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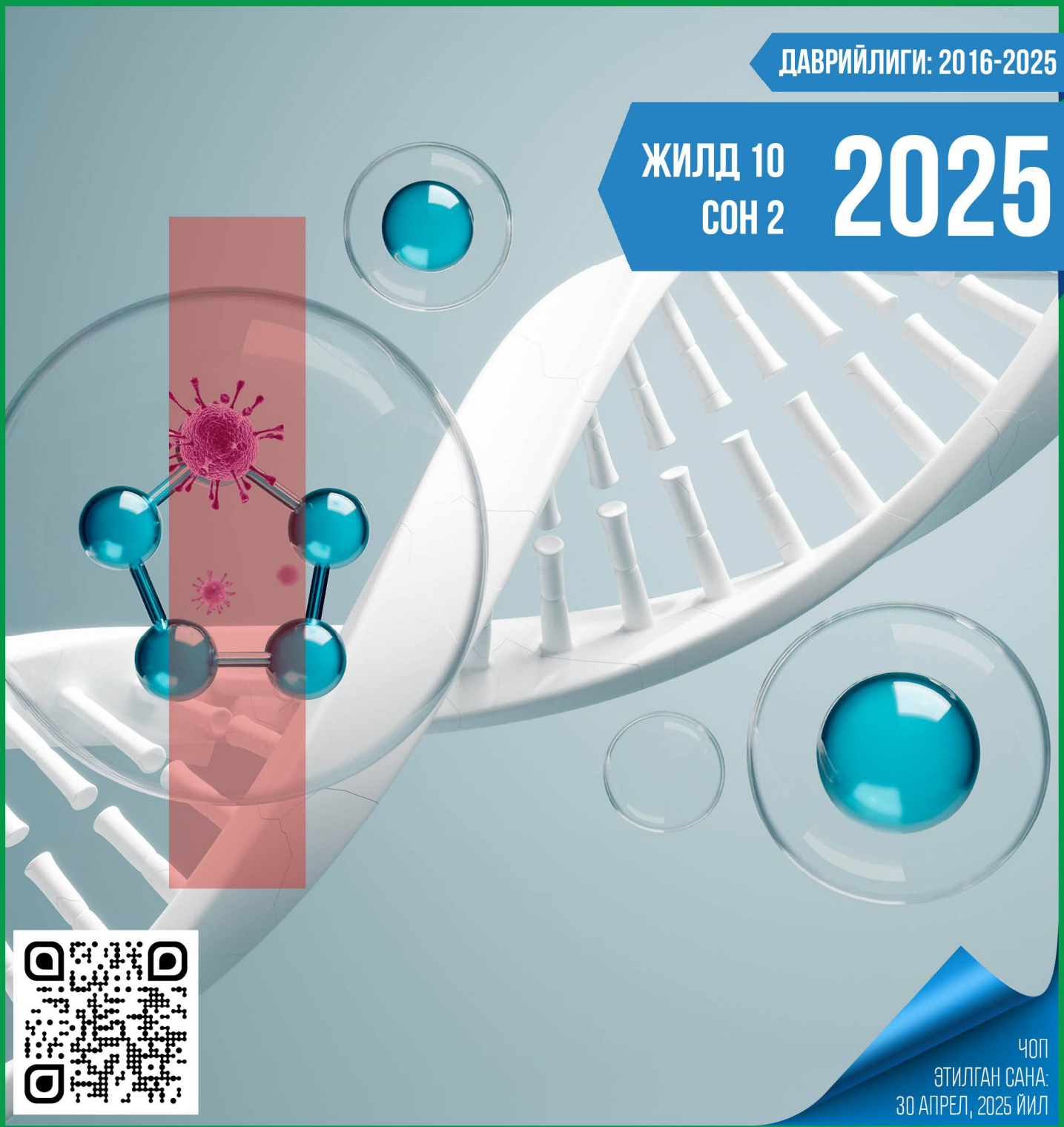

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SURGICAL TACTICS FOR POSTCHOLECYSTECTOMY SYNDROME: FEATURES AND CHALLENGES OF IMPLEMENTATION

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ABSTRACT

The work is based on the results of treatment of 102 patients with intraoperative injuries of the bile ducts in the Samarkand branch of the RCEM and in the clinic of SamSMU in the period from 2012–2021. Damage to the bile ducts was observed in 102 (1.3%) patients in 7925 cholecystectomy, of which in 65 (63.7%) after LCE, in 24 (23.5%) after minilaparotomy cholecystectomy (MLCE), in 13 (12.8%) after cholecystectomy from a wide laparotomy approach. Among the examined patients, there were 81 (79.4%) women and 21 (20.6%) men. The age of the patients ranged from 19 to 76 years.

Key words: postcholecystectomy syndrome, cholecystectomy, gallstone disease.

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ХИРУРГИЧЕСКАЯ ТАКТИКА ПРИ ПОСТХОЛЕЦИСТЭКТОМИЧЕСКОМ СИНДРОМЕ: ОСОБЕННОСТИ И СЛОЖНОСТИ РЕАЛИЗАЦИИ

АННОТАЦИЯ

В основе работы лежат результаты лечения 102 больных с интраоперационными повреждениями желчных протоков, в Самаркандском филиале РЦЭМП и в клинике СамГМУ в период с 2012–2021 гг. Повреждения желчных протоков отмечены у 102 (1,3%) больных на 7925 ХЭ, из них у 65 (63,7%) после ЛХЭ, у 24 (23,5%) после минилапаротомной ХЭ (МЛХЭ), у 13 (12,8%) после ХЭ из широкого лапаротомного доступа. Среди обследованных больных женщин было 81 (79,4%), мужчин 21 (20,6%). Возраст пациентов варьировал от 19 до 76 лет.

Ключевые слова: постхолецистэктомический синдром, холецистэктомия, желчнокаменной болезнь.

MARDONOV Bobosher Amirovich
PhD, dotsent

Samarqand davlat tibbiyot universiteti

POSTXOLETSISTEKTOMIK SINDROMDA XIRURGIK TAKTIKA: O‘ZIGA XOS XUSUSIYATLARI VA QIYINCHILIKLARI

ANNOTATSIYA

Maqolada 2012–2021-yillarda RSHTYoIM Samarqand filiali va SamDTU klinikasida o‘t yo‘llarining intraoperative shikastlanishi bilan og‘rigan 102 nafar bemorni davolash natijalariga asoslangan.O't yo'llarining shikastlanishi 7925 ta xoletsistektomiyada 102 (1,3%) bemorda qayd etilgan, ulardan 65 (63,7%) LXE keyin, 24 (23,5%) minilaparotom xoletsistektomiya (MLXE), 13 (12, 8%) keng laparotomi xoletsistektomiyadan keyin kuzatilgan.Tekshirilgan bemorlarning 81 nafari (79,4 %) ayollar va 21 nafari (20,6 %) erkaklardir. Bemorlarning yoshi 19 yoshdan 76 yoshgacha bo'lgan.

Kalit so’zlar: postxoletsistektomik sindrom, xoletsistektomiya, o’t tosh kasalligi.

Introduction. According to WHO data, bile duct injury is one of the most severe complications in biliary surgery and shows no tendency to decrease despite the continuous improvement in cholecystectomy techniques. Authors dealing with reconstructive surgery of the extrahepatic bile ducts note that, compared with traditional cholecystectomy, the introduction of laparoscopic cholecystectomy has led to a 2-4-fold increase in bile duct injuries, with incidence rates ranging from 0.1% to 3%. The consequences of iatrogenic bile duct injury can have devastating effects on patient health, and only timely and competently performed surgery can prevent severe complications such as biliary cirrhosis, portal hypertension, purulent cholangitis, and hepatic failure. Therefore, early diagnosis of bile duct injury is crucial; however, in practice, more than half of these injuries are detected postoperatively.

The main contributors to bile duct injuries during cholecystectomy include technical and tactical errors made by surgeons, as well as inadequate technological support. Factors predisposing to bile duct injury include inflammatory-infiltrative changes in the gallbladder neck area, poorly controlled bleeding, the presence of a cystocholedochal fistula, and anatomical anomalies in the cystic duct and artery positioning. Even minor injuries to major bile ducts, if diagnosed late, can pose a threat to life and lead to severe postoperative complications such as diffuse or localized peritonitis, subhepatic abscesses, external biliary fistulas, and post-traumatic cicatricial strictures.

Severe bile duct injuries present exceptional therapeutic challenges, and outcomes in both short-term and long-term periods cannot be considered satisfactory. Mortality rates following reconstructive surgeries range from 8% to 17%. Such patients often require repeated, sometimes multiple, reconstructive operations, which are not always successful, and these patients are rightly referred to as "biliary cripples."

Research Objective: To improve outcomes of intraoperative bile duct injury repair through factor analysis of treatment results and optimization of surgical strategy.

Materials and Methods. This section provides a general characterization of the clinical data, as well as clinical and instrumental research methods. The study is based on the treatment outcomes of 102 patients with intraoperative bile duct injuries, who were treated at the Samarkand branch of the Republican Center for Emergency Medical Care and the Clinic of Samarkand State Medical University during the period from 2012 to 2021. Among 7925 performed cholecystectomies, bile duct injuries occurred in 102 cases (1.3%), including 65 patients (63.7%) after laparoscopic cholecystectomy (LC), 24 patients (23.5%) after mini-laparotomy cholecystectomy (MLC), and 13 patients (12.8%) after open cholecystectomy through extensive laparotomy.

Among the examined patients, there were 81 women (79.4%) and 21 men (20.6%), aged between 19 and 76 years. Of the 102 patients with intraoperative bile duct injuries, peripheral bile duct injuries were identified in 61 patients (59.8%), including cystic duct stump failure in 19 patients, bile duct injury in the gallbladder bed in 37 patients, and drainage dislocation into the

common hepatic duct in 5 patients. Clinical manifestations of peripheral bile duct injuries in all these cases presented as bile leakage in the early postoperative period.

Injury to the main bile ducts (MBD) after cholecystectomy was identified in 41 patients (40.2%). Of these, injury to the MBD was detected intraoperatively in 20 patients (48.9%) and in the early postoperative period in 21 patients (51.2%). Evaluation of injuries to the main bile ducts was conducted according to the classification proposed by E.I. Galperin (2009) and presented in Table 1.

Marginal or partial injuries of bile ducts were found in 8 patients (19.5%), clipping or ligation of the duct without transection in 7 patients (17.1%), complete transection of the duct in 3 patients (7.3%), excision of the bile duct in 11 patients (26.8%), and excision with ligation in 12 patients (29.3%). According to the injury level classification, injuries were distributed as follows: "+2" in 12 patients (29.2%), "+1" in 18 patients (43.9%), "0" in 7 patients (17.1%), "-1" in 2 patients (4.9%), and "-2" in 2 patients (4.9%).

Table 1

Type and localization of bile duct injuries (n=103)

Character / Level	Marginal injury	Transection	Excision	Excision and ligation	Clipping or ligation without transection	Total
+2	6	2	-	2	2	12
+1	1	1	5	8	3	18
0	1	-	3	1	2	7
-1	-	-	2	-	-	2
-2	-	-	1	1	-	2
Total	8	3	11	12	7	41

In the early postoperative period, intraoperative bile duct injuries clinically manifested as progressive obstructive jaundice in 13 patients (12.7%), bile peritonitis in 30 patients (29.4%), significant bile leakage through abdominal drainage in 48 patients (47.1%), and two or more complications in 11 patients (10.8%).

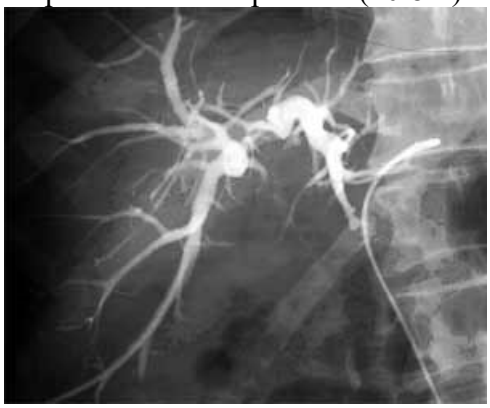

Fig. 1. Laparoscopic cholecystectomy. Intraoperative cholangiography. Intrahepatic bile ducts are visualized with contrast. The distal segment of the

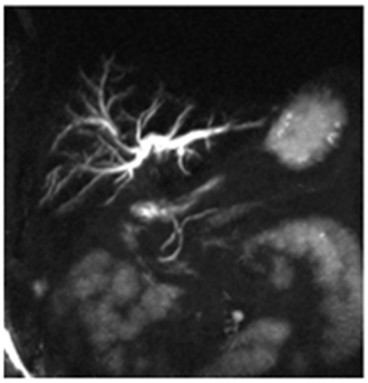

Fig. 2. Magnetic resonance cholangiopancreatography (MRCP). Complete injury of the

common hepatic and common bile duct is not visualized.

common hepatic duct in the region of the hepatic hilum.

The diagnostic methods employed were aimed at identifying, differentiating, and topographically characterizing bile duct injuries and sources of bile leakage. Various specialized diagnostic methods were utilized, including ultrasound (US), computed tomography (CT), magnetic resonance cholangiopancreatography (MRCP) (Fig. 2), intraoperative cholangiography (Fig. 1), percutaneous transhepatic cholangiography (PTC), endoscopic retrograde cholangiopancreatography (ERCP), and laparoscopy.

Peripheral bile duct injuries in 61 patients clinically manifested as bile leakage. The initial tactical approaches primarily focused on identifying the leakage source and possible intra-abdominal complications such as biliary peritonitis and biloma. To achieve this, indications were optimized for applying high-tech minimally invasive surgical methods, including repeat laparoscopy, transduodenal endoscopic interventions, and ultrasound-guided puncture techniques.

In cases of bile leakage with volumes up to 100 ml/day (31 patients), in the absence of peritonitis signs, with stable patient conditions and normal blood test results, dynamic observation with mandatory ultrasound monitoring and conservative therapy (antispasmodics, infusion therapy, anti-inflammatory, and antibiotic therapy) were implemented. Conservative treatment proved effective in 21 patients, as bile leakage progressively decreased through drainage and completely resolved within 3 to 7 days. Six patients required ultrasound-guided puncture of biloma to evacuate accumulated bile in the subhepatic space. In one patient, the leakage was due to the displacement of the choledochal drainage tube.

Conservative treatment was ineffective in another 4 patients who continued to experience bile leakage of 200-250 ml/day. These patients underwent ERCP and endoscopic papillosphincterotomy (EPST) (Fig. 3). In two of these cases, the cause of leakage was cystic duct stump failure; in the other two patients, the cause was accessory bile ducts in the gallbladder bed. Following endoscopic biliary drainage and nasobiliary drainage placement, bile leakage ceased within 2 to 5 days.

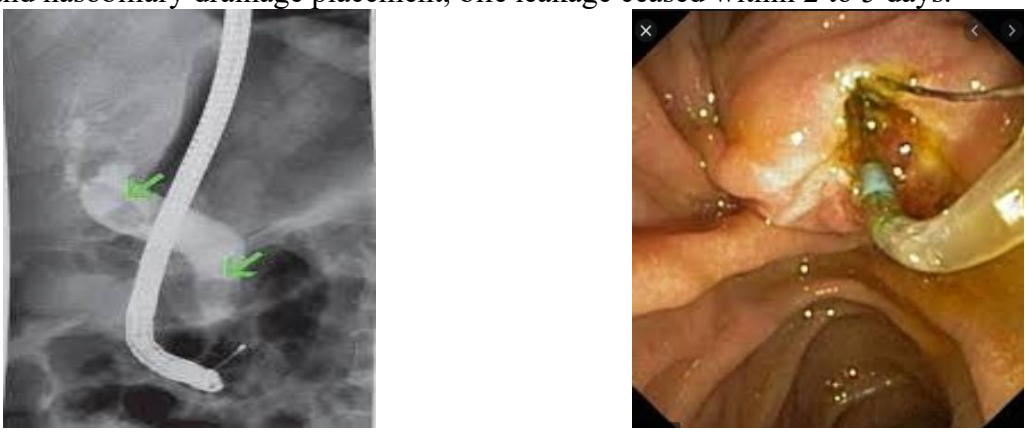

Fig. 3. ERCP + EST. Patient Zh., 61 years old, 3rd day after laparoscopic cholecystectomy. Residual choledocholithiasis, intrabiliary hypertension. Insufficiency of the cystic duct stump

In cases of bile leakage up to 500 ml/day (n=30) due to cystic duct stump insufficiency caused by choledocholithiasis and biliary hypertension with external bile leakage, conservative treatment was performed. For 30 patients with bile leakage up to 500 ml/day due to cystic duct stump insufficiency secondary to choledocholithiasis and biliary hypertension, external bile drainage was applied. Endoscopic papillosphincterotomy (EPST) resolved bile leakage in 4 patients with drain dislocation from the common bile duct.

Relaparoscopy and repeated clipping of the cystic duct stump were performed in 8 patients with cystic duct stump insufficiency after laparoscopic cholecystectomy (LC). In one case with bile peritonitis, relaparotomy, common bile duct exploration, stone removal, and abdominal cavity lavage were performed.

Intraoperative diagnosis revealed 20 injuries to the main bile ducts. Among them, complete transection of the common bile duct (CBD) was identified in 2 patients, excision of the hepatic duct and common bile duct in 11 patients, and partial injuries in 7 cases. According to anatomical localization, injuries involved the common hepatic duct (CHD) in 11 patients, combined hepatic and common bile duct damage in 4 patients, and injuries at the hepatic duct confluence in 2 patients.

All patients underwent reconstructive surgeries. Reconstruction procedures were performed in 11 cases and restorative operations in 9. In cases of minor partial duct injuries (diameter ≤5 mm, n=7), defects were sutured transversely, creating an additional opening distal to the injury to insert a T-shaped drainage tube into the CBD lumen.

In more severe injuries, reconstructive surgeries were required in 11 patients: hepaticojejunostomy with Roux-en-Y loop was performed in 9 patients (Fig. 5), and hepaticojejunostomy (Fig. 4) in 2 patients. Two patients with extensive CHD transection, involving destruction of the hepatic duct confluence, underwent complex reconstructive procedures. One patient with bile peritonitis required relaparotomy, bile duct reconstruction, and abdominal cavity drainage.

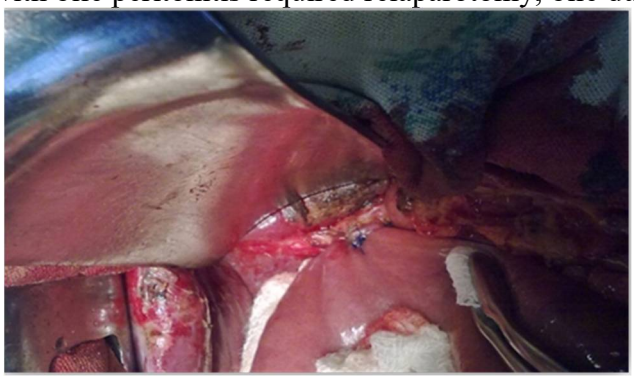

Fig. 4. Established hepaticoduodenal anastomosis.

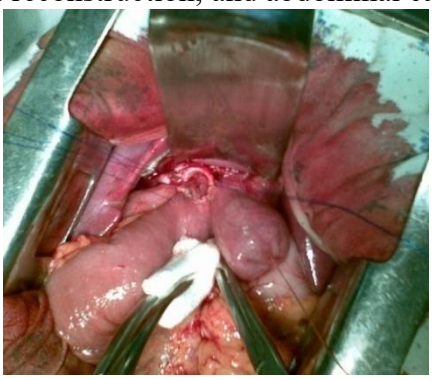

Fig. 5. Formation of hepaticojejunostomy (Hepp-Couinaud technique).

In the early postoperative period, intraoperative bile duct injuries clinically presented as bile leakage up to 500 ml/day in 30 patients with cystic duct stump failure caused by choledocholithiasis and biliary hypertension. Among these, external drainage successfully resolved bile leakage following endoscopic papillosphincterotomy (EPST) in 4 patients whose bile leakage resulted from drain dislocation from the common bile duct.

In 8 cases of cystic duct stump insufficiency after laparoscopic cholecystectomy (LCE), relaparoscopy and repeated clipping of the cystic duct stump were performed. Additionally, one female patient with bile peritonitis underwent relaparotomy, choledocholithotomy with bile duct drainage, and abdominal cavity lavage. Relaparoscopy with clipping of aberrant bile ducts was performed in 11 patients, while 1 patient with peritonitis required relaparotomy.

During surgery, 20 main bile duct injuries were diagnosed intraoperatively: complete transection of the common hepatic duct was found in 2 patients, excision of the hepatic and common bile ducts in 11 patients, and partial marginal injuries in 7 patients. Localization of injuries included the common bile duct (CBD) in 6 patients, common hepatic duct (CHD) in 8, combined CHD and bifurcation region in 4, and proximal hepatic duct with confluence disruption in 2 cases. All patients underwent reconstructive surgery, including restorative operations in 9 patients and reconstructive interventions in 11 patients.

For marginal partial injuries of the common hepatic duct (n=7), repair was performed by placing Prolene 5/0 sutures on the damaged duct wall with Kehr drainage insertion. In 5 of these patients, small partial injuries (≤5 mm) of the common bile duct wall were sutured transversely, creating an additional opening distal to the injury site to insert a T-shaped drainage tube into the CBD lumen. Biliobiliary anastomosis (BBA) was performed in 2 patients with complete transection of the common hepatic duct.

Eleven patients required biliodigestive anastomoses: hepaticoduodenal anastomosis (HDA) was created in 2 patients (Fig. 4), and hepaticojejunostomy (HJ) with Roux-en-Y limb was performed in 9 patients (Fig. 5).

Results of the Study. The effectiveness of the treatment provided for peripheral bile duct injuries (n=61) was evaluated based on the cessation of bile leakage through abdominal drainage. Endoscopic transduodenal interventions were definitive in resolving bile leakage in 50% of these patients. When reintervention was required, bile leakage was successfully managed via relaparoscopy in 19 patients (63.3%). The frequency of relaparotomy was 6.6% (2 patients).

Among the 41 patients who underwent surgery for main bile duct injuries (MBD), various complications were observed in the immediate postoperative period in 10 cases (24.4%).

In the group of patients whose MBD injuries were detected intraoperatively, specific early postoperative complications occurred in 2 patients (10%). One patient developed partial anastomotic insufficiency following hepaticojejunostomy (HJ), presenting with bile leakage via safety drainage, which spontaneously resolved by the 8th postoperative day. Another patient developed hemobilia with bile mixed with blood draining through the framework drainage after Roux-en-Y hepaticojejunostomy; however, this complication posed no critical threat and resolved with conservative treatment.

In the group of patients whose injuries were identified in the early postoperative period, complications were observed in 38.1% of cases shortly after repeat surgeries. Mortality was recorded in 3 patients (14.3%): one due to acute renal failure, one due to acute cardiovascular insufficiency, and one resulting from advanced peritonitis and multiple organ failure. Partial insufficiency of biliodigestive anastomoses (BDA) was observed shortly after surgery in 3 patients (2 after hepaticojejunostomy and 1 after hepaticoduodenostomy). Two cases presented with external bile leakage via safety drainage, and one developed a subhepatic biloma. Bile leakage stopped spontaneously on postoperative days 7 and 15, respectively, and the biloma was drained under ultrasound control. Another patient who underwent hepaticojejunostomy experienced hemobilia that was resistant to conservative therapy and required relaparotomy.

Long-term results of surgical treatment were evaluated in 32 out of 41 operated patients (78.1%), with a follow-up period ranging from 1 to 10 years (mean follow-up: 6.45 ± 0.58 years). Among the group whose MBD injuries were identified intraoperatively, 15 patients (75%) had satisfactory long-term outcomes, while 5 patients (25%) developed cicatricial strictures of bile ducts and biliodigestive anastomoses. In the group with injuries identified in the early postoperative period, satisfactory outcomes were noted in 9 of the 17 patients followed long-term (52.9%). Cicatricial strictures of bile ducts and BDAs were identified in 7 cases (41.2%).

Conclusion. Bile duct injuries during cholecystectomy occurred in 1.3% of cases, with two-thirds observed following laparoscopic cholecystectomy. Peripheral bile duct injuries accounted for 59.8% of cases, while main bile duct injuries were noted in 48.2%. Intraoperative complete transection or excision of the common hepatic duct requires Roux-en-Y hepaticojejunostomy using precision techniques as the procedure of choice. Restorative procedures are indicated for marginal injuries of the common hepatic duct, whereas biliobiliary and hepaticoduodenal anastomoses are not recommended due to the high risk of stricture formation.

A diagnostic and therapeutic algorithm incorporating endoscopic transduodenal interventions, ultrasound-guided percutaneous techniques, and laparoscopy allowed avoidance of relaparotomy in 96.7% of patients with intraoperative peripheral bile duct injuries. Correction of bile duct injuries when detected intraoperatively was associated with significantly lower complication rates both in the early (10%) and late (25%) postoperative periods, compared to cases where injuries were detected postoperatively (38.1% and 41.2%, respectively, with a mortality rate of 14.3%).

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