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Minimally Invasive Interventions in Surgical Treatment of Complications of Choleliyhiasis

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Abstract The paper analyzes the results of surgical treatment of 57 patients with acute cholecystitis and choledocholithiasis. Staged surgical treatment with the use of preliminary decompressive interventions on the bile ducts made it possible to stop the phenomena of cholestasis and purulent intoxication, improve the results of radical operations. At the same time, 81.8% of patients with severe, 61.6% of moderate severity and 24.1% with mild severity of acute purulent cholangitis needed to use diapeutic and endoscopic transduodenal interventions. Optimization of the tactical and technical aspects of the complex surgical treatment of patients with acute cholecystitis and choledocholithiasis complicated by acute purulent cholangitis made it possible to significantly reduce postoperative purulent-septic and cholemic complications to 12.1%, mortality to 2.4%.

Keywords Cholelithiasis, Acute cholecystitis, Choledocholithiasis, Surgical tactics

1. Relevance

The leading place in the structure of postoperative complications after cholecystectomy (CE) is occupied by external or intra-abdominal bile leakage (BI) in the early postoperative period, which should be considered as an independent problem, since it can have serious consequences and be life-threatening [1,2,3,10,11,14,16,17]. The main causes of postoperative GI are damage to the peripheral bile ducts (aberrant hepatocystic ducts of the gallbladder bed - Luschka's ducts, leakage of the cystic duct stump) and "large" - iatrogenic damage to the main bile ducts [5,19,21].

The outflow of bile through the drainage contributes to the early diagnosis of biliary complications, but even a small bile leakage into the abdominal cavity can lead to serious complications [4,6,7,13,20]. Diagnosis of intra-abdominal bile leakage is a difficult task, the presence of safety drainage in the sub hepatic space contributes to early diagnosis and prevention of biliary peritonitis [8,9,12,15,18].

2. The Aim of the Study

The aim of the study was to improve the results of surgical treatment of patients with acute cholecystitis and choledocholithiasis by differentiated use of minimally invasive methods for correcting bile flow.

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3. Material and Research Methods

In a group of 83 patients with acute cholecystitis and choledocholithiasis operated on in 2010-2019. treatment was carried out taking into account the severity of acute suppurative cholangitis (AHC) proposed at the conciliation conference in Tokyo (2013). In accordance with these criteria, mild severity was noted in 54 (65%) patients, moderate in 18 (21.6%), and severe in 11 (13.2%) patients.

The patients were subjected to various minimally invasive and open surgical interventions, taking into account the proposed severity criteria, as well as the presence of a clinic of acute destructive cholecystitis and peritonitis.

In patients with moderate severity (n=18) and severe AHC (n=11), minimally invasive decompressive interventions were used as the first stage of treatment in 20 patients. (Table 1).

At the same time, in 9 patients with acute destructive cholecystitis, decompression of the gallbladder was performed by means of percutaneous transhepatic microcholecystostomy (PCMCS) under ultrasound control. Then, 5 of them underwent endoscopic papillosphincterotomy (EPST) and nasobiliary drainage (NBD). In the remaining 4 patients, PTCS significantly stopped the clinical manifestations of AHC. In 11 patients without a clinical picture of acute cholecystitis, the first stage was endoscopic transduodenal intervention - EPST with lithoextraction and NBD of the choledochus. The second stage in these 20 patients on days 7-12 was laparoscopic cholecystectomy (LCE) -13, minilaparotomic cholecystectomy (MLCE) -7, while in 4 LCCE it was supplemented with choledocholithotomy.

In 4 patients with clinical peritonitis, according to emergency indications, laparotomy, CE, choledocholithotomy and sanitation of the abdominal cavity were performed. Another 5 patients with a progressive AHC clinic with an unsuccessful attempt at EPST underwent CE with choledocholithotomy from an open mini-access.

Thus, two-stage surgical treatment was performed in 11 (61.1%) patients with moderate severity and 9 (81.8%) with severe AHC.

In mild AHC, two-stage surgical treatment was performed in 13 (24.1%) patients, one-stage radical surgery was performed in 41 patients (Table 2).

In total, 18 (21.7%) patients of the study group performed PTCS in the surgical treatment of patients with AHC. Drainage of the gallbladder under ultrasound control was performed through the area of the liver parenchyma in order to seal the canal and prevent leakage of bile into the abdominal cavity.

Drainage in all cases was performed with an "umbrella" stylet - a catheter with a "basket" at the end, catheter diameter 4F and 9F.

After performing microcholecystostomy, the contents of the gallbladder were completely evacuated, its cavity was washed with saline to a clean discharge, and the drainage was lengthened. The drainage discharge was assessed visually and sent for bacteriological examination. The completeness of the emptying of the cavity of the gallbladder was controlled echographically.

In this study group, EPST was performed in only 27 patients. At the same time, 15 patients without a clinic of destructive cholecystitis underwent EPST and NBD at the first stage. In 12 patients with a prevalence of acute destructive cholecystitis, this intervention was performed after PTCS. At the same time, it should be noted that in 9 patients, attempts at EPST and installation of NBD were unsuccessful, and in one case, the patient developed acute pancreatitis with a fatal outcome.

Thus, 2-stage surgical treatment was performed in 33 patients of the study group, which amounted to 39.7%. These patients, after preliminary minimally invasive decompression of the biliary tract, underwent CE at the second stage on days 7-12, moreover, 22 - LCE, 11 - MLCE, and in 6 of them, MLCE was supplemented with choledocholithotomy.

In 50 (60.3%) patients of the study group, a radical operation - CE and choledocholithotomy was performed both from a wide laparotomic approach in 17 patients with a combination of AHC with acute destructive cholecystitis and peritonitis, and from a minilaparotomic approach in 33 patients. Thus, LC was performed in 22 (26.5%) patients, CE from mini-access 44 (53%), CE from wide laparotomy access 17 (20.5%).

All surgical interventions in the main group of patients were completed with drainage of the choledochus, of which 56 (67.5%) had external drainage, and 27 (32.5%) had NBD with endoscopic transduodenal intervention.

Table 1. Surgical interventions in patients with AHC of moderate and severe severity in the main group (n=29)

Diagnosis	Type of operation		Number of patients	
Acute purulent cholangitis and acute destructive cholecystitis	ChChMHS, EPST and NBD →	LCH	2	9
	ChChMHS, EPST and NBD →	M LCH	3	
	ChChMHS →	M LCH, choledocho-lithotomy	4	
Acute purulent cholangitis, acute destructive cholecystitis and peritonitis	Laparotomy, CE, choledocholithotomy and sanitation of the abdominal cavity		4	
Acute purulent cholangitis, chronic calculous cholecystitis	EPST and NBD →	LCH	11	16
	M LCH, choledocholithotomy		5	

Table 2. Surgical interventions in patients with acute purulent cholangitis of mild severity in the main group (n=54)

Diagnosis	Type of operation		Number of patients	
Acute purulent cholangitis and acute destructive cholecystitis	ChChMHS, EPST and NBD →	LCH	6	9
	ChChMHS, EPST and NBD →	MLCH	1	
	ChChMHS →	MLCH, choledocholithotomy	2	
Acute purulent cholangitis, acute destructive cholecystitis and local peritonitis	Laparotomy, CE, choledocholithotomy and sanitation of the abdominal cavity		13	
Acute purulent cholangitis, chronic calculous cholecystitis	EPST and NBD →	LCH	3	32
	EPST and NBD →	MLCH	1	
	MLCH, choledocholithotomy		28	

4. Results and Its Discussion

In the study group, postoperative complications developed in 10 patients, which amounted to 12.1%. At the same time, bilomas of the subhepatic region formed in 3 (3.6%) patients who were successfully sanitized by ultrasound-guided punctures. In 2 (2.4%) patients there was cholemic bleeding from the liver from the area of transhepatic puncture of the gallbladder. External bile leakage was observed in 2 patients, during relaparoscopy, in 1 case, a failure of the cystic duct stump was detected, which was repeatedly clipped, in another 1 case, the gallbladder bed was coagulated as a source of bile leakage into the abdominal cavity. Duodenal bleeding was noted in 1 patient after EPST, the bleeding was stopped. In 1 patient, a subdiaphragmatic abscess was formed, sanitized by repeated punctures under ultrasound control. In 3 patients suppuration of the postoperative wound was observed.

Died 2 out of 83 operated patients, mortality was 2.4%. The reason for the poor outcome was acute pancreatitis as a complication of transduodenal endoscopic intervention in 1 patient and ongoing peritonitis in 1 case.

Thus, a differentiated approach in the surgical treatment of patients with acute cholecystitis and choledocholithiasis using minimally invasive decompressive interventions contributed to the early relief of cholangitis, the prevention of liver abscesses and the development of biliary sepsis. Achieved a decrease in purulent - septic complications from 24.5% to 12.1%, mortality from 8.2% to 2.4%.

5. Conclusions

1. Staged surgical treatment of patients with acute cholecystitis and choledocholithiasis, taking into account the severity of acute purulent cholangitis and the use of preliminary decompressive interventions on the bile ducts, made it possible to stop the phenomena of cholestasis and purulent intoxication, improve the results of radical operations. At the same time, 81.8% of patients with severe, 61.6% of moderate severity and 24.1% with mild severity of acute purulent cholangitis needed to use diapeutic and endoscopic transduodenal interventions.
2. Differentiated use of minimally invasive methods of surgical treatment of patients with acute cholecystitis and choledocholithiasis complicated by acute purulent cholangitis contributed to the improvement of treatment results due to early relief of cholangitis, prevention of liver abscess formation and development of biliary sepsis. Achieved a decrease in postoperative purulent - septic and cholemic complications up to 12.1%, mortality up to 2.4%.

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