

Choosing the Optimal Surgical Treatment for Reflux Esophagitis

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ABSTRACT

The authors once again raised the problem of GERD, as despite the development of antireflux surgery, the results of complex treatment of patients with reflux esophagitis leave much to be desired. On the one hand, the effectiveness of conservative treatment is low, on the other hand, there are contraindications to bougie or balloon dilation sessions, as well as an increased risk of anesthetic complications in the event of surgery. Based on the results of their own research, the authors have proven the greater effectiveness of robot-assisted operations compared to traditional laparoscopic techniques.

Keywords:

Complex treatment, Reflux esophagitis, Conservative treatment, Balloon dilation, Surgery, Robot-Assisted Operations (RSO).

Introduction

The concept of "reflux" was introduced by one of the outstanding morphologists Carl von Rokitansky (1855), who also attempted to determine the pathogenesis of "reflux esophagitis". Further research confirmed the correctness of Carl von Rokitansky's theory. In 1879, Henrich Quincke gave a detailed description of ulcerative changes in the distal esophagus [1,2]. Henri Ingersol Bowdich (1853) also presented a paper presenting anatomical transformations in the development of paraesophageal hernia [3-5].

The technique proposed by Rudolph Nissen in 1956 is considered a breakthrough in the surgery of gastro-esophageal reflux. The essence of the method was to form a 5-centimeter cuff from the bottom of the stomach around the lower part of the esophagus. But unfortunately, according to many authors, dysphagia was the negative side of R. Nissen's original method. This complication was explained by technical reasons during the formation of the cuff, the use of the anterior wall, rather than the bottom of the stomach, leads to rotation of the stomach. This technical error was eliminated in the modification of the Mario Rossetti software [6-9].

The use of laparoscopic technologies has become a revolutionary breakthrough in surgery. The Belgian surgeon Bernard Dallemagne (1991) published his first experience of performing laparoscopic fundoplication of Nissen [10-13].

Despite its centuries-old history of antireflux surgery, the problem of GERD and its complications, in particular peptic strictures of the esophagus, is currently relevant. Traditionally, the most basic methods of surgical treatment for reflux esophagitis are bougie or balloon dilation, the main purpose of which is to expand the area of esophageal lumen stenosis and then lengthen it.

To date, surgical tactics in reflux esophagitis are ambiguous: on

the one hand, even with relatively low effectiveness of conservative treatment, surgical intervention is not recommended. On the other hand, there are contraindications to bougie or balloon dilation sessions, as well as an increased risk of anesthetic complications in the event of surgery.

Materials and Methods

The results of a retrospective analysis of the medical records of 109 patients with peptic strictures of the esophagus of benign origin showed that the duration of the disease is more than 3 years. Unfortunately, many patients took the drugs on their own, without prescriptions from the attending physician, and in most cases the treatment was haphazard. The main reason for contacting a doctor is the presence of severe symptoms of dysphagia.

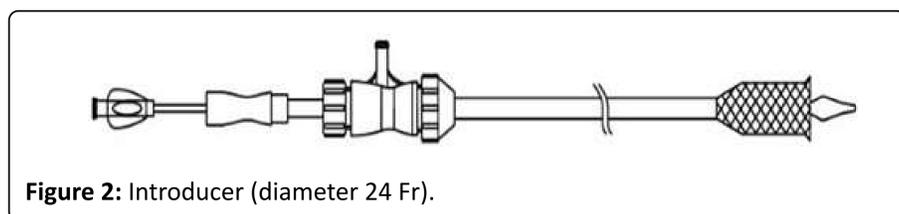
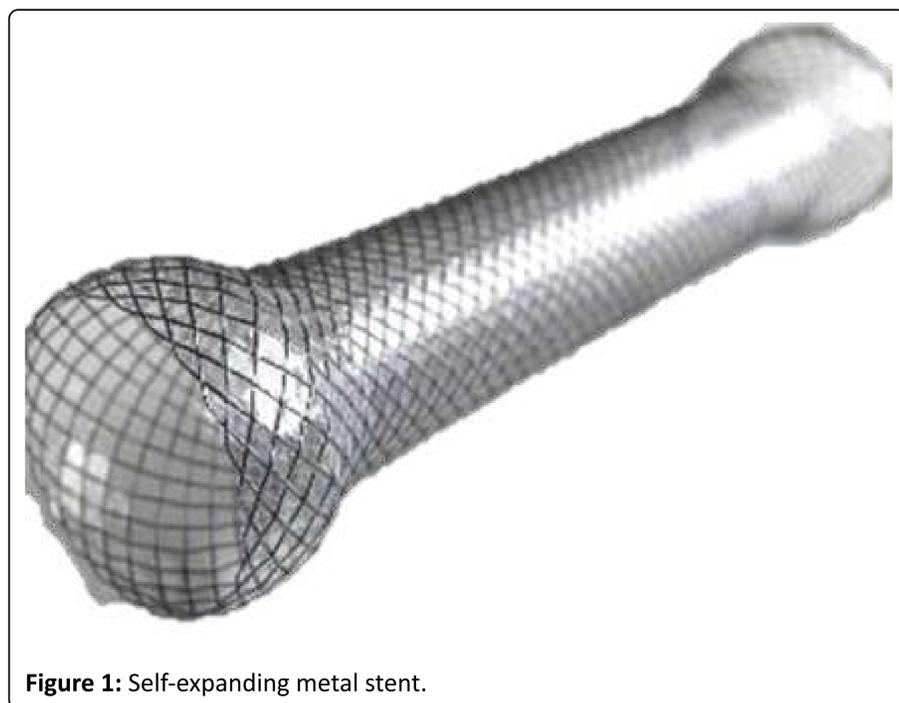
The process of bougation and/or balloon dilation should be carried out only under X-ray supervision. If symptoms of dysphagia are detected in patients with peptide strictures for no more than 2-3 months, balloon dilation is recommended. Balloon dilation courses are also conducted between successful bougie sessions.

As a result of our clinical observations, it is most effective to perform bougie every other day, while the course should not exceed two weeks. After each procedure, the patient should not eat for 2 hours.

Unfortunately, 4 patients were unable to undergo bougie due to the atypical location of the entrance to the stomach and the inability to pass the string through the narrowing of the esophagus. In this case, the procedure was performed under the control of a videoscope, while the string itself was inserted into the lumen of the esophagus through the endoscope channel. Next, we used balloon dilation of short esophageal strictures under X-ray control. In our study, cylinders with a length of 8 to 10 cm and a diameter of 1.8 to 2 cm with a built-in soft guide were used. The course of this manipulation is every other day, with a gradual increase in the time between them. In eight patients, balloon dilation was primarily supportive; to consolidate success after augmentation, the intensity of the

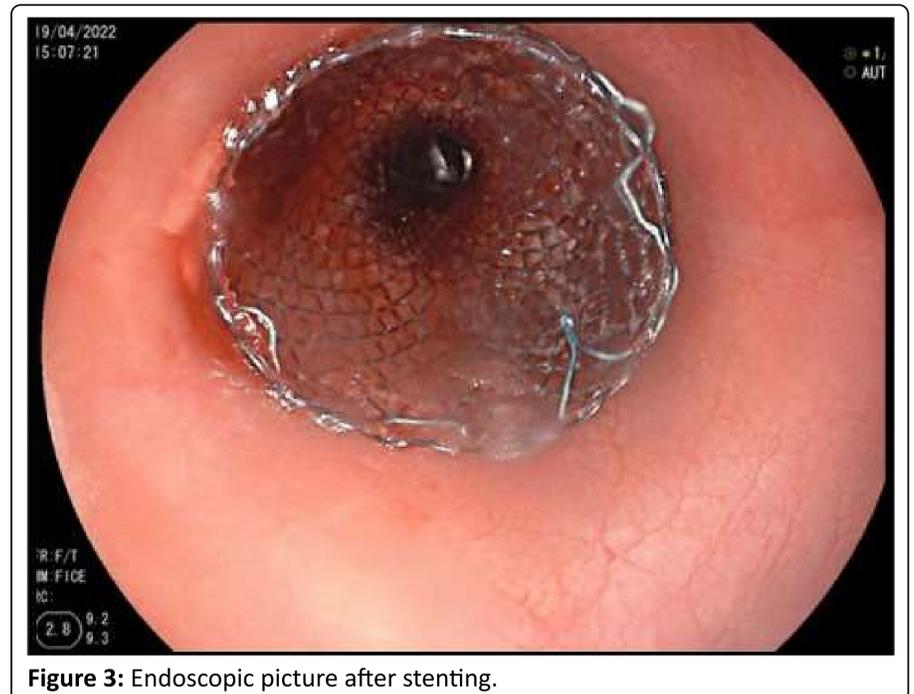
procedure was once every 10 days or more, while the total course of treatment was 3-6 months. In the case of confirmed effectiveness of the performed bougie and/or balloon dilation procedures, the next stage of surgical treatment, antireflux surgery, was performed in patients with peptic strictures in order to prevent the development of restenosis.

Recently, in the treatment of inoperable stages of esophageal cancer with pronounced signs of dysphagia, the use of so-called self-expanding nitinol stents with an antireflux valve has become the choice of surgical treatment. We also used esophageal endoprosthesis using self-expanding metal stents manufactured by Flextent (China). According to the method, stents should have a length exceeding the stenosis site by an average of 4 cm (Figure 1, 2) with two funnels, the proximal and distal, accounting for an average of 2 cm.



The technique of the stenting technique was slightly modified by us, so the metal conductor of the bougie is inserted into the stomach through an endoscopic channel below the tumor location, after removing the endoscope, an introducer (24 Fr) with a stent is inserted under the control of fluoroscopy (Figure 3, 4). After confirming the correct fixation of the stent, it is removed from the introducer, and the opening of the stent begins from the beginning of the distal funnel to the proximal one. After successful opening of the stent, it is fixed in the area of the tumor process. Some time after the successful stenting, all the ballroom staff underwent a control endoscopic and X-ray contrast examination. In our study, stenting was performed in 15 (13.7%) cases.

Fundoplication as one of the operative methods of antireflux surgery was proposed back in 1973 by A.F. Chernousov, and since 2006 it has been modified several times. With the active introduction of minimally invasive technology into surgical practice, we have also made several changes to the fundoplication technique. Firstly, in the process of mobilizing the cardiac part of the stomach, we recommended the intersection of 2-3 a. gastrica brevis et a. gastrica posterior (ascending branch



of a. lienalis). Secondly, a complete mobilization of the fundal part of the stomach is carried out to create a cuff without violating the integrity of the tissue structures, their tension, in this case, tissue twisting does not occur. Thirdly, the esophagus is additionally mobilized with a length of no more than 4-6 cm, in order to prevent its shortening after the cuff is created (Figure 5).

In the case of SPV, it is necessary to cross the so-called "Grassi" nerve, the secretory part of the X pair of PMN-n. vagus, which is located on the left wall of the esophagus. When forming the cuff, it is necessary to capture the muscle layer of the esophagus when applying knotty sutures (Figure 6).

When forming a fundoplication cuff, it is necessary to strive to create a symmetrical shape of the cuff by involving the wall of the esophagus in the fold between the anterior and posterior walls of the stomach.

A 4-4.5 cm long fundoplication cuff is formed using a non-absorbable, atraumatic suture, while the tip is first fixed with several sutures to the esophagus to prevent slipping in the following order: the first suture on a small curvature of the stom-

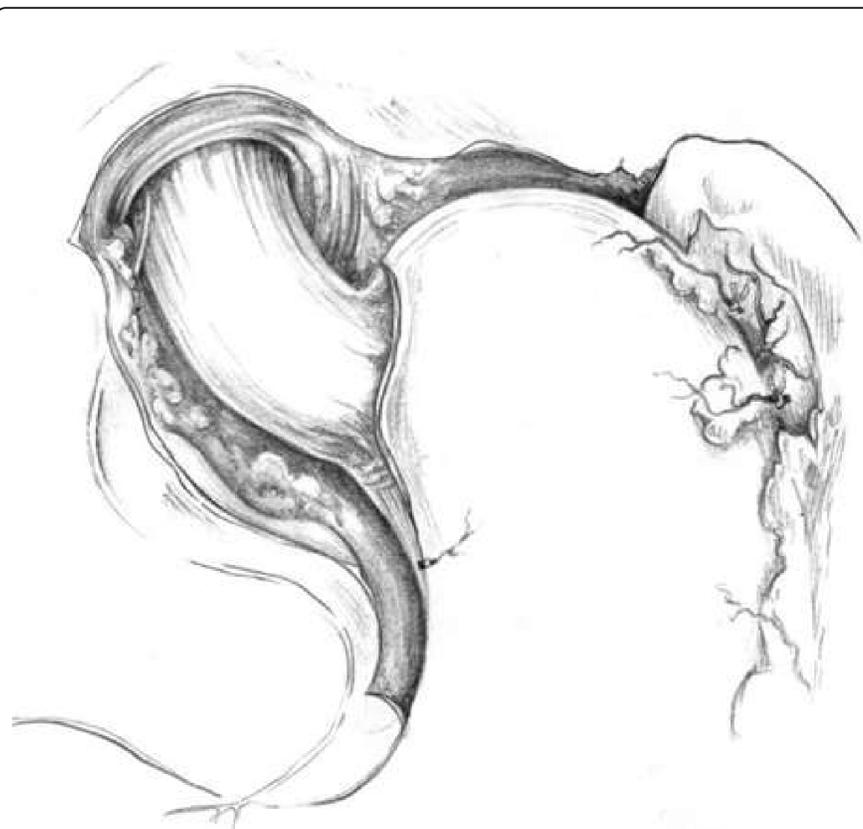


Figure 5: Scheme of cardia mobilization with identification and preservation of vagus nerves and ligation of short gastric arteries.



Figure 7: Diagram of the formed fundoplication cuff and posterior crural surgery.



Figure 6: Fundoplication cuff formation stage: application of separate nodular sutures by low curvature.

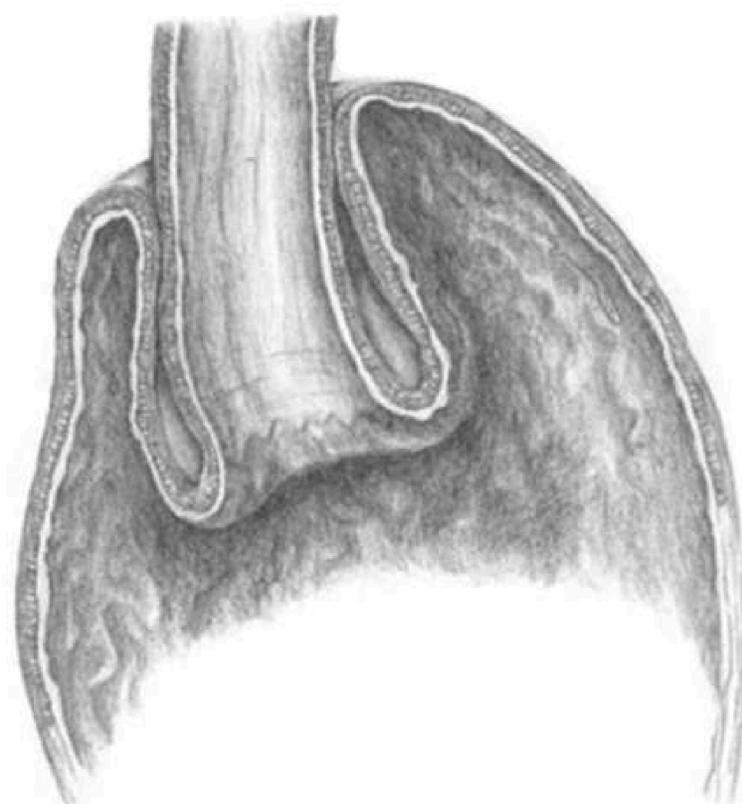


Figure 8: Symmetrical cuff in cross section.

-ach; then the second suture to restore the acute angle of the Giss on a large curvature; one suture on the anterior and posterior walls of the stomach (Figure 7, 8).

Thus, the formed cuff does not lead to deformation of the wall of the esophageal-gastric junction, thereby eliminating the possibility of the formation of diverticular pockets with subsequent deformation of the stomach wall.

Special attention should be paid to the scheme of fundoplication in patients (n=51) with secondary reflux esophagitis and duodenal ulcer on the background of duodenal ulcer. In this case, during mobilization, it is necessary to perform CPV in order to reduce the secretory activity of the gastric mucosa, thereby significantly reducing the risk of complications in such patients.

Results

Based on the objectives of this study, 90 patients underwent fundoplication using modern endoscopic and videosurgical technologies, laparoscopic and robot-assisted.

During laparoscopy, the patient is lying on his back on the operating table, while according to the requirements, the head of the table is raised by 30-400 degrees. It is in this position that the maximum viewing volume of the esophageal-gastric junction is achieved, the ability to work with two hands simultaneously, and most importantly, while maintaining a straight body position during manipulation.

This type of surgical intervention does not differ in any way from the traditional surgical technique performed, however, due to the new technologies used, there are some technical features. So, after the introduction of an atraumatic retractor, the left lobe of the liver is diverted to the side of the assistant using a Baby clamp or a soft intestinal clamp captures the stomach and pulls it down and to the left. With the help of such a simple technique, the stomach descends into the abdominal cavity, it becomes possible to tighten the small omentum and esophageal ligaments before mobilization begins. At the same time, further stretching of the gastric tube to a level above the diaphragm leads to the fact that both the stomach and esophagus become more mobile and pliable for further traction.

The mobilization itself was carried out using monopolar (endocook) and/or ultrasonic harmonic scissors "Harmonic Ace" from Ethicon. It is also possible to use a bipolar LigaSure instrument (d=5mm) from Medtronic. However, as many researchers point out, when giant hernias are found UNDERNEATH, excision of the hernial sac due to its localization in the posterior mediastinum is a technically difficult procedure. It is the use of high-tech equipment that makes it possible to obtain a complete picture of the true condition of the hernial sac in order to atraumatically separate it from important anatomical formations of the mediastinum, such as the pericardium, mediasthenal pleura, aorta, etc.

Further along the small curvature of the stomach, an assistant clamp is performed upward under the stomach, followed by traction, which makes it possible to gain access to mobilize the cardia, the fundal part of the stomach, then along the posterior surface of the esophagus, followed by doping of a. gastrica posterior (ascending branch of a. lienalis) and a. gastrica brevis. In the case of technical complications in the isolation and ligation of a. gastrica brevis in patients with obesity or the presence of adhesions, cicatricially altered posterior surface of the stomach, vascular ligation was performed using the conventional traditional method. In such cases, the surgeon's assistant uses a clamp to fix the anterior wall of the stomach floor, pulling down and to the right, resulting in tension of the lig. gastrolienalis and the excretion of A. gastrica brevis. With a large volume of the stomach, the vessels have a larger diameter, so we used the Ligasure device (d=10mm)) for complete coagulation of blood vessels.

Only after all the manipulations have been performed to fully mobilize the esophagus, cardiac and fundus stomach, it is possible to objectively assess the degree of shortening of the esophagus, since this is the reason for the retraction of the cardia into the posterior mediastinum. Therefore, it is at this stage that it is possible to determine the final choice of the antireflux surgery technique, after which the gastric tube is inserted back into the stomach.

The Technique of Forming an Antireflux Cuff During Laparoscopy

With the laparoscopic method, there is a risk of the formation of an asymmetric cuff shape or incomplete capture of wall tissues in the area of the stomach floor, which causes the creation of so-called "diverticular pockets" and/or blindly ending "pouches" in the area of the created antireflux cuff with its pronounced deformation. In order to prevent this complication, we propose

the following technique for forming a "seam of symmetry" - suturing along the middle lines of the stomach floor in the frontal plane, then stitching the left wall of the esophagus, moving 4-4.5 cm from the esophageal-gastric junction. After forming the posterior section of the antireflux cuff, it is possible to easily form a complete symmetrical shape of the cuff. Despite a number of studies, in our clinical practice we have abandoned the use of a third robotic arm, due to the lack of visible advantages of using it, the formation of a "conflict" between the "hands" of the robot and the tools used, especially in patients with asthenic physique. In this case, the most optimal option was to use an assistant trocar (d=5mm), which led to a significant reduction in the cost of the operation. At the same time, after the ports are inserted, they are docked with the robot's manipulators ("docking"). Using a robot-assisted complex, we performed fundoplication using a modified technique according to A.F. Chernousov, while essentially all stages are similar to laparoscopic surgery. Despite this, there are a number of technical features when performing operations on RCCs, primarily the lack of tactile sensations during suturing, tissue traction, i.e. the lack of "feedback" between the surgeon's hands and the robot. In case of a change in the patient's position or simultaneous operations, it is necessary to disconnect the manipulators from the trocars. Four patients were operated on with a diagnosis of Cardiac GPO, reflux esophagitis of moderate severity, and shortening of the esophagus of the first stage. Further, surgical interventions were performed in patients with cardiofundal and giant hernias. All operations performed have shown a number of advantages over laparoscopic operations, such as the ability to obtain a clear 3D image of the pathological formation; using bendable instruments, it is possible to perform effective precision dissection of the hernial sac itself, existing cicatricial accretions in the posterior mediastinum, most in its narrow areas without damaging the mediastinal pleura, pericardium and vagus nerves. Separately, we would like to note that thanks to the use of EndoWrist technology, the rapid formation of intracorporeal sutures of the antireflux cuff is possible. However, it must be borne in mind that the Harmonic Shears from Ethicon do not have a sufficient degree of flexibility, which makes it impossible to use this tool in all planes. Therefore, during the surgical intervention, we used a bent robotic monopolar hook, as practice has shown, the use of this hook does not fully form hemostasis during the intersection of the gastric arteries.

Discussion

Traditionally, the most basic methods of surgical treatment for reflux esophagitis are bougie or balloon dilation, the main purpose of which is to expand the area of esophageal lumen stenosis and then lengthen it. To date, indications for surgical treatment of reflux esophagitis are numerous: These are Barrett's esophagus, esophageal bleeding on the background of GPO, shortening of the esophagus due to the formation of strictures, however, the main unifying factor is the ineffectiveness of conservative treatment for more than 6 months. Surgical treatment is also recommended after balloon dilation, as well as bougie procedures and the presence of short strictures of a large area of localization. According to recent studies, even with relatively low effectiveness of conservative treatment, surgical intervention is not recommended. It should be borne in mind

that there are contraindications to bougie or balloon dilation sessions, as well as an increased risk of anesthetic complications in the event of surgery.

Conclusion

Thus, a comparative characteristic of various techniques for the surgical formation of an antireflux cuff, especially with shortening of the esophagus as a result of peptic strictures, showed greater effectiveness of robot-assisted operations compared with traditional laparoscopic techniques of this kind.

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Conflict of interest

None.

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