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RESULTS OF TREATMENT OF PATIENTS WITH CHOLECYSTOCHOLEDOCHOLITHIASIS BY LAPAROENDOSCOPIC METHOD

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ХОЛЕЦИСТОХОЛЕДОХОЛИТИАЗ БИЛАН КАСАЛЛАНГАН БЕМОРЛАРНИ ЛАПАРОЭНДОСКОПИК УСУЛ БИЛАН ДАВОЛАШ НАТИЖАЛАРИ

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РЕЗУЛЬТАТЫ ЛЕЧЕНИЯ БОЛЬНЫХ С ХОЛЕЦИСТОХОЛЕДОХОЛИТИАЗОМ ЛАПАРОЭНДОСКОПИЧЕСКИМ МЕТОДОМ

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Резюме. *Тадқиқотнинг объекти сифатида холецистохоледохолитиазда ўткир холецистит ва холангит билан огриган 107 нафар беморлар олинган. Калкулёз холецистит ва холедохолитиаз билан огриган беморларда Rendezvous техникасида ЭПСТ ва холедохолитоэкстракция ёрдамида таклиф этилган такомиллаштирилган бир босқичли ЛХЭ ёрдамида гибрид операцияларни амалга ошириш мақсадга мувофиқ. ЭПСТ ёрдамида такомиллаштирилган ЛХЭ техникаси 87,9% кузатувларда холедохолитиазнинг ўртача хавфида самарали бўлиб, бу анъанавий ЭПСТдан 18,9% юқори, p = 0,035 ва ЭПСТ билан боғлиқ асоратларнинг 17,7% камроқ частотаси билан бирга келади, p = 0,017.*

Калит сўзлар: *Ўт-тош касаллиги, холецистохоледохолитиаз, хирургик даволаш.*

Abstract. *The study included 107 patients with acute cholecystitis and cholangitis associated with cholecystocholedocholithiasis. In patients with calculous cholecystitis and choledocholithiasis, hybrid surgeries using the proposed improved single-stage laparoscopic cholecystectomy with assisted endoscopic spinal tapping (EPS) using the Rendezvous technique and choledocholithoextraction are advisable. The improved laparoscopic cholecystectomy technique with assisted endoscopic spinal tapping (EPS) is effective in 87.9% of patients with an average risk of choledocholithiasis, which is 18.9% higher than traditional endoscopic spinal tapping (EPS), p = 0.035, and is accompanied by a 17.7% lower incidence of EPSS-associated complications, p = 0.017.*

Key words: *Gallstone disease, cholecystocholedocholithiasis, surgical treatment.*

Relevance of the research topic. Choledocholithiasis is one of the most common pathologies of the hepatobiliary system and is often accompanied by the development of serious complications such as acute cholecystitis, cholangitis, and obstructive jaundice. Modern surgery aims to apply minimally invasive treatment methods that allow simultaneous elimination of pathology of the gallbladder and the common bile duct, reduce the invasiveness of the intervention, and shorten the length of hospital stay. In this regard, particular interest is focused on the laparoendoscopic “rendezvous” technique, which combines laparoscopic cholecystectomy with endoscopic intervention on the major duodenal papilla [1,2].

This technology is considered an alternative single-stage approach to the treatment of patients with cholecystocholangiolithiasis, allowing both removal of the gallbladder and sanitation of the bile ducts during a single surgical procedure. The use of a guidewire through the cystic duct facilitates cannulation of the major duodenal papilla, reduces the risk of unsuccessful endoscopic cannulation, and may help decrease the incidence of postoperative complications, including post-procedural pancreatitis.

Despite its obvious advantages, the widespread implementation of this technique in clinical practice remains limited. This is primarily due to organizational and technical difficulties, since the procedure requires the simultaneous participation of surgical and endoscopic teams, as well as the availability of specialized equipment in a single operating room. Additional challenges may arise during the laparoscopic stage of the intervention due to gas insufflation during the endoscopic procedure, which can lead to distension of the stomach and intestines and complicate manipulations within the abdominal cavity [3,5].

At the same time, accumulated clinical experience indicates that the laparoendoscopic approach can be an effective and safe treatment method, including in urgent conditions. Its use allows optimization of the process of removing stones from the common bile duct, reduction of the duration of the endoscopic stage of the operation, and improvement of the overall effectiveness of treatment.

Thus, further improvement of the organizational and technical aspects of laparoendoscopic interventions, as well as evaluation of their clinical effectiveness and safety, are relevant tasks of modern surgery. Solving these issues will expand the possibilities of applying the laparoendoscopic rendezvous method in the treatment of patients with cholecystocholangiolithiasis and improve the outcomes of surgical treatment in this category of patients [4].

Aim of the study. To evaluate the possibilities of performing a single-stage hybrid intervention in patients with choledocholithiasis associated with calculous cholecystitis.

Materials and methods. The study group included 107 patients with choledocholithiasis. To address the objectives of the study, the patients were divided into two groups as follows:

The first group consisted of 55 patients who underwent a hybrid surgical intervention—laparoscopic cholecystectomy combined with assisted endoscopic papillosphincterotomy using the Rendezvous technique with choledocholith extraction (LERV group).

The second group consisted of 52 patients in whom stone removal from the common bile duct was performed using a transpapillary intervention—endoscopic papillosphincterotomy with choledocholith extraction (EPST group). Surgical treatment was dictated by an urgent complication of choledocholithiasis (obstructive jaundice), which required emergency surgical intervention of minimal extent, corresponding to endoscopic papillosphincterotomy.

The age of the patients included in the study ranged from 22 to 82 years. In the first group, the age ranged from 22 to 81 years, with a median of 59.00 (IQR 54.00; 68.00); in the second group, the age ranged from 22 to 72 years, Me = 60.00 (IQR 56.00; 66.00). The age structure in the studied groups was comparable (p = 0.230).

In the overall group, women were 2.1 times more numerous than men (67.3% female patients and 32.7% male). These data correspond to the epidemiological indicators of the prevalence of cholecystocholangiolithiasis. In both study groups, women predominated: in the first group their proportion was 69.1% (38 patients), and in the second group 65.4% (34 patients). In the LERV group, the male-to-female ratio was 1:2.2 (31.0% and 69.0%, respectively), and in the second group it was 1:1.9 (34.6% and 64.5%, respectively). The groups were comparable by sex (p = 1.000).

Most patients (76.6% (82)) were hospitalized on an emergency basis, which to some extent reflects the relevance of the problem of cholecystocholangiolithiasis and characterizes the difficulties in treating such patients. The ratio of elective to emergency patients in the overall group was 1:3 (23.4% and 76.6%, respectively). In group 1 (LERv), this ratio was 1:1.5, while in the second group (EPST) the proportion of emergency patients was significantly higher—90.4%.

Concomitant pathology was identified in 76 patients (71.1%) out of 107: in the first group in 75.8% of patients and in the second group in 68.9%.

According to transabdominal ultrasound examination, gallstones were detected in the gallbladder in all patients of both groups (Fig. 1).

The median diameter of the hepaticocholedochus in the first group (LERv) was 6.50 mm (IQR 6.00; 8.00), which was comparable to the diameter of the common bile duct in the EPST group—6.00 mm (IQR 6.00; 8.00); p = 0.909. According to the study data, no calculi were detected in the hepaticocholedochus in patients of either group.

Computed tomography (CT) for visualization of stones in the common bile duct was performed in 34.5% (19) of cases in the first group (LERv) and in 28.8% (15) of cases in patients of the second group (EPST).

Magnetic resonance imaging (MRI) confirmed choledocholithiasis in 86 (80.4%) patients: in 49 (83.1%) patients of the LERV group and in 37 (71.2%) patients in the EPST group (Fig. 2).

Intraoperative cholangiography (IOC) was performed in all 55 patients of the LERV group to confirm the presence of stones in the common bile duct and to determine the size of the calculi. According to IOC data, the median diameter of the common bile duct in the LERV group was 9.00 mm (IQR 8.00; 12.00), while the size of the calculi in this group was 6.00 mm (IQR 4.00; 8.00).

Endoscopic retrograde cholangiopancreatography (ERCP) was performed in all 52 patients of the second group (EPST).

Fig. 1. Sonographic visualization of stones in the gallbladder and the common bile duct

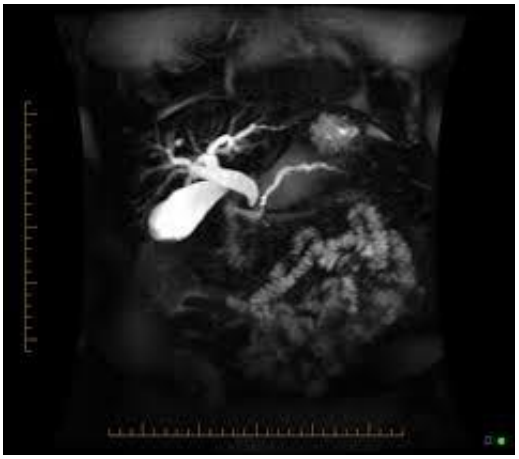

Fig. 2. MR cholangiopancreatography. Obstruction of the distal common bile duct

Fig. 3. Intraoperative cholangiography. Dilatation of the intrahepatic and extrahepatic bile ducts

Fig. 4. Endoscopic retrograde cholangiopancreatography. Calculus in the distal common bile duct

According to ERCP data, the median diameter of the common bile duct in this group was 10.00 mm (IQR 8.00; 12.00), and the diameter of the calculi was 5.00 mm (IQR 4.00; 8.00).

During the LERV procedure in the first group of 55 patients, the gallbladder was removed laparoscopically and the common bile duct was sanitized through an endoscopic approach via the major duodenal papilla. Two operating teams participated in the procedure — a surgical team and an endoscopic team. The intervention was performed under general anesthesia with tracheal intubation and mechanical ventilation.

The patient was placed on the operating table in the supine position with the legs apart ("French position"), with the thoracic part elevated by 15–20 degrees (G.R. Fowler position) and with a slight tilt of the operating table 10–15 degrees to the left. The laparoscopic tower was positioned on the right side near the head end of the operating table. The surgeon stood between the patient's thighs, the assistant stood to the right of the surgeon, and the scrub nurse with the instrument table stood to the left. The tower for the endoscopic stage was positioned to the left of the head end of the operating table. The endoscopist performing the intervention was positioned near the patient's left shoulder, and the endoscopic nurse stood to the right of the endoscopist.

The teams were arranged in such a way that the relationship between the axes of visualization and operative manipulation for both the surgeon and the endoscopist did not differ from those in standard surgical procedures.

The surgical procedure was conventionally divided into four consecutive stages: - the first laparoscopic stage; - the stage of joint work between the laparoscopic and endoscopic teams (Rendezvous); he endoscopic stage; the second laparoscopic stage.

At the first stage, after identifying the cystic artery, it was clipped with a 5 mm titanium clip and transected using an L-shaped hook with monopolar cutting. Next, the cystic duct was dissected along its full length. After placing a 5 mm titanium clip on the distal part of the cystic duct, closer to the neck of the gallbladder, the cystic duct was incised below the clip to perform intraoperative direct cholangiography (Figs. 5, 6).

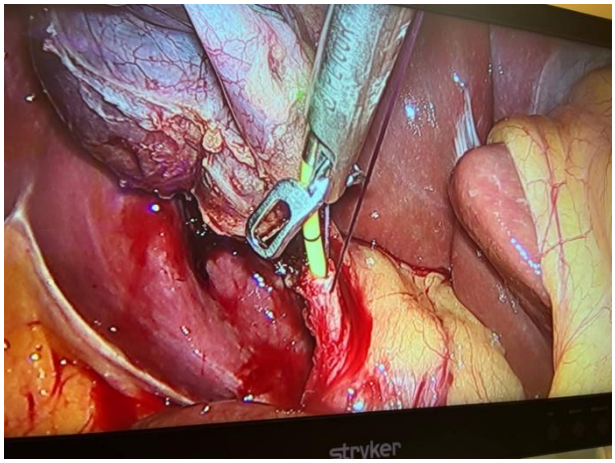

Fig. 5. Intraoperative cholangiography using forceps

Fig. 6. Intraoperative cholangiography

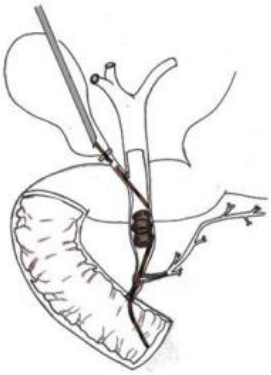

Fig. 7. Antegrade passage of the guidewire into the duodenum

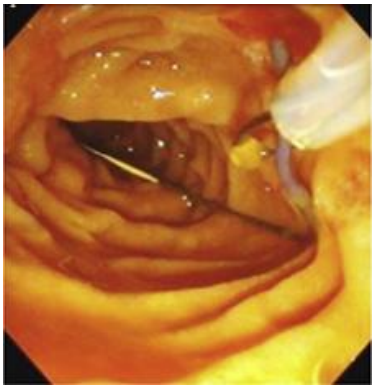

Fig. 8. Capture of the guidewire within the duodenal lumen

Fig. 9. Papillosphincterotomy

Fig. 10. Choledocholith extraction

Cholangiography was carried out using Aesculap cholangiography forceps and a 6 Ch ureteral catheter. The forceps were introduced through a 5 mm instrument trocar placed in the right hypochondrium.

During the second stage of the surgical procedure (Rendezvous), close collaboration between the surgical and endoscopic teams is required. The surgeon made an incision in the cystic duct just below the previously placed clip and introduced a 0.035 Fr, 450 cm long endoscopic guidewire into the cystic duct through a 3 mm trocar. The guidewire was then advanced antegradely through the major duodenal papilla (MDP) into the lumen of the duodenum (Fig. 7).

Once the guidewire was passed through the MDP, the endoscopist advanced a video duodenoscope into the duodenum and visualized the MDP, where the guidewire was present. From the duodenal lumen, the guidewire was captured using a modified hollow endoscopic bougie (Fig. 8).

The bougie for capturing and advancing the endoscopic guidewire through the working channel of the duodenoscope is a hollow rod with a diameter of 3.0 mm.

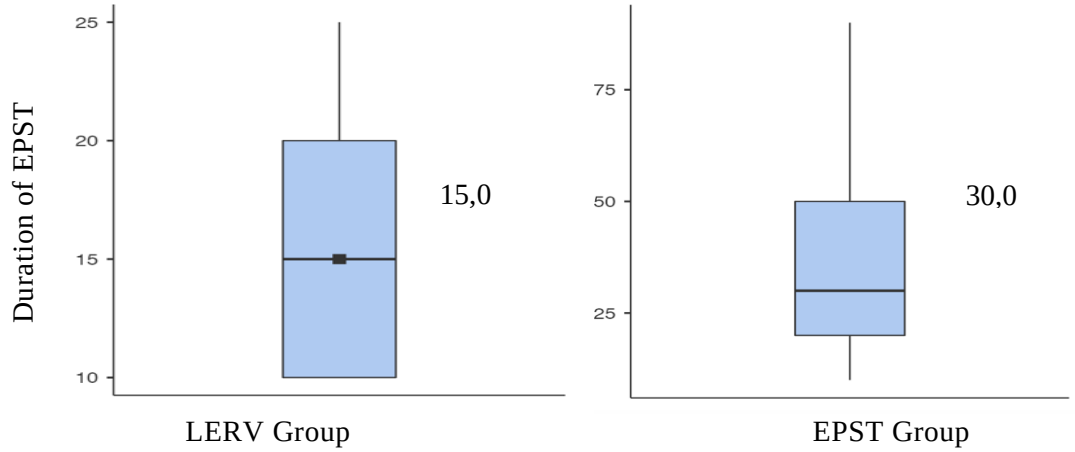

Fig. 11. Duration of the EPST stage with choledocholith extraction in the LERV group (n = 55) and EPST group (n = 52) (data presented as Me [median], IQR [interquartile range])

Table 1. Comparison of the frequency and risk of postoperative EPST-associated complications between the group

Type of postoperative complication	Frequency of complications				p	OSh; 95% DI
	LERV		EPST			
	Abs.	%	Abs.	%		
Acute cholangitis	0	0	0	0	-	-
Acute cholecystitis	0	0	2	3,8	0,215	-
Retro-duodenal perforation	0	0	0	0	-	-
Bleeding	1	1,8	2	3,8	1,000	1,14; 0,07-19,1
Acute pancreatitis	2	3,6	8	15,4	0,044*	8,35; 0,94-74,1
Total complications	3	5,4	12	23,1	0,017*	6,98; 1,4-35,7

*Note: ***** — differences are statistically significant (p < 0.05)*

Its distal end is cut at a 45-degree angle and has a lateral opening measuring 5 mm in length and 1.5 mm in width to allow visual control of the guidewire movement within the catheter lumen. This design creates a hollow endoscopic catheter that, during the procedure without radiological control, facilitates capturing the guidewire from the duodenal lumen and ensures verification of reliable guidewire capture and its passage through the catheter lumen from the duodenal lumen to the external opening of the duodenoscope's working channel.

During the third, endoscopic stage of the hybrid surgical procedure, a papillotome was advanced over the guidewire into the ampulla of the major duodenal papilla (MDP), thereby performing selective cannulation of the common bile duct. Retrograde endoscopic papillosphincterotomy (EPST) was then performed using the standard technique (Fig. 11).

The papillotome was subsequently removed while leaving the endoscopic guidewire in the bile ducts. Depending on the diameter of the common bile duct and the size of the stones, lithoextraction was performed using Dormia four-wire baskets of varying sizes and stiffness (Fig. 11).

During the fourth stage, a "from-the-neck" laparoscopic cholecystectomy was performed.

In the second group, 52 patients underwent EPST using the standard technique.

Results and discussion. Based on the main assessed characteristics — sex, age, presence of concomitant pathology, severity of inflammatory syndrome in the blood, levels of amylase, urea, PTI, diameter of the hepaticocholedochus, and size of the stones — both groups were statistically comparable.

In the LERV group, the mean duration of EPST with choledocholith extraction was 15.0 minutes (IQR 10.0; 20.0). In the EPST group, the mean time for sphincterotomy and stone removal from the common bile duct was 30.0 minutes (IQR 20.0; 45.0). Thus, the transpapillary stage in LERV required statistically significantly about half the time on average compared to the standard EPST procedure (p < 0.001) (Fig. 11).

No intraoperative complications related to endoscopic retrograde papillosphincterotomy (such as bleeding, intraoperative impaction of the basket with a stone, or retro-duodenal perforation) were observed in either group.

The frequency of postoperative EPST-associated complications was analyzed according to the ESGE 2020 classification. The results are presented in Table 1.

Thus, the analysis revealed statistically significant differences in the overall frequency of postoperative complications between the groups (p = 0.017) and in the incidence of postoperative EPST-associated pancreatitis (p = 0.044).

Table 2. Comparison of indicators in patients admitted to the intensive care unit (ICU).

Parameter	LERV Group, n= 55	EPST Group, n= 52	P
Number of patients admitted to ICU, n (%)	10 (18,2)	2 (3,6)	0,109
Duration of ICU stay, Me (IQR), days	1,0 (1,0; 1,0)	1,0 (1,0; 1,0)	0,683
SOFA score, Me (IQR), points	3,0 (1,25; 4,0)	3,0 (3,0; 3,0)	1,000
APACHE II score, Me (IQR), points	9,00 (8,00; 12,25)	11,0 (8,5; 11,0)	0,614

Table 3. Number of bile duct clearances in the LERV and EPST groups

Number of transpapillary clearances	Number of cases, n (%)		P
	LERV, n = 55	EPST, n = 52	
Single-stage	47 (85,7)	35 (67,7)	
Two-stage	6 (11,4)	12 (22,6)	0,035*
Three-stage	2 (2,9)	3 (6,5)	
Clearance not achieved	0	2 (3,8)	

When preoperative EPST was performed, the odds of developing postoperative complications increased 6.98-fold (95% CI: 1.4–35.7), and the odds of developing postoperative pancreatitis increased 8.35-fold (95% CI: 0.94–74.1), indicating the safety of the laparoendoscopic rendezvous technique and its advantage over standard endoscopic papillosphincterotomy.

In the intensive care unit (ICU) after surgery, 10 patients (18.2%) from the LERV group and 2 patients (3.6%) from the EPST group were observed (p = 0.109). The median length of stay in the ICU was 1.0 day (IQR 1.0; 1.0) in both groups (p = 0.683). The mean SOFA score for patients admitted to the ICU in the LERV group was 3.0 points (IQR 1.25; 4.0) and in the EPST group 3.0 points (IQR 3.0; 3.0) (p = 1.000). In both groups, the SOFA score was low, indicating a low degree of multiorgan failure.

Assessment of ICU patients using the APACHE II scale also showed low scores in both groups: 9.00 (IQR 8.00; 12.25) in the LERV group and 11.0 (IQR 11.0; 11.0) in the EPST group (p = 0.614), indicating a low risk of adverse outcomes. The data are presented in Table 2.

Endoscopic papillosphincterotomy was performed in all patients in both groups, and no failures of this stage of the transpapillary intervention were observed.

The success rate of single-stage bile duct clearance in the main (LERV) group was statistically higher, reaching 85.7% (47 patients), while in the EPST group it was 67.7% (35 patients) (p = 0.035).

In 8 patients (14.3%) of the LERV group and in 15 patients (29.1%) of the EPST group, complete bile duct clearance was not achieved during the initial transpapillary intervention. The number of bile duct clearances in the LERV and EPST groups is presented in Table 3.

The length of hospital stay for patients in the laparoendoscopic rendezvous (LERV) group ranged from 4 to 14 days, while in the EPST group it ranged from 4 to 21 days. The median length of stay in the LERV group was 7.0 days (IQR 6.0; 8.0), and in the EPST group it was 8.0 days (IQR 5.0; 11.0), p = 0.100. Figure 23 shows the hospitalization duration for patients in the main and control groups.

In the LERV group, 48 patients (87.9%) and in the EPST group, 36 patients (69.0%) had an uncomplicated postoperative course; all were discharged in satisfactory condition under the follow-up of a surgeon and gastroenterologist at their place of residence. The median length of stay for these uncomplicated cases was 6.0 days (IQR 5.0; 8.0) in the LERV group and 7.5 days (IQR 5.0; 9.25) in the EPST group.

Postoperative complications occurred in 4 patients (12.1%) in the LERV group, leading to a statistically significant increase in hospital stay to 13.0 days (IQR 11.5; 14.0), p = 0.003. In the EPST group, complications developed in 9 patients (31.0%), but this did not result in a statistically significant prolongation of hospitalization, with a median of 10.0 days (IQR 7.0; 16.0), p = 0.274.

Based on the results of our study, it should be noted that the use of a modified single-stage technique of laparoscopic cholecystectomy combined with assisted endoscopic papillosphincterotomy using the Rendezvous technique and choledocholith extraction in patients with cholecystocholangiolithiasis improves surgical outcomes and is economically advantageous, as it reduces the number of operations and hospitalizations for the patient.

Conclusions:

1. In patients with calculous cholecystitis and choledocholithiasis, performing hybrid operations using the proposed improved single-stage laparoscopic cholecystectomy with assisted EPST in the Rendezvous technique and choledocholith extraction is advisable.

2. The proposed improved technique of laparoscopic cholecystectomy with simultaneous assisted EPST (Rendezvous technique) does not require the mandatory use of a hybrid operating room, a special radiological table, or the involvement of a radiologist.

3. The proposed technique, instruments, and operating team arrangement are applicable for patients with acute and chronic cholecystitis and moderate risk of choledocholithiasis, after confirming the presence of stones in the common bile duct using intraoperative cholangiography performed via the cystic duct.

4. The improved technique of laparoscopic cholecystectomy with assisted EPST is effective in patients with moderate risk of choledocholithiasis in 87.9% of cases, which is 18.9% higher than traditional EPST ($p = 0.035$) and is associated with a 17.7% lower rate of EPST-associated complications ($p = 0.017$).

Literature:

1. Gerosa M., Guttadauro A., Stillittano D. F., Sassun R., Sileo A., Vignati B., Di Fratta E., Maggioni D., Mari G. Single-stage laparoscopic cholecystectomy with intraoperative ERCP for cholecystocholedocholithiasis: lessons learned from the COVID-19 pandemic // Frontiers in Surgery. — 2024. — Vol. 11. — Article 1398854.
2. Koiava L., Koiava O., Abuladze D., Musiyarira L., Gavasheli S., Abiatari I. Management of cholecystocholedocholithiasis by laparoendoscopic rendezvous: a single-center experience // World Academy of Sciences Journal. — 2026. — Vol. 8. — Article 16.
3. Lv S., Wang B., Hu P., Shi B., Zhang W., Wang A. Efficacy analysis of hybrid operating room-based laparoscopic cholecystectomy combined with intraoperative ERCP in the treatment of cholelithiasis with choledocholithiasis // Journal of Minimal Access Surgery. — 2023. — Vol. 19, № 3. — P. 360–366.
4. Sayed M. M., Abdelmohsen A. S., Ibrahim M., Raafat M. Single-stage laparoendoscopic management of cholecystocholedocholithiasis: a retrospective study comparing ERCP first versus laparoscopic cholecystectomy first // Annals of Hepato-Biliary-Pancreatic Surgery. — 2025. — Vol. 29, № 1. — P. 55–61.
5. Tai J. X., Zhang Q. Safety and efficacy comparison of single-stage and two-stage ERCP combined with laparoscopic cholecystectomy: a systematic review and meta-analysis // Frontiers in Medicine. — 2025. — Vol. 12. — Article 1713857.

РЕЗУЛЬТАТЫ ЛЕЧЕНИЯ БОЛЬНЫХ С ХОЛЕЦИСТОХОЛЕДОХОЛИТИАЗОМ ЛАПАРОЭНДОСКОПИЧЕСКИМ МЕТОДОМ

Абдурахманов Э.М., Бабажанов А.С.

Резюме. *Объектом исследования явились 107 больных с острым холециститом и холангитом при холецистохоледохолитиазе. У пациентов с калькулезным холециститом и холедохолитиазом целесообразно выполнение гибридных операций с применением предложенной усовершенствованной одноэтапной ЛХЭ с ассистированной ЭПСТ в технике Rendezvous и холедохолитоэкстракцией. Усовершенствованная техника ЛХЭ с ассистированной ЭПСТ эффективна при среднем риске холедохолитиаза в 87,9% наблюдений, что на 18,9% выше традиционной ЭПСТ, p = 0,035, и сопровождается на 17,7% меньшей частотой ЭПСТ-ассоциированных осложнений, p = 0,017.*

Ключевые слова: *Желчнокаменная болезень, холецистохоледохолитиаз, хирургическое лечение.*