

## CASE STUDY

# SIMULTANEOUS HIATAL HERNIA PLASTICS WITH FUNDOPLICATION, LAPAROSCOPIC CHOLECYSTECTOMY AND UMBILICAL HERNIA REPAIR

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The article presents a case report of patients with multimorbid pathology – hiatal hernia with gastroesophageal reflux disease, cholecystolithiasis and umbilical hernia. Simultaneous surgery was performed in all cases – laparoscopic hiatal hernia with fundoplication, laparoscopic cholecystectomy and umbilical hernia alloplasty (in three cases – by IPOM (intraperitoneal onlay mesh) method and in one – hybrid alloplasty – open access with laparoscopic imaging). After the operation in one case there was an infiltrate of the trocar wound, in one case – hyperthermia, which were eliminated by conservative methods. The follow-up result showed no hernia recurrences and clinical manifestations of gastroesophageal reflux disease.

**KEY WORDS:** hiatal hernia, cholecystolithiasis, umbilical hernia, simultaneous operation

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**INTRODUCTION**

Present-day possibilities of endovideoscopic technologies allow us to carry out a wide range of surgical interventions on the organs of the abdominal cavity, extraperitoneal space, and the anterior abdominal wall. The opportunities for simultaneous operations (operations for two or more diseases during single anesthesia) exist along with the improvement of operative techniques, gaining experience in endoscopic surgery [1]. In particular, laparoscopic cholecystectomy (LCE) for cholecystolithiasis is performed simultaneously with umbilical plastics [2, 3], postoperative [4] or hiatal hernia [5].

**CASES REPORT**

In this report, we present clinical observations of patients with combined pathology, who underwent simultaneous laparoscopic plastic surgery of hiatal and umbilical hernias and LCE (table 1).

A common feature of all patients (case 1-4) was a long history of recurrent pain in the right upper abdomen, dyspeptic syndrome (heartburn, belching, heaviness after eating, etc.), episodic administration of antacids, H<sub>2</sub>-histamine blocker inhibitors or proton pump inhibitors with short-term effect. In all cases, the examination revealed asymptomatic umbilical hernia, and ultrasound examination of the abdominal cavity – cholecystolithiasis. Due to the dyspeptic symptoms, an endoscopic examination detected

signs of gastroesophageal reflux, and later, according to the results of computed tomography, a hiatal hernia of type 1 or 2 by SAGES was diagnosed [6, 7]. In addition, increase of the BMI, in case 1, 2, 4 – concomitant arterial hypertension and / or heart failure were found in all cases.

Main indications for surgical intervention were umbilical hernia and cholecystolithiasis, but due to the presence of symptomatic hiatal hernia (symptoms of GERD and the ineffectiveness of conservative therapy), additional intervention – laparoscopic hiatal hernioplasty and fundoplication were offered to the patients.

The operations were performed under combined anesthesia (epidural anesthesia at the level of Th 6-8 and tracheal intubation, mechanical ventilation with inhalation anesthesia). An incision of the skin up to 10 mm is made on the border of the middle and lower third of the line from Xiphoid Processus to the umbilicus at the beginning of the procedure. A carboxyperitoneum up to 12–14 mm Hg is created by the Veresh needle and a 10-mm trocar for laparoscopic optics is inserted. Three additional 5 mm trocars are inserted: the first – at the Desjardins point, the second – in the area 4–5 cm below the costal arch on the left along the mid-clavicular line, the third – 1–2 cm below the left costal arch on the anterior clavicle-axillary line. The Nathanson retractor is inserted 2 cm below Xiphoid Processus and 1 cm to the left of the midline to fix the left lobe of the liver.

During the first stage of the intervention, the stomach and the abdominal esophageal portion are mobilized

**Table 1.** General characteristics of patients.

Indicator	Case 1	Case 2	Case 3	Case 4
Sex	female	female	female	male
Age, year	55	51	61	57
Cholecystolithiasis	+	+	+	+
Hiatal hernia, SAGES type	1	1	2	1
GERD	+	+	+	+
Umbilical hernia, size	< 2 cm	< 2 cm	>2 cm	>2 cm
BMI	26.2	28.3	28.1	25.4
Comorbidities:				
AH	+	-	+	+
HF	-	-	+	-

Note. SAGES – Society of American Gastrointestinal and Endoscopic Surgeons; GERD – gastroesophageal reflux disease; BMI – body mass index; AH – arterial hypertension; HF – heart failure.

**Table 2.** Features of surgical interventions and their result

Indicator	Case 1	Case 2	Case 3	Case 4
1 <sup>st</sup> stage:				
- posterior crurography	+	+	+	+
- alloplasty	-	+	-	+
- fundoplication	Nissen	Nissen	Toupet	Nissen
- anterior crurography	-	+	-	-
Duration of the 1 <sup>st</sup> stage (min)	45	115	50	40
2 <sup>nd</sup> stage:				
- LCE	+	+	+	+
Duration of the 2 <sup>nd</sup> stage (min)	10	10	20	15
3rd stage: umbilical hernia repair:				
- IPOM	-	-	+	+
- hybrid	+	+	-	-
Duration of the 3 <sup>rd</sup> stage (min)	15	15	10	15
The total duration of the operation (min)	100	170	110	105
Postoperative complications:				
- trocar wound infiltrate;	-	+	-	-
- postoperative hyperthermia	+	-	-	-
Duration of inpatient treatment, days	7	8	7	6
Long-term result (from 2 years):				
- recurrence of umbilical hernia	-	-	-	-
- symptoms of GERD	-	-	-	-

along a large curvature, using the 5-mm Ligasure, and a 5-mm ultrasound dissector lowered in the proximal direction. A Laparoscopic Goldfinger Retractor is inserted into the area of the His-angle for the esophageal traction. A gastric tube size 28-30 Fr is inserted transorally. The posterior crurography is performed with atraumatic suture material – Ethibond 2-0 or V-lock 90. In one case, the posterior crurography and anterior crurography was performed due to the atypical diaphragm's legs configuration. Antireflux cuff is created by Nissen or Toupet method with fixation by Ethibond 2-0 sutures with the anterior esophageal wall. In one case, the diaphragm defect was closed with an allograft Crurasoft V-shaped mesh prosthesis with Polytetrafluoroethylene (PTFE) coating.

A standard LCE is performed in the second stage of the operation. A 5-mm trocar is inserted 1-2 cm below the right costal arch along the anterior-axillary line towards the gallbladder, additionally. A 10-mm trocar is inserted instead of Nathanson's retractor in the direction of the liver at an angle of 45°. After identification of the Kalo triangle, the vesical duct is clipped with three titanium clips or Hem-o-lok clips, the vesical artery is clipped with a titanium clip and dissected, using laparoscopic scissors or by bipolar coagulation. A step-by-step subserous cholecystectomy is performed from the "neck". The gallbladder is removed from the abdominal cavity through a trocar incision after the hemostasis in the area of the gallbladder bed.

The IPOM umbilical hernia repair is performed in the third stage. A 10-mm trocar for optics in the left

meostrictic area along the mid-clavicular line is inserted, and a 5-mm trocar – in the iliac region on the left along the mid-clavicular line. The hernia sac together with the peritoneum is mobilized. Through a 10-mm trocar, a composite mesh graft based on Sepra technology is inserted into the abdominal cavity, which is fixed with a herniostepler along the perimeter and in the area of the hernia gate.

A primary 10-mm trocar for laparoscopic optics is placed below umbilical ring, and in the last stage of the operation, a hybrid umbilical hernia is performed – the hernia gate is separated from the peritoneum in one case. A round mesh graft with stiffening ribs, coated with a hydrogel or has a PTFE coating, is inserted into the abdominal cavity through the hernia gate. There are two polypropylene tapes in the center of the allograft, taken out of the hernia gate and fixed to the aponeurosis of the rectus abdominal muscles by separate sutures, fixing the allograft according to the type “in lay”.

A common feature of surgical interventions in all cases was the necessity to change the position of the patient on the operating table and the location of the endovideosurgical console, and the operating team. To correct hiatal hernia and GERD, the console was located to the left of the patient, who was in the anti-Trendelenburg position with a roller under the thoracic spine. The surgical team is located as follows: the surgeon stands between the lower extremities, assistants – to the right and left of the patient. To perform LCE: the position of the patient is with a tilt to the left. The location of the operating team changes: the surgeon – to the left of the patient, the first assistant between the lower extremities, the second assistant to the right of the patient. To perform IPOM, the endovideosurgical console is located to the right of the patient. The patient's position is inclined to the right. This should be taken into account when planning the operation and securely fix the patient to the operating table.

General characteristics of surgical interventions and their result are given in table. 2.

Thus, frequency of simultaneous operations for comorbidities with existing indications for surgical treatment is steadily increasing, improving laparoscopic methods. These clinical observations demonstrate the possibility of surgical correction of four diseases simultaneously – hiatal hernia, GERD, cholecystolithiasis and umbilical hernia.

A similar case was described by T. Yamanaka et al. [8]. In one case they performed a laparoscopic hiatal hernia repair with Nissen fundoplication, LCE and open umbilical hernia repair.

In contrast, in all our cases we performed hiatal hernia repair with fundoplication and LCE, but for umbilical hernia we performed allogeneic plastics, using mesh graft by IPOM method in three cases. The hernia sac was openly removed from paraumbilical incision in one case (hybrid plastics), used for the introduction of a 10-mm trocar with subsequent alloplasty, applying an endoprosthesis of a special configuration for the umbilical ring. There were no significant postoperative complications. Recurrence of umbilical hernia and manifestations of GERD during a

long-term observation period was not found.

Besides, these observations demonstrate the possibility of similar combinations. This should be taken into consideration when examining and planning surgical treatment. T. Yamanaka et al. believe that such a combination is a variant of the incomplete Saint's triad [8].

## CONCLUSIONS

In our opinion, the Saint's triad, multiple hernias and many other comorbidities, including cholecystolithiasis, have a common pathogenetic mechanism. This mechanism is connective tissue disorders resulting in systemic and local disorders of collagen metabolism [9-11]. This peculiarity explains coexistence of several diseases in one patient and confirms the necessity for a comprehensive analysis of clinical symptoms and additional research methods. The allogeneic hernioplasty of all localization can be considered as an optimal surgical intervention in case of the connective tissue disorders multiple manifestations.

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*The Authors declare no conflict of interest.*

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