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FEATURES OF DIAGNOSIS AND TREATMENT OF EARLY BILIARY COMPLICATIONS AFTER CHOLECYSTECTOMY

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Annotation. The paper analyzes the results of surgical treatment of 93 patients with early biliary complications after cholecystectomy due to "minor" injuries (aberrant hepatocytic ducts of the gallbladder bed - Luschka's ducts , leaky cystic duct stump, drainage prolapse from the common bile duct) and injuries to the main bile ducts ("major" injuries.) Improvement of treatment and diagnostic tactics in patients with biliary complications after CE allowed to significantly improve the treatment results in the main group, where complications in the immediate postoperative period amounted to 8.1%, in the late period - 5.4%, mortality was not observed (in the comparison group - 17.8% and 14.2%, respectively, mortality - 3.6%).

Key words: cholecystectomy , bile leakage , bile peritonitis, surgical tactics.

Of biliary complications associated with cholecystectomy (CE) have been published in the literature. The frequency of such complications, according to a number of authors, ranges from 1.2 to 5.1%, and in some observations reaches 14.5% (1,3,6,12). The main causes of postoperative bile leakage can be both "minor" injuries - insufficiency of the cystic duct stump, aberrant hepatocystic ducts of the gallbladder bed - Luschka's ducts, prolapse of drainage from the hepaticocholedochus, and "major" injuries - iatrogenic injuries of the main bile ducts (5,13).

There are various, sometimes contradictory, approaches to both the choice of the method for verifying the source of bile leakage , to determining the indications for repeated intervention, and to the choice of the method for correcting this complication (2).

The most important role in the pathogenesis of bile leakage after cholecystectomy belongs to uncorrected biliary hypertension due to stricture of the BDS, choledocholithiasis , acute pancreatitis. The study shows that the mechanism of bile leakage may be associated with functional hypertension in the biliary system, which is caused by inflammatory changes and increased liver function (10). Against this background, any minor damage to the small bile ducts in the gallbladder bed on the

liver during cholecystectomy can lead to pronounced postoperative bile leakage into the abdominal cavity (4,9,14).

Leading clinics dealing with this problem evaluated the results of performing various types of cholecystectomies in patients with acute and chronic calculous cholecystitis, in whom bile leakage was noted in the early postoperative period . The reasons for the flow of bile from the stump of the cystic duct can be due to both its failure due to the displacement of the clip, and due to a rapid and significant increase in pressure in the duct system due to obstruction at the level of the terminal section of the common bile duct .

Treatment of the cystic duct stump, performed against the background of inflamed and infiltrated tissues, as well as against the background of intraoperative bleeding, can lead to bile leakage due to incorrect application of the clip. Similar consequences result from cases of application of clips of the wrong size, especially in cases of expansion of the cystic duct. The mechanism of bile leakage after cholecystectomy is associated with the functioning of the sphincter apparatus of the BDS, which contributes to a change in the pressure gradient in the bile ducts. Even in the absence of pathology on the part of the Vater's papilla, the physiological role of the sphincter of Oddi leads to the fact that bile more easily flows beyond the bile ducts than into the lumen of the duodenum (13).

The main cause of postoperative peritonitis is the leakage of bile into the free abdominal cavity. According to the literature, the incidence of bile peritonitis varies significantly: from 0.4% to 4% in chronic cholecystitis, reaching 10% in acute cholecystitis (7,9,15).

The clinical picture of bile leakage after hepatic endoscopy depends on the following factors: - the rate of bile leakage ; the degree of confinement of the source of bile leakage ; - the degree of infection of the bile; - the presence or absence of drainage. Clinical manifestations of bile leakage depend on where the discharge occurs. If bile comes out, through drainage or trocar insertion points, then a biliary fistula may form; if inward, then the development of biloma , biliary ascites, biliary peritonitis is likely (2,6,14,17).

The difficulty of early diagnostics of intra-abdominal bile leakage leads to delayed repeated surgical intervention and, as a consequence, to an unfavorable treatment outcome. On the other hand, the difficulty of diagnostics also explains the unjustified performance of relaparotomies in 0.6-17% of patients. Intensive therapy, the use of antibiotics and modern methods of pain relief carried out in the postoperative period significantly change the picture of the developing complication, obscuring acute phenomena, erasing the signs of a catastrophe in the abdominal cavity. Therefore, the classic picture of complications develops rarely and, as a rule, late, and the performance of relaparotomy is accompanied by high mortality. Therefore, at the slightest suspicion

of trouble, it is necessary to conduct a number of studies that can be the beginning of active, targeted dynamic observation **(** 8,11,16).

Objective of the study : To improve the results of surgical treatment of patients with cholelithiasis who developed biliary complications after surgery, using relaparoscopy , transduodenal endoscopic interventions, and puncture methods under ultrasound control to reduce the number of repeated laparotomy operations.

Material and methods of the study . The study is based on the analysis of the results of examination and treatment of 93 patients who developed a biliary complication - bile leakage - in the early postoperative period after CE . The clinical picture of this complication was characterized by external bile leakage in 71 patients (56.7%) and bile leakage into the abdominal cavity with the formation of a biloma or the development of bile peritonitis in 22 (43.3%) .

According to the classification by L. Morgenstern (2006) , grade I bile leakage – up to 100 ml/day through drainage from the abdominal cavity or limited accumulation of fluid in the gallbladder bed with a volume of less than 100 ml during ultrasound was detected in 33 patients (35.4%). Grade II bile leakage – up to 500 ml/day through drainage or free fluid above and below the liver during ultrasound was detected in 29 patients (31.1%). Grade III bile leakage – more than 500 ml/day through drainage or free fluid in 3 or more areas of the abdominal cavity was detected in 31 patients (33.3%).

The source of postoperative bile leakage , according to the classification P. Neuhaus , in 12 cases there were additional (aberrant) bile ducts (Lushka ducts) in the gallbladder bed, in 13 cases there was failure of the cystic duct stump due to slipping of the clips, in 5 patients there was GI from a defect in the wall of the common hepatic duct as a result of spontaneous loss of the installed drainage from the hepaticocholedochus , in 31 cases – iatrogenic damage to the main bile ducts. In 32 observations, the source of bile leakage was not identified, due to its spontaneous cessation with conservative therapy.

Early biliary complications were observed after LCE – 2.1% (43), CE from mini-laparotomy access 1.1% (29), CE from laparotomy access – 2.4% (12 patients), 9 patients with this complication were transferred from other hospitals.

The average age of patients with bile leakage after CE was 49 +- 5.1 years – persons of the most working age, men – 23 and women – 70, i.e. the ratio was 1:3, although in the gender structure of operated patients with cholelithiasis this ratio was 1:6, which confirms the literature data on the difficulties of performing CE in males.

64 (68.8%) of 93 patients were admitted for acute and destructive cholecystitis, 29 (31.2%) for chronic calculous cholecystitis, i.e. biliary complications were observed more than 2 times more often after emergency operations than after planned ones.

These patients underwent ultrasound (93), RPCG (24), fistulocholangiography (14), intraoperative cholangiography (14), MRCP (13), relaparoscopy (12).

In accordance with the objectives of the study, patients were divided into comparable study groups: the main group consisted of 37 patients with biliary complications after hepatic endoscopy, operated on in the period 2010-2021, the comparison group - 56 patients operated on in 2000-2009.

In case of grade I bile leakage in the comparison group (19 patients), recanalization was performed in 7 patients. counter-openings with drainage of the subhepatic region. Relaparoscopy was performed in 3 patients , in 1 case the source of bile leakage was recognized as an aberrant bile duct, which was clipped , in 2 observations the source of bile leakage was not established. Relaparotomy was performed in 2 patients , where the cause of intra-abdominal bile leakage in 1 observation was the loss of drainage from the stump of the cystic duct, in another observation the source of bile leakage was not established. In 7 patients, bile leakage stopped on its own on the 4-10th day after surgery (table 1).

Table 1

Surgical correction of grade I bile leakage with "minor" injuries in the comparison group (n=19).

Source of bile leakage after hepatic endoscopy (according to P. Neuhaus)		**Types of interventions performed**	**Number of patients**
Peripheral minor bile leakage:	A_1 - failure of the cystic duct stump	Relaparotomy , repeated drainage of the cystic duct stump	1
	A_2 - aberrant bile duct	Relaparoscopy , clipping aberrant bile duct, abdominal cavity sanitation, gallbladder bed drainage	1
The source of bile leakage is not identified.		Recanalization counter-openings and drainage of the subhepatic region	7
		Relaparoscopy , sanitation and drainage of the subhepatic region	2
		Relaparotomy , debridement and drainage of the subhepatic region	1
		Bile leakage from the abdominal cavity drainage stopped on its own	7

Total	19

In the comparison group (17 patients) with grade II bile leakage due to cystic duct stump insufficiency, 3 out of 8 patients underwent relaparoscopy with repeated cystic duct clipping after LCE . 2 patients with spontaneous drainage loss from the GC also underwent relaparectomy with repeated drainage of the common bile duct. In 7 patients with bile leakage from aberrant bile ducts of the gallbladder bed, bile leakage was stopped during relaparoscopy - 3, relaparotomy - 4. In 2 patients, the cause of cystic duct stump insufficiency was choledocholithiasis and biliary hypertension, they underwent relaparotomy with choledocholithotomy and drainage of the common bile duct . Another 3 patients with bile peritonitis due to failure of the cystic duct stump underwent relaparotomy with ligation of the duct stump and sanitation of the abdominal cavity (table 2).

Table 2

Surgical correction of grade II bile leakage with "minor" injuries in the comparison group (n=17).

Source of bile leakage after hepatic endoscopy (according to P. Neuhaus)		**Types of interventions performed**	**Number of patients**
Peripheral minor bile leakage:	A_1 - insufficiency of the cystic duct stump	Relaparoscopy , repeated clipping of the cystic duct stump	3
		Relaparotomy , re-ligation of the cystic duct stump	3
		Relaparotomy , choledocholithotomy, drainage of the common bile duct	2
	A_2 - aberrant duct in the gallbladder bed	Relaparoscopy , clipping aberrant bile ducts	3
		Relaparotomy, dressing aberrant bile duct.	4
	C_1 – GC defect (spontaneous loss of drainage from the GC)	Relaparotomy , repeated drainage of the common hepatic duct	2
Total			17

Damage to the main bile ducts was the cause of grade III bile leakage in 20 patients of the comparison group, 5 of whom were transferred from other hospitals with drainage of the proximal stump of the hepatic duct. Reconstructive operations were performed in 9 cases, of which, with marginal damage to the common hepatic duct, 4 patients underwent suturing of the defect on a T-shaped drainage. With complete intersection of the common hepatic duct, biliobiliary Anastomosis was performed in 5 patients. Reconstructive surgeries were performed in 11 patients: hepaticoduodenoanastomosis was performed in 3 patients, hepaticojejunostomy on transhepatic frame drainage was performed in 8 patients. Roux-en-Y GEA was performed in 2 patients after complete intersection of the hepaticocholedochus was detected . In 6 observations, external drainage of the hepaticocholedochus was performed in the first stage , then in the second stage, Roux-en-Y GEA was performed on the transhepatic frame drainage (table 3).

Table 3

Reconstructive and restorative surgeries performed on patients in the comparison group for GC injuries

Damage level	Suturing the GC on the drainage		Biliobiliary anastomosis		Hepaticoduodenoanastomosis		Hepaticojejunal anastomosis on TPCD		Total	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
"+2"; "+1"	4	0	5	5	3	5	3	5	15	75
"0"	-	-	-	-	-	-	4	20	4	20
"-1";	-	-	-	-	-	-	1	5	1	5
Total	4	0	**5**	**25**	**3**	5	**8**	**30**	**20**	**100**

In the main group (14 patients), in the absence of signs of peritonitis, satisfactory condition of the patients, no changes in blood tests, dynamic observation with mandatory ultrasound control and conservative treatment were carried out - antispasmodics, infusion , anti-inflammatory and antibacterial therapy. In 9 patients, the treatment was effective, bile leakage through the drainage progressively decreased and completely stopped within 5-7 days, so other diagnostic and therapeutic procedures were not required. 3 patients required biloma punctures under ultrasound control to evacuate fluid accumulation in the subhepatic space, and in 1 patient the cause of bile leakage was prolapse of the drainage from the common bile duct . In another 2 patients, conservative treatment was also ineffective and they underwent RPCG and EPST. In 1

patient, the cause of bile leakage was insufficiency of the cystic duct stump, in another 1 patient the source was not identified. After endoscopic drainage of the biliary system, bile leakage in these patients stopped on the 2nd and 5th days.

In the main group (n=12) with cystic duct stump incompetence due to both choledocholithiasis and biliary hypertension with external bile leakage, RPCG with EPST and nasobiliary drainage was the final method of stopping bile leakage in 2 patients . In 1 observation, in a patient with cystic duct stump incompetence, bile leakage was not stopped after endoscopic transduadenal intervention , the patient underwent relaparoscopy and clipping of the cystic duct. Also, in case of bile leakage in 3 patients from aberrant bile ducts, they were clipped during relaparoscopy, 1 with peritonitis - during relaparotomy. Relaparotomy, choledocholithotomy with drainage of the common bile duct and sanitation of the abdominal cavity were performed in 1 patient with bile peritonitis.

In case of damage to the main bile ducts, grade III bile leakage was observed in 11 patients in the main group. Of these, 4 were admitted from other hospitals with drainage installed in the proximal stump of the damaged hepatic duct. Of these, 3 underwent GEA by RU with TPCD, and in 1 observation, high-precision GEA was performed without frame drainage.

high Roux -en-Y HEA without a frame was also applied in 2 patients with complete intersection of the hepatic duct detected intraoperatively . In 1 patient with bile peritonitis, the abdominal cavity was sanitized and the hepatic duct was drained at the first stage. Reconstructive surgery was performed after 3 months - HEA with TPDC. Restorative surgeries were performed in 3 patients. BBA was applied in 1 patient with intersection of the hepatic duct. In 3 patients, with marginal damage of no more than ½ the duct diameter, duct suturing was performed in 2 cases, in one observation, a stent was installed in the hepatic duct after RPCG.

Results and discussion. Comparative analysis of the treatment results for first-degree bile leakage showed that in 2/3 of cases the patients underwent repeated surgical interventions, and conservative therapy was performed only in 36.9% of cases. Directly opposite results were obtained in the main group, where special endoscopic and diapeutic methods allowed avoiding repeated surgical operations in 35.7% of patients, and in the remaining 2/3 conservative therapy was effective.

In the comparison group (17 patients), grade II bile leakage was corrected in 100% of cases by means of repeated surgical intervention – relaparotomy (11) and relaparoscopy (6). Improvement of the treatment and diagnostic tactics of patient management in the main group (12 patients) using endoscopic transduodenal interventions made it possible to stop external bile leakage in 6 (50%) patients. Relaparoscopy made it possible to eliminate the cause of bile peritonitis in 4 observations and only 2 patients (16.6%) required relaparotomy .

Thus, the introduction of minimally invasive methods of correction of external and intra-abdominal bile leakage as transduodenal Endoscopic interventions, ultrasound-guided abdominal punctures, laparoscopy, and active conservative therapy with daily ultrasound monitoring allowed 92.4% of patients with "minor" bile duct injuries to avoid repeat laparotomy. Relaparotomy was performed only in 2 patients.

Comparative analysis of treatment results in a group of patients with grade III bile leakage caused by damage to the main bile ducts has proven the effectiveness of high Roux -en-Y HEA using precision technology. All 3 patients showed good results in the immediate and late postoperative periods. Performing HEA on TPDC (performed in 4 patients of the main group and 8 in the comparison group) is certainly justified when applying a biliodigestive anastomosis in conditions of infiltrative disorders in the duct wall and high hilus (level 0, -1) damage. Replaceable transhepatic drainage, on which HEA is formed, is extremely necessary in the above situations and helps the surgeon. However, inconvenience for the patient, a significant decrease in his ability to work associated with the need for long-term wearing of drainage tubes (up to 2 years) reduces the value of the technique. BBA (imposed in 5 patients in the comparison group and 1 in the main group) and GDA (in 3 patients in the comparison group) in all cases resulted in strictures of the ductus arteriosus and BDA. They underwent repeated reconstructive surgeries. Suturing of the ductus arteriosus defect covering less than ½ of the duct diameter is indicated only when using precision techniques.

Purulent and septic complications after repeated interventions for bile leakage after hepatic endoscopy were observed in 10 patients (17.8%) in the comparison group: - bile peritonitis (3 patients); - formation of subhepatic and subdiaphragmatic abscess (3 patients); - suppuration of the postoperative wound (4 patients). Of these, 2 (3.6%) died. The cause of death in both observations was acute renal and hepatic failure against the background of a septic condition.

, complications were observed in 3 patients (8.1%) after surgical correction of bile leakage after CE. In 2 observations, there were purulent-septic complications, in 1 case, acute pancreatitis after endoscopic papillosphincterotomy . No mortality was observed in the main group.

In the late postoperative period in the comparison group, cicatricial strictures of the HC or previously applied BDA accompanied by clinical picture of cholangitis developed in 8 patients (14.7%). Moreover, 3 of them were re-operated - they were applied GEA by Roux . In the main group in the late period, stricture of the HC was observed in 2 patients (5.4%) - 1 after application of BBA and 1 more after suturing of injury of the common hepatic duct on T- shaped drainage. Both patients underwent reconstructive surgeries - GEA by Roux .

It should be noted that external and intra-abdominal bile leakage significantly prolonged the treatment period of patients. The average duration of inpatient treatment

of patients after CE was 2-7 (3.4±1.2) days. In the comparison group, the stay of patients with bile leakage after CE was 15.9±2.3 days, in the main group - 12.3±3.1 days.

Conclusions:

1. External and intra-abdominal bile leakage after hepatic endoscopy was 1.6% (after LCE 2.1%) and occurred 2 times more often after emergency operations for destructive cholecystitis. The cause of bile leakage in 2/3 of patients were "minor" injuries - aberrant hepatic-cystic ducts of the gallbladder bed, insufficiency of the cystic duct stump, prolapse of the CC drainage and marginal injury to the CC, in 1/3 of patients "major" injuries - intersection and excision of the CC.

2. The treatment and diagnostic algorithm for identifying the source of bile leakage and its correction should include ultrasound monitoring and diapeutic methods for stage I bile leakage, transduodenal endoscopic interventions and relaparoscopy for stage II bile leakage, MRCP and reconstructive surgeries for stage.

3. minimally invasive endoscopic transduodenal interventions, diapeutic methods and laparoscopy, as well as active conservative therapy in the main group made it possible to avoid relaparotomy in 92.4% of patients with bile leakage of grades I and II (“minor” injuries) .

4. In case of grade III bile leakage ("large" injuries), the best results were obtained by applying high Roux -en-Y GEA using precision equipment and the Hepp - Coinaud and Cattel methods . Improvement of treatment and diagnostic tactics in patients with bile leakage after CE allowed to significantly improve the treatment results in the main group, where complications in the immediate postoperative period were 8.1%, in the late period - 5.4%, mortality was not observed (in the comparison group - 17.8% and 14.2%, respectively, mortality - 3.6%).

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