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## PERSONALIZED APPROACH TO THE TREATMENT OF CHOLECYSTOCHOLEDOCHOLITHIASIS: THE ROLE OF HYBRID SURGERY

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### ✓ *Resume*

*The study group consisted of 55 patients who underwent hybrid surgical intervention - laparoscopic cholecystectomy and assisted endoscopic papillosphincterotomy by the Rendezvous technique with choledocholithoextraction (LERV group). In patients with calculous cholecystitis and choledocholithiasis it is expedient to perform hybrid operations using the proposed improved one-stage LCE with assisted EPST by Rendezvous technique and choledocholithoextraction. The proposed technique, devices and the scheme of the operating team arrangement are applicable in patients with acute and chronic cholecystitis and average risk of choledocholithiasis, after confirmation of the presence of concrements in the choledochus by the data of intraoperative cholangiography performed through the vesicular duct.*

*Keywords: Biliary stone disease, cholecystocholedocholithiasis, hybrid operation.*

## ПЕРСОНАЛИЗИРОВАННЫЙ ПОДХОД К ЛЕЧЕНИЮ ХОЛЕЦИСТОХОЛЕДОХОЛИТИАЗА: РОЛЬ ГИБРИДНОЙ ХИРУРГИИ

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### ✓ *Резюме*

*В исследовательскую группу вошли 55 пациентов, которым была проведена гибридная хирургическая операция – лапароскопическая холецистэктомия и ассистированная эндоскопическая папиллосфинктеротомия по методу «Рандеву» с холедохолитэкстракцией (группа LERV). У пациентов с калькулезным холециститом и холедохолитиазом целесообразно выполнять гибридные операции, используя предложенную улучшенную одноэтапную ЛХЭ с ассистированной ЭПСТ по методу «Рандеву» и холедохолитэкстракцией. Предложенная техника, инструменты и схема расположения операционной бригады применимы у пациентов с острым и хроническим холециститом, а также со средним риском холедохолитиаза, после подтверждения наличия конкрементов в холедохе по данным интраоперационной холангиографии, выполненной через пузырный проток.*

*Ключевые слова: Желчнокаменная болезнь, холецистохоледохолитиаз, гибридная операция.*

## БИР ПАЙТДА ҚИЛИНАДИГАН ЛАПАРЭНДОСКОПИК ДАВОЛАШ УСУЛИ: ХОЛЕЦИСТОХОЛЕДОХОЛИТИАЗ БЕМОРЛАРИ УЧУН

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✓ **Резюме**

*Тадқиқот гуруҳи 55 нафар беморни ўз ичига олди, уларда гибрид жарроҳлик аралашуви – лапароскопик холецистэктомия ва «Рандеву» усули билан ассистланган эндоскопик папиллосфинктеротомия ва холедохолитэкстракция (LERV гуруҳи) амалга оширилди. Ҳисобли холецистит ва холедохолитиаз бўлган беморларда таклиф қилинган яшиланган бир пайтдаги ЛХЭ, «Рандеву» усули орқали амалга ошириладиган ассистланган ЭПСТ ва холедохолитэкстракциядан иборат гибрид операцияларни қўллаш мақсадга мувофиқдир. Таклиф этилган усул, асбоб-ускуналар ва операция жамоасининг жойлашув схемаси ўткир ва сурункали холецистит, ўртача даражадаги холедохолитиаз хавфи бўлган беморларда, холецистик йўл орқали бажарилган интраоперацион холангиография маълумотлари асосида қўлланилади.*

*Калит сўзлар: Ўт тош касаллиги, холецистохоледохолитиаз, гибрид операция.*

### **Relevance**

In the national clinical recommendations 'Acute cholecystitis', in clinical recommendations of the European Society of Gastrointestinal Endoscopy (ESGE), The World Society of Emergency Surgery (WSES) and European Association for the Study of the Liver (EASL) the performance of cholecystectomy simultaneously with EPST in Rendezvous technique and removal of bile duct stones is considered as a worthy alternative to the traditional two-stage treatment if there is sufficient surgical experience and technical capabilities [1,2,5].

However, the availability of laparoendoscopic rendezvous is currently limited in most hospitals. The main reasons for limiting the use of this technology, according to the majority of authors, are related to unresolved organisational problems, the lack of a hybrid operating room in most surgical hospitals, the need to have complexes of equipment for videolaparoscopic surgery, oral manipulative video endoscopy and X-ray television in one operating room, the need for additional involvement of specialised specialists in the operation, as well as X-ray exposure of the patient and surgical team. Compliance with all these factors is particularly difficult in emergency care. [3,4,6].

**The aim of the study** is to improve the results of surgical treatment of patients with complicated form of cholelithiasis - cholecystocholedocholithiasis.

### **Material and methods of research**

The study group consisted of 55 patients who underwent hybrid surgical intervention - laparoscopic cholecystectomy and assisted endoscopic papillosphincterotomy by Rendezvous technique with choledocholithoextraction (LERV group).

The age of the patients included in the study ranged from 22 to 81 years, with a median of 59.00 (IQR 54.00; 68.00). There were 2.1 times more females than males (67.3% female patients and 32.7% male patients).

Inclusion criteria for the study: patients with intermediate risk of choledocholithiasis combined with acute or chronic cholecystitis.

Exclusion criteria: - patients with acute biliary pancreatitis; - patients with low risk of choledocholithiasis; - patients with high risk of choledocholithiasis.

During LERV in the first group of 55 patients the gallbladder was laparoscopically removed and the common bile duct was sanitised by endoscopic access through the BSDC. Two operating teams - surgical and endoscopic - participated in the operation. The intervention was performed under general anaesthesia with tracheal intubation and ventilation. The patient was placed on the operating table in a supine position with legs apart ('French position'), thoracic region elevated 15-20 degrees (G.R. Fowler position), with a slight inclination of 10-15 degrees of the operating table to the left. The stand for performing the laparoscopic stage was placed on the right side at the head end of the operating table. The surgeon was between the patient's thighs, the assistant on the surgeon's right, the operating nurse with the instrument table on the left. The stand for performing the endoscopic stage was placed to the left of the head end of the operating table. The endoscopist was positioned near the left shoulder of the patient to perform the intervention, the endoscopy nurse to the right of the endoscopist.

The teams were arranged in such a way that the ratio of the axes of observation and surgical exposure of neither the surgeon nor the endoscopist changed compared with standard surgical interventions (pic. 5,6)



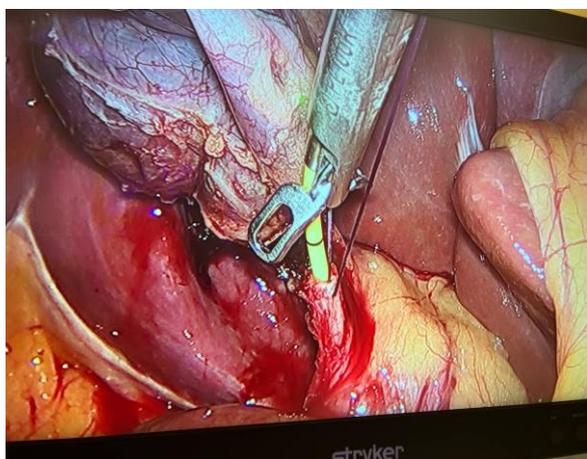
**Picture 5. Layout of the surgical teams and equipment**



**Picture 6. Location of surgical and endoscopic teams**

The surgical intervention was conventionally divided into four consecutive stages: - first laparoscopic stage; - stage of joint work of laparoscopic and endoscopic (Rendezvous) team; - endoscopic stage; - second laparoscopic stage.

In the first stage, after isolation of the vesicular artery, it was clipped with a 5 mm titanium clip and crossed with an L-shaped hook using monopolar cutting. Next, the vesicular duct was isolated at its maximum length. After a 5 mm titanium clip was placed on the vesicular duct in its distal part, closer to the gallbladder neck, the vesicular duct was incised below the placed clip to perform intraoperative direct cholangiography (pic. 7, 8). Cholangiography was performed using Aesculap cholangiography forceps and a 6 Ch ureteral catheter. The forceps were inserted through a 5 mm instrumental trocar placed in the right subcostal area.



**Picture 7: Intraoperative cholangiography with forceps.**

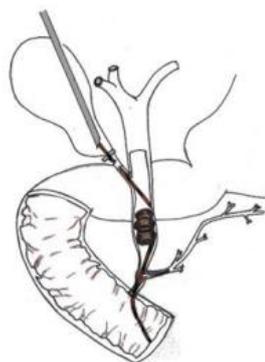


**Picture 8: Intraoperative cholangiography.**

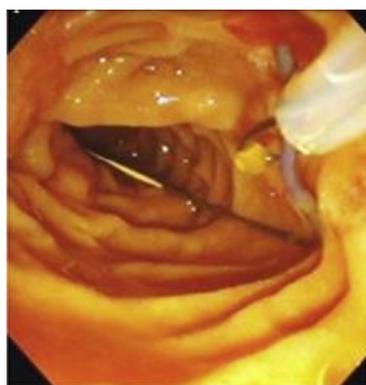
During the second stage of surgical intervention (Rendezvous), the surgical and endoscopic teams had to work together. The surgeon made an incision of the vesicular duct just below the previously applied clip and inserted a 0.035 Fr endoscopic string 450 cm long through a 3 mm diameter trocar into the vesicular duct. It was then guided antegradely through the BSDC into the duodenal lumen (DIC) (Picture 9).

After the string was passed through the BSDC, the endoscopist routinely passed the video duodenoscope into the duodenum and visualised the BSDC with the string in its lumen. From the side of the lumen of the duodenum, the string was caught by a modified hollow endoscopic bundle (pic. 10).

The bujug for catching and guiding the endoscopic string through the duodenoscope working channel is a hollow rod with the diameter of 3.0 mm, differing in that the distal end of the catheter is cut at an angle of 45 degrees and there is a hole with the length of 5 mm and width of 1.5 mm on its lateral surface for visual control of the string movement in the catheter lumen. The design of the hollow endoscopic catheter is created, which in the conditions of the intervention without radiological control could facilitate the capture of the string from the side of the duodenoscope lumen and provide the possibility to control the reliability of the fact of capturing the endoscopic string by the catheter and its passage through the catheter lumen from the duodenoscope lumen to the external opening of the duodenoscope working channel.



**Picture 9: Antegrade conduction of the string in the duodenum**



**Picture 10. Capturing the string in the lumen of the duodenum**

At the third endoscopic stage of hybrid surgical intervention, the papillotome was lowered along the string and inserted into the ampulla of the BSDC, thus performing selective intubation of the choledochus. Retrograde endoscopic papillosphincterotomy (EPST) was performed in a standard way (pic. 11).

Then the papillotome was removed with leaving the endoscopic string in the biliary tract. Depending on the diameter of the common bile duct and the size of the stones, lithoextraction was performed with four-stringed Dormia baskets of different size and rigidity (pic. 12).



**Picture 11. Papillosphincterotomy**



**Picture 12. Choledocholithoextraction**

During the fourth stage, laparoscopic cholecystectomy ‘from the neck’ was performed.

### **Results and their discussion**

Duration of operative intervention of laparoendoscopic rendezvous was on average 120,0 minutes (IOR 90,0;120,0). Duration of the operation in patients with chronic inflammation was significantly lower than in acute cholecystitis;  $p = 0.035$  (90.0 minutes (IQR 80.0;120.0) vs. 120.0 minutes (IQR 100.0;170.0), respectively), but the severity of inflammatory changes (catarrhal or phlegmonous) in acute cholecystitis did not affect the duration of operative intervention;  $p = 0.138$ . The duration of the endoscopic stage (EPST with choledocholithoextraction) averaged 15.0 (IQR 10.0; 20.0) minutes.

We did not observe any intraoperative complications.

Postoperative complications related to laparoscopic cholecystectomy occurred in 2 patients (3.6%). Postoperative EPST-associated complications were detected in 5.45% (3) cases: 1(1.8%) patient had postoperative bleeding from the papillotomy area and 2 (3.6%) patients had postoperative pancreatitis; the patient was in the high-risk group for postoperative pancreatitis. In 2 cases (3.6%) in the postoperative period the patient was diagnosed with TELA in small branches with the development of polisegmental pneumonia. The combination of complications was not observed. Thus, a total of 7 (12,7%) complications were registered in 55 patients who underwent laparoendoscopic intervention: in 3 cases they were complications of I degree (5,45%) and in 4 cases (7,2%) - of IIIa, IIIb degree according to Clavien-Dindo classification of surgical complications.

Hyperamylasemia occurred in 7 (12.7%) patients. В отделении интенсивной терапии после операции наблюдали 10 (18,2%) пациентов основной группы.

There were no fatal outcomes in the LERV group.

Complete sanation of the hepaticocholedochal tract in one stage in patients of the study group was achieved in 87.2% (48) of cases. 5 patients underwent the second transpapillary intervention for complete clearance of the biliary tract. 2 patients required three endoscopic procedures.

The mean duration of hospitalisation was 7.0 (IQR 6.0; 8.0) bed days. The development of postoperative complications in 7 (12.7%) patients led to an increase in the duration of hospitalisation to an average of 13.0 (IQR 11.5; 14.0) bed-days.

It should be noted that in general the results of treatment of patients with medium risk of cholangiolithiasis on the background of calculous cholecystitis operated with the modified technique of laparoendoscopic rendezvous were satisfactory. They quite correlate with the literature data, in which the results of treatment of patients with cholangiolithiasis using hybrid laparoendoscopic surgery in Rendezvous technique are presented.

### Conclusions

1. In patients with calculous cholecystitis and choledocholithiasis it is reasonable to perform hybrid operations using the proposed improved one-stage LCE with assisted EPST in Rendezvous technique and choledocholithoextraction.
2. The proposed improved technique of LCE with simultaneous performance of assisted EPST (Rendezvous technique) does not require mandatory use of hybrid operating room conditions, special radiological table and involvement of a radiologist.
3. The proposed technique, devices and the scheme of the operating team arrangement are applicable in patients with acute and chronic cholecystitis and medium risk of cholangiolithiasis, after confirmation of the presence of concrements in the choledocha by intraoperative cholangiography performed through the vesicular duct.

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