

REDO LAPAROSCOPIC ANTIREFLUX SURGERY IN PATIENTS WITH HIATAL HERNIA

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Gastroesophageal reflux disease (GERD) occurs in 8-33% of the adult population and in most cases is associated with hiatal hernia (HH) [5]. Since 1991, laparoscopic fundoplication has been the «gold standard» for the surgical treatment of GERD [10]. According to foreign literature, laparoscopic antireflux operations (LAOs) are accompanied by good short- and long-term functional results, degree of patient satisfaction of 85-96% [9]. Despite the high efficiency of LAO, 3-6% of patients need repeated surgical interventions [6]. The most common indications for reoperation after primary fundoplication are recurrence of reflux symptoms, dysphagia, recurrence of HH, severe pain syndrome [14]. Repeated LAOs are technically more complex due to the adhesion process in the area of the primary operation and the need to reconstruct the fundoplication wrap. All this leads to the longer duration of the operation and a higher frequency of complications [3]. The result of repeated LAOs depends on the technical support and experience of the surgical team [6,14].

The purpose of this study was to evaluate the peculiarities and effectiveness of repeated laparoscopic antireflux operations.

Material and methods. During the period from 2008 to 2019 in Odessa Regional Hospital LAOs were performed on 1168 patients. In 57 patients, including 20 men and 37 women aged 39-72 years, due to unsatisfactory results of operations, redo-operations were performed. Redo LAOs were performed between 3 and 60 months after the initial operation. The mean body mass index (BMI) of patients was 27.5±5.4 kg/m². Indications for redo LAOs were recurrence of HH, recurrence of GERD symptoms, dysphagia, severe pain syndrome, esophageal stricture. All patients underwent a barium swallow or computed tomography, 24-hour pH - monitoring, endoscopy.

In 37 patients, the main cause of reoperation was recurrence of hiatal hernia and migration the wrap into the posterior mediastinum. In addition, 2 patients experienced gastroparesis, which was considered as a consequence of damage to the anterior trunk of the vagus nerve. Persistent dysphagia and severe recurrence of reflux symptoms were cause of repeated LAOs in eight and four patients respectively. Five patients insisted on repeated surgery because of severe epigastric pain. Three patients underwent reoperation due to esophageal stricture (Table 1).

After redo LAOs, all patients underwent clinical examinations in our clinic, telephone interviews and special questionnaires. Quality of life was assessed using GERD-HRQL questionnaire.

Re-fundoplication technique. The technique of re-fundoplication was standardized, did not differ significantly in each case. Dissection of the esophagus and fundoplication wrap was made by laparoscopic scissors and with minimal use of coagulation, to avoid the risk of thermal damage to the wall of the esophagus and stomach. After identification of the esophagus and the fundus, reconstruction of the fundoplication wrap and posterior cruroraphy were performed. In the cases of large recurrent hernias mesh implants were used for reinforcement of crura repair.

The following tests were used: the Chi-square test or Fisher's exact test as appropriate for nominal data, and Mann-Whitney U test for comparison of unrelated parametric data. A p value of <0.05 was considered statistically significant.

Results and discussion. All redo interventions were performed laparoscopically without conversion to laparotomy. Mesh implants were used for HH repair in 35 (61.4%) patients. Parietex composite mesh were used in 27 patients, and ProGrip self-fixing mesh implant was used in 8 patients. Complete or partial refundoplication was performed in 52 (91.22%) patients. Nissen refundoplication was performed in 29 (50.87%) patients; Toupet - in 21 (36.84%) patients; Dor - in 2 (3.5%) patients (Table 2).

In 2 patients with recurrence of HH posterior cruroraphy was performed without refundoplication due to the satisfactory condition of the fundoplication wrap. During repeated interventions, in most cases, only partial excision of mesh implants was performed because of their deep ingrowth into the tissue. In 5 patients the severe epigastric pain was caused by a partially absorbable lightweight UltraPro mesh. It induced an inflammatory process in the solar plexus, which led to pain syndrome. Total excision of the mesh was managed to perform in 4 patients. It was not possible to separate the esophagus from the surrounding tissues and achieve adequate intraabdominal esophageal length in 5 patients. Thus, patients underwent Collis gastroplasty. Patients with gastroparesis underwent pyloroplasty.

The cause of esophageal stricture in three patients was the migration of the nitinol frame of the mesh into the esophageal lumen. During the initial operation, these patients underwent HH repair with nitinol-framed lightweight polytetrafluoroethylene mesh in the form of a "heart", developed by the American company MMDI.

We used an endoscope to remove the part of frames and then place stents to prevent mediastinitis. In three patients operated on this way, the stents were removed after one-month, normal passage of food through the esophagus was restored.

Table 1. Reasons of failure

Reason for Failure	No. (%)
Hiatal hernia recurrence (mediastinal migration of wrap)	37 (64.91 %)
Misplaced wrap	6 (10,53 %)
Short esophagus	3 (3.51 %)
Gastroparesis	2 (5.56 %)
Disrupted wrap	2 (3.7 %)
Mesh-related complications	8 (14,94 %)

Table 2. Characteristic of patients

Characteristic	No. (%)
Total patients	57
Gender	male 20; female 37
Median age	58 years (range, 39–72 years)
Single redo surgery	54 (94,7%)
Multiple redo surgeries	3 (6,12 %)
Type of operation:	
Nissen fundoplication	29 (51,85 %)
Toupet fundoplication	21 (44,44 %)
Dor fundoplication	2 (3,5 %)
Collis gastroplasty	2 (3,5 %)
Roux-en-Y	1 (1.75 %)

Table 3. Intraoperative complications

Complication	No. of cases (%)	Clavien–Dindo classification
Gastric perforation	2 (3,5%)	III
Splenic injury	1 (1,75%)	III
Pneumothorax	3 (5.26%)	II
Pleural effusion	2 (3,5%)	I

Table 4. Results of redo ARS

	Before redo ARS, n=54	12 months after surgery, n=51	P value
Mean GERD-HRQL score	27,3±4.1	6,4±1.3	<0.001
Mean DeMeester score	36.7±11,2	19.6±7.2	<0.005

Intraoperative complications were observed in 8 (14.04%) patients. 2 (3.5%) patients experienced gastric perforation, which was visualized and sutured during surgery; in 1 (1.75%) patient - damage to the spleen with bleeding, which was stopped by bipolar coagulation; in 3 (5.26%) patients – pneumothorax, in 2 patients (3.5%) pleural effusion (Table 3).

Long-term results in the period from 6 months to 6 years were observed in 49 (85.96 %) patients. Good results were observed in 45 (91.83%) patients after repeated operations. According to the GERD-HRQL questionnaire the quality of life significantly improved from the mean value of 27.3±4.1 at baseline to 6.4±1.3 in the long-term follow-up (p 0.001) (Table 4). The third operation was necessary in 3 (6.12%) patients, 2 patients underwent Collis gastroplasty, 1 patient – gastrectomy with Roux –en - Y reconstruction.

The most frequently procedure after primary failed fundoplication is Redo fundoplication. According to the literature data such operations performed in 89% of cases [4]. Redo fundoplication is more complex even for very experienced surgeons. This procedure has a longer operative time, and it is more difficult to perform compared to the first fundoplication [10]. Intraoperative complications such as bleeding, perforation, pneumothorax and spleen injury are more commonly appear while re-operations [2,12]. The elimination of such complications is more traumatic and significantly lengthens the recovery period and the time of hospital stay for re-operations (5-41 days in our study). The intraoperative complications reach to 17-22% during the re-operation [6]. In our study, gastric perforation was observed in 2 patients. Because of its intraoperative diagnoses and repair, we man-

aged to avoid further complications. Postoperative complications include pulmonary complications, leakage from the gastrointestinal tract, cardiac complications, hemorrhage, pneumonia, and incisional hernias and occur in about 15% cases [9]. The success rate after the first re-fundoplication is very variable ranging from 42 to 94% [12]. As the practice of our clinic and other foreign clinics show the success rate higher in clinics with a large experience of redo ARS.

In our study, it was demonstrated that repeated LAO can be performed safely and with a high degree of patient satisfaction. In most patients, the reason for reoperation was recurrence of HH, which was accompanied by severe symptoms of GERD and dysphagia [14]. It should be noted that recurrence of HH was less common in patients who underwent HH repair with mesh. According to our observations, mesh implants with a nitinol frame shouldn't be used, as this may be accompanied by migration of the mesh into the lumen of the esophagus.

Safety placed the ports is very important for accurate evaluating current situation that allow take down any adhesions from the stomach and distal esophagus to the liver and crura carefully. Almost in many cases the previous fundoplication wrap is removing. Important to preserve the vagus nerves during reoperation. This is could be difficult, by reason of unclear definition of structures due to previous operations. The massive adhesions between the left lobe of the liver, stomach and fundoplication wrap frequently caused technical difficulties of such operations. When separating the adhesions, we mainly used laparoscopic scissors, because the use of coagulation is accompanied by an increased risk of thermal damage to the wall of the esophagus and the stomach [1].

Unsatisfactory results of repeated LAOs are often associated with shortening of the esophagus. Dissection of the esophagus doesn't always allow to achieve its adequate elongation, which leads to the recurrence of HH. In this case, it is recommended to perform Collis gastroplasty [11,12]. Two patients who underwent Collis gastroplasty in our clinic reported satisfactory results at long-term follow-up.

The laparoscopic approach has prevalence and associated with better results compare to open surgery. In large systematic reviews the conversion rate to an open operation is reported to be between 7.4 and 8.7% [6,14]. Causes of conversion are adhesions, perforations, bleeding, and poor visualization [13,14]. Hashmi et al. 2019 reported that LAOs have significant advantages over open surgical interventions [2]. During our study, all redo surgeries were performed without conversion to laparotomy, which minimized the risk of serious intraoperative complications.

The use of mesh for repeated LAOs allows to achieve good results in comparison with simple cruroplasty [6]. The many of surgeons don't use of mesh in crural reinforcement during reoperative surgery due to the risk of mesh erosion to esophagus. Despite, in our study we used mesh implants in 61.4% of patients to reduce the HH recurrence rate. We tried to place small pieces of mesh soaked in fibrin glue over the crura to avoid contact with the esophagus and did not use tackers or staplers. During the long-term follow-up, we have not observed mesh-related complications. Our study showed that repeated LAOs allows obtaining good long-term results in 90% of patients, which is identical to the data of foreign authors [1-4].

Conclusions. Redo LAOs are technically complex surgical procedures and should be performed by surgeons with extensive experience in the field of antireflux surgery. LAOs are accompanied by good long-term results in 90% of patients.

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SUMMARY

REDO LAPAROSCOPIC ANTIREFLUX SURGERY IN PATIENTS WITH HIATAL HERNIA

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The purpose was to study the features and results of redo laparoscopic antireflux surgery.

For the period from 2008 to 2019, in Odessa Regional Hospital laparoscopic antireflux operations were performed in 1164 patients. 57 patients underwent laparoscopic reoperation during

the study period based on the following indications: recurrence of hiatal hernia (n=37), recurrent reflux (n=4), dysphagia (n=8), severe pain (n=5), esophageal stricture (n=3). All patients underwent repeated examinations in our clinic, telephone interviews, mailing of special questionnaires. All complaints were recorded, the quality of life was determined according to the GERD-HRQL questionnaire.

All redo operations were performed laparoscopically without conversion to laparotomy. Intraoperative complications were observed in 11.11% of patients. Long-term follow up from 6 months to 6 years was observed in 90.74% of patients. The quality of life of patients according to the GERD-HRQL questionnaire significantly improved in long-term follow-up ($p<0.001$). Good results were observed in 91.84% of patients after redo operations. The third operation was needed in 5.6% of patients.

Redo laparoscopic antireflux operations are technically difficult surgical interventions and provide good long-term results in 90% of patients.

Keywords: redo laparoscopic antireflux surgery, fundoplication, hiatal hernia.

РЕЗЮМЕ

ПОВТОРНЫЕ ЛАПАРОСКОПИЧЕСКИЕ АНТИРЕФЛЮКСНЫЕ ОПЕРАЦИИ У ПАЦИЕНТОВ С ГРЫЖАМИ ПИЩЕВОДНОГО ОТВЕРСТИЯ ДИАФРАГМЫ

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Целью исследования явилось определение особенностей и результатов повторных лапароскопических антирефлюксных вмешательств.

За период с 2008 по 2019 гг. в Одесской областной больнице лапароскопические антирефлюксные операции выполнены у 1164 больных. 57 пациентов подверглись лапароскопической повторной операции в течение периода исследования по поводу рецидива грыжи пищеводного отверстия диафрагмы (n=37), рецидива рефлюкса (n=4), дисфагии (n=8), выраженного болевого синдрома (n=5), стриктуры пищевода (n=3). Все больные проходили повторные обследования, проведены телефонные интервью, рассылки специальных анкет. У пациентов фиксировались все жалобы, определялось качество жизни по опроснику GERD-HRQL.

Все повторные вмешательства выполнены лапароскопически без конверсии в лапаротомию. Интраоперационные осложнения наблюдались у 11,11% больных. Отдаленные результаты в сроке от 6 месяцев до 6 лет прослежены у

90,74% больных. Качество жизни больных, согласно результатам опросника GERD-HRQL, достоверно улучшилось в отдаленные сроки наблюдения ($p<0,001$). У 91,84% пациентов после повторных операций отмечены хорошие результаты. Третья операция потребовалась 5,6% больным.

Повторные лапароскопические антирефлюксные операции являются сложными в техническом плане оперативными вмешательствами и дают хорошие отдаленные результаты у 90% больных.

რეზიუმე

განმეორებითი ლაპაროსკოპიული ანტირეფლუქსური ქირურგია დიაფრაგმული ჰერნიით დაავადებულ პაციენტებში

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კვლევის მიზანს წარმოადგენდა განმეორებითი ანტირეფლუქსური ოპერაციების თავისებურების და შედეგების შესწავლა.

2008-2019 წწ. ოდესის საოლქო საავადმყოფოში 1164 პაციენტს ჩატარდა ლაპაროსკოპიული ანტირეფლუქსური პროცედურა, მათ შორის 57 პაციენტს - განმეორებითი ლაპაროსკოპიული ანტირეფლუქსური ოპერაცია: 37 - ჰიატალური თიაქრის რეციდივის, 4 - რეფლუქსის რეციდივის, 8 - დისფაგიის, 5 - ძლიერი ტკივილის და 3 - ეზოფაგალური სტრიქტურის გამო. ყველა პაციენტმა გაიარა შესაბამისი განმეორებითი კვლევები, ჩატარდა სატელეფონო გამოკითხვა და შეიქმნა სპეციალური ანკეტები. პაციენტების ჩივილი დაფიქსირდა და მათი ცხოვრების ხარისხი განისაზღვრა GERD-HRQL კითხვარის მიხედვით.

ყველა განმეორებითი ანტირეფლუქსური ოპერაცია წარმოებული იყო ლაპაროსკოპულად კონვერსიის გარეშე. პაციენტების 11,11%-თან გამოვლინდა ინტრაოპერაციული გართულებები; 90,7%-ში 6 თვიდან 6 წლის პერიოდში მოხდა შორეული შედეგების შესწავლა. GERD-HRQL კითხვარის მიხედვით პაციენტების ცხოვრების ხარისხი შორეულ პერიოდში მკვეთრად გაუმჯობესდა ($p<0,001$). განმეორებითი ოპერაციების შემდგომ კარგი და საუკეთესო შედეგი აღენიშნა პაციენტების 91,84%-ს, მესამე ქირურგიული ჩარევის აუცილებლობა აღინიშნა 5,6%-თან.

განმეორებითი ლაპაროსკოპიული ანტირეფლუქსური პროცედურა წარმოადგენს ტექნიკურად რთულ ქირურგიულ ჩარევას და 90%-ში იძლევა კარგ და საუკეთესო შორეულ შედეგებს.