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Research Article

FEATURES OF SURGICAL TACTICS FOR "FRESH" DAMAGES OF THE MAIN BILY DUCTS

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ABSTRACT

The results of surgical treatment of 103 patients with "fresh" IVS injuries were analyzed. The main operation for complete transection and excision of the IVS is HepEA according to Roux-en-Y, which was performed in 67 patients with good long-term results in 97.01%. The formation of the BBA with complete intersection of the duct in all cases resulted in a stricture. Restorative surgery is indicated only for partial damage to the duct. HepDA also had a negative effect on treatment outcomes. Complications in the immediate postoperative period17.5%, in the remote – 33.9%. Repeated surgical interventions were performed in 32.03% of patients, mortality rate was 5.8%.

KEYWORDS

Bile ducts, iatrogenic damage, restorative and reconstructive operations.

INTRODUCTION

Over the past two decades, the incidence of biliary tract diseases has increased in many countries of the world, including Uzbekistan. Accordingly, the number of operations on them. Thus, about 700,000 cholecystectomies (CE) are performed annually in the

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USA, more than 100,000 in Russia, and about 10,000 in Uzbekistan [5, 7, 13].

At the same time, the frequency and severity of bile duct injuries have noticeably increased and amount to 0.2 - 1.9% [2, 4, 7, 8, 9, 11, 14, 16]. Authors dealing with this problem note that the introduction of laparoscopic cholecystectomy has led to a noticeable increase in the frequency and severity of bile duct injuries. Taking the average frequency of injuries to the main bile ducts (MBD) as 0.5 - 1% in Uzbekistan, from 50 to 100 people suffer from such a complication per year.

Treatment of bile duct injury is extremely difficult, requires expensive therapeutic and diagnostic procedures, and leads to serious disability in patients. Mortality is 8-17%, complications during operations occur in up to 47% of cases, the development of post-traumatic strictures of the bile ducts - up to 35-55% [1, 3, 6, 10, 12, 15, 17].

The timing of detection of IVS damage is important in the outcome of treatment. There are "fresh" injuries and post-traumatic scar strictures of the bile ducts and biliodigestive anastomoses. "Fresh" injuries are divided into those diagnosed on the operating table and those detected in the early postoperative period.

The results of studies, including in Uzbekistan, show that only in 30% of cases iatrogenic damage to the bile ducts is recognized during surgery, up to 50% of damage is diagnosed in the postoperative period against the background of the development of peritonitis, rapidly increasing obstructive jaundice or bile leakage through the drainage. More than 15% of patients die from progressive peritonitis, increasing jaundice or other postoperative complications that are not recognized in a timely manner.

For the healthcare of our Republic, analysis of the frequency and causes of unsatisfactory results of surgical interventions on the biliary tract is extremely relevant. In addition, it is extremely important for practical surgeons to develop an algorithm of actions for "fresh" injuries of the bile ducts.

Purpose of the study: optimization of surgical treatment of "fresh" injuries of the main bile ducts.

METHOD

An analysis of the results of surgical treatment of 103 patients with "fresh" IVS injuries in the period 2014 – 2023 was carried out. In our own observations, IVS injuries were noted in 38 (0.58%) patients in 6521 cholecystectomies; 65 patients were admitted from other hospitals with "fresh" IVS injuries.

In 78 patients there was intersection (9), excision (38) and excision with ligation of the proximal stump of the hepaticocholedochus (31), in 11 - a parietal edge wound, in 14 - alipation or ligation without crossing the duct.Localization of damage: common bile duct (CBD) - in 14 patients, common hepatic duct (CHD) - in 48, AHF and bifurcation area - in 31, AHF with destruction of confluence - in 10. The nature and location of damage are presented in Table. 1.

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Table 1.
Nature and location of damage MZhP.

Character Localization	Edge damage	Intersection	Excision	Excision and ligation	Clipping or ligation without crossing	Total
+2	8	5	1	4	6	24
+1	2	4	12	17	3	38
0	1	-	8	4	5	18
-1	-	-	10	3	-	13
-2	-	-	7	3	-	10
Total	eleven	9	38	31	14	103

In 28 (27.2%) patients, IVS damage was detected intraoperatively. In the vast majority - 75 (72.8%) patients, damage was detected in the early postoperative period: increasing obstructive jaundice was observed in 34 patients, biliary peritonitis - in 20, bile leakage - in 10, and a combination of two or more complications was observed in 11 patients.

When intraoperative damage to the IVS was detected, out of 28 patients, 17 patients underwent restorative surgery and 11 patients underwent reconstructive surgery.

Crossing and excision of the bile ducts.

This type of damage was observed in 18 of 28 patients (64.3%), with transection in 6 (21.4%) and excision in 12 (42.8%) patients. According to the terminology of bile duct strictures, damage "+2" (the length of the preserved proximal part of the AKI is more than 2 cm) was in 3 patients, "+1" (the length of the AKI is 1 cm) – in 6 patients, "0" - bifurcation injury - in 2 patients, "-1" (preservation of the arch of AKI confluence) – in 3 patients and "-2" (AKI confluence is destroyed) – in 4 patients. Thus, most patients had high damage. Damage was identified intraoperatively by the appearance of bile in the surgical wound and additional tubular structures in the removed gallbladder.

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11 patients from this group underwent reconstructive surgery: 9 of them had hepaticojejunostomy (Hepaticojejunostomy) with a loop of small intestine disconnected according to Roux, and 2 patients had HepDA applied.

For injuries at the "+1", "0" level, the site for anastomosis was created by dissecting the left hepatic duct, exposing it under the chiliary plate (Hepp-Couinaud method).

In 4 cases, when the damage occurred with the destruction of confluence (level "-2"), in order to form a single anastomosis with the jejunum, the platform was created by parallel suturing of the remnants of the lobar ducts along their medial walls, cutting the septum between them (Cattell method). After the neoconfluence was formed, both lobar ducts were additionally dissected, which significantly increased the diameter of the future anastomosis.

Despite the small diameter of the ducts, it was possible to create a platform for anastomosis ranging in size from 10 to 25 mm (≤ 15 mm - 3; 16-25 mm - 7; ≥25 mm - 1). In 2 patients, HepEA was placed on transhepatic frame drainage (TPCD) according to Seipol-Kurian due to the narrow diameter of the duct.

Thus, the use of techniques developed during operations for IVS strictures made it possible to perform relatively wide precision anastomoses.

Reconstructive surgery (RBS) with transection (4) and excision (3) of the CBD and AKI was performed in 7 patients.

Regional wound of the hepaticocholedochus.

A marginal wound was observed in 10 (35.7%) patients. In 2, the AKI was damaged and in 8, the CBD was damaged. All patients underwent reconstructive surgery: 2-3 sutures (Prolene 5/0) were placed on the wall of the duct using a Kera drainage.

The types of operations for patients with "fresh" IVS injuries detected intraoperatively are presented in Table 2.

Table 2.

Types of operations for patients with IVS injuries identified intraoperatively.

Type of operation	Quantity
Suturing a duct defect on a Kera drainage	10
BBA	7
HepDA	2
HepEA	9

In the early postoperative period, IVS injuries were detected in 75(72.8%)patients, with intersection and excision in 60 (80%) patients, clipping or ligation without intersection in 14 (18.7%) and marginal damage in 1 (1.3%) patient. Damage "+2" was in 13 patients, "+1" – in 31, "0" – in 15, "-1" – in 9 and "-2" – in 7 patients.

When injuries were detected without inflammatory-infiltrative changes in the subhepatic space and

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hepatorenal failure (HRF), 35 patients underwent one-stage surgery.

Of the 14 patients with clipping or ligation of the duct, 12 patients had the clips or ligature removed and 2 patients had a BBA applied. During excision of HC, HepEA was applied to 8 patients, HepDA was applied to 2 patients, and BBA was applied to 10 patients simultaneously. In case of a marginal wound, 1 patient underwent suturing of the duct defect on the Kera drainage.

In the presence of peritonitis, an inflammatory-infiltrative process and PPN due to obstructive jaundice and cholangitis, the bile ducts of 40 patients were externally drained in the first stage, reconstruction was performed in the second stage.

In this group, 3 patients died after the first operation due to advanced peritonitis and multiple organ failure. 1 patient refused the second stage of the operation.

After correction of the inflammatory-infiltrative process in the abdominal cavity and the clinic of PPN, 6 patients were given HepDA and 30 patients were given HepEA, of which 27 anastomosis was applied to TPCD: according to Praderi-Smith (2), Seipol-Kurian (21) and Galperin (4). The indications for TPCD were high damage to the bile ducts and a narrow diameter of the duct. The types of operations for patients with "fresh" IVS injuries identified in the early postoperative period are presented in Table 3.

Table 3.
Types of operations for patients with IVS injuries identified in the early postoperative period.

Type of operation	Quantity
Removing ligatures or clips	12
BBA	12
Suturing a duct defect on a Kera drainage	1
HepDA	8
HepEA	38
External drainage of the bile duct	4

RESULTS

After correction of intraoperatively detected IVS injuries, no specific complications were observed in the immediate postoperative period. In the long-term postoperative period, cicatricial strictures of the bile ducts and BDA were detected in 35% (Table 4).

In 7 patients, after the application of a BBA, a cicatricial stricture of the bile ducts was detected. In contrast to the marginal wound, with complete transection and excision of the bile duct, the axillary blood supply to the bile duct is disrupted, which leads to a cicatricial stricture, and the anastomosis in these cases is performed with tension. These patients required repeated interventions: HepEA was applied to 5 patients; 1 – HepDA (had a history of gastric resection

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according to B-II); 1 – bile duct stenting with a satisfactory treatment result.

In patients after the application of HepDA, attacks of cholangitis and BDA stricture were periodically observed in the long-term postoperative period. 1 patient had HepEA applied and 1 patient periodically received sessions of balloon dilatation and diathermic expansion of the anastomotic area.

After applying HepEA, out of 9 patients, an anastomotic stricture was observed in 1 patient. He underwent antegrade bougienage with a satisfactory treatment result.

Table 4.
Long-term results and types of re-interventions in the first group of patients.

Types of operations	Qty	Stricture of the gallbladder and BDA	Repeated intervention
Suturing the defect on the Kera drainage	10	-	-
BBA	7	7	5-HepEA, 1-HepDA, 1-duct stenting
HepDA	2	2	1-HepEA, 1-REBV
HepEA	9	1	REBV

In patients with IVS injuries detected in the early postoperative period after surgical interventions, specific complications were observed in 8% and 33% of cases, respectively, in the immediate and late postoperative periods. Death was observed in 6 (8%) cases: in 2 patients due to acute renal failure, 1 due to acute cardiovascular failure, 3 due to advanced peritonitis and multiple organ failure.

In the immediate postoperative period, in 5 patients after the application of HepEA and HepDA, partial failure of the BDA was observed, which in 4 cases was manifested by bile leakage and 1 biloma of the subhepatic region. Bile leakage stopped spontaneously on days 11-15 after surgery, and the biloma was drained under ultrasound guidance. In 1 patient, after the application of HepEA, hemobilia was observed in the immediate postoperative period, which was treated conservatively (Table 5).

Table 5.
Types of complications in the immediate postoperative period in the second group of patients.

Type of complication	Qty	%
Peritonitis	3 (3 deaths)	4
Liver failure	4 (2 deaths)	5.33

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Cardiovascular failure	1 (fatal)	1.33
Hemobilia	1	1.33
Wound suppuration	4	5.33
Partial failure of BDA Of these, external bile leakage biloma	5 4 1	6.67
Total	**18**	**24**
Of these, deaths	**6**	**8**

In 15 patients, after reconstructive operations in the late postoperative period, a cicatricial stricture of the bile duct developed and they required repeated interventions: 12 patients were treated with HepEA; 1 patient with HepDA, 2 patients with bile duct stenting. From this group, the patient, after applying HepDA, periodically takes courses of X-ray endobiliary intervention (REI) due to recurrent cholangitis and HepDA stenosis.

All 7 patients with HepDA underwent repeated interventions: 2 patients had HepDA uncoupled and HepEA was applied, 5 patients received periodic REBV sessions.

In 3 patients, after application of HepEA, stenosis of the MDA was observed. 1 patient underwent repeated HepEA and 2 patients periodically received conservative therapy (Table 6).

Table 6.
Long-term results and types of re-interventions in the second group of patients.

Types of operations	**Qty**	**Stricture of the gallbladder and BDA**	**Repeated interventions**
Removing ligatures or clips	12	5	HepEA
BBA	12	10	7-HepEA, 2 – stent, 1-HepDA (REBV)
Suturing the defect on the Kera drainage	1	-	-
HepDA	8	7	2 – HepEA, 5 – REBV
HepEA	38	3	1 – HepEA, 2 – conservative therapy
External drainage of the bile duct	4	-	-
Total	75	25	15- HepEA, 2 – stent, 1-HepDA (REBV), 5 – REBV, 2 – conservative therapy

In total, complications developed in 18 (17.5%) patients in the immediate postoperative period. In the long-term period, an unsatisfactory result (development of stenosis) was observed in 35 (33.9%) patients: in 13

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(37.14%) and 22 (62.86%), respectively, after reconstructive and restorative operations. Repeated surgical interventions were required in 33 (32.03%) patients.

CONCLUSION

In recent years, the number of cholecystectomies has increased markedly and most of them are performed laparoscopically (according to our data - more than 80%). The number of IVS injuries has also increased, and these injuries are particularly severe, since in addition to the high bifurcation mechanical trauma, the thermal effect on the duct wall is added.

The best results were obtained in patients where operations were performed upon intraoperative detection of IVS injuries (in 84.3% of patients). But unfortunately, intraoperative detection of IVS injuries occurred in 27.2% of cases. In a significant proportion of patients, bile duct injuries are diagnosed late (according to our data - in 72.8%), after the development of bile peritonitis or obstructive jaundice. Because of this, most patients had to undergo external drainage of the bile ducts at the first stage, missing the opportunity to normalize bile flow immediately after injury.

We believe that if damage to the IVS is detected in the immediate postoperative period against the background of peritonitis, subhepatic abscess, or bile leakage, at the first stage it is advisable to limit ourselves to external drainage of the biliary tract. It is advisable to perform reconstructive surgery after the inflammatory-infiltrative process subsides in 2-3 months. This tactic was justified in 30 (73.1%) patients in this group.

Our experience has shown that the main operation for complete transection and excision of the IVS is HepEA according to Roux-en-Y: a good long-term result was obtained in 97.01% of patients. HepEA without frame drainage significantly reduces the treatment time for patients, however, we were able to use the Hepp–Couinaud method only in 11 patients in this group. The peculiarity of this operation is the isolation of the left hepatic duct at its confluence with the right duct under the portal plate. This makes it possible to isolate the ducts outside the scar tissue and apply an anastomosis up to 2-3 cm wide, mainly due to the left hepatic duct, avoiding long-term (up to 1.5-2 years) drainage of the anastomosis zone, which is burdensome for the patient.

Restorative surgery is indicated only for partial marginal damage to the duct. In 11 patients of this group, by suturing the duct defect on the Kera drainage, we achieved a satisfactory result. When the duct is injured, in contrast to its complete intersection, good results are explained by the fact that the integrity of the narrow posterior wall of the duct ensures sufficient blood supply.

The formation of the BBA during the intersection and excision of the duct in all 17 cases resulted in the formation of a scar stricture: 14 patients underwent reconstructive surgery, 3 - endoscopic stenting. Our,

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still small, experience with endobiliary stenting allows us to positively evaluate this method.

Operations during which an anastomosis of the damaged duct with the duodenum was formed had a negative impact on the results of treatment. These patients developed chronic cholangitis and stenosis of the BDA, which required repeated reconstructive operations in 2 cases and endoscopic intervention in 9 cases.

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