



## The Choice of Surgical Tactics for Correcting Hiatal Hernia in Patients with Cholelithiasis in Combination with Gastroesophageal Reflux

<sup>1</sup>Kholikov F. Y., <sup>2</sup>Kenzhayev L. R., <sup>3</sup>Urokov Sh.T., <sup>4</sup>Abdurakhmanov M.M.

Department of Surgical Diseases and Resuscitation, Bukhara State Medical Institute named after Abu Ali ibn Sino, Bukhara branch of the Republican Scientific Center for Emergency Medical Care, Bukhara, Republic of Uzbekistan

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### KEYWORDS

Cholelithiasis, hiatal hernia, gastroesophageal reflux disease, combined pathologies.

### ABSTRACT:

*The study presents the results of examining and surgically treating 84 patients with cholelithiasis in conjunction with a hernia of the esophageal diaphragmatic opening. Among them, 49 patients were part of the main group, while 35 belonged to the comparison group. These patients were admitted and underwent surgery at the clinic between 2017 and 2022. Based on a comprehensive comparative analysis of both early and long-term surgical outcomes, an enhancement in the effectiveness of surgical treatment was observed in patients with cholelithiasis, who also had gastroesophageal reflux disease and hernia of the esophageal diaphragmatic opening. The selection of treatment approaches was determined using a calculated method involving an original formula. The research conducted in this study contributed to the optimization of surgical treatment tactics for patients with this combined pathology.*

### RELEVANCE.

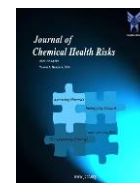
Relevance. The connection between calculous cholecystitis (CH) and hiatal hernia (HH) holds significant relevance, as evidenced by numerous research findings. Renowned researchers R.B. Avakyan and A.L. Guscha have postulated the existence of a natural convergence of gastroesophageal reflux, instigated by HH, with gallstone disease (GSD) [1, 6, 7, 8]. This proposition finds support in various clinical syndromes recorded in the annals of surgical history.

One such syndrome is Saint's triad, which highlights the co-occurrence of HH, cholelithiasis, and colonic diverticulum, observed in approximately 3.2-5% of cases. The Castaing triad, encountered in about 7.2% of cases, involves the amalgamation of obstructive biliary tract disease (HHD), acute cholecystitis, and duodenal ulcer. Another syndrome, known as the Lortat-Jacob syndrome, combines HH, acute calculous cholecystitis, and esophageal diverticulum. Notably, a distinct combination of acute cholecystitis and HH is observed in 4.5-60% of patients [3, 7, 2, 18, 12, 11, 13].

Understanding the relationship between CH and HH is crucial for enhancing the diagnosis, treatment, and prevention of these conditions. Further research in this domain will expand our knowledge of the pathogenesis and mechanisms of interaction, and enable the development of effective treatment and prevention strategies for patients suffering from both disorders.

Moreover, research conducted in Western Europe and the United States has revealed that 30-40% of the population has received a diagnosis of gastroesophageal reflux disease (GERD) [5, 11, 12, 14]. Among these individuals, up to 25% require ongoing medical therapy, while 15% exclusively necessitate surgical treatment. These statistics underscore the clinical significance of GERD and the importance of exploring its association with CH and HH.

The findings from studies conducted by R. Blondet, R. Farlander, Harrington, and J. Schlegel strongly support the existence of a connection between reflux esophagitis and acute calculous cholecystitis (ACC). These researchers



propose that gallstone disease (GSD) not only coexists with gastroesophageal reflux but also acts as a causative factor for its development (Kubyshkin V.A., Korniyak B.S., 2004) [11, 12, 15, 16].

It is worth noting that a significant number of authors have emphasized that up to 11% of patients with cholelithiasis, upon re-evaluation after cholecystectomy (CE), present with clinical symptoms of gastroesophageal reflux disease (GERD). These symptoms often prove resistant to conservative therapy and require surgical intervention [3, 5, 8].

Thanks to the implementation of laparoscopic techniques, simultaneous surgical interventions have become feasible in cases where gallstone disease (GSD) coexists with gastroesophageal reflux disease (GERD) and hiatal hernia (HH). Laparoscopic surgical procedures for the aforementioned pathology are minimally invasive and have shown excellent long-term results in 88.5-94% of patients over observation periods exceeding 10 years [9, 10]. However, despite the continuous advancement of modern diagnostic methods and the availability of simultaneous surgical correction for this combined pathology, there is currently no unified treatment approach or optimal methodology for correcting HH and GERD in cases of GSD.

Further research is required to establish standardized guidelines for the treatment of patients with concurrent GSD,

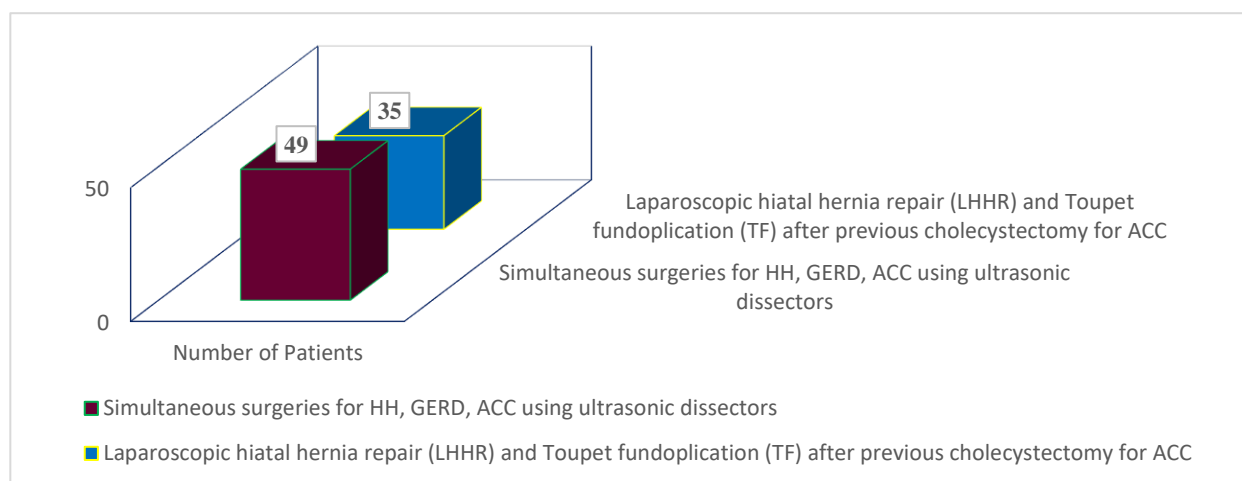
GERD, and HH. The development of an optimal treatment strategy that takes into account the individual characteristics of each patient will significantly contribute to improving patient outcomes and quality of life. Additionally, ongoing research in this field should focus on evaluating the long-term efficacy and safety of laparoscopic procedures in managing this complex combination of pathologies.

### PURPOSE OF THE WORK

Improvement of Surgical Treatment Outcomes in Patients with Acute Cholecystitis Complicated by Hiatal Hernia

### MATERIAL AND METHODS

The basis of the study is a clinical analysis of the results of examination and treatment of 84 patients suffering from gastroesophageal reflux disease (GERD) and hiatal hernia (HH) in combination with acute calculous cholecystitis (ACC). The main group consisted of 49 patients who underwent simultaneous surgeries for HH and GERD in combination with ACC, using ultrasonic dissectors. Original research was conducted at the clinic of the Department of Surgical Diseases and Intensive Care of the Bukhara Branch of the Republican Scientific Center for Emergency Medical Care.



**Figure 1.** Comparison of Patients in Main Group and Control Group for Gastroesophageal Reflux Disease (GERD) and Hiatal Hernia (HH) with Acute Calculous Cholecystitis (ACC)

The control group comprised 35 patients who were

diagnosed with gastroesophageal reflux disease (GERD) and



hiatal hernia (HH) and had previously undergone cholecystectomy as a result of acute calculous cholecystitis (ACC). To address their condition, all patients in the control group underwent laparoscopic hiatal hernia repair (LHHR) and Toupet fundoplication (TF).

Following the surgical procedures, these patients reported experiencing a range of dyspeptic symptoms during the postoperative period, including heartburn, nausea, vomiting, a bitter taste in the mouth, hiccups, epigastric pain after eating, and abdominal bloating. The aforementioned symptoms were thoroughly examined in the context of

retrospective medical histories and current conditions of the patients, using instrumental diagnostic methods.

The diagnostic assessments revealed the presence of hiatal hernia (HH) and varying degrees of reflux esophagitis and gastroesophageal reflux disease (GERD) among the patients in the control group. These findings further supported the association between GERD, HH, and ACC in this particular group of patients. By investigating their complaints based on retrospective medical histories and current conditions, a comprehensive understanding of the impact and manifestations of GERD, HH, and ACC was achieved.

**Table 1.**  
**Distribution of patients by age and gender**

Age (years)	Men		Women	
	Group I	Group II	Group I	Group II
18 - 44	1	1	2	3
45 - 59	<b>10</b>	<b>12</b>	<b>15</b>	<b>12</b>
60 - 74	7	5	9	7
75 - 90	-	-	-	-
<b>Total</b>	<b>18</b> <b>(21,4%)</b>	<b>18</b> <b>(21,4%)</b>	<b>26 (31%)</b>	<b>22 (26,2%)</b>

The criteria for including patients in the study group were: clinical signs of hiatal hernia (HH), gastroesophageal reflux disease (GERD), and esophagitis, which were detected during endoscopic and radiological examinations in patients with acute cholecystitis. The data is presented in Table 1.

## RESULTS AND ITS DISCUSSION

Among the patients in Group I, 26 (31%) were female and 18 (21.4%) were male. The average age of the patients was between 45 and 59 years (27 patients).

Among the patients in Group II, there were 22 females (26.2%) and 18 males (21.4%). The average age of the patients was between 45 and 59 years (24 patients).

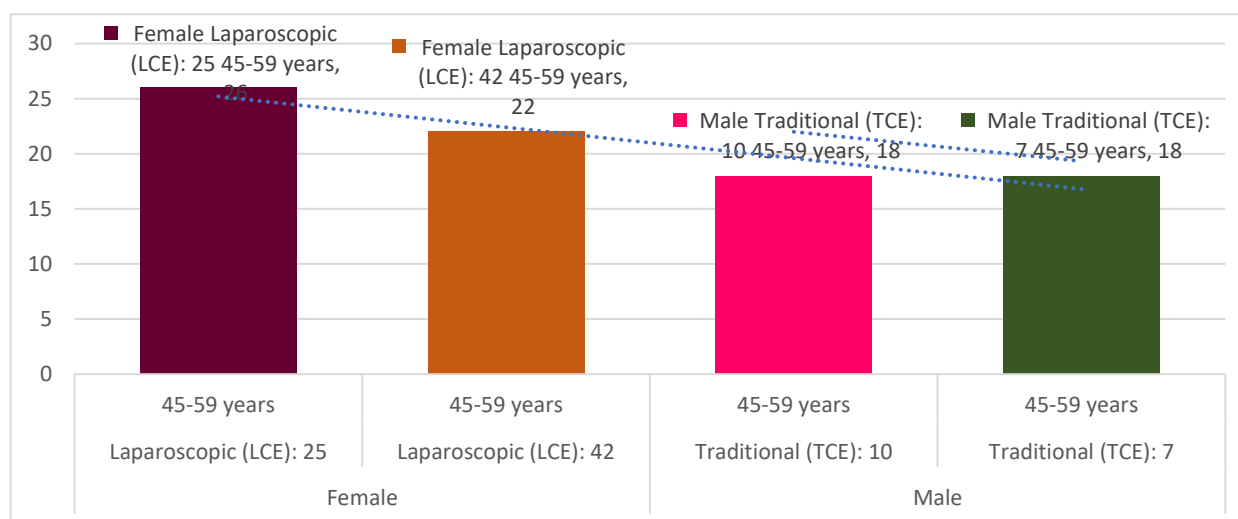
Cholecystectomies performed on patients in Group I (CE) were laparoscopic cholecystectomies (LCE) for 25 patients (71.4%) and traditional cholecystectomies (TCE) for 10 patients (28.6%). The time interval for performing the surgeries ranged from 3 months to 5 years.

Despite conducting instrumental examinations for hiatal hernia (HH) in these patients, none were detected. After the surgery, all of these patients were offered antisecretory therapy due to the presence of dyspeptic symptoms. Conservative therapy for reflux esophagitis was effective for all patients, but symptoms resumed after the therapy was discontinued.

The second group comprised 49 patients referred for ACC and having accompanying HH and GERD pathologies.



Among them, 42 (85%) underwent laparoscopic cholecystectomy (LCE) and 7 (15%) traditional cholecystectomy (TCE) surgeries



**Figure 2.** Comparison of Cholecystectomy Types and Patient Demographics in Group I and Group II

### Treatment of the main group of patients:

Treatment of the main group of patients involved the simultaneous performance of cholecystectomy and antireflux operations using both laparoscopic and traditional (laparotomy) methods. This approach allowed for the management of gallbladder issues and the treatment of reflux symptoms in a single operation.

In the early postoperative period, symptoms were managed using conservative methods based on clinical indications. This involved the use of non-surgical interventions such as medication and lifestyle modifications to address any discomfort or complications that arose after the surgery.

Overall, the treatment approach in the main group aimed to address both the gallbladder pathology and the reflux symptoms concurrently, providing patients with comprehensive care. By combining the cholecystectomy and antireflux operations, the treatment aimed to improve patient outcomes and reduce the need for multiple surgeries. The use of conservative methods in the early postoperative period

reflected a personalized approach to managing symptoms and ensuring optimal recovery.

These treatment strategies highlight the importance of a multidisciplinary approach in addressing the complex needs of patients with both gallbladder and reflux issues. By incorporating surgical and conservative interventions, healthcare providers can tailor treatment plans to individual patients, promoting better outcomes and quality of life.

### Treatment of the control group of patients:

1. Treatment of gastroesophageal reflux disease in the post-cholecystectomy period using conservative methods.
2. Both laparoscopic and traditional (laparotomy) antireflux surgical interventions were included.
3. Treatment of symptoms in the early postoperative period using conservative methods based on clinical indications.

Simultaneous surgeries are performed only in cases of limited inflammatory processes of the gallbladder. Simultaneous surgeries are not carried out if the inflammatory process in the gallbladder and its vicinity has acutely



developed (gangrene of the gallbladder, abscess of the gallbladder, localized and widespread purulent peritonitis, gallbladder perforation).

The development of postoperative complications in these patients was observed in 6 (46.5%) patients in the postoperative period.

Among them, wound infection was noted in 2 (15.4%) patients, gastroparesis in 1 (7.7%) patient, and early dysphagia in 1 (7.7%) patient. In one case, there was localized pain in the epigastric region, and this case was considered as an episode of postoperative pancreatitis.

The average length of stay in the hospital for this group of patients was  $8.2 \pm 1.3$  days.

As mentioned earlier, the first group consisted of 35 patients who had a history of cholecystectomy due to UA. Among them, 24 (68.5%) had a history of LCE, and 11 (31.5%) had a history of traditional cholecystectomy (TCE).

Indeed, dysphagia developed as a result of hyperfunction of the sphincter in 1 (4.5%) typical complication of antireflux surgeries.

The total duration of hospitalization for this group of patients was  $5.3 \pm 1.2$  days.

In the II main group, 49 patients with ACC and HH, GERD, and reflux esophagitis were included. Simultaneous surgeries were conventionally performed only in 9 (15%) cases. 2 out of 9 (4%) patients were converted to the traditional laparotomy method.

Postoperative wound inflammation (infection) developed in 2 (22.2%) patients after traditional surgical intervention. It should be noted that postoperative wound inflammation (infection) occurred in patients of both the I and II groups who were operated on using the traditional method. In this subgroup, postoperative pancreatitis developed in 1 (11.1%) patient, and the same patient developed postoperative gastroparesis.

Laparoscopic simultaneous cholecystectomy (LCE) and Nissen fundoplication, Chernousov's modification, were performed laparoscopically for 42 (85%) patients.

In two cases (4.7%), a transition from the laparoscopic method was necessary. Both cases were related to technical difficulties in identifying the structures of the Calot's triangle. The development of this UA field accelerated the inflammation process. Additionally, the fundoplication stage was performed through the laparotomy wound due to conversion.

In one patient, early postoperative dysphagia and hyperfunction of the sphincter were observed in 2.3% of cases, both of which required satisfactory endoscopic dilation and were performed up to the tapered level.

In total, complications in this group occurred in 3 (7.1%) non-life-threatening cases and were resolved.

The total duration of hospitalization in this group of patients was  $6.1 \pm 1.5$  days.

Thus, it can be confidently stated that in patients with ACC, HH, and reflux esophagitis, the simultaneous performance of laparoscopic cholecystectomy (LCE) and fundoplication affects the duration of the operation; however, the number of complications is significantly lower than in the control group of patients. Furthermore, the symptoms of GERD and reflux esophagitis also showed positive outcomes in both the early and late postoperative periods.

Considering the fact that patients in the control group had previously undergone cholecystectomy, they also underwent fundoplication surgery. Fundoplication was performed laparoscopically in 22 (63%) cases and traditionally in 13 (37%) cases.

In the control group, complications were noted after surgeries performed using the traditional (laparotomy) method. These included wound inflammation (infection) in 2 (15.4%) cases, gastroparesis in 1 (7.7%), early dysphagia in 1 (7.7%), postoperative pancreatitis in 1 (7.7%), and drainage tube drainage in 1 (7.7%). In total, 6 (46.5%) non-life-threatening complications developed in 13 patients.

All the aforementioned complications of the early postoperative period were of temporary nature, requiring additional joint endoprosthesis, endoscopic dilation, and did not impact the patient's long-term functional state.



In the control group, laparoscopic surgeries were characterized by a reduction in the number of complications after fundoplication in 22(63%) patients. Only in 1(3.8%) case, early dysfunction due to sphincter hyperfunction

occurred. This situation was significantly lower compared to traditional surgeries in the control group, where complications developed after them.

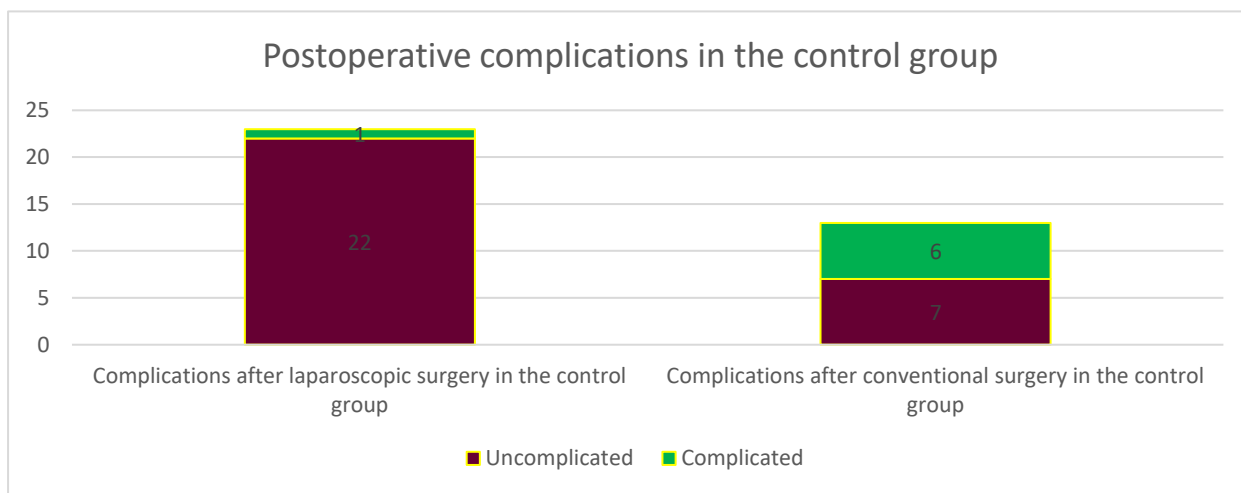


Figure 3. Postoperative Complications in the Control Group: Analysis of Adverse Events and Patient Outcomes

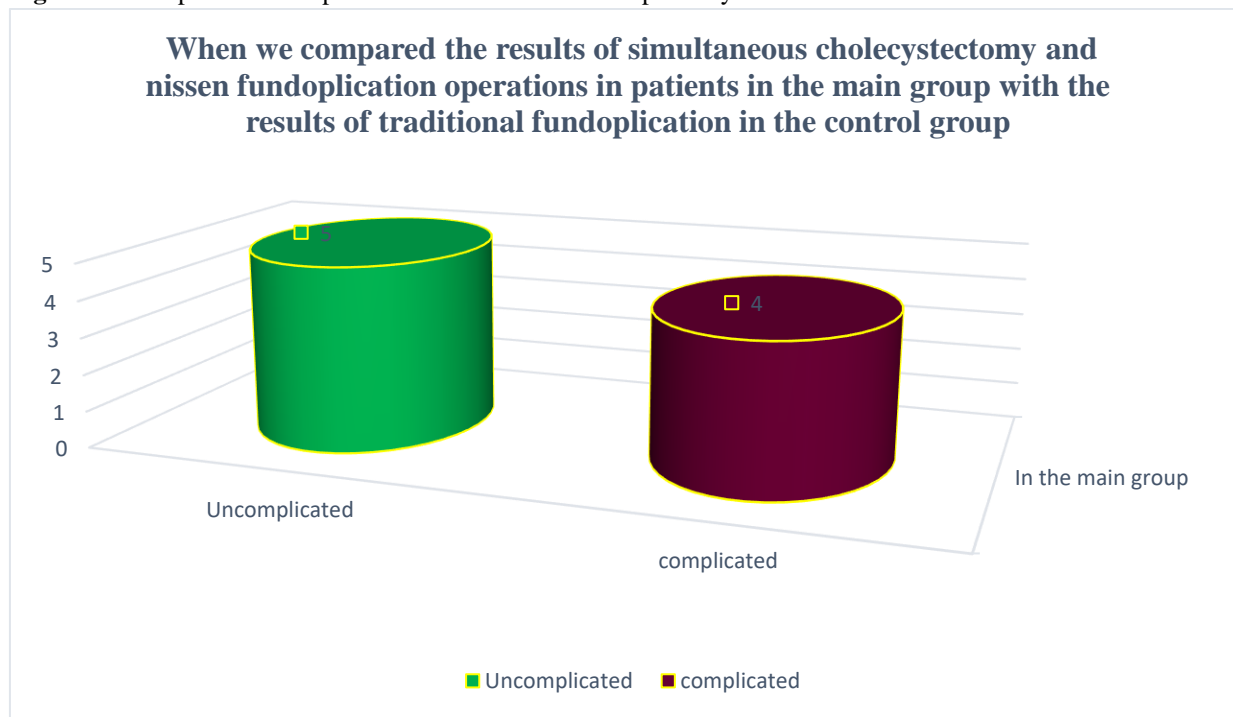


Figure 4. Comparison of Simultaneous Cholecystectomy and Nissen Fundoplication vs. Traditional Fundoplication: Patient Outcomes in the Main and Control Groups



It can be concluded that in the control group, with traditional method fundoplication, and in the main group with simultaneous traditional method (cholecystectomy and fundoplication), the percentage of complications was very close, 6(46.5%) compared to 4(44.4%). These were primarily conditions associated with inflammation of the laparotomy wound. Menstrual days in the patients of the control group were  $8.2 \pm 1.3$  days, and in the main group -  $8.3 \pm 1.4$  days after traditional simultaneous surgeries. The duration of the operation was 85 minutes in the control group and 135 minutes in the main group.

In the control group, only fundoplication surgery was performed laparoscopically, while in the main group, simultaneous laparoscopic cholecystectomy (LCE) and fundoplication were performed. When analyzing the results of surgical treatment in these patients, the following was revealed. In the control group, symptoms of early dysphagia were observed in only 1 (4.5%) patient during laparoscopic surgery. In the main group, symptoms of early dysphagia were observed in 1(2.3%) patient, and in 2(4.7%) patients, conversion occurred due to technical difficulties.

Based on the analyzed data, several findings can be derived. Firstly, the control group underwent a single laparoscopic procedure, specifically fundoplication, while the main group underwent a simultaneous laparoscopic operation involving cholecystectomy and fundoplication. This signifies a distinct surgical approach between the two groups.

In terms of complications, the incidence rate was similar between the control group (1, 4.5%) and the main group (3, 7.1%). This suggests that the inclusion of cholecystectomy in the main group did not significantly elevate the risk of complications compared to the control group.

Furthermore, when comparing patients who underwent conversion with the traditional patient group, complications primarily associated with laparotomy wound inflammation were observed. However, there was no notable disparity in the occurrence of postoperative complications between the two groups.

The duration of laparoscopic surgery was slightly prolonged in the main group ( $6.1 \pm 1.5$  days) compared to the

control group ( $5.3 \pm 1.2$  days). This indicates that performing simultaneous minimally invasive interventions in patients with acute cholecystitis (AC) and gastroesophageal reflux disease (GPOD), combined with reflux esophagitis, may result in a slightly lengthier surgical duration.

In conclusion, the present analysis suggests that simultaneous minimally invasive interventions, such as cholecystectomy and fundoplication, in patients with AC and GPOD, yield favorable outcomes in terms of intraoperative and postoperative complications. The comparable occurrence of complications between the control and main groups implies that the addition of cholecystectomy does not significantly impact the complication rate. Therefore, simultaneous interventions can be considered as a viable approach for patients necessitating both procedures.

It is essential to acknowledge that these conclusions are based on the specific data evaluated in this study and should be interpreted within the study's limitations. Further research and extensive studies are required to validate these findings and provide more robust evidence regarding the outcomes of simultaneous minimally invasive interventions in this particular patient population.

## CONCLUSION

1. Patients with acute calculous cholecystitis (ACC) exhibit a prolonged symptom complex, consisting of general dyspeptic symptoms characteristic of chronic calculous cholecystitis and gallbladder motor dysfunction (GMD). In the preoperative period, when there is suspicion of GMD and gastroesophageal reflux disease (GERD), additional instrumental investigations should be conducted.

2. The sequence of surgeries should be observed in patients with gallbladder motor dysfunction (GMD) and gastroesophageal reflux disease (GERD) against the background of acute calculous cholecystitis (ACC). First and foremost, cholecystectomy is performed, followed by the second stage of fundoplication surgery with the replacement of instruments by ultrasound devices.

3. In patients with ACC and HH, simultaneous operations are only carried out in the presence of limited inflammatory processes in the gallbladder. Simultaneous operations are not performed if an acute inflammatory process



has developed within the gallbladder and its surrounding area (such as gangrene of the gallbladder, abscess around the gallbladder, local and extensive purulent peritonitis, or perforation of the gallbladder).

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