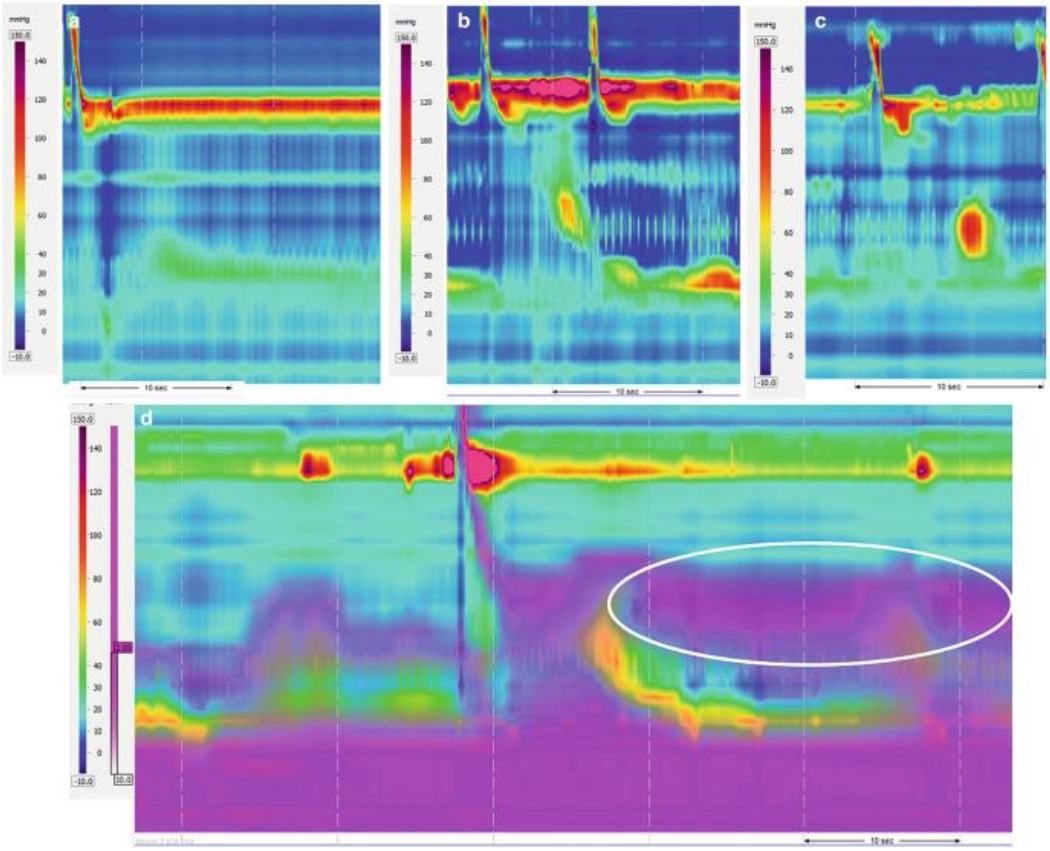
The stricture forms a long-term narrowing, which leads to dilatation of the upper part of the esophagus and discomfort during emptying, usually manifested by dysphagia. Several factors influence the course of the disease: surgical technique, length of the atretic segment, presence of a fistula, and concomitant gastroesophageal reflux [3]. The clinical spectrum of GERD is diverse. Most patients experience a mild course of the disease, characterized by occasional nausea and acid regurgitation. However, esophagitis develops in almost 40% of patients, which can be severe in half of cases. One of the most common consequences of long-term severe esophagitis is the formation of ulcerative strictures of the esophagus. The morbidity in patients with gastric strictures is significant, with their potentially chronic recurrent course, increased risk of food exposure, susceptibility to pulmonary aspiration, frequent comorbidity with Barrett's esophagus, and the need for esophageal dilation, sometimes complicated by perforation [5].

Epidermolysis bullosa (EB) is a group of rare inherited skin diseases characterized by fragility of the stratified squamous epithelium, leading to blistering and scarring in response to minor trauma. It is divided into 4 types: simplex, combined, dystrophic, and Kindler syndrome.

One of the most common and severe gastrointestinal complications in patients with EB is esophageal stricture. According to the National EB Registry (NEBR), esophageal strictures occur in 86.7% of patients with the recessive dystrophic EB subtype and 79.1% of patients with severe generalized EB. The incidence of strictures increases with age in all groups, but they are more common in patients with the severe generalized form, half of whom develop symptoms by the

age of 10 years [4].

Eosinophilic esophagitis (EE) is a disease affecting the esophagus, characterized by infiltration of the esophageal tissue by eosinophils with severe occult epithelial hyperplasia. Other diseases with similar features, especially GERD, must be excluded. EE has been identified in recent years in studies of patients with GERD who have failed to respond to PPI therapy or fundoplication. The disease usually occurs in children, but its prevalence is increasing in adults, especially young adults.



Tissue hypereosinophilia can affect the deeper layers of the esophagus, and in advanced cases, complications such as fibrosis and esophageal stenosis occur due to persistent inflammatory activity [2].

Congenital esophageal stenosis occurs in approximately 1 in 25,000 to 50,000 births. The causes of its occurrence remain unclear, although some researchers point to an embryological origin of this pathology. VSP manifests itself as a concentric lumen of the esophagus, which can be detected from birth, but symptoms in the neonatal period are not always obvious. Often this condition is accompanied by esophageal atresia.

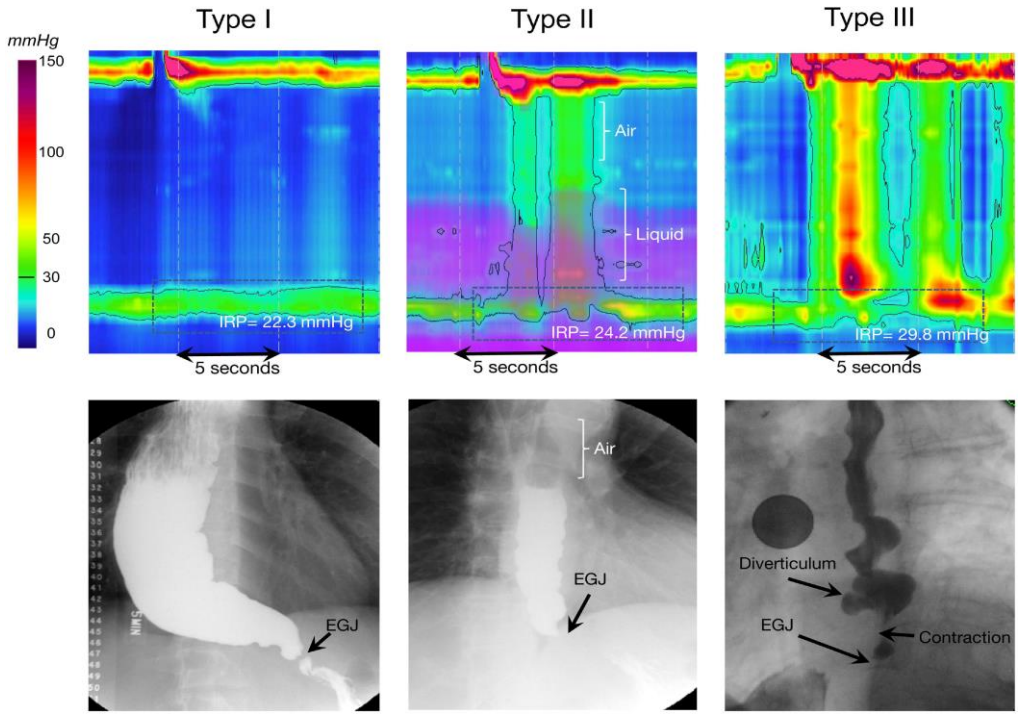
The main symptom to watch for is difficulty swallowing, or dysphagia, which can be of varying severity. In addition to this symptom, the patient may experience hypersalivation, eating disorders, including refusal to eat, chest pain, unpleasant itching, nausea, vomiting, and bleeding.

Discussion: Due to impaired swallowing, food and water can enter the respiratory tract, which causes a strong cough and also poses a risk of aspiration pneumonia. During the examination, the doctor carefully collects the patient's medical history, as well as learns about changes in the patient's diet and any disturbing symptoms. Many patients with chronic peptic stricture change their diet and, although they do not eat their usual diet, no longer complain of dysphagia because they avoid foods that aggravate their symptoms. Therefore, it is important to learn about the types of foods that cause it. More than 75% of patients with gastric and duodenal ulcers usually have symptoms of heartburn. However, some patients describe a decrease in heart rate, as their stenosis is aggravated by a decrease in the flow of acid into the esophagus through the obstructed

lumen. In this group of patients, a careful history is important to rule out other causes of stricture, particularly drug-related esophagitis. Atypical presentations of ulcerative strictures that may delay the correct diagnosis include chronic cough and asthma. These symptoms are caused by aspiration of acid or food into the lungs. Chest pain may be caused by esophagitis, esophageal spasm, or food becoming trapped at the level of the stricture. Patients with strictures rarely lose weight because they have a good appetite and maintain caloric intake by eating a bland liquid diet. Significant weight loss should suggest carcinoma or achalasia [1].

The esophagus is the most vulnerable part of the gastrointestinal tract to corrosive agents. The most serious damage occurs in cases of concentrated caustic burns, which cause deep liquefaction necrosis of the esophageal wall, including the muscular layer. Most often, such burns are caused by caustic preparations containing potassium and sodium hydroxides, which are used to clean pipes and surfaces. If the substance is in granular form, it can settle in the upper esophagus, which can cause serious damage. Highly concentrated liquid chemicals move rapidly through the oropharynx and cause significant damage to the entire esophagus.

Unlike alkalis, strong acids usually cause coagulative necrosis with the formation of coarse scabs that do not penetrate deeper than the submucosa. In addition, acids have a bitter taste and children often spit them out. However, when swallowed, they reach the stomach faster than alkalis and cause serious damage to it, especially if it is empty, which can lead to impaired evacuation and pyloric stenosis. Due to the developing pylorospasm, the duodenum and jejunum are protected from the effects of toxic substances.



Conclusion: The normal healing process after an esophageal anastomosis involves the formation of scar tissue. After surgery, wound healing undergoes a remodeling phase, during which fibroblasts contribute to tissue contraction. In open wounds, contraction has a positive effect on their healing; however, wound contraction in the area of a three-to-three circular anastomosis creates a narrowing. Therefore, the occurrence of stenosis at the site of an esophageal anastomosis should be considered natural.

Complications of reflux esophagitis are distinguished separately, they include cicatricial stenosis of the esophagus (peptic stenosis), chronic ulcers, Barrett's esophagus (epithelial metaplasia) and adenocarcinoma. With a long course of the disease, pathological changes, starting from the mucous membrane, penetrate into the deeper layers, resulting in the formation of fibrosis and scar tissue. This, in turn, leads to a narrowing of the lumen of the esophagus and its pathological

shortening.

List of used literature:

1. Hussain T, Maurer JT, Lang S, Stuck BA. [Pathophysiology, diagnosis and treatment of Zenker's diverticulum]. HNO. 2017 Feb;65(2):167-176. [PubMed]
2. Wang ZM, Zhang SC, Teng X. Esophageal diverticulum serves as a unique cause of bronchoesophageal fistula in children: A case report. Medicine (Baltimore). 2017 Dec;96(51):e9492. [PMC free article] [PubMed]
3. Sonbare DJ. Pulsion Diverticulum of the Oesophagus: More than just an Out Pouch. Indian J Surg. 2015 Feb;77(1):44-8. [PMC free article] [PubMed]
4. Little RE, Bock JM. Pharyngoesophageal diverticuli: diagnosis, incidence and management. Curr Opin Otolaryngol Head Neck Surg. 2016 Dec;24(6):500-504. [PubMed]
5. Le Mouel JP, Fumery M. Zenker's Diverticulum. N Engl J Med. 2017 Nov 30;377(22):e31. [PubMed]
6. Law R, Katzka DA, Baron TH. Zenker's Diverticulum. Clin Gastroenterol Hepatol. 2014 Nov;12(11):1773-82; quiz e111-2. [PubMed]
7. Fékéte F, Vonns C. Surgical management of esophageal thoracic diverticula. Hepatogastroenterology. 1992 Apr;39(2):97-9. [PubMed]
8. Thomas ML, Anthony AA, Fosh BG, Finch JG, Maddern GJ. Oesophageal diverticula. Br J Surg. 2001 May;88(5):629-42. [PubMed]
9. Khullar OV, Shroff SR, Sakaria SS, Force SD. Midesophageal Pulsion Diverticulum Resulting From Hypercontractile (Jackhammer) Esophagus. Ann Thorac Surg. 2017 Feb;103(2):e127-e129. [PubMed]
10. Crawley B, Dehom S, Tamares S, Marghalani A, Ongkasuwan J, Reder L, Ivey C, Amin M, Fritz M, Pitman M, Tulunay-Ugur O, Weissbrod P. Adverse Events after Rigid and Flexible Endoscopic Repair of Zenker's Diverticula: A Systematic Review and Meta-analysis. Otolaryngol Head Neck Surg. 2019 Sep;161(3):388-400. [PubMed]
11. Nitschke P, Kemper M, König P, Zahnert T, Weitz J, Reissfelder C, Distler M. Interdisciplinary Comparison of Endoscopic Laser-Assisted Diverticulotomy vs. Transcervical Myotomy as a Treatment for Zenker's Diverticulum. J Gastrointest Surg. 2020 Sep;24(9):1955-1961. [PubMed]
12. Mantsopoulos K, Psychogios G, Künzel J, Zenk J, Iro H, Koch M. Evaluation of the different transcervical approaches for Zenker diverticulum. Otolaryngol Head Neck Surg. 2012 May;146(5):725-9. [PubMed]
13. Yuan Y, Zhao YF, Hu Y, Chen LQ. Surgical treatment of Zenker's diverticulum. Dig Surg. 2013;30(3):207-18. [PubMed]
14. Diseases of the esophagus / Maev IV, Busarova GA, Andreev DN - 2019.
15. Radiological diagnostics of anomalies and malformations of the digestive tract in children/ / VG Mazur, EA Sotnikova, EA Savaley. - 2019.
16. Congenital atresia of the gastrointestinal tract in newborns / Borisevich MA, Kumeiko ID, Izenov AM, etc. // International Journal of Applied and Fundamental Research. – 2019. – No. 6.