

## Complex diagnostic methods for non-tumoral pathologies of gastro-esophageal junction (mini review)

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**According to the literature, there is a significant increase in esophageal pathologies in developed countries, which reduces the life quality and working abilities of patients. Timely and correct diagnosis of non-tumor abnormalities of the gastro-esophageal junction is one of the main factors influencing the quality of treatment and the recovery of the patients.**

**Keywords:** Gastroesophageal junction, GERD, hiatal hernia, gastroesophageal reflux

Increased level of urbanization and life rhythm, poor nutrition, and negative stress on the background of active changes in the socio-economic structure of society have a negative impact on people's health and, consequently, increase the incidence of gastro-intestinal diseases. Despite of the development of modern medicine and the improvement of diagnostic methods, the diagnosis of gastro-intestinal diseases is still topical. According to the literature, there is a significant increase in esophagus pathology in developed countries, which reduces patients' life quality and their ability to work.

Currently, gastro-esophageal reflux disease (GERD) is one of the important problems of modern gastro-enterology. Given the prevalence of GERD and its complications among the able-bodied population, it can be called the epidemic of the 21<sup>st</sup> century. Among the pathologies of the upper sections of the digestive tract, GERD is found in 40-50% of the adult population. GERD is prevalent in both children and adults (Волчкова и Оспанов, 2011; Hopkins et al., 2015; Можаровский и др., 2017). According to many authors, the clinical signs of the disease are associated with functional disorders of the gastro-intestinal tract (Велигоцкий и Горбулич, 2007; Шишко и Петрулевич, 2015; Шестакович, 2015; Chenxi et al. 2017). According to the World Health Organization's classification, GERD is a chronic recur-

rent disease that causes reflux of gastric and/or duodenal secret, and is irrespective of the presence of morphological changes in the gastrointestinal tract as a result of impairment of the motor-evacuator function of the gastro-esophageal zone. In the latest recommendation of the international consensus (Montreal Consensus 2006), GERD is a disease that manifests itself with the symptoms and/or complications of the patient as a result of reflux in gastro-intestinal disorders. GERD has been adopted as an independent disease in 1997 (Herval, Belgium) (Мхаммад и Орозбекова, 2017).

Due to the scope of its spreading, GERD is considerably more popular. Despite of numerous epidemiological studies on GERD and its effects, the used questionnaires and the descriptions of reflux are different. Mainly, Mayo, GERD - Q, DIGEST - Q, RDA and country-specific questionnaires were used for studies. The most commonly accepted clinical description of GERD in the world is the presence of at least once a week a complaint of pyrosis and/or regurgitation. However, surveys also use clinical description such as at least twice a week pyrosis and/or regurgitation, and at least once a year, pyrosis and/or regurgitation. So, it is very difficult to summarize all studies and draw conclusions. At the same time, epidemiological analyzes show that the incidence of GERD varies in eastern and western countries,

and even in different geographical areas of the country, different ethnic groups, and people of different races. The most extensive, randomized study of eastern countries was conducted in China in the 1990s by the Mayo survey and it found that 2.5% of the population was suffering from pyrosis and regurgitation, which is considered a complaint of GERD. Subsequent literature data indicate that this figure rose up to 6.2% in China. In Japan, the incidence of GERD occurrence is 16.5%, which is the highest in the Far East. In the Indian Peninsula this figure is 5.3-7.1%. In the European and American continents, the highest values were recorded in the United States (26.2%), Norway (26%) and Sweden (25.9%). A study, conducted in the United States, was also analyzed in epidemiological aspect among subgroups and it was found for 38% of Hispanic people, 14.7% in Asian subgroups, 29.9% in whites, and 22.1% in blacks. As for Turkey, this figure was reflected in studies, as 23%, and the highest was in Russia - 33%. On a whole, gastro-intestinal reflux symptoms in Western Europe and North America are encountered in about 20% of the population and 5% in Asia. Most likely, the actual values of its incidence are higher, as some of the epidemiological groups are asymptomatic patients and atypical forms of GERD. The complications of GERD (esophagitis, Barrett esophagitis and related adenocarcinoma of the esophagus) are more commonly encountered in western countries (Мхаммад и Орозбекова, 2017; Serhat ve Yüksel, 2017; Akyüz and Soyer, 2017).

The diaphragmatic hernia (hiatal hernia) is one of the main causes of formation GERD. The hiatal hernia (НН) ranks a position in the structure of the digestive tract diseases after gastric ulcer and cholecystitis (Левин и др., 2013; Дронова и др. 2016; Затевахина и др., 2016; Akyüz and Soyer, 2017).

The brightest and the most common complication of the НН is a pain (45-80%). It can irradiate to the neck, ears, shoulders and back. In 10-11% of patients it can simulate angina by irradiating to the back of the breast. According to various literature data, discomfort and aching syndrome are reported in up to 35% of cases in xiphoid process, 25% in the sternum projection and 20% in the heart region. The cause of pain is the compression of the vascular and nerve endings as a re-

sult of migration of the cardiac and fundal part of the stomach from diaphragm (Левин и др., 2013; Затевахина и др., 2016; Akyüz and Soyer, 2017).

The diaphragmatic hernia is sub-divided into 4 types: sliding hernia, paraesophageal hernia, mixed hernia and giant hernia. Sliding hernia (type 1) is the most common type (90-95%) and is mainly observed in association with GERD. In sliding hernia (type 1) the gastro-esophageal junction (GEJ) is monitored in the posterior mediastinum with the cardiac proximal. In Type 1 hernias the natural barrier against GER is disrupted, the diaphragm legs pressure on the low esophageal sphincter is reduced, and the proximal cardia displacement causes the opening of Hiss angle, which makes the reflux more susceptible. For Type 2 hiatal hernia while GEJ and cardia remains at the typical location, the gastric fundus or part of the large curvature passes from the diaphragm to the thoracic cavity. Type 3 incorporates the symptoms of both types, no matter how far esophagus and cardia are displaced to the thoracic cavity, and the gastric fundus and the greater curvature are always above. For Type IV other abdominal organs also (spleen, small intestine and colon) are displaced to the thoracic cavity besides stomach and GEJ. (Калинина и др., 2014; Зябрева и Джулай, 2015; Pawluszewicz et al., 2018)

Non-tumoral pathologies of the GEJ are difficult to identify and can easily be ignored and misdiagnosed. Timely and correct diagnosis of non-tumoral pathology of the GEJ is one of the main factors affecting the quality of treatment and the health of patients.

The most reliable method used for the diagnosis of gastro-esophageal reflux is the daily pH measuring of the esophagus.

Esophago-myometry provides information on the myomotoricity of the esophagus. This method is considered a "gold standard" in determining of the motor discoordination of the esophagus. However, the method is less effective in the diagnosis of joint abnormalities of the abdominal cavity.

Another method used in the diagnosis of esophageal diseases is endoscopy. Despite of its invasive nature and creating discomfort in the patient, the method is widely used because of its higher sensitivity than X-ray method and is considered a "gold standard."

The main visualization methods used in diagnostics of the esophagus pathologies are radiology, computed tomography (CT) and endoscopic ultrasound (EUS) techniques. Although all methods are highly informative and play an important role in revealing pathologies of the esophagus, each method has different capabilities, accuracy and sensitivity to the pathology. It should be noted that non-invasiveness of the method plays a major role for the selection of examination methods. As the devices improve, new opportunities are open for diagnostic methods, which change the method's priority in the diagnosis of pathologies.

The most traditional and widely used method in diagnostics of diseases of the esophagus is radiology. The method has sufficient diagnostic capabilities and is 71% informative in the diagnosis of HH. The method allows determining the presence, size, shape of the hernia, functions of the GEJ and possible complications (Туранов и др., 2010; Зябрева и Джулай, 2015; Дронова и др., 2016).

In the last decade, multi-spiral computerized tomography (CT) has been used extensively in the differential diagnosis of GEJ pathology. The main advantage of the CT over the routine radiological and endoscopic techniques is that it allows the GEJ to objectively assess not only the anatomical area but also the diaphragm legs, diaphragm, and other structures of the diaphragm. The American Association of Abdominal Surgeons recommends computerized tomography (CT) of the thoracic cavity organs for the diagnosis of HH. Multi-spiral CT and 3D reconstructive capabilities with peroral contrast increase the sensitivity of the method for the diagnosis of HH (Bilgi ve Batirel, 2013; Журбенко и др., 2015; Семенякина и др., 2017)

Although the endoscopic ultrasound (EUS) provides a detailed overview of the GEJ wall, the ability to perform biopsies under its control raises the importance of the method, the method's dependence on qualification of the person performing the procedure, semi-invasiveness and sedation, as well as lack of equipment in most hospitals, limits the use of the method.

Technological development of ultrasonic devices, lack of ionizing properties of sound waves, easy implementation of the method and non-invasiveness have contributed to the widespread application of ultrasound examination in clinical prac-

tice. Transabdominal Ultrasonography (TUS) is the primary method for examination of the abdominal cavity and the peritoneal cavity and usually identifies the next stages of diagnostic search. Although in the pathology of the digestive tract sonography is mainly used for the diagnosis of parenchymal organs, for a long time it has been considered as an obstacle for sound waves due to air in the gastrointestinal tract and the sonographic examination has not been practically performed.

The first information of transabdominal ultrasound of GEJ in children was published by Westra in 1990 (Westra et al., 1990). Later, in 1994 Aliotta and colleagues conducted sonographic analysis of the GEJ in adults (Aliotta et al., 1995). Based on comparative analysis of patients with 18 healthy and 12 patients with HH, author reported that, healthy individuals had a clear visualization of GEJ and abdominal esophageal diameter up to 10 mm, other patients with HH had 16-21 mm diameter and non-clear visualization of GEJ. It was found that precision in measuring diameter values is 90% and non-clear visualization of GEJ is 94.7%. Barone et al. (2006) with the help of TUS in 168 patients measured the diaphragm diameter of the esophagus and compared with endoscopy: in 24 of 29 patients with a diameter greater than or equal to 18 mm, HH was endoscopically confirmed. Д.А.Балагански и др. (2011) reported an increase in diameter of the abdominal portion of the esophagus—75.9%, wall thickness 82.8%, adverse extension 44.8%, The angle of 90 degrees and more in 27.6%, and reflux during examination in 27.6% of children with GERD.

From the literature review it gets clear that the opportunities of TUS are mostly restricted to the diagnosis of gastro-esophageal reflux in newborns, and sometimes in carcinomas, leiomyom and achalasia in adults. The role of TUS in the diagnostic algorithm and its effectiveness in the dynamics of pathological processes has not been fully described. We did not find any literature on TUS addressing the after fundoplication surgery cases. Ultrasound is a method that provides sufficient information about the abdominal cavity and we believe that it can also provide an irreplaceable information on the morphology of the GEJ.

Given the above, it appears that there is a need for the creation of a new diagnostic algorithm

that is more rational, shortens the examination period and allows for the selection of the most optimal surgical method based on the results obtained with the complex application of radiologic

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## Qida borusu - mədə keçidinin qeyri-şiş patologiyalarının kompleks müayinə Metodları

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Ədəbiyyat məlumatlarına əsasən inkişaf etmiş ölkələrdə qida borusu patologiyalarının nəzərəcarpacaq dərəcədə artması müşahidə edilir ki, bu da xəstələrin həyat keyfiyyətini və əmək qabiliyyətini aşağı salır. Qida borusu-mədə keçidinin qeyri-şiş patologiyalarının vaxtında və düzgün diaqnostikası müalicənin keyfiyyətinin artmasına, xəstələrin sağalmasına təsir edən əsas amillərdəndir.

**Açar sözlər:** Qida borusu-mədə keçidi, QERX, hiatal yırtıqlar, gastroözofageal reflü

**Комплексные методы обследования неопухолевых патологий  
пищеводно-желудочного перехода**

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Согласно литературным данным в развитых странах наблюдается значительное увлечение патологии пищевода, что снижает качество жизни и трудоспособность пациентов. Своевременная и правильная диагностика неопухолевых патологий пищеводно-желудочного перехода является одним из основных факторов, влияющих на качество лечения и раннее выздоровление пациентов.

**Ключевые слова:** *Пищеводно-желудочный переход, ГЕРБ, хиатальная грыжа, гастро-эзофагеальный рефлюкс*