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Optimization of Diagnostic and Treatment Tactics in Biliary Peritonitis

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Monograph

Optimization of Diagnostic and Treatment Tactics in Biliary Peritonitis

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The monograph presents the main theoretical issues regarding the diagnosis and surgical treatment of biliary peritonitis following cholecystectomy. The criteria for diagnosing peritonitis during and after surgery, surgical treatment methods, and their prevention are highlighted. The authors' algorithm for selecting surgical treatment tactics for patients with peritonitis after cholecystectomy is described, depending on the degree of bile leakage. Mini-invasive endoscopic transduodenal interventions, diapectic methods and laparoscopy, as well as active conservative therapy, have been introduced into clinical practice, significantly improving treatment outcomes for minor bile duct injuries. Tactical and technical aspects for the correction of large bile duct lesions complicated by peritonitis have been developed, depending on the type and level of injury. This made it possible to improve the quality of diagnosis and optimize the choice of conservative or surgical treatment.
The monograph is intended for surgeons, masters, clinical residents, and medical institute students.

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PREFACE

Bile peritonitis is a severe complication of acute cholecystitis, as well as a consequence of bile leakage into the abdominal cavity after operations on the biliary tract. At the same time, despite the seriousness of this problem, insufficient attention is paid to biliary peritonitis, although mortality from this complication, according to various authors, reaches 6.2% to 24%.

Among the causes leading to the development of biliary peritonitis, the main ones are destructive forms of gallbladder inflammation, as well as bile leakage into the abdominal cavity after surgeries on bile ducts from additional bile ducts, failure of the gallbladder duct culture after cholecystectomy (CH), dislocation of the drainage installed after choledochotomy, and intraoperative damage to the common hepatic duct. At the same time, a feature of biliary peritonitis, unlike bacterial peritonitis, is the blurring of the clinical picture, which often leads to delayed diagnosis. Depending on the sterility of the bile, choleperitoneoma most often develops, and this is quite often observed when bile is passed through the wall of the gallbladder without perforation.

For the treatment of biliary peritonitis, laparotomy or relaparotomy is usually used, which in itself is a highly traumatic intervention in which postoperative mortality reaches 9.1–22.5%. The outcome of surgical interventions largely depends on the choice and sequence of surgical correction methods used. The further prospects for improving the results of surgical treatment of patients with biliary peritonitis currently depend on the use of gentle minimally invasive surgical interventions - puncture-draining and endoscopic - and performing operations before the development of a systemic inflammatory reaction of the body and abdominal sepsis.

Thus, the surgical treatment of biliary peritonitis is a complex tactical and technical task, the solution to which our study is dedicated.

Large-scale work is being carried out in Uzbekistan to improve the social protection of the population and the healthcare system. In this direction, specifically in improving the surgical treatment of patients with biliary tract diseases, positive changes have been achieved. At the same time, to improve the care provided to patients, scientifically grounded results are required to evaluate the effectiveness of surgical intervention, taking into account the prevention of intra- and postoperative complications. The Action Strategy for five priority areas

of development of the Republic of Uzbekistan for 2017-2021 sets tasks for the development and improvement of the medical and social assistance system for the most vulnerable categories of the population to ensure their full-fledged life.

Among the tasks set, in a narrower context, one of the urgent directions can be considered the solution of problems in optimizing the diagnosis and improving surgical tactics for patients with biliary tract diseases and improving its results.

This dissertation work serves, to a certain extent, to fulfill the tasks provided for in the Decree of the President of the Republic of Uzbekistan No. UP-6110 dated November 12, 2020, "On measures to introduce fundamentally new mechanisms into the activities of primary healthcare institutions and further increase the efficiency of reforms carried out in the healthcare system," the Resolutions of the President of the Republic of Uzbekistan No. PP-4887 dated November 10, 2020, "On measures to further improve the state management system in the healthcare sector," No. PP-4891 dated November 12, 2020, "On additional measures to ensure public health by further increasing the efficiency of medical prevention work," as well as other regulatory legal documents directly related to this activity.

The diagnosis and treatment of biliary peritonitis remains a complex clinical task (Gabriele R. et al., 2010). Numerous studies related to this nosology are primarily dedicated to the cytological diagnosis of biliary peritonitis, the role of oxidative stress, liver and kidney failure, and clinical and instrumental diagnostics, with authors paying significantly less attention. Meanwhile, there is no unified, generally accepted classification of biliary peritonitis to date, indicating that most researchers are not inclined to exaggerate its clinical specificity and do not see a significant difference between it and bacterial peritonitis due to damage or perforation of one of the gastrointestinal tract walls (Koch M. et al., 2011). At the same time, the study of the pathogenesis and the development of new methods for the diagnosis and treatment of biliary peritonitis continue to remain outside the focus of researchers, despite the fact that postoperative mortality in biliary peritonitis reaches 34% (Bagnenko S.F., 2009; Gardashov N.T., 2017; Amorotti S. et al., 2012; Donatelli G. et al., 2014).

The clinical course of biliary peritonitis is diverse. It depends on the speed of bile outflow into the free abdominal cavity and its quantity. The slow entry of bile into the abdomen in limited quantities causes a

subacute and even chronic course of biliary peritonitis with weakly pronounced, and sometimes not at all pronounced, peritoneal symptoms. At the same time, the amount of exudate in the abdomen is large, and its nature is predominantly serous-biliary. The rapid entry of bile into the abdomen and its significant amount cause acute, predominantly biliary-hemorrhagic peritonitis that quickly leads to death. The amount of exudate in the abdomen is usually small, and symptoms of general intoxication predominate in the clinical picture. The diagnosis of biliary peritonitis is correctly established in approximately 10% of all cases due to the variegated and blurred clinical presentation. (Nazirov F.G. et al., 2019; Bobkiewicz A. et al. 2019).

The primary cause of postoperative peritonitis is the leakage of bile into the free abdominal cavity. According to literature data, the frequency of biliary peritonitis varies significantly: from 0.4% to 4% in chronic cholecystitis, reaching 10% in acute cholecystitis (Sh.I. Karimov et al., 2017; Limaylla-Vega H. et al, 2017).

The clinical presentation of bile leakage after CE depends on the following factors: - rate of bile leakage; degree of localization of the bile source; - degree of bile infection; - presence or absence of drainage. The clinical manifestations of bile leakage depend on where the discharge occurs. If bile enters the external environment through drainage or troakar insertion points, a bile fistula may form; if it enters the internal environment, biloma, bile ascites, and bile peritonitis may develop (E.I. Galperin et al., 2010; Boldin B.V. et al., 2017).

The complexity of early diagnosis of intra-abdominal bile leakage leads to delayed repeated surgical intervention and, consequently, to unfavorable treatment outcomes. On the other hand, the difficulty of diagnosis also explains the groundless execution of relaparotomies in 0.6-17% of patients. Intensive therapy conducted in the postoperative period, the use of antibiotics, and modern anesthesia methods significantly change the picture of the developing complication, masking acute manifestations and erasing signs of abdominal catastrophe. Therefore, the classic pattern of complications develops rarely and, as a rule, late, while performing relaparotomy is accompanied by high mortality. Therefore, at the slightest suspicion of unfavorable conditions, it is necessary to conduct a series of studies that can serve as the beginning of active, purposeful dynamic observation (A.G. Beburishvili et al., 2009; Seon Ung Yun et al., 2015).

Since the treatment of biliary peritonitis is undoubtedly a complex task and requires the efforts of specialists of various profiles, the outcome of surgical interventions largely depends on the choice and rational sequence of application of various techniques. In this regard, the further prospects for improving surgical treatment results depend to a certain extent on the use of gentle surgical interventions (endoscopic, radioscopic), performing operations at earlier stages before the development of a systemic inflammatory reaction and abdominal sepsis.

CHAPTER 1. CURRENT STATE OF THE PROBLEM OF SURGICAL TREATMENT OF BIAL PERITONITIS

Bile peritonitis is a severe complication of biliary stone disease, as well as a consequence of bile leakage into the abdominal cavity after operations on the biliary tract. Despite the seriousness of this problem, insufficient attention is paid to biliary peritonitis, although mortality from this complication, according to various authors, reaches 6.2% to 24% (10.16, 23.86, 100.135).

Among the causes leading to the development of biliary peritonitis, the main ones are destructive forms of gallbladder inflammation, bile leakage into the abdominal cavity after surgeries on bile ducts from additional bile ducts, failure of the gallbladder duct culture after cholecystectomy (CH), dislocation of the drainage installed after choledochotomy, and intraoperative damage to the common hepatic duct (9,19,36,80,90,123).

At the same time, according to A.M. Hajibayev et al. (2019), the peculiarity of biliary peritonitis, unlike bacterial peritonitis, is the blurring of the clinical picture, which often leads to delayed diagnosis. Depending on the sterility of the bile, choleperitoneum often develops, occurring when bile passes through the gallbladder wall without perforation (78.89, 142).

For the treatment of biliary peritonitis, laparotomy or relaparotomy is usually used, which in itself is a highly traumatic intervention with post-operative mortality reaching 9.1–22.5% (5.15,109,125).

The outcome of surgical interventions largely depends on the choice and sequence of surgical correction methods used. The further prospects for improving the results of surgical treatment for patients with biliary peritonitis currently depend on the use of gentle minimally invasive surgical interventions - puncture-draining and endoscopic - and performing operations before the development of abdominal sepsis (4,87).

1.1. Problems of occurrence, diagnosis, and treatment of biliary peritonitis as a complication of acute cholecystitis

Diagnosing and treating biliary peritonitis remains a complex clinical task. Numerous studies concerning this nosology are primarily dedicated to the cytological diagnosis of biliary peritonitis (24.72), the role of oxidative stress (45.64), and liver-kidney failure (48.54), while authors pay significantly less attention to clinical and instrumental

diagnostics. At the same time, there is no single generally accepted classification of biliary peritonitis to date, indicating that most researchers are not inclined to exaggerate its clinical specificity and do not see a significant difference between it and bacterial peritonitis due to damage or perforation of the wall of one of the bile duct sections (6,40,47,146).

At the same time, the study and development of new methods for the diagnosis and treatment of biliary peritonitis continue to remain outside the focus of researchers, despite the fact that postoperative mortality in biliary peritonitis, according to E.A. Petrosyan et al. (2015) 34% (58). The unresolved nature of the aforementioned problems necessitates further research to deepen understanding of the pathogenesis, developmental mechanisms of multi-organ failure, and the development of new methods for early diagnosis and treatment of biliary peritonitis.

Causes leading to biliary peritonitis include destructive forms of gallbladder inflammation - phlegmonous, gangrenous, perforating cholecystitis, as well as purulent cholangitis (34,98,110). In acute cholecystitis, the frequency of this complication reaches 5.5%, while in gangrenous and perforating cholecystitis, it occurs in up to 30.9% of cases. The authors note the exceptional difficulty of diagnosing biliary peritonitis, which explains late surgical intervention and high mortality rates of up to 30% (65,121,143).

The frequency of common forms of biliary peritonitis increases with age—from 9.3% in young people to 15.4% in the elderly and up to 26.0% in the elderly (12.33). At the same time, purulent-septic complications in the latter category of patients occur in 32.7% of cases, with mortality reaching 14.2%. Most often, biliary peritonitis develops in elderly and senile individuals, which is associated with age-related ischemic changes in the gallbladder wall that lead quite quickly to destructive forms of cholecystitis. Bile peritonitis is a complication of gallbladder perforation – perforated bile peritonitis. A characteristic feature of biliary peritonitis is that infected bile contents pour into the abdominal cavity. According to S.F. Bagnenko et al. (2019) the development of the infectious process, and most importantly, toxemia, occurs under these conditions with fewer obstacles. If we add to this the dysfunction of leukocytes, especially neutrophils (disruption of migration and phagocytosis caused by an inadequate level of chemotactic factors in the blood), then with a sufficiently extensive

dissemination of the infectious onset throughout the abdomen, the inflammatory process and toxicemia develop in a galloping rhythm. Bile is a strong chemical irritant, and if it contains bacteria—which is quite common in patients with acute cholecystitis—the development of biliary peritonitis is inevitable. Under conditions of inflammatory diseases of the bile ducts, it is infested by various microorganisms. In acute cholecystitis, flora growth was observed in 50–74.2% of patients, and in chronic cholecystitis in 11–39.3%. Mechanical jaundice due to cholelithiasis increases the incidence of infection to 76.5–82.1%. When infected bile enters the abdominal cavity, purulent biliary peritonitis develops, requiring urgent surgical treatment (7.44, 73.91, 147).

Unlike the perforation of the gallbladder into confined spaces or hollow organs, perforation and bile leakage into the free abdominal cavity lead to abdominal catastrophe and end in abdominal sepsis.

According to the observations of V.S. Budipranama (2020), bile peritonitis often occurs without the direct entry of bile into the abdominal cavity, due to sweating, for example, in "obstructive cholecystitis" - so-called sweating bile peritonitis (90). This is due to the slow entry of bile into the abdominal cavity, when the body manages to distinguish the pathological focus from other parts of the abdominal cavity. Along with the severe course of such peritonitis, there are observations where patients remain in a satisfactory state for a long time. In the nature of the development of such peritonitis, great importance is attached to bile stagnation, infection, and the action of pancreatic enzymes, which is the basis of the enzymatic theory of bile peritonitis.

The entry of bile into the abdominal cavity does not always lead to the development of biliary peritonitis with its characteristic morphological changes and clinical manifestations. B.R. Dashet et al. (2020) impose various meanings on the concept of bile peritonitis: from the simple leakage of uninfected bile into the abdominal cavity to bile ascites. In these cases, the clinical picture is smooth, and patients may remain in a satisfactory state for a long time. In bile ascites, there are no inflammatory phenomena in the abdominal cavity—there are no fibrinous deposits on the peritoneum, and changes occur on the intestinal side; its loops are shiny, but the intestine itself is not swollen and is actively peristaltic (91).

Depending on the rate of perforation, local, diffuse, or circumscribed peritonitis develops. The development of local peritonitis is most frequently noted in patients with bile duct microperforation. In

patients with diffuse peritonitis, perforation of the gallbladder was observed more frequently. According to numerous studies, in peritonitis, the functioning of natural systems that ensure the elimination of toxins is disrupted, and the liver not only loses its barrier functions, among which detoxifying functions occupy a special place and play a major role in the pathogenesis of the disease, but also becomes the source of production for medium-molecular-weight compounds accumulating in the body. Even when the source of biliary peritonitis is eliminated, the combination of organic and functional disorders occurring in various organs and systems of the body leads to the death of a portion of patients in the postoperative period (45.83,122).

One of the main reasons for the development of intoxication in biliary peritonitis is the absorption of bile acids, bile pigments, bilirubin into the bloodstream and the appearance of a large number of underoxidized metabolic products capable of affecting the vascular wall, increasing its permeability to various substances. The accumulation of low and medium molecular weight substances in the blood is associated with disorders of the central nervous system function, the development of immunodeficiency, hemodynamic disorders, and a tendency toward the development of septic states. In the development of endogenous intoxication syndrome, the level of these substances in the blood correlates with its severity (48.79).

Another factor capable of exerting a significant influence on the development of endogenous intoxication syndrome is an increase in the intensity of free radical oxidation with an increase in the content of lipid peroxidation products, which cause irreversible inactivation of enzymes and structural restructuring of cell membranes (46).

According to A.M. Hajibayev et al. (2019) among acute abdominal diseases, it is difficult to find a disease more complex in clinical course and diagnostic difficulties than biliary peritonitis. The diversity of the pathological process is directly dependent on the complex action of bile and the body's response reactions. These factors determine the multi-symptomatic nature of biliary peritonitis and the absence of pathognomonic signs (70).

Analyzing the clinical picture and comparing it with pathomorphological changes, it is necessary to note the difference in their nature in various forms of biliary peritonitis. Clinical presentation of perforated bile peritonitis in gallbladder perforation, according to S.N. Styazhkin et al. (2018), has characteristic features. It is accompanied by

an acute attack of cholecystitis, most often on the second or third day of the illness, and manifests as intense pain in the right hypochondrium. At the same time, the patients' condition worsens sharply, which is explained by shock phenomena.

Upon bile expectoration, localized peritonitis is primarily observed. This is due to the slow entry of bile into the abdominal cavity, when the body manages to distinguish the pathological focus from other parts of the abdominal cavity (69,120,144). The clinical presentation of sweat-induced bile peritonitis is characterized by a gradual increase in symptoms. In the initial stage, the clinical symptoms do not differ from acute cholecystitis.

Patients with biliary peritonitis require surgical intervention first and foremost. According to V.F. Zubritsky et al. (2017), in the shock phase of biliary peritonitis, surgical intervention without patient preparation usually ends in high mortality. Surgical trauma exacerbates pronounced acute disorders in vital systems. A patient with a perforation of the gallbladder into a free cavity requires thorough preparation. In the stabilization phase, surgical intervention is the most beneficial and does not require long preparation, and therapeutic measures may accompany the operation.

It is most difficult to establish indications in the terminal phase of purulent complications many days after gallbladder perforation, when patients are practically incurable. Most of them die during or shortly after surgery. Thus, the analysis of treatment results for biliary peritonitis indicates that the effectiveness of treating such patients depends on the duration of surgical intervention (63.77).

The constituent elements of the classical treatment method for widespread forms of peritonitis are: - timely surgical intervention, the main task of which is to eliminate the causes that caused the peritonitis; - detoxification therapy; - correction of homeostasis disorders; - rational antibiotic therapy; - combating gastrointestinal paresis. In turn, the sequence of surgical interventions includes adequate surgical access, exudate evacuation, elimination of the peritonitis source, abdominal cavity toiletation, and its drainage (1.45.99).

The first direction involves early laparotomy, as only in this case can the mortality rate be reduced. Laparotomy includes two stages: - eliminating the source of the developing complication as radically as possible; - sanitation and drainage of the abdominal cavity. An important stage in performing laparotomy for peritonitis is choosing an

adequate surgical approach. To date, practically all specialists consider midline laparotomy to be the only correct surgical approach for peritonitis (14,61,111). Under conditions of good relaxation, the midline incision is the most optimal for intervention on any abdominal organs.

The next stage of the surgery is to identify the source of infection and perform abdominal sanitation. The elimination of the peritonitis source is carried out individually, depending on its cause. The most important link in the surgical treatment of peritonitis is the sanitation of the abdominal cavity and its thorough drying. To achieve this, traditional methods are supplemented by washing it with solutions of antiseptics, antibiotics, surfactants, and protease inhibitors, as well as using sorbents (15.59).

Sanitation measures in the same volume can be continued during repeated laparotomy. A significant point in the treatment of peritonitis is the drainage of the abdominal cavity (56,112).

For effective drainage, the nature of the drainage, its position, and the maintenance of the drainage system in good working order are of great importance. Among the variety of existing drains, silicone one- and two-way tubes have become the most common. Of the two main drainage principles (using passive and active drains), most surgeons perform passive drainage. Abdominal drainage with active aspiration of contents, although it ensures faster and more complete evacuation of pathological exudate in the early postoperative period, has several significant disadvantages (16,74,126).

Thus, the presented data allow for the conclusion that biliary peritonitis is a special category of peritonitis characterized by a severe course, difficulties in early diagnosis, and the need for a comprehensive approach to treatment in combination with active surgical tactics, detoxification, correction of electrolyte disorders, immune status, and antibacterial therapy. Despite the extreme relevance and significance of the problem, many questions have not yet received exhaustive answers. These points served as the starting point for conducting this study.

1.2. Modern understanding of the etiology and surgical treatment of postoperative biliary peritonitis

Nearly 10% of the adult population is diagnosed with gallstone disease, and more than 5 million cholecystectomies (43.80,105) are performed worldwide annually. At the same time, despite the widespread implementation of minimally invasive methods in modern

liver and bile duct surgery, the number of iatrogenic complications, one of which is biliary peritonitis, has no downward trend (19,27,42,101,124,136). Bile peritonitis develops in 94.5% of patients with damage to the extrahepatic bile ducts during laparoscopic cholecystectomy. It can also complicate the course of liver transplantation, endoscopic endobiliary interventions, laparoscopic and transcutaneous puncture biopsies of the liver, transcutaneous transhepatic drainage of the biliary tract, and liver resection (13,25,36,102,145,148).

New medical technologies, on the one hand, reduce the treatment time of patients, and on the other, significantly affect the frequency of postoperative complications (29.41.92, 127, 147). Practically all authors dealing with the problem of extrahepatic bile duct surgery note that compared to traditional cholecystectomy, the introduction of laparoscopic methodology led to a 2-4-fold increase in bile duct injuries, reaching 3% (107). Among the causes leading to the development of biliary peritonitis, the primary place is occupied by such forms of the clinical course of UC as cholangiolithiasis, phlegmonous, gangrenous, perforating cholecystitis, and purulent cholangitis. In these diseases, the incidence of biliary peritonitis can reach 50% (32.4–33.75).

After cholecystectomy, bile leakage is possible from additional bile ducts. Another cause of this complication described in the literature is diagnostic liver puncture, which is used in cases difficult to diagnose. Finally, a common cause of bile-purulent peritonitis is surgery on the bile ducts: anastomosis of the gallbladder or duct with the stomach or intestines. The reason for bile entering the abdominal cavity after these operations is the insufficiency of the sutures. If a significant amount of bile accumulates in the abdominal cavity, moderate intestinal bloating, dulling of percussion sound in inclined areas, and sometimes mild sclera jaundice are observed. (60.82).

As noted by E. Ekmekcisi et al. (2018), the clinical course of biliary peritonitis varies. It depends on the speed with which bile is poured into the free abdominal cavity and its quantity (97). The slow entry of bile into the abdomen in limited quantities causes a subacute and even chronic course of biliary peritonitis with weakly pronounced, and sometimes not at all pronounced, peritoneal symptoms. At the same time, the amount of exudate in the abdomen is large, and its nature is predominantly serous-biliary. The rapid entry of bile into the abdomen and its significant amount cause acute, predominantly biliary-

hemorrhagic, peritonitis. The amount of exudate in the abdomen is usually small, and symptoms of general intoxication predominate in the clinical picture. The diagnosis of biliary peritonitis is correctly established in approximately 10% of all cases due to the diversity and blurriness of the clinical picture. (2,25,137).

Reconstructive operations on the bile ducts and liver transplantation occupy a significant place among the causes leading to the development of biliary peritonitis (18.55). During orthotopic liver transplantation, depending on the methods used for postoperative management of patients, this condition occurs in 9-19% of all cases. Cases of this disease development following liver biopsy were also noted (50.71.88,108).

According to G.A. Flores – Rangel et al. (2018), traumatic injuries contribute significantly to the development of biliary peritonitis (103). The incidence of biliary peritonitis in these cases, according to various authors, ranges from 2 to 7% of cases (3.32.53.106).

The occurrence of postoperative biliary peritonitis is significantly influenced by the duration and severity of the primary disease, the quality of preoperative preparation, the volume of surgery, technical and tactical errors, the patient's age, the presence of comorbidities and infection virulence, as well as insufficient immunobiological defense mechanisms and delayed regeneration, especially in cases of impaired functional reserves of vital organs (49.57,128).

A characteristic feature of postoperative biliary peritonitis that developed after surgical interventions for focal liver diseases and mechanical jaundice is that these patients almost always exhibit a latent or apparent impairment of liver function. Therefore, the outcome of relaparotomy in these diseases depends not only on the timing of its execution but also on the severity of the previous liver failure. Even with timely and correct relaparotomy, the prognosis for this patient population is quite pessimistic. The presence of enteral insufficiency syndrome in postoperative biliary peritonitis and the entry of a large amount of toxins into the portal canal further exacerbate liver dysfunction (50.66,113).

To date, there is no unified concept of the pathogenesis of multi-organ failure in postoperative biliary peritonitis that would allow for its comprehensive pathogenetic treatment depending on etiological factors and methods for the comprehensive prevention of this complication. In this regard, it is of particular interest to study the functional state of the

liver in patients with postoperative biliary peritonitis with enteral insufficiency syndrome, depending on the degree of aggressiveness and toxicity of substances entering through the portal bed, followed by the breakthrough of endotoxins into the systemic bloodstream and the development of endotelial dysfunction. Furthermore, despite the exceptional importance of the issue, there is no generally accepted clinical classification of postoperative biliary peritonitis as one of the foundations for mutual understanding and uniting efforts in solving this crucial problem of hepatobiliary surgery (84.93, 129, 138).

For the treatment of postoperative biliary peritonitis, relaparotomy is widely used, which is a highly traumatic intervention and is often accompanied by high complications and mortality rates. In recent years, there has been a significant number of reports on the effective treatment of acute surgical diseases of the abdominal organs and some of their postoperative complications using endovideosurgical technologies and puncture-drainage techniques under ultrasound control (16,80,85,130).

Some authors distinguish between biliary peritonitis and choleperitoneum. Bile flowing into the free abdominal cavity is not indifferent to the body as a whole, nor to the peritoneum in particular. By being absorbed into the blood from the abdominal cavity, it causes general bile intoxication of the body, and by affecting the peritoneum locally, it causes its inflammation—chemical, biliary-hemorrhagic peritonitis (22,104).

Severe pathomorphological changes develop in the liver and kidneys during biliary peritonitis. In the acute form of biliary peritonitis, inflammatory-degenerative-necrotic processes (edema, hemorrhages, protein dystrophy leading to necrosis) develop in the liver and kidneys. In the chronic form of biliary peritonitis, predominantly inflammatory-degenerative processes develop in the liver and kidneys, and necrosis processes are weakly expressed (protein dystrophy, fatty degeneration). At the same time, infection combined with bile significantly accelerates the development of generalized peritonitis and intoxication (17.56,139).

Under the classic approach, the treatment of postoperative biliary peritonitis includes eliminating the source, sanation, draining the abdominal cavity, and closing it, which is problematic in patients with widespread and recurrent peritonitis (23). In patients with peritonitis, when there is a large abdominal wall defect or when it is necessary to perform a planned relaparotomy, the final closure of the abdominal wall (i.e., fascia and skin) is not indicated. Instead, the abdominal cavity is

temporarily closed, forming a laparostomy that ensures decompression, facilitates re-examination, and preserves the edges of the wound. Programmed relaparotomies (or stage lavage) allow for a reduction in abdominal contamination. The decision to perform the next laparotomy is made in accordance with the prevalence of peritonitis (31,162).

In patients with trauma, intra-abdominal bleeding, and intestinal ischemia, open management of the abdominal cavity facilitates relaparotomy.
after the first surgery (sewing or resection of an abdominal organ), allows for the stabilization of the patient's general condition and reduces laparotomy time. Conversely, primary suturing of the aponeurosis during primary intervention in these situations is a risk factor for the development of elevated intra-abdominal pressure (21).

Since the treatment of postoperative peritonitis is undoubtedly a complex task and requires the efforts of specialists of various profiles, the outcome of surgical interventions largely depends on the choice and rational sequence of application of various techniques. In this regard, the further prospects for improving surgical treatment results depend to a certain extent on the use of gentle surgical interventions (endoscopic, radiosurgical), performing operations at earlier stages, before the development of a systemic inflammatory reaction and sepsis (67,94,114).

Scientific literature extensively discusses methods for abdominal cavity sanation and drainage. Some authors (56,131) recommend washing the abdominal cavity with a large amount of solution after eliminating the source of peritonitis during sanitary surgery. Others (115), however, advise limiting it to drying and draining. Some surgeons perform constant or fractional abdominal lavage during the postoperative period, while others use special double-chamber drains with constant irrigation and aspiration using various apparatuses (11.26) In some cases, the treatment of peritonitis is based on the use of aspiration siphon pelvic drainage. At the same time, the authors refuse to wash the abdominal cavity during and after surgery. Other researchers propose using a combination of local treatment methods for peritonitis that allows for sufficiently good results in any surgical department with minimal trauma and maximum simplicity.

According to the authors, the primary condition for the success of surgical treatment of postoperative peritonitis is the correctly performed primary relaparotomy. The most controversial issue remains the

methods of its completion—indications for drainage, and the use of such an aggressive method in the postoperative period as multiple abdominal cavity examinations (30.68).

V.F., Kulikovsky et al. (2018) recommend not draining the abdominal cavity if it is slightly contaminated with bacteria. At the same time, the treatment results are significantly better. According to their data, wound suppuration was only 3.1%, and intra-abdominal complications occurred in only 1.6% of patients, while among patients who underwent abdominal drainage, the incidence of wound suppuration was 2 times higher (6.5%), and intra-abdominal complications occurred with the same frequency as in patients without drainage, amounting to 1.4% (38).

In widespread peritonitis with a low degree of bacterial contamination, the infectious process is in most observations interrupted by a single surgical intervention and empirical antibacterial therapy. These results indicate that refusing abdominal drainage in this category of patients did not lead to an increase in the number of infectious intra-abdominal complications, and the number of patients with wound infection even decreased. Similar results were obtained by other authors when refusing abdominal drainage(39.95).

N.A. Kuznetsov et al. (2011) adhere to the following tactics: the prevalence of peritonitis is assessed according to the classification of B. D. Savchuk. In cases of local circumscribed peritonitis, it is recommended to drain the abscess cavity using a tube or Penrose's method. In cases of local unlimited peritonitis, if its source is reliably eliminated, the abdominal wall wound is sutured shut (37). In cases of diffuse and widespread peritonitis, if there are no fixed fibrous inclusions on the abdomen and a small degree of contamination, the abdominal cavity is not drained, and the laparotomy wound is sutured shut. In cases where there is a high degree of bacterial contamination and the fixed fibrinous deposits on the peritoneum do not allow for simultaneous adequate sanation of the cavity and there is a real risk of developing intra-abdominal infection in the postoperative period, the method of repeated revisions and sanations of the abdominal cavity is applied. A.I. Shugaev et al. suggest using the same tactics. (2015). They consider the use of laparostomy in clinical practice to be pathogenetically justified. According to them, programmed sanations allow for the removal of purulent exudate and fibrin films that support inflammation in the abdominal cavity, visual control of the course of the

inflammatory process, and timely elimination of new tissue destruction foci. The interval between sanations should be from 24 to 72 hours. Patients with local and diffuse forms of peritonitis are recommended to be operated on using laparoscopic methods (41.79).

In the early stages of diffuse peritonitis, care should be limited to quickly and carefully removing the source of infection and suturing the wound without further action on the abdominal cavity, except for removing excess fluid, which is then transferred to the abdominal cavity itself, which is better able to cope with the "remains" of bacteria. In cases where widespread peritonitis is accompanied by anterior abdominal wall phlegmon, V.F. Zubritsky et al. (2017) recommend using vacuum drainage of the abdominal cavity to complete the next programmed abdominal sanation. At the same time, the interval between sanations must not exceed 48 hours, and if vacuum is lost in the drainage system, the sanation intervention must be performed urgently. Thus, from the perspective of leading specialists, abdominal drainage for peritonitis should be performed strictly according to indications (40.81, 116).

An important point in observing operated patients is dynamic control. Primary attention is paid to changes in clinical indicators compared to the uncomplicated course of the postoperative period. Suspicion of the development of early postoperative intra-abdominal complications serves as an indication for the use of additional research methods (radiological, endoscopic, ultrasound, computed tomography) (62,76,80,132,141).

The primary role is assigned to radiological methods, including computed tomography and ultrasound. Based on a comprehensive examination of patients, the localization, size, configuration, and estimated volume of abscesses are determined. The diagnostic accuracy of such a comprehensive study for widespread postoperative peritonitis is 80%, and for abscesses, it is 99%. Computed tomography has significant advantages, with diagnostic accuracy reaching 88-100%, and specificity reaching 89%. Computed tomography allows for the acquisition of an image not only of the examined organ but also of the peri- and para-organ spaces. The patient's obesity, the presence of gas in the intestines, and the depth of the bulk formations do not affect the accuracy of the diagnosis (117,133).

The diagnosis of residual sediment accumulations and abdominal abscesses should be the result of active and purposeful searching, rather

than an accidental discovery. Ultrasound must be performed on the 3-4th day after surgery for any type of peritonitis. This method, which is safe for the patient, can be performed in 58-96% of patients (28.96), which is largely determined by the specialist's qualifications. This tactic allows for the detection and elimination of limited fluid accumulations in the abdominal cavity by puncture before the development of abscesses. In ultrasound imaging, fluid accumulations appear as volumetric echonegative or hypoechogenic formations of various shapes. When fluid accumulates under the diaphragm or in the subhepatic space, fluid accumulations appear as sickle-shaped or oval formations. In this case, reactive discharge is usually observed in the pleural cavity. An equally important diagnostic sign is a decrease in diaphragm mobility on the affected side. If an abscess or infiltrate forms in the pelvis, they can be identified during finger rectal or vaginal examination (50,140). Additionally, abscess formation manifests as a significant deterioration in the patients' condition, an increase in endogenous intoxication, a hectic temperature reaction, chills, and painful infiltrates upon palpation. At the same time, it was noted that ultrasound is the most informative for diagnosing tumors localized in the pelvis. Similar accumulations of exudate in the pelvic cavity are visualized as a rounded hypoechogenic formation that may appear heterogeneous due to the presence of fibrin and pus clots.

Liquid accumulations in the interintestinal spaces are defined as voluminous, polymorphic, hypoechogenic formations without clear contours, which are distinguished from the contents in the lumen of adjacent intestinal loops by the absence of peristaltic movements and contents movement within them. During the transformation of fluid accumulations into abscesses, a pyogenic capsule of varying degrees of density and thickness forms around them (118).

Recently, due to the development and implementation of a new generation of ultrasound scanners in clinical practice, one of the directions of minimally invasive surgery is developing rapidly - percutaneous intervention under ultrasound control. The technical support for this direction involves the use of special sensors that can be sterilized by fully immersing them in disinfectant solutions; puncture adapters that allow for high-precision puncture in the required direction; and special ultrasound control needles, drains, conductors, and dilators. Currently, there are isolated reports of percutaneous intervention under ultrasound control in the treatment of abdominal abscesses (52,119,134).

Thus, the surgical treatment of biliary peritonitis represents a highly complex technical and tactical task requiring further scientific search for its solution in both applied and fundamental research areas.

CHAPTER 2. CHARACTERISTICS OF CLINICAL OBSERVATIONS AND METHODS OF DIAGNOSIS

2.1. General characteristics of patients

In the surgical departments of the 1st clinic of the Samarkand State Medical Institute over the last 20 years, between 2001 and 2020, 5849 patients with cholelithiasis were operated on, of whom 1167 (19.9%) had acute destructive cholecystitis (Fig. 2.1), i.e., approximately every fifth patient.

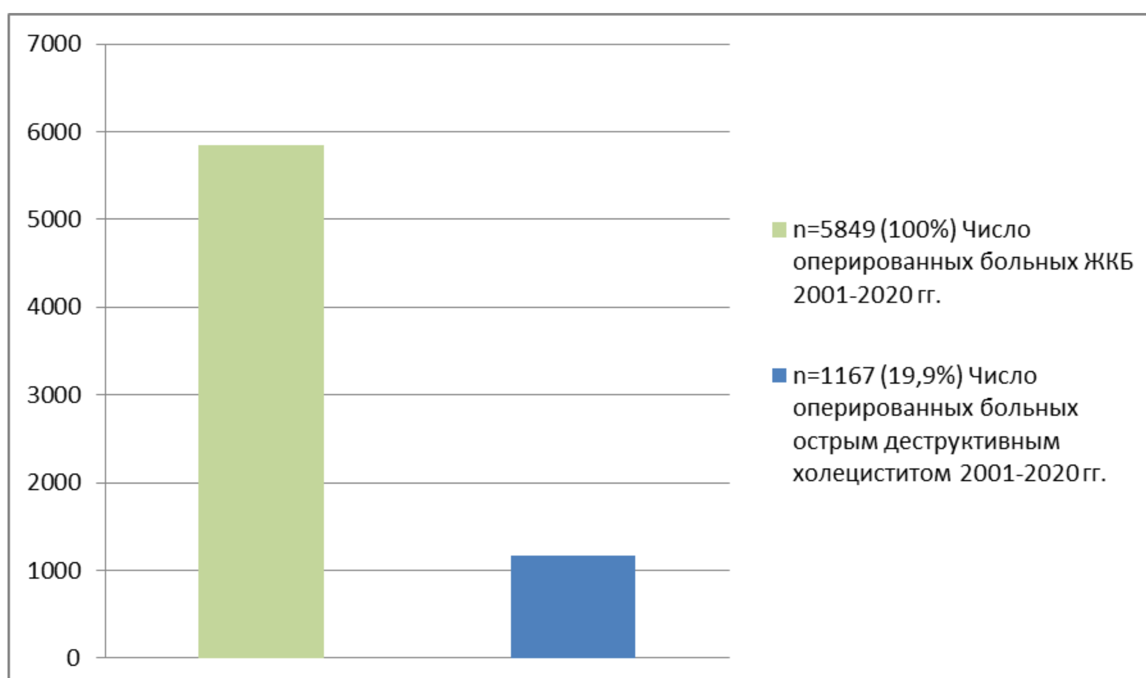


Fig. 2.1. Number of operated patients with acute destructive cholecystitis relative to the total number of operated patients with UC

We noted a significant increase (1.9 times), i.e., almost 2 times, in the number of operated patients with biliary stone disease over the last decade between 2011 and 2020 (the number of operations was 3,801), compared to the period between 2001 and 2010 (the number of operations was 2,048) (Fig. 2.2).

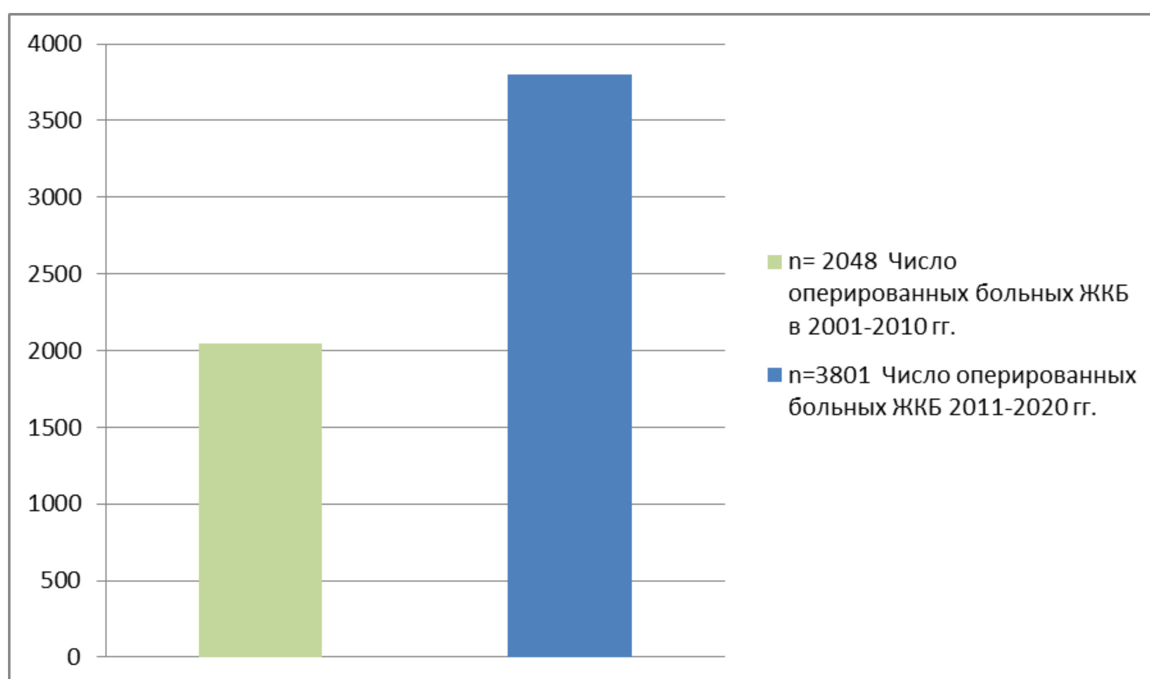


Figure 2.2. Number of operated patients with UC in the compared groups

At the same time, the incidence of acute destructive cholecystitis in the analyzed time intervals was approximately equal to the total number of operated patients with cholelithiasis: 19.2% (394 patients – 2001-2010), and 20.3% (773 patients – 2011-2020) (Fig. 2.3).

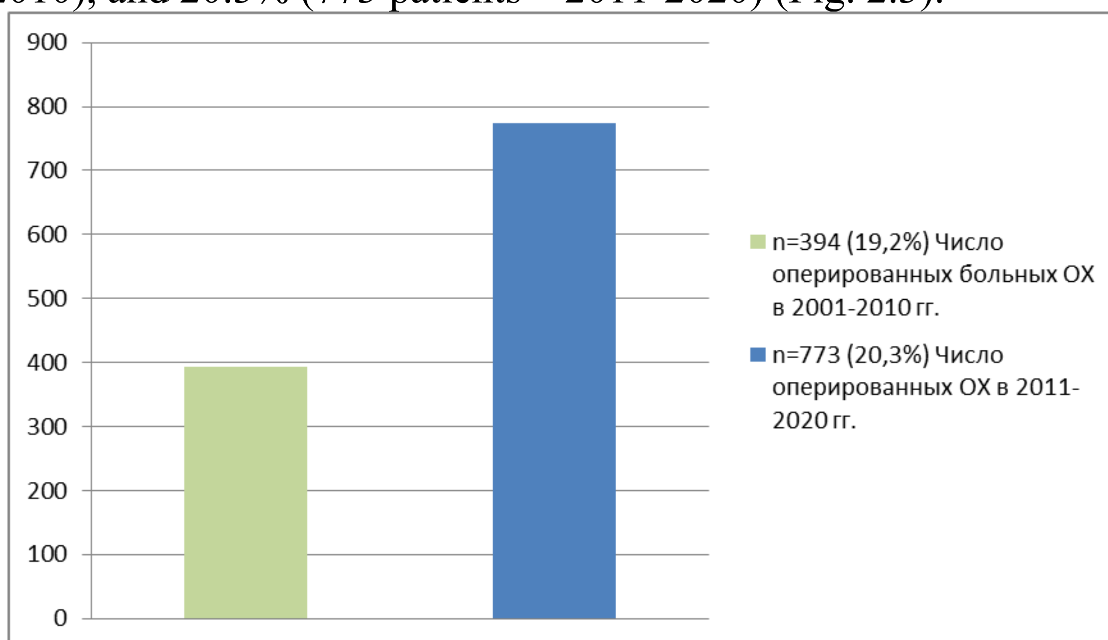


Figure 2.3. Number of operated patients with acute destructive cholecystitis in the compared groups

At the same time, the frequency of operated patients with peritonitis decreased significantly by 8.4% (32) and 6.3% (49), as complications of acute destructive cholecystitis (Fig. 2.4) and

postoperative biliary peritonitis by 1.1% (22 patients) and 0.7% (27 patients) respectively (Fig. 2.5).

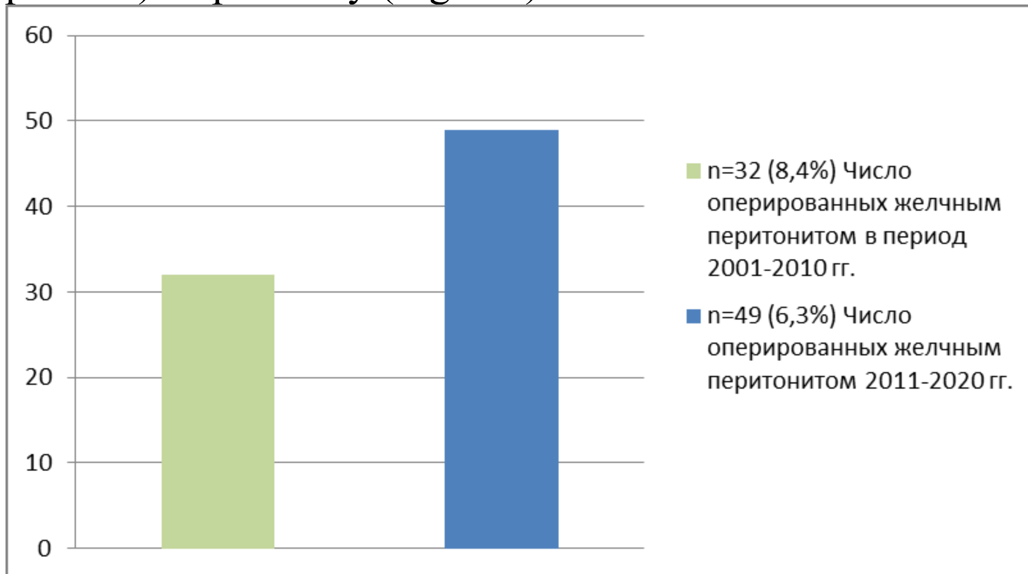


Figure 2.4. Number of operated patients with biliary peritonitis in the compared groups

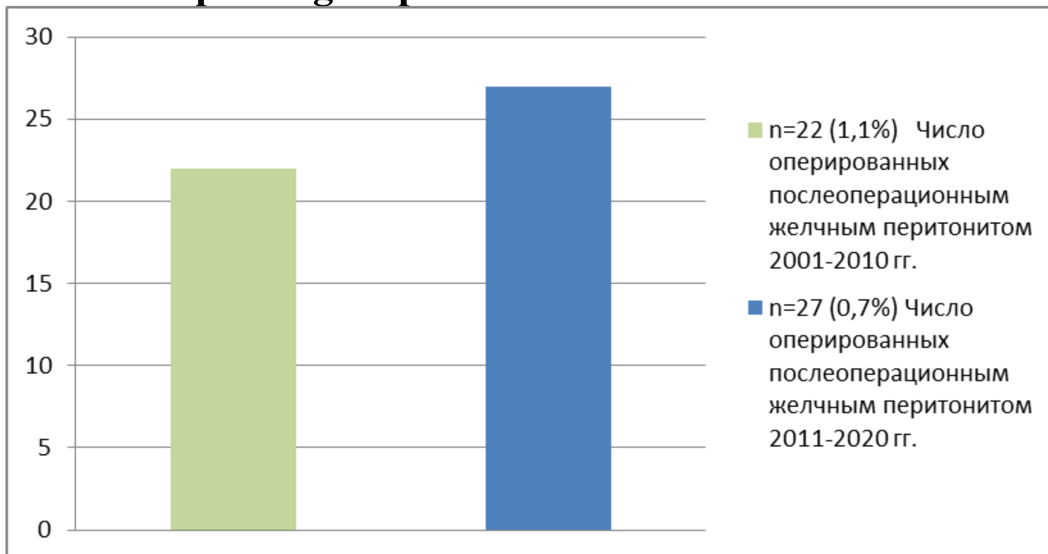


Fig. 2.5. Number of operated patients with postoperative biliary peritonitis in the compared groups

Based on the goal of our study, we examined the results of examination and treatment for 131 patients with biliary peritonitis, which accounted for 2.2% of all 5849 operated patients with cholelithiasis (Fig. 2.6).

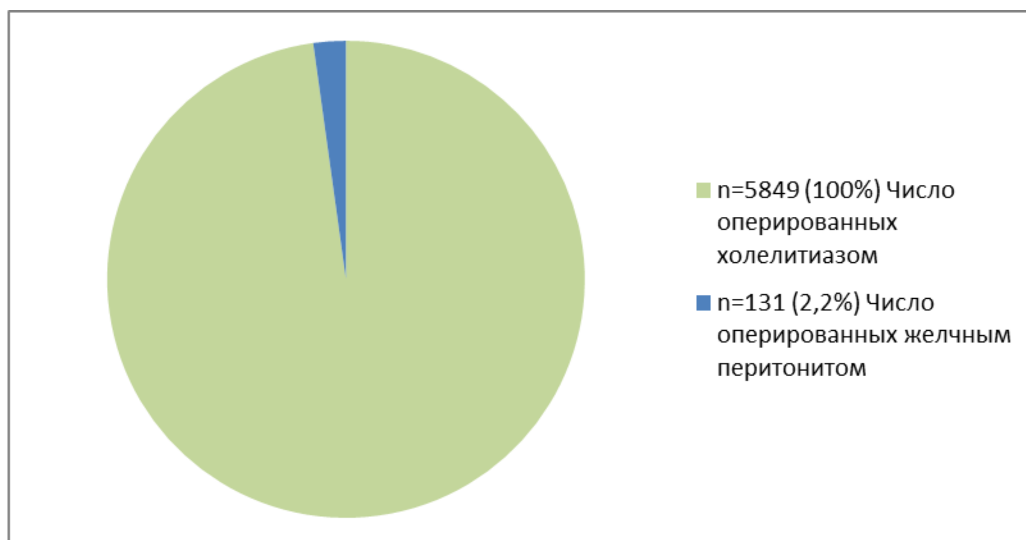


Fig. 2.6. Number of operated patients with biliary peritonitis

Of these, 82 (7.1%) had peritonitis as a complication of acute destructive cholecystitis, and 49 (0.8%) had peritonitis as a complication after surgery for cholelithiasis (Fig. 2.7).

Among the patients with peritonitis, there were 39 (29.7%) men and 92 (70.3%) women, with a gender ratio of 1:2.5. This same ratio among all operated patients with gallstone disease was 1:6, which confirms literature data on the more complex course of cholelithiasis in men. Patients aged 60-74 years predominated—46 (35.2%) and 45-59 years—37 (28.2%). 11 (8.3%) patients were over 75 years old, 29 (22.1%) were 30-44 years old, and 8 (6.1%) were under 29 years old. The average age of the patients was 55.2±1.3 years. The distribution of patients by gender and age groups, according to WHO recommendations (2000), is presented in Table 3. 2.1.

table. 2.1.

Distribution of patients with biliary peritonitis by sex and age groups

Age group	Age of patients	Male	Female	Total	%
Young people	18-29	2	6	8	6,1
Junior middle age	30-44	10	19	29	22,1

Senior middle age	45-59	12	25	37	28,2
Elderly	60-74	11	35	46	35,2
Old age	Elderly over 75	4	7	11	8,3
Total		39	92	131	100

Thus, biliary peritonitis developed most frequently in elderly and senile patients, which was caused by an increase in the destructive forms of acute cholecystitis in them, which were accompanied by blurred symptoms of the disease. The elderly, as a rule, had a long history of gallstone disease and were carriers of a dormant infection, significant morphological changes not only in the gallbladder but also in the liver and pancreas. Furthermore, these patients had severe comorbidities, which to a certain extent required thorough preparation of such patients for performing surgical interventions.

Comorbidities were present in 82 (62.6%) patients. (Table. 2.2)

Table. 2.2

Structure of concomitant pathology in patients with biliary peritonitis

Associated pathology	Frequency of occurrence	%
Ischemic heart disease	49	37,4
Hypertension	66	50,4
Circulatory insufficiency	23	17,5
Chronic bronchitis, COPD	17	12,9
Chronic pyelonephritis	10	7,6
Kidney stone disease	7	5,3
Stomach and GI ulcer disease	9	6,8
Chronic colitis	5	5,3
Diabetes mellitus	11	8,4

Morbid obesity	14	10,7
Varicose veins of the lower extremities	17	12,9
Ventral hernias	12	9,1

Cholangitis, as a complication of the primary pathological process, was identified in 67 patients (51.1%). Chronic concomitant pathology of two systems was noted in 41% of patients, and three or more in 26%.

Taking into account modern trends in the development of surgery, to solve research tasks aimed at developing new therapeutic and diagnostic tactics for CP, patients were divided into two groups. Group I (comparison group) included 55 (41.9%) patients with peritonitis as a complication of acute destructive cholecystitis and postoperative biliary peritonitis operated on during the 2001-2010 period, whose complex treatment utilized standard generally accepted approaches. To the second group (main group) - 76 (58.1%) who underwent surgery during the 2011-2020 period, in whom the algorithm for conducting therapeutic and diagnostic measures was based on the principles of FTS - an accelerated recovery program (ACP) and minimally invasive surgical interventions were used as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery – ERApoS (Enhanced Recovery After Surgery).

The clinical form of biliary peritonitis was determined according to the classification of S.M. Kurbonov (2013).

2.2. Research methods for patients

All patients with biliary peritonitis underwent a comprehensive clinical examination based on the assessment of complaints, anamnesis data, clinical presentation of the disease, and laboratory, instrumental, and radiological diagnostic methods.

The first and most frequent clinical manifestation of biliary peritonitis in the examined patients was complaints of abdominal pain of varying intensity. In 41.2% of patients, they were moderately intense and localized depending on the source, while in 58.8% of cases, the pain was intense and localized in 2 or more anatomical areas of the abdomen. At the same time, the intensity of pain depended on the localization of the source and the time since the onset of the disease. With widespread

peritonitis lasting a day or more, the pain was intense and spread to all parts of the abdomen.

The clinical manifestations of the disease, in addition to the aforementioned ones, included nausea, weakness, general malaise, fever and chills, abdominal bloating, and stool and gas retention.

During the objective examination of patients, pain in one or more areas of the abdomen was identified in combination with muscle tension in the anterior abdominal wall. Thus, in 37.2% of patients, local pain was noted in one of the areas with a soft abdomen and combined with symptoms of abdominal irritation; in the remaining patients, the pain was widespread and localized in the right abdominal regions. At the same time, the symptoms of peritoneal irritation were assessed as suspicious, and signs of anterior abdominal wall muscle tension did not intensify over time.

Studying the clinical presentation of peritonitis in various clinical and morphological forms showed that the clinical presentation depended on the severity of the inflammatory process in the abdominal cavity and the volume of exudate.

It was established that in all identified morphological forms of peritonitis, the main clinical signs occur equally frequently (Table. 2.2).

Table 2.3

Frequency of disease symptoms in the study groups

Symptom	gr. compare	main group
	n=40	n=37
Pain	100%	100%
Nausea/ Vomiting	83,3%	79,2%
Intestinal paresis	91,8%	96 16,5%
Body temperature, °C	37,0±2,9	37,1±0,8

Analyzing the development of pain syndrome signs, including muscle tension in the anterior abdominal wall and the presence of abdominal irritation symptoms, it was established that the frequency of its manifestation in the studied groups of patients with peritonitis is statistically insignificant (p=0.006).

Hemodynamic disturbances in biliary peritonitis manifested as an increase in heart rate and a tendency toward hypotension. Disorders on the respiratory organs include respiratory weakness, predominantly on the affected side and tachypal (Table. 2.4).

Table 2.4

Hemodynamic disorders in the compared groups

Clinical manifestations	gr. compare	main group
	n=40	n=37
Heart rate per minute	110±12	96±6
Hypotonia, < 70 mm Hg	12 (11,8%)	20 (20,6%)
Hypertension, < 70 mm Hg	6 (5,9%)	4 (4,1%)
Weakening of breathing, %	8 (21%)	3 (6,3%)
Respiratory rate, in minutes	22,8±1,8	20,6±1,7

The obtained data allowed for the conclusion that in patients in the first and second groups, the dominant clinical symptom is tachycardia with a stable general condition of the peritonitis patient. In patients with widespread peritonitis without a tendency to differentiation, pronounced clinical symptoms of a systemic inflammatory reaction and local symptoms from the abdominal organs prevail, determining the severity of the patient's condition.

The complex of clinical, laboratory, and instrumental diagnostic methods used to treat patients with postoperative biliary peritonitis under dynamic supervision included:

1. Monitoring of body temperature, blood pressure (BP), pulse (CHP), and central venous pressure (CVD).
2. 2. General blood and urine analysis.
3. 3. Dynamic determination of the main biochemical parameters of blood (glucose, total protein, albumin, bilirubin and its fractions, alanine transferase (AlAT), aspartate transferase (AsAT), creatinine, urea, electrolytes (K, Na, Ca).

4. 4. Assessment of arterial and mixed venous blood gas composition, as well as acid-base state.
5. 5. Coagulogram.
6. 6. ECG registration.
7. 7. Hourly and daily diuresis were monitored, and pathological and physiological losses were calculated.

All 131 patients underwent ultrasound examinations of the abdominal organs, followed by indications for fibrogastroduodenoscopy, RPXG (17), fistula-cholangiography (9), intraoperative cholangiography (24), MRPXG (21), computed tomography (19), and laparoscopy (49).

Ultrasonic examination.

In cases of bile leakage into the abdominal cavity and biliary peritonitis, instrumental examination of all patients began with ultrasound to detect free fluid in the abdominal cavity or its limited accumulations. Furthermore, ultrasound examination evaluated the diameter of the main bile ducts as one of the important characteristics of impaired bile outflow (Fig. 2.8).

Ultrasound was performed upon patient admission to the hospital, followed by ultrasound monitoring with an interval of 2-3 days. Particular attention was paid to assessing the dynamics of changes in the abdominal cavity, the presence of fluid in the scrotal sac and free fluid in the abdominal cavity, and the degree of retroperitoneal tissue infiltration. Additionally, the condition of the gallbladder and bile ducts was assessed.

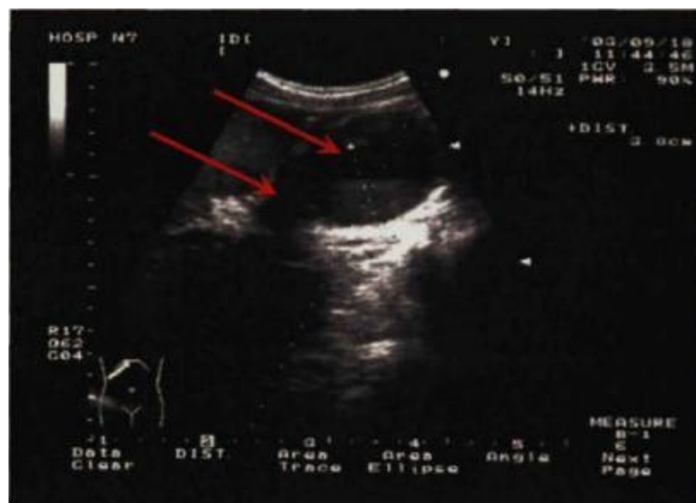


Figure 2.8. Echocardiogram of patient D., 54 years old. 2nd day after LXE surgery. Accumulation of bile in the subhepatic region.

Ultrasound was performed on 131 patients using digital scanners "Hitachi EUB 6500," "Siemens G 60S Sono Line."

Performing abdominal ultrasound was significantly complicated due to the severity of the patients' condition and restricted diaphragm mobility. Abdominal cavity examination is also complicated by intestinal paresis, which complicated the interpretation of the ultrasound picture. The visualization of the surgical intervention area was simplified by scanning from the intercostal spaces using a sectoral sensor. In the postoperative period, great importance was attached to examining the projection of the gallbladder bed and the subhepatic space for the presence of localized fluid accumulations. In the presence of fluid accumulation in the subhepatic space, ultrasound made it possible to determine its volume, and if necessary, to perform diagnostic puncture under ultrasound control for diagnostic and therapeutic purposes. Puncture and, if necessary, drainage of volumetric fluid formations were performed under ultrasound control using a linear T-shaped sensor with a frequency of 3.5 MHz.

Endoscopic retrograde pancreatocholangiography.

The primary diagnostic method for identifying pathologies within and outside the hepatic bile ducts and the main pancreatic duct was RCPG. This method is informative and objective for assessing the condition of the biliary tract. RCPG allowed for the determination of the cause, nature, and level of bile and pancreatic duct obstruction, as well as changes in the nature of bile. In patients, RCPG was performed on 17 patients and allowed for: correctly establishing the genesis of bile leakage, and determining the presence and localization of contrast outside the bile ducts.

RCPG allowed for the resolution of diagnostic problems and the implementation of adequate interventions to resolve cholestasis phenomena, or, equally importantly, to recommend a rational treatment method in each specific case (Fig. 2.9).

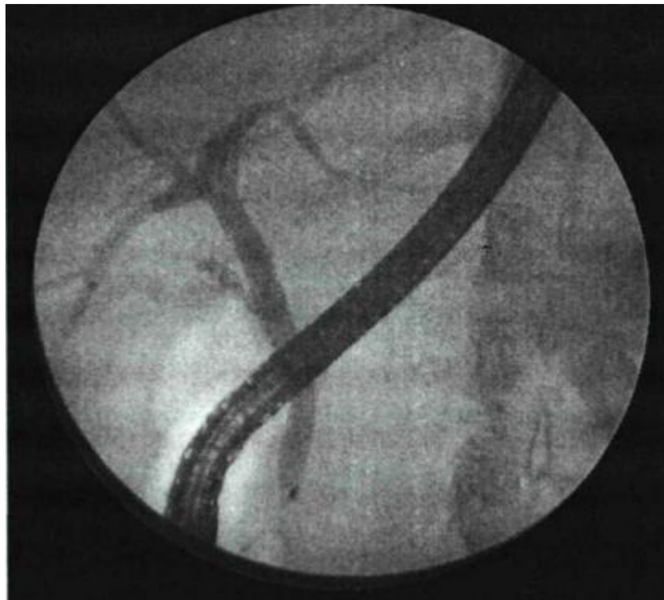


Fig. 2.9 RPXG. Patient S., 47 years old. Condition on the 3rd day after LXE surgery. Residual choledocholithiasis, biliary hypertension.

RCPG was performed in a special radiological office using a General Electric C-arc X-ray machine with an electronic-optical transducer. In addition to the generally accepted fixation of X-ray images on films, we used the recording of X-ray data on magnetic media and hard drives of personal computers. To implement the endoscopic part of the treatment and diagnostic complex, various models of endoscopic devices were used. Preference was given to the endoscopes of the Japanese firm "Olympus," whose devices have a large number of modifications, which are extremely necessary for choosing optimal conditions for performing manipulations, and are distinguished by high reliability and ease of operation. The main models of duodenoscopes were the JF-1T 40 series endoscopes with an instrumental channel with a diameter of 3.2 mm. These endoscope models have a small outer diameter and a significant curvature of the distal end, allowing them to be highly maneuverable during duodenal deformities. Duodenoscopes with a large instrumental canal clearance of 4.2 mm were used to perform transpapillary therapeutic interventions. This allowed for the use of large-diameter instruments at various stages of intervention.

For contrasting bile ducts, ionic and non-ionic contrast agents were used: urographin, trazograph, omnipak 300, and ultravist 300 at a concentration of 25-30% to avoid the "clogging" effect of low-density concretions.

Fistulocholangiography

We used FCHG for external bile leakage through a drainage tube in hepatocholedochus in 9 patients. This study contributed to the identification of bile duct damage and its localization. The technique for performing fistulaography is as follows. The patient lies on their back. 10-15 ml of water-soluble contrast agent (omnipak) was injected into the drainage tube at low pressure. The radiography was performed in several projections (Fig. 2.10).

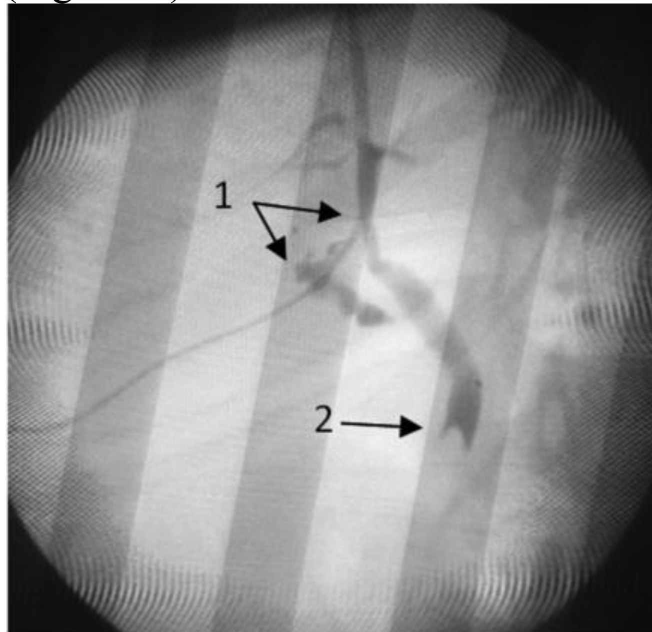


Figure 2.10. Fistulocholangiogram of patient A., 41 years old. The release of contrast material from the bile ducts into the abdominal cavity is determined. 1 - drainage in the hepatocholedochus; 2 — concretion of the distal part of the common bile duct.

Intraoperative cholangiography

Intraoperative cholangiography is an indispensable diagnostic method for the intraoperative diagnosis of IVP lesions (Fig. 2.11).

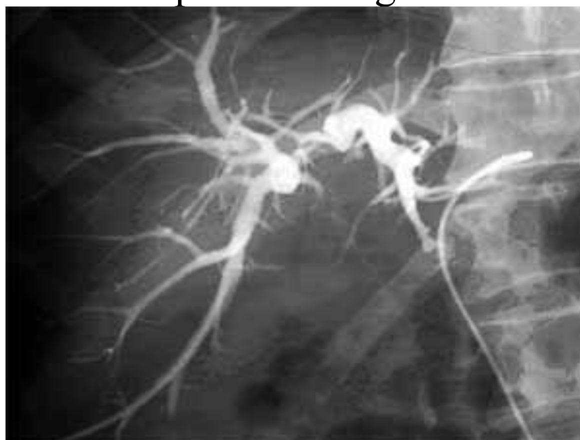


Figure 2.11. Intraoperative cholangiography of patient D., 46 years old. Intrahepatic bile ducts are contrasted. The distal part of the hepatocholedochus is not contrasted.

Intraoperative cholangiography is considered absolutely indicated in anatomically complex situations and when there is a suspicion of intraoperative damage to the gastrointestinal tract, and was performed in 24 patients. The main indications for IHD were the appearance of bile in the surgical field, when the source of its leakage is unclear, or the presence of additional tubular structures in the cervical area of the gallbladder. Intraoperative cholangiography was performed either through the bladder duct or by puncture. Triobmrast contrast agent and urographin 76% - 20.0 were administered.

Magnetic resonance pancreatocholangiography (MRPCHG)

MRPCHG is the most informative scanning diagnostic method and was performed on 21 patients. The study was performed using the "Philips Gyroscan Intera" apparatus, 1.0 T. The MRPCHG methodology allowed for obtaining a complete direct image of the intra- and extrahepatic bile ducts without the administration of contrast agents or intervention in the biliary system. The image can be obtained in several projections (horizontal, frontal, sagittal) depending on the research objective. MRPXG is distinguished by its good reproducibility. The use of MRPCHG at the preoperative examination stage allowed for the non-invasive assessment of biliary hypertension severity, the identification of anatomical features of the biliary tree, and the assessment of damage levels (Fig. 2.12).

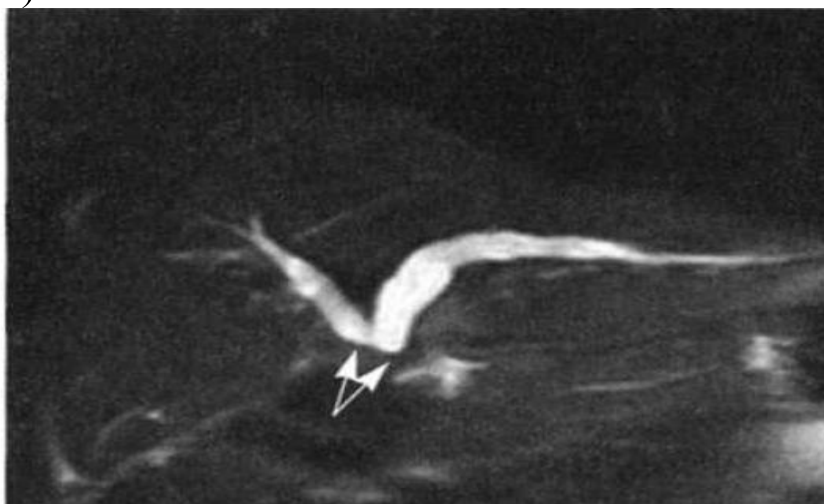


Figure 2.12 MRPXG. Patient S., 54 years old. Condition after LXE surgery, 2nd day. Complete lesion of hepatocholedochus at the hepatic portal

Laparoscopy

Laparoscopic examinations were performed under endotracheal anesthesia. Indications for laparoscopy were: 1) peritonitis of unknown etiology; 2) the need for sanitation and drainage of the abdominal cavity.

Laparoscopy was completed, if necessary, with gallbladder catheterization, decompression, and biliary tract sanation. The peritoneal exudate obtained during laparoscopy was subjected to bacteriological examination.

The study was conducted on 49 patients under general intravenous or intubation anesthesia. The choice of anesthesia method depends on the patient's somatic and psychological state, taking into account the proposed surgical program. Relaxation of the anterior abdominal wall muscles improved visibility and enhanced the diagnostic value of the procedure.

Pneumoperitoneum was applied using one of the known methods. Depending on the laparoscope diameter, a 5 or 10 mm troakar was inserted. Diagnostic laparoscopy was performed using a video system. (Fig. 2.13).

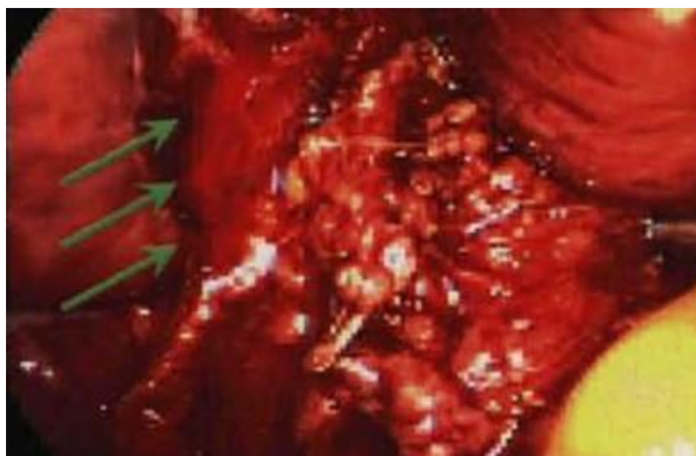


Figure 2.13. Relaparoscopy. Patient G., 39 years old. Condition after LXE surgery on the 3rd day. Biliary outflow from additional hepato-vesicular ducts (Lyushka's ducts) is visualized.

Computed tomography (CT) with bolus contrast was performed. Repeat research was conducted as necessary.

CT was performed on 19 patients. The cut thickness and tomography step were 10 mm from ThIX-X to LIII-IV. The obtained data made it possible to more reliably assess the condition of abdominal organs and retroperitoneal space, differentiate the form of peritonitis, and determine therapeutic and diagnostic tactics.

Laboratory studies of peripheral blood, urine, and biochemical blood analyses were performed according to generally accepted methods.

To characterize the degree of endogenous intoxication and the dynamics of the inflammatory process, the calculation of the leukocyte index of intoxication by J.J. Kalf-Kalif was used.

To diagnose complications in a timely manner, blood, bile, peritoneal exudate, and fluids aspirated during diagnostic punctures in clinical microbiology laboratories were subjected to microbiological examination.

To assess the severity of the patients' condition, the APACHE II scale (Acute Physiology and Chronic Health Estimation; KnausW.A. et al., 1985). The severity of physiological indicators was calculated by adding the scores obtained during the assessment of the body's physiological and laboratory parameters. The state of the nervous system was assessed using the Glasgow scale. The total score of the APACHE II scale was obtained by adding the scores of physiological indicators, patient age, and chronic diseases.

The degree of organ dysfunction was determined using the SOFA scale (Sequential Organ Failure Assessment; Vincent J.L. et al., 1996), which accounts for disorders in the cardiovascular, respiratory, liver, kidney, circulatory, and central nervous systems.

Assessment of systemic inflammatory response syndrome SIRS (SystemicInflammatoryResponseSyndrome; BoneR.C. et al. 1991) were conducted by identifying international clinical and laboratory criteria:

- body temperature above 38°C or below 36°C;
- tachycardia more than 90 beats per minute;
- tachypnoea greater than 20 per minute or pCO2 less than 32 mm Hg;
- leukocytosis more than 12x109/l or less than 4x109/l, or more than 10% of immature forms.

Statistical processing of the research results was performed using the "IBMPCAT "Pentium-IV" personal computer with an expanded "Microsoft Office" application package version 2000 for personal computers. The statistical significance of the indicators and the reliability of differences between the compared groups were evaluated using the "BIOSTAT" software package, using Student's t-test, Fisher's t-test, and $\chi 2$ criteria. Spearman's rank correlation coefficient was used to analyze the dependencies.

CHAPTER 3. OPTIMIZATION OF SURGICAL TREATMENT FOR BIAL PERITONITIS AS A COMPLICATION OF ACUTE CHOLECYSTITIS

3.1. Clinical presentation of biliary peritonitis as a complication of acute cholecystitis

This chapter presents the results of the examination and treatment of 82 patients with biliary peritonitis as a complication of acute destructive cholecystitis who underwent surgery between 2001 and 2020.

Taking into account modern trends in the development of surgery, to solve research tasks aimed at developing new treatment and diagnostic tactics for biliary peritonitis, patients were divided into two groups. Group I (comparison group) included 33 patients with peritonitis as a complication of acute destructive cholecystitis operated on during the 2001-2010 period, whose comprehensive treatment utilized standard generally accepted approaches. To the second group (main group) – 49, operated on during the 2011-2020 period, in whom the algorithm for conducting therapeutic and diagnostic measures was built on the principles of FTS - an accelerated recovery program (ACP) and minimally invasive surgical interventions were applied as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery - ERAS (Enhanced Recovery After Surgery).

Bile peritonitis developed most frequently in elderly and senile patients, due to an increase in the destructive forms of acute cholecystitis with peritonitis, which were accompanied by blurred disease symptoms. Elderly patients, as a rule, had a long history of COPD and were carriers of a dormant infection with significant morphological changes not only in the gallbladder but also in the liver and pancreas. Furthermore, these patients had severe comorbidities that, to a certain extent, prevented surgeons from performing rehabilitative planned surgical interventions, leading to the development of destructive forms of acute cholecystitis, gallbladder perforation, and biliary peritonitis.

Based on the mechanism of bile leakage into the abdominal cavity as a complication of acute destructive cholecystitis, we observed two forms of biliary peritonitis: penetrating and sweating. Perforated bile peritonitis was found in 27 (32.9%) patients (12th comparison group, 15th main group), manifesting as an acute catastrophe in the abdominal

cavity against the background of destruction and perforation of the gallbladder wall. Propotatory biliary peritonitis developed against the background of destructive cholecystitis without perforation of the gallbladder wall, and due to the gradual transpiration of bile into the free abdominal cavity, the peritonitis was accompanied by subtle symptoms. Only when significant bile accumulation occurs in the abdominal cavity did symptoms characteristic of peritonitis manifest, which served as the reason for their transport to a surgical hospital. According to our observations, sweat-induced peritonitis occurred in 55 (67.1%) patients (21st comparative group, 34th main group). Thus, in our observations, a significant prevalence (more than 2 times) of sweat-induced bile peritonitis is noted (Table 3.1).

Table 3.1

Distribution of patients according to the mechanism of bile peritonitis development

character peritonitis	**Total patients**		**Gr. Compare**		**Main gr.**	
	quantity	%	quantity	%	quantity	%
punching	27	32,9	12	44,4	15	55,6
sweaty	55	67,1	21	38,2	34	61,8
total	82	100	33	40,2	49	59,8

In the development of biliary peritonitis, according to Academician F.G. Nazirov et al. (2019), the following factors are fundamental.

The nature, quantity, and rate of bile outflow. The reaction of the peritoneum and the organism as a whole differs when massive, simultaneous bile leakage occurs, or when it flows slowly or bile is sweated out. In the first case, the clinic of abdominal shock was observed, whereas with bile sweating, it occurred clinically imperceptibly (in our observations, out of 27 patients with biliary peritonitis, only 3 were admitted to the clinic in a state of shock). The quality of bile also influenced the development of the pathological process caused by bile. In cases of gallbladder empyema, wall perforation was not accompanied by a shock state (in our observations, there were 10 such patients).

The site of bile outflow is the free or bounded abdominal cavity. The spread of bile throughout the abdominal cavity was accompanied by a severe shock reaction. At the same time, when bile was discharged and accumulated in a limited space, a clear picture of peritonitis manifestations was not observed.

Thus, among 82 patients with destructive cholecystitis complicated by biliary peritonitis, according to the nature of the pathological process, sweat was observed in 55 (67.1%) patients, of whom diffuse was observed in 9 (16.4%) and localized in 46 (83.6%). Perforated bile peritonitis was observed in 27 (32.9%) patients, including disseminated in 10 (37.1%) and localized in 17 (62.9%) (Table. 3.2).

Table 3.2

Distribution of patients by prevalence of biliary peritonitis

character peritonitis	**Total patients**		**Gr. Compare**		**Main gr.**	
	quantity	%	quantity	%	quantity	%
scattered	19	23,2	8	42,1	11	57,9
demarcated	63	76,8	25	39,7	38	60,3
Total	82	100	33	40,2	49	59,8

Thus, according to our study, circumscribed biliary peritonitis was observed in 3⁄4 of patients (76.8% of observations).

In patients with puncture and sweat bile peritonitis upon admission to the hospital, the acute onset of the disease was noted in 27 (32.9%) and gradual progression in 55 (67.1%). The more severe form - diffuse biliary peritonitis - was observed in 23.2%, i.e., in 1⁄4 of the patients.

On the first day of the disease, 31 (37.8%) patients were admitted, on the second day – 22 (26.8%), on the third day – 18 (21.9%), from four to seven days – 6 (7.3%), and over seven days – 5 (6.1%). Thus, a significant percentage of patients are hospitalized late, which is explained by their late seeking medical assistance as a result of inadequate assessment of their condition.

The diversity of the pathological process was directly dependent on the complex mechanism of bile action and the body's response. These

factors are to some extent determined by the multi-symptomatic nature of biliary peritonitis and the absence of pathognomonic signs. In 1/3 of cases, bile peritonitis began acutely and suddenly, and then its clinical picture resembled many acute diseases of the abdominal organs, which often led to diagnostic errors. At the same time, biliary peritonitis in 2/3 of the patients began slowly with a gradual increase in disease symptoms, which were assessed as chronic diseases of the abdominal organs. The specified clinical features and course of biliary peritonitis necessitated late diagnosis and surgical treatment for this disease. All patients exhibited symptoms of a systemic inflammatory reaction.

Upon hospitalization, a relatively satisfactory general condition was noted in 17 (20.7%) patients, moderate severity in 31 (37.8%), severe in 24 (29.3%), and extremely severe in 10 (12.2%) patients.

Based on the criteria for diagnosing sepsis, systemic inflammatory response syndrome (SIRS) was observed in 114 (87%) patients, 10 of whom were in a septic state.

3.2. Optimization of surgical treatment tactics for patients with biliary peritonitis resulting from acute destructive cholecystitis

Patients with biliary peritonitis required emergency surgical treatment, and the presence of bile in the abdominal cavity required its immediate removal and the elimination of the source. At the same time, patients were most often elderly with severe comorbidities, which required a differentiated approach to the timing and scope of surgical intervention. In these cases, there was a need for intensive infusion detoxification therapy, correction of water-electrolyte balance, and replenishment of protein composition in the body. However, it was impossible to normalize these disorders without surgical intervention; therefore, it was necessary to be guided by relative indicators of improvement and stabilization of the patients' condition.

Of the 82 patients admitted to the hospital with biliary peritonitis, 31 (37.8%) underwent surgery within the first 6 hours. This group of patients was admitted in a relatively stable condition, requiring diagnostic measures and preoperative preparation. Between 6 and 24 hours, i.e., within 1 day, 43 (52.4%) patients underwent surgery. Within 24 hours of admission, surgery was performed on 8 (9.8%) patients (Table 3.3).

Table 3.3

Distribution of patients by surgery duration from the time of admission to the hospital

Transaction terms	Total patients		Gr. Compare		Main gr.	
	quantity	%	quantity	quantity	%	quantity
Until 6 o'clock.	31	37,8	12	36,4	19	38,8
From 6 to 24 hours.	43	52,4	17	51,6	26	53,1
Over 24 hours.	8	9,8	4	12,1	4	8,1
Total	82	100	33	40,2	49	59,8

In patients of the comparison group, depending on the volume, the operations performed were divided into 3 types: - CE, sanation, and drainage of the subhepatic space were performed in 19; - CE, sanitation, and drainage of the abdominal cavity (right lateral canal and pelvis) were performed in 9; - CE, choledocholithotomy, sanation, and drainage of the subhepatic space were performed on 5 patients. In all cases, a wide upper-middle access was used (Table 3.4).

Table 3.4

Scope and nature of surgical interventions in patients with biliary peritonitis in the comparison group

Operation volume	Total patients	
	quantity	%
Laparotomy, surgical excision, sanitation, and drainage of the subhepatic space	19	57,6
Laparotomy, surgical excision, sanitation, and abdominal drainage	9	27,3
Laparotomy, SE, choledocholithotomy, sanation, and drainage of the subhepatic space	5	15,2
Total	33	100

The main group of patients underwent the following types of operations:
- Microcholecystostomy and bilum puncture under ultrasound with guidance for 11; - LCHE, sanitation, and drainage of the subhepatic space were performed in 9; - LCHE, sanitation and drainage of the abdominal cavity (right lateral canal and pelvis) 4.; LCHE, sanitation and drainage of the subhepatic space, EPST–3; - X-ray from mini-laparotomy access and choledocholithotomy, drainage of the choledochus and sanation and drainage of the subhepatic space 6; - CE, sanitation, and drainage of the abdominal cavity from an open wide laparotomy approach in 16 patients (Table 3.5).

Table 3.5

Scope and nature of surgical interventions in patients with biliary peritonitis in the main study group

Operation volume	Total patients	
	quantity	quantity
Microcholecystostomy and bilum puncture	11	22,4
LCHE, sanitation, and drainage of the subhepatic space	9	18,4
LCHE, abdominal sanitation and drainage	4	8,1
LCHE, sanitation and drainage of the subhepatic space, EPST	3	6,1
Minilaparotomy, CE, choledocholithotomy, choledochus drainage, sanation and drainage of the subhepatic space	6	12,2
Laparotomy, PE, sanitation, and abdominal drainage	16	32,6
Total	49	100

In the main study group, 11 patients with acute destructive cholecystitis and limited bile accumulation in the subhepatic space with a severe general condition underwent decompression of the gallbladder via transcutaneous-transhepatic microcholecystostomy (TCHMCS) and biloma puncture under ultrasound guidance. Bile drainage was performed through a section of the liver parenchyma to seal the duct and prevent bile leakage. In all cases, drainage was performed using an "umbrella" stiletto—a catheter with a "basket" at the end, with catheter diameters of 4F and 9F. After performing microcholecystostomy, these patients underwent bilum puncture under ultrasound supervision to evacuate the limited accumulation of fluid in the abdominal cavity. The contents of the gallbladder and bile duct were completely evacuated, the cavity was rinsed with a physiological solution until a pure secretion was obtained, and the drainage was extended. The drainage secretions were evaluated visually and sent for bacteriological examination. The full emptying of the gallbladder cavity was monitored echographically.

All percutaneous interventions were performed under ultrasound scanning control using a Bruel & Kjer 1846 device with a sectoral sensor operating in 3.5 MHz mode with a removable puncture attachment. The telemonitor of this device is equipped with an electronic matrix to guide the puncture trajectory to the target organ. The angle of inclination provided by the puncture device (approximately 20°), and consequently the tool's stroke, coincides with the marker line on the telemonitor screen (Fig. 3.1).

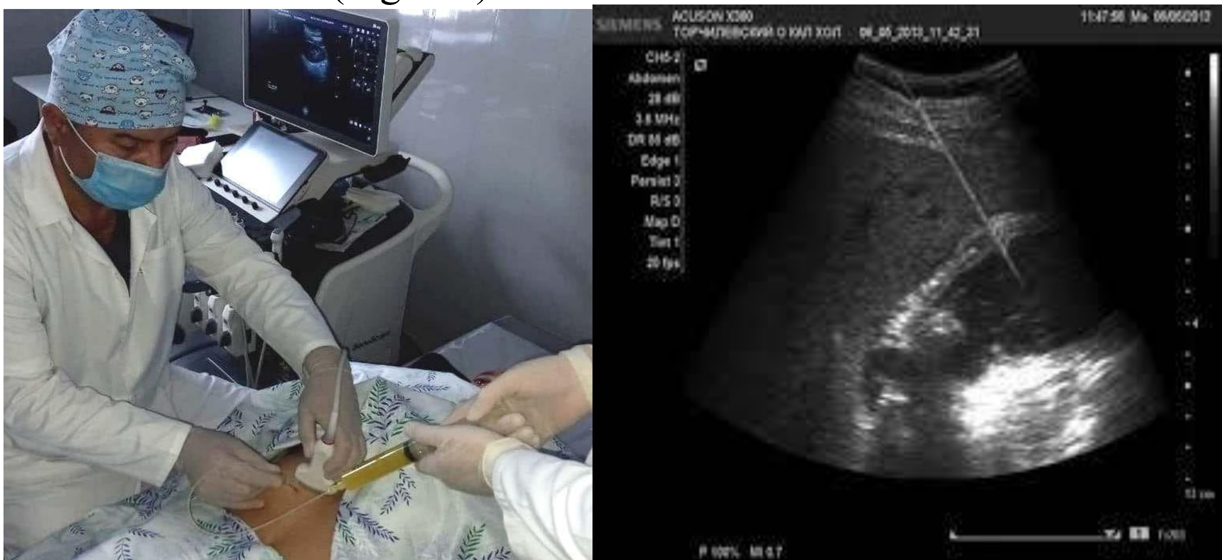


Figure 3.1 Biloma puncture under ultrasound scanning control

We present the clinical observation:

Clinical example*. Patient K., 68 years old, medical history No. 3948, was admitted to the clinic on March 12, 2019, complaining of pain in the right hypochondrium, abdominal bloating, bitter taste in the mouth, body temperature rising to 39°C, periodic chills, nausea, and vomiting. Has been ill for 10 days. Previously, she had experienced several episodes of seizure-like pain in her right hypochondrium. Ambulatory ultrasound examination revealed gallbladder concretions dating back to 2018. The patient's general condition upon admission is of moderate severity, the skin is pale. Auscultation reveals vesicular breathing in the lungs on both sides, with no wheezing. Heart sounds are muffled, and the pulse is rhythmic and tense. The tongue is slightly dry and covered with a white coating. The abdomen is of normal shape, participates in the act of breathing, and palpation reveals pain in the right hypochondrium. Murphy and Ortner-Grekov symptoms are positive. The liver and spleen are not palpated. The chair is the same color. Frequent urination.*

General blood test: Hb-85 g/l, er.-2.7x1012 µl/l, CP-0.8, thrombus-230, leukaemia-12.7x109 µl/l, blood coagulation -3'50"-4'00," p.-3%, c.-65%, eosin-1%, lymph.-20%, mon.-7, ESR-25 mm/h. Biochemical blood test: biol.-22.65 µmol/l, ALT-0.96 mmol/l, AST-0.34 mmol/l, tim.pr.-4, urine.-4.66 mmol/l, stable nitrogen-17 g/l, creatinine-82.9 mmol/l, total protein-70.5 g/l. Chest X-ray: no pathology identified. Ultrasound: gallbladder 8.5×4 cm, bladder wall 5 mm, specifics up to 0.8 cm in diameter are identified in the lumen. Choledoch d-0.9 cm, thick bile with flakes is identified in the lumen, intrahepatic bile ducts are not dilated.

A diagnosis of acute calculous cholecystitis has been established. On the 2nd day, an ultrasound-guided CCHMCS was performed. 160.0 tons of purulent bile with flakes were evacuated. On the 2nd day from the moment of drainage, a fistulography was performed, during which the gallbladder with large stones and undilated bile ducts were contrasted, with a good discharge of contrast into the 12th finger. Despite the ongoing medication treatment and the adequate functioning of the microcholecystostomy, hyperthermia persisted in the patient. Upon ultrasound performed on the 2nd day after drainage, a 16.7x5.5x6.8 cm bulk formation was detected in the right mesogastric region, with areas of various echogenicity—a biloma (Figure 3.4).

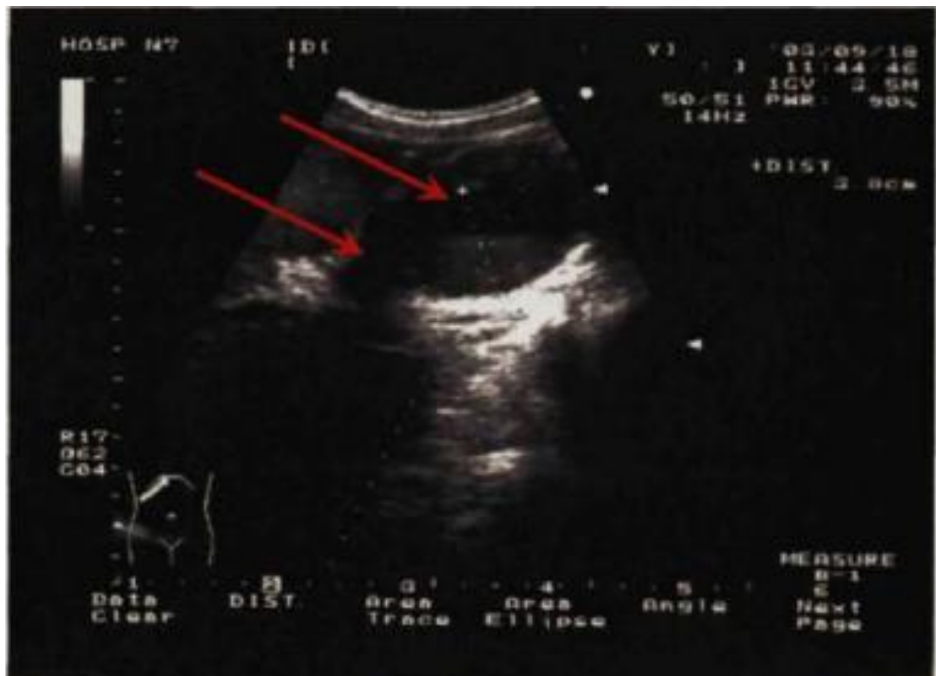


Figure 3.4 Echocardiogram of patient K., 68 years old, 2 days after TMJMS. Limited fluid accumulation in the subhepatic space up to 150 ml.

Under ultrasound guidance, the biloma was drained, from which 150.0 grams of turbid bile were obtained (Fig. 3.5). After draining the biloma, the patient's body temperature normalized. During the control ultrasound performed after drainage, positive dynamics were noted, the size of the bulk formation decreased to 4.7x2.8 cm, and the biloma was re-evacuated. Subsequently, after replacing the drainage with a rubber outlet, the cavity was obliterated.

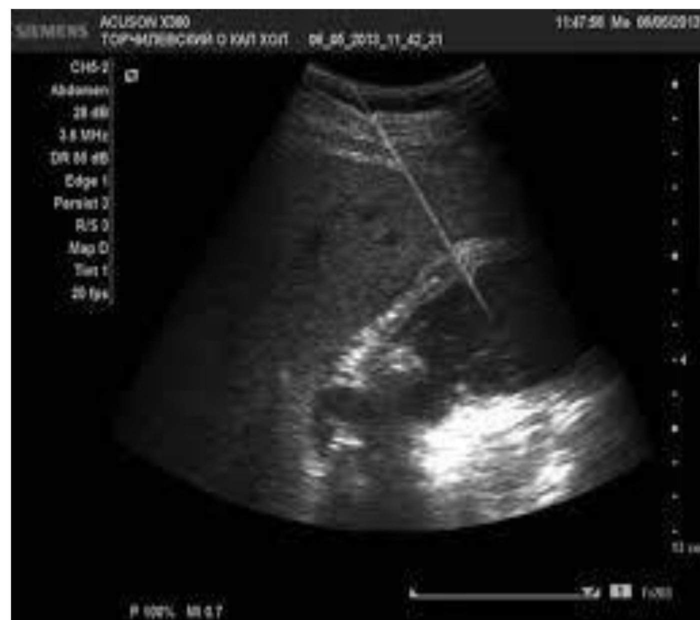


Figure 3.5. Ultrasound-controlled biloma puncture on the 2nd day after TMJMCS in patient K.

The subsequent postoperative period proceeded smoothly. Body temperature normalized, pain and peritoneal symptoms disappeared. She was discharged on the 7th day after a follow-up ultrasound, during which no fluid accumulation was detected in the subhepatic space. The patient has been discharged in a satisfactory condition.

In this example, an elderly patient demonstrated the effectiveness of TCMCS and puncture for bile accumulation in the abdominal cavity. After 4 months, she underwent a scheduled LCHE.

Laparoscopic cholecystectomy was completed by sanation and drainage of the subhepatic space in 9 patients with acute destructive cholecystitis and local peritonitis. In cases of diffuse biliary peritonitis, LXE was supplemented by abdominal cavity sanation with mandatory additional drainage of the right lateral canal and pelvic cavity in 4 patients. LXE was performed under general anesthesia, achieving deep relaxation of the abdominal wall. The main stages of endoscopic surgery are: creating a pneumoperitoneum, inserting troakers and instruments, reviewing the abdominal cavity, isolating the gallbladder from the adhesions, bladder duct, and bladder artery with subsequent clipping and incision; isolating the gallbladder from the liver bed and extracting it from the abdominal cavity (sometimes using a container) and installing a control drainage in the subhepatic space. To insert troaches into the abdominal cavity, an arc-shaped incision of 1.5 cm is made above or below the navel, and three incisions of 0.5 cm are made in the right subcostal area. LCHE was performed standardly using the "elephant's trunk" methodology, with identification and separate clipping of the bladder duct and artery.

In 3 patients with co-occurrence of choledocholithiasis, EPST was performed after LCHE.

We present the clinical observation:

Clinical observation: Patient M., 63 years old, I/B No. 4651/125, was admitted to the clinic on 12.11.2019 with complaints of pain in the right hypochondrium, nausea, vomiting, darkening of urine color, and sclera icterus. Has been ill for a week. He attributes his illness to overeating fatty foods. In her medical history, she had several episodes of seizure-like pain in her right hypochondrium. Ultrasound examination revealed gallbladder concretions dating back to 2016.

The patient's general condition upon admission was of moderate severity, and the skin was icteric. Auscultation reveals vesicular breathing in the lungs on both sides, with no wheezing. Heart tones are muffled, with an accent of the second tone above the aorta, and the pulse is rhythmic and tense. The tongue is slightly dry and covered with a coating. The abdomen is of normal shape, participates in the act of breathing, palpation reveals muscle tension in the right hypochondrium, and under the rib, the floor of a painful, enlarged gallbladder is palpated. Murphy and Ortner-Grekov symptoms are positive. The liver and spleen are not palpated. The chair is the same color. Frequent urination.

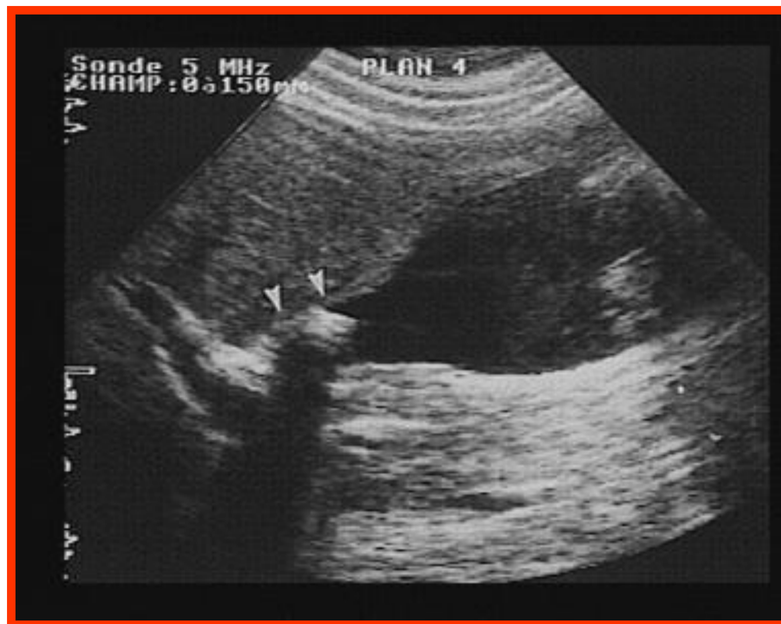


Fig. 1. Patient M., 63 years old. Sonogram. Enlarged gallbladder.

Total blood count: Hb-96 g/l, er.-3.4x1012/mcl, F-0.8, thrombus-230, l.-9.7x109/mcl, VSC-3'50"-4'00," p.-3%, c.-65%, eoz.-1%, lymph.-20%, mon.-7, ESR-25 mm/h, Ht-24.

Biochemical blood test: bil. -149.65 µmol/L, direct -138.27 µmol/L, ALT -1.96 mmol/L, AST -1.34 mmol/L, tim.pr.-2, urine -4.66 mmol/L, stable nitrogen -17 g/L, creatinine -82.9 mmol/L, total protein -70.5 g/L.

Chest X-ray: no pathology identified.

Ultrasound: gallbladder measuring 15×8 cm, concretions up to 1 cm in diameter are identified in the lumen, and one concretion is embedded in the gallbladder neck. Choledochus d-1.9 cm, intrahepatic bile ducts dilated.

With the clinical diagnosis: "Acute destructive calculous cholecystitis. Local peritonitis. Choledocholithiasis. On November 13, 2019, laparoscopic cholecystectomy was performed under endotracheal anesthesia. The phlegmanously altered gallbladder was removed after preliminary puncture and evacuation of pus from the bladder cavity. Up to 150 ml of bile and serous exudate were evacuated from the subhepatic region. Sanitation and drainage of the subhepatic region were performed.

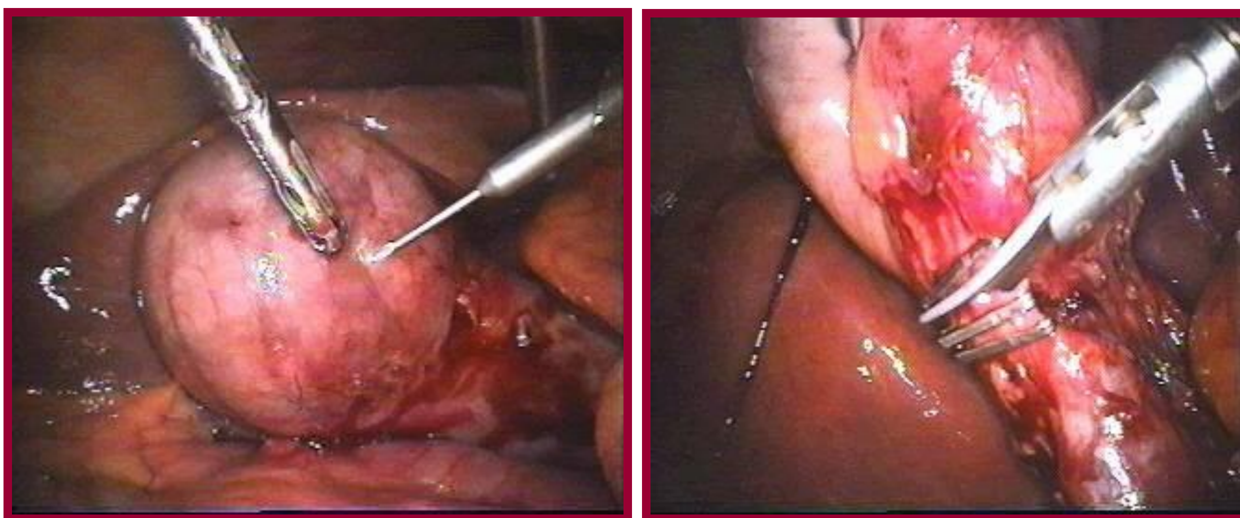


Fig. 3.7. Stages of laparoscopic cholecystectomy for patient M., 63 years old.

On November 16, 2019, EPST was performed to decompress the bile ducts (Fig. 3.8). Under pressure, thick, turbid bile and 0.7-0.9 cm soft concretions were isolated. The patient's condition improved after the surgery.

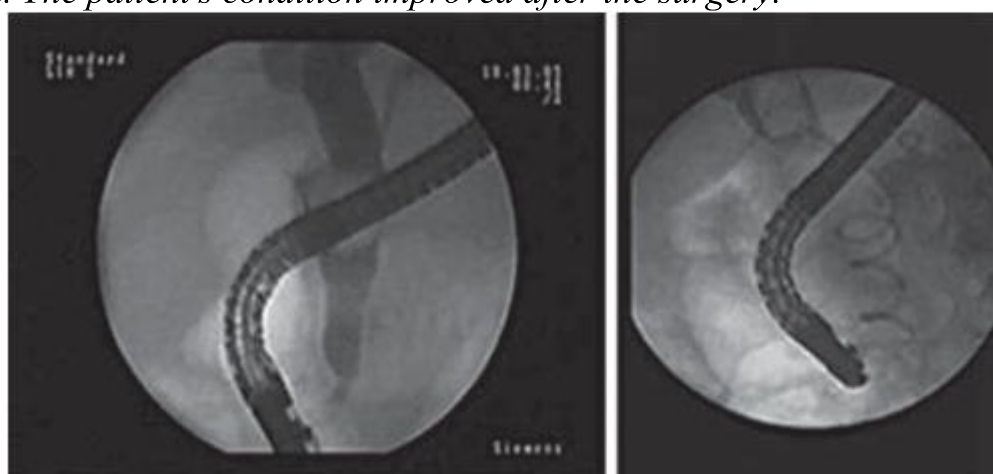


Fig. 3.8. EPST and endoscopic installation of the nazobiliary drainage for patient M., 63 years old.

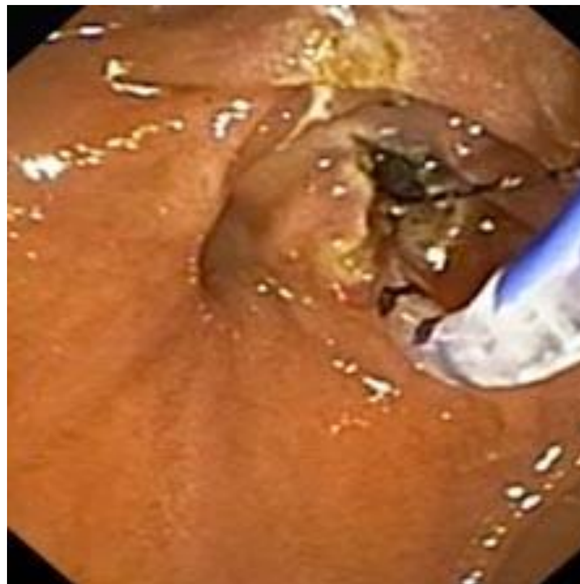
Repeat blood test on the 5th day. General blood test: Hb-94 g/l, er.-3.2x1012/mkl, F-0.8, thrombus-230, l.-6.5x109/mkl, VSC-3'50"-4'00," p.-3%, c.-65%, eoz.-1%, lymph.-20%, mon.-7, ESR-15 mm/h, Ht-24. Biochemical blood test: biol. - 29.15 µmol/L, direct - 18.1 µmol/L, ALT - 0.92 mmol/L, AST - 1.34 mmol/L, tim.pr. - 2, urine - 4.66 mmol/L, stable nitrogen - 17 g/L, creatinine - 82.9 mmol/L, total protein - 70.5 g/L.

The postoperative period proceeded smoothly, with serous-hemorrhagic fluid up to 5 ml from the drainage tube on the first day. The drainage tube was removed on the second day after the surgery. The patient was discharged home in

satisfactory condition on the 7th day after LCHE and on the 4th day after EPST on November 20, 2019.

In this clinical observation, the use of endoscopic technologies allowed for the correction of severe complications of UC, such as acute phlegmonous cholecystitis, biliary peritonitis, and choledocholithiasis.

EPST was performed in the Endosurgery Department 1 of the SamMI clinic using a standard duodenoscope, an electrosurgical unit, and a sphincterotomy. In most cases, a pull-type sphincterotome was used. It is a plastic catheter with a metal string inside. In the distal part of the catheter, the string passes outside it and hides again in the membrane at the end of the papillotomy. The tension of the sphincterotome leads to the bending of its distal end and the placement of the string in the cutting position. This type of sphincterotomy differs in the length of the proboscis and the number of channels (for conduction, contrast administration). The length of the cutting string varies from 20 to 40 mm. The large length of the cutting string facilitates its correct orientation in the BDS. The most convenient ones seem to us to be sphincterotomes with an additional conductor channel. Firstly, their use avoids difficulties with repeated sphincterotomy of the bile ducts after primary catheter cannulation, contrast maintenance, and detection of indications for PCT—the sphincterotome is freely installed along the conductor; secondly, the conductor prevents the instrument from "sliding" out of the DCA during incision. (Fig. 3.6)



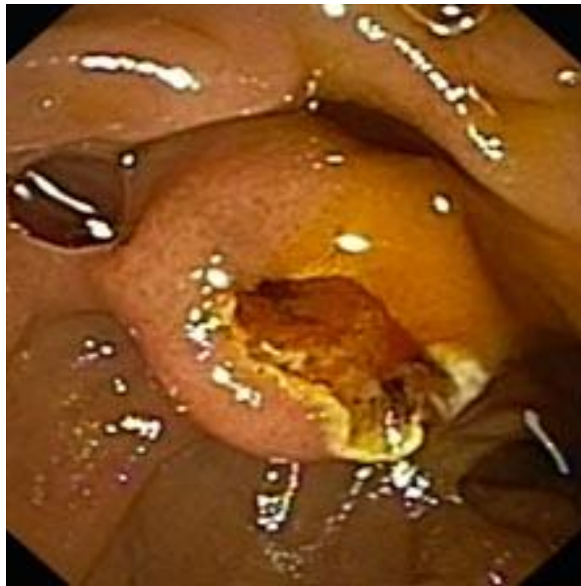


Fig. 3.6. Patient D., 50 years old. Stages of endoscopic papillosphincterotomy

During papillosphincterotomy, the patient must be adequately sedated (we use relaanium in combination with narcotic analgesics or propofol), and the peristalsis must be removed (we use atropine intramuscularly in combination with metasin intravenously). A sharp movement or peristaltic wave at the moment of incision can lead to extremely undesirable consequences. For prophylactic purposes, sandostatin and antibiotics were administered before the procedure.

The incision was performed by a series of short current injections, slowly (to adequately coagulate the edges of the incision and control its length), gradually withdrawing the sphincterotome, which ensured that only the tip of the cutting string was in contact with the tissues. (Figure 3.7)

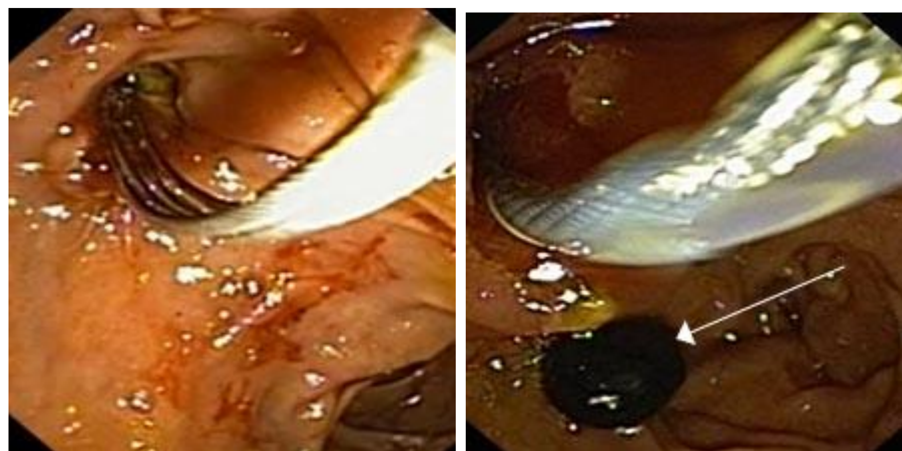


Fig. 3.7. Sphincterotomy stage

In all cases, EPST was completed with the installation of a nazobiliary drain (Fig. 3.8).

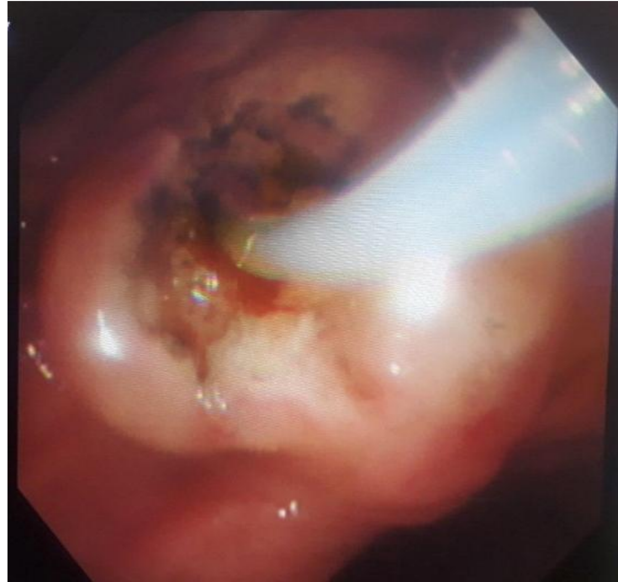


Fig. 3.8. Endoscopic papillosphincterotomy and installation of a nazobiliary drainage.

In 6 patients with SE, choledocholithotomy was performed from an open mini-access. To perform XE from a mini-access, a vertical transrectal incision with a length of 4-5 cm was made in the right hypochondrium. Retractor-mirrors create a significant operational space in terms of volume, allowing for visual control of the operation's progress and free manipulation of instruments. By changing the position of the retractor-mirrors and thereby increasing the surgical space in the area of interest, one can not only perform isolated cholecystectomy but also expand the intervention: perform choledocholithotomy and external drainage of the choledochus (Fig. 3.9).

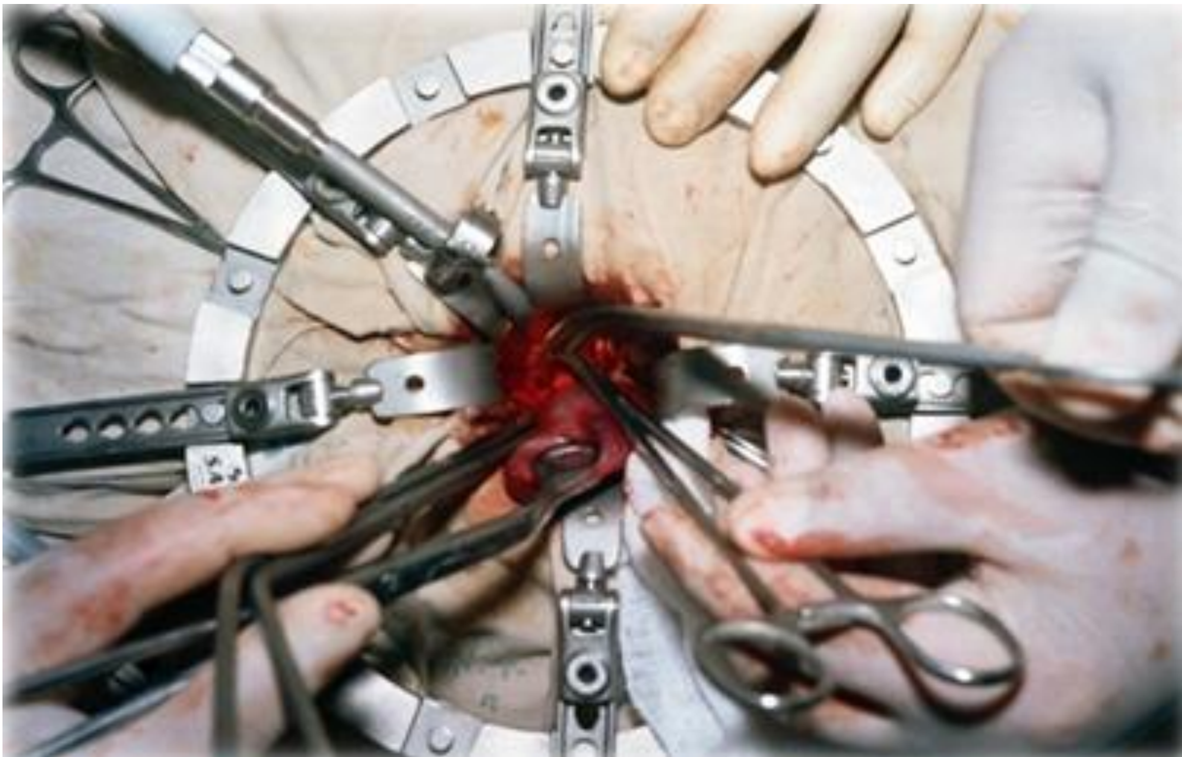


Fig. 3.9. SAN's "mini-assistant" toolkit

At the same time, in 16 patients with widespread biliary-purulent peritonitis, CE and abdominal cavity sanation were performed from a wide laparotomy approach.

We present the clinical observation:

Clinical observation: Patient Sh., 58 l. IB No. 4379/312 was admitted to SamMI Clinic No. 1 on May 24, 2020, with complaints of abdominal pain, nausea, vomiting, abdominal bloating, dry mouth, fever, chills, sclera jaundice, stool achola, and general weakness. From the history, he has been ill for 7 days. The patient's general condition upon admission is severe, with icteric skin and sclera. Auscultation reveals weak vesicular breathing in the lungs on both sides, with no wheezing. Heart sounds are muffled and rhythmic. The tongue is dry and covered. The abdomen is symmetrical, enlarged due to bloating, does not participate in breathing, and upon palpation, muscle tension and pain are detected in all areas. Symptoms of Shchetkin-Blumberg, Ortner-Grekov, Murphy, and Myussi-Georgiyevsky are positive. The liver and spleen are not palpated. Stool is acholytic. Frequent urination. General blood test: Hb-78 g/l, er.-2,2x1012/mcl, CP-0.7, thrombus-210, l.-12.1x109/mcl, VSC-2'30"-3'50," p.-3%, c.-65%, eoz.-5%, lymph.-22%, mon.-5, ESR-26 mm/h. Biochemical blood test: biol.-126.6 µmol/l, ALT-0.98 mmol/l, AST-1.19 mmol/l, tim.pr.-4, urine.-8.36 mmol/l, est. nitrogen-19 g/l, creat.-119.2 µmol/l, total protein-52.5 g/l. Chest X-ray: without pathology. Ultrasound: gallbladder measuring 94x45 mm, walls thickened to 8 mm, 9x13 mm concretion is identified in the neck area. The intrahepatic bile ducts are slightly dilated, the walls are thickened, and a 10x8 mm concretion is visible in the lumen

of the choledochus. The intestinal loops are dilated and swollen. Free fluid in the amount of 300 ml is determined in the subhepatic region and the pelvic cavity.

With the clinical diagnosis: "Acute calculous destructive cholecystitis. Peritonitis. Choledocholithiasis. Mechanical Jaundice" on May 25, 2020. The patient underwent surgery under general endotracheal anesthesia: "Laparotomy. Cholecystectomy. Choledocholithotomy. Sanitation and external drainage of the choledochus according to A.V. Vishnevsky. Abdominal cavity sanitation and drainage. Upon repeated blood analysis: Hb-74 g/l, er.-2.0x1012/mcl, CP-0.7, thrombus-243, l.-8.1x109/mcl, VSC-3'30"-5'50," p.-2%, c.-66%, eoz.-3%, lymph.-24%, mon.-5, ESR-14 mm/h. Biochemical blood analysis: biol.-36.6 μmol/l, ALT-0.78 mmol/l, AST-0.91 mmol/l, tim.pr.-4, urine.-7.56 mmol/l, acute nitrogen-16 g/l, creatinine-89.2 μmol/l, total protein-55.3 g/l. Ultrasound: Intrahepatic bile ducts are normal, wall thickness 3 mm, and a drainage tube is visible in the lumen of the choledochus. On the 7th day after surgery, the patient was discharged home in satisfactory condition with drainage in the choledocha.

This clinical example demonstrates the necessity of performing emergency surgery from a wide midline laparotomy approach with removal of the phlegmonously altered gallbladder, choledocholithotomy, and abdominal sanation.

Thus, the priority use of minimally invasive surgical interventions (diapeptic and laparoscopic methods) in the treatment of local biliary peritonitis as a complication of acute destructive cholecystitis was successfully implemented in 67.3% of patients in the main group. Performing XE and abdominal sanitation from a wide laparotomy approach was necessary in only 32.7% of cases with widespread bile-purulent peritonitis.

CHAPTER 4. OPTIMIZATION OF SURGICAL TREATMENT FOR POSTOPERATIVE BIAL PERITONITIS

4.1. Causes and features of postoperative biliary peritonitis development

This chapter presents the results of examination and treatment for 49 patients with biliary peritonitis that developed due to bile leakage into the abdominal cavity after operations on the bile ducts. Between 2001 and 2020, i.e., over the last 20 years, 5849 patients with cholelithiasis were operated on, and the frequency of this complication was 0.84%.

Among the complications of surgical intervention after surgery on the bile ducts, bile leakage into the abdominal cavity in the early postoperative period should be considered an independent problem, as it has very serious consequences and is life-threatening.

The main causes of postoperative bile leakage and biliary peritonitis in our observations were both "small" lesions of the bile ducts (according to the classification of E.I. Galperin (2011) as - failure of the gallbladder duct, aberrant liver-bladder ducts of the gallbladder bed (Lyushka's ducts), loss or dislocation of the previously installed drainage from the hepatocholedoch, and "large" lesions - iatrogenic unintentional injuries of the main bile ducts during cholecystectomy.

Three degrees of postoperative bile leakage were identified according to the classification proposed by L.Morgenstern (2006). Grade I bile leakage is up to 100 ml/day through drainage from the abdominal cavity or a limited accumulation of bile in the gallbladder bed with a volume of less than 100 ml according to ultrasound data. Grade II bile leakage - up to 500 ml/day through drainage or free fluid above and below the liver. Grade III bile leakage - more than 500 ml/day through drainage or free fluid in 3 or more abdominal areas.

The source of postoperative bile leakage in 9 observations was additional (aberrant) bile ducts (Lyushka ducts) in the bed of the gallbladder, in 14 observations - failure of the vesicle duct sheath due to slipping clips or ligatures, in 5 patients - biliary infection from a defect in the wall of the hepatocochleidox due to spontaneous detachment, i.e. dislocation of the established drainage from the hepatocochleidox, in 21 - iatrogenic damage to the main bile ducts (Fig. 4.1).

Bile leakage was observed after LCHE in 2.1% (21), CHE from mini-laparotomy access in 1.1% (9), and CHE from laparotomy access in 2.4% (19 patients).

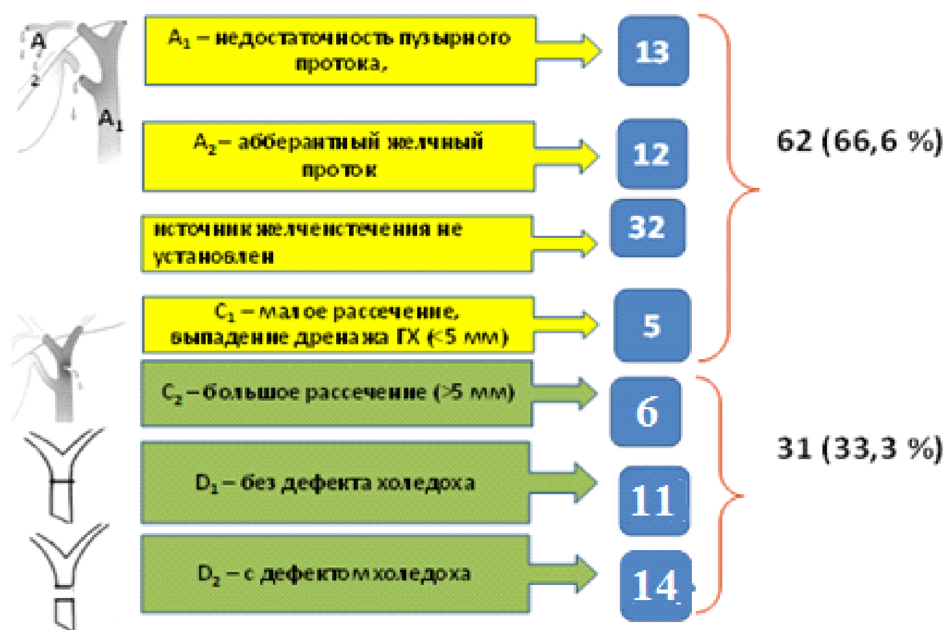


Fig. 4.1. Source of postoperative bile leakage into the abdominal cavity according to P. Neuhaus (2000).

The average age of patients with biliary secretion and biliary peritonitis after CE was 49+5.1 years – the most able-bodied age, with men accounting for 16 and women for 33, i.e., a ratio of 1:2, although in the gender structure of operated patients with UC, this ratio was 1:6, which once again confirms literature data regarding the complexities of performing CE in men.

Of the 49 patients with bile leakage, 35 (71.4%) were hospitalized and operated on urgent indications for acute destructive cholecystitis, and 14 (28.6%) for chronic calculous cholecystitis. According to our study, bile leakage was observed 3 times more frequently after emergency operations than after scheduled ones (Fig. 4.2).

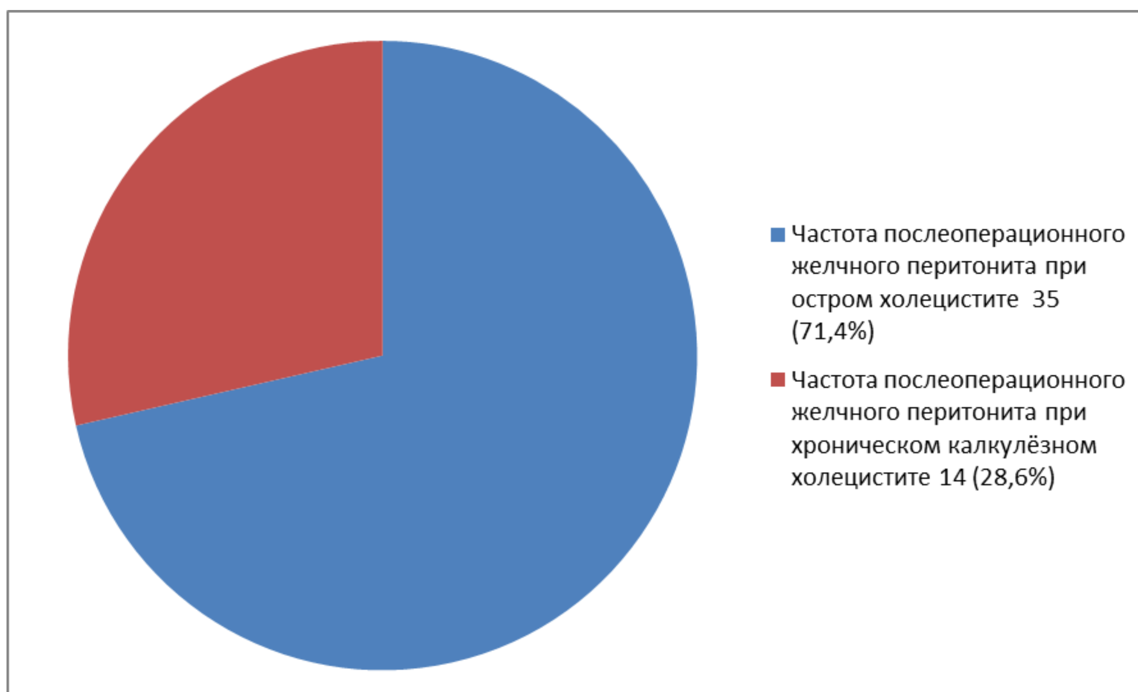


Figure 4.2. Frequency ratio of postoperative biliary peritonitis in acute and chronic cholecystitis

In cases of biliary peritonitis after SE in the early postoperative period, all patients underwent ultrasound (49), according to indications RPCH (14), fistula-cholangicography (9), intraoperative cholangicography (13), MRPCH (13), and relaparoscopy (12).

Taking into account modern trends in the development of surgery, to solve research tasks aimed at developing new therapeutic and diagnostic tactics for CP, patients were divided into two groups. Group I (comparison group) included 22 patients (1,1% of 2,048 patients) with postoperative biliary peritonitis as a complication of operations on bile ducts, operated on during the 2001-2010 period, whose complex treatment utilized standard generally accepted approaches. To the second group (main group) – 27 (0.7% of 3,801 patients) who underwent surgery during the 2011-2020 period, in whom the algorithm for conducting therapeutic and diagnostic measures was based on the principles of FTS - an accelerated recovery program (ACP) and minimally invasive surgical interventions were used as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery - ERAS (Enhanced Recovery After Surgery).

For grade I bile leakage and local biliary peritonitis up to 100 ml, according to ultrasound data in the comparison group (6 patients), 3 patients underwent contraperture recanalization with drainage of the subhepatic region. Relaparotomy was performed on 3 patients: the source of bile leakage in 1 observation was the dislocation of the drainage from the hepatocoeledoch, which was re-fixed. In another 2 observations, the source of bile leakage was the failure of the vesicle duct sheath, which was re-ligated. The subhepatic region has been sanitized and drained.

In patients with grade II bile leakage and local biliary peritonitis with a volume of up to 500 ml occupying the subhepatic region and the right lateral canal, according to ultrasound data in the comparison group (6 patients), relaparotomy with repeated ligation of the bladder duct was performed in 2 patients due to bladder duct insufficiency. At the same time, in 2 patients, choledocholithiasis and biliary hypertension were the causes of bladder duct culture failure; they underwent relaparotomy with choledocholithotomy and drainage of the choledochus. In 2 patients with spontaneous drainage loss from the biliary tract, relaparotomy was also performed with repeated drainage of the common bile duct. Surgeries were completed with abdominal cavity sanation and drainage of the subhepatic space, right lateral canal, and pelvic cavity.

Damage to the main bile ducts was the cause of grade III bile leakage and diffuse bile peritonitis in 10 patients of the comparison group. Restorative surgeries were performed in 5 cases, of which 2 patients with borderline damage to the hepatocholedochus had the defect sutured on a T-shaped drainage. With complete hepatocholedoch resection, a biliobilliary anastomosis was applied to 3 patients. Reconstructive surgeries were performed on 5 patients: hepaticoduodenoanastomosis was performed on 2, and external drainage of the proximal duct of the common hepatic duct was performed in the first stage due to peritonitis, followed by hepaticoduodenoanastomosis on a transhepatic framework drainage 3 months later.

In the main study group (7 patients), due to bile leakage from aberrant ducts in the gallbladder bed with a volume of up to 100 ml according to ultrasound data, 3 patients required puncture under echographic control to evacuate fluid accumulation in the subhepatic space.

We present the clinical observation:

Patient K., 48 years old, registration No. 3948/214, was admitted to the clinic on March 12, 2019. Complaints: pain in the right hypochondrium, bitter taste in the mouth, abdominal bloating, nausea, vomiting. Has been ill for 10 days. He attributes his illness to overeating. Previously, she had experienced several episodes of seizure-like pain in her right hypochondrium. Ambulatory ultrasound examination revealed gallbladder concretions dating back to 2018.

Condition is moderate, skin is pale. Auscultation reveals vesicular breathing in the lungs on both sides, with no wheezing. Heart sounds are muffled, and the pulse is rhythmic and tense. The tongue is slightly dry and covered with a white coating. The abdomen is of normal shape, participates in the act of breathing, and palpation reveals pain in the right hypochondrium. Murphy and Ortner-Grekov symptoms are positive. The liver and spleen are not palpated. The chair is the same color. Frequent urination.

General blood test: HB-85 g/l, er -2.7×1012 mkl. CP-6.8. thrombus-230, leukaemia - 12.7x109μc/l. blood coagulation -3'50"-4'00," p.-3%, c.-65%. eoz.-1%. lymph -20%. mon.-7. ESR - 25 mm/h. Biochemical blood test: Bil - 22.65 μmol/l. ALT-0.96 mmol/L. AST - 0.34 mmol/L. Tim.pr - 4.0. Urea - 4.66 mmol/L. Residual nitrogen - 17 g/L, Creat - 82.9 mmol/L. Total protein - 70.5 g/L.

The diagnosis was "Acute calculous cholecystitis." On March 12, 2019, the patient underwent laparoscopic cholecystectomy without any technical difficulties. On the 2nd day after surgery, the patient experienced pain in the right hypochondrium. No discharge was observed along the trapping drainage of the subhepatic space. The performed ultrasound revealed signs of limited, homogeneous fluid accumulation in the subhepatic space in the amount of 100 ml. Peritoneal symptoms were absent. Conservative (antibacterial and infusion) therapy and dynamic observation of the patient continued. On the 4th day after LCHE, the patient's pain in the right hypochondrium intensified, and her body temperature rose to 37.9 °C. Local peritoneal symptoms have appeared. Ultrasound monitoring revealed a limited accumulation of homogeneous fluid in the subhepatic region, which increased in amount to 150 ml. Under local anesthesia, a limited fluid collection puncture was performed under ultrasound control, during which up to 150 ml of bile was evacuated from the subhepatic space (Fig. 4.3).

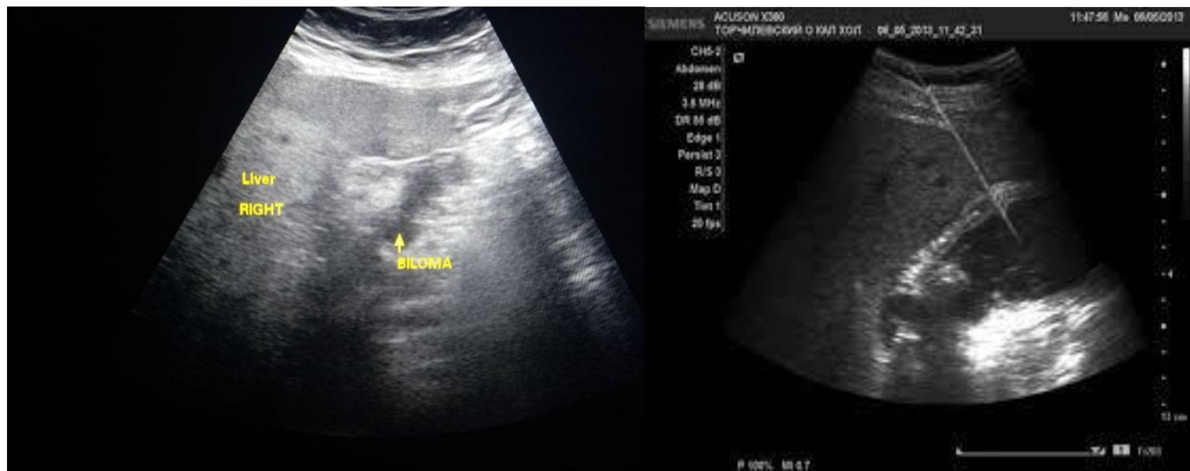


Figure 4.3 A. Echocardiogram of patient K. 48 years old, 4 days after LCHE, limited fluid accumulation in the subhepatic space up to 150 ml. Biloma puncture under ultrasound supervision.

The subsequent postoperative period proceeded smoothly. The patient continued antibacterial, detoxification, and infusion therapy under regular laboratory monitoring. As a result of the comprehensive sanation and medication therapy, the patient's condition improved dynamically, body temperature normalized on the same day after the liver area was sanitized, and pain in the right hypochondrium and peritoneal symptoms disappeared. On the 7th day, during control ultrasound, no fluid accumulation was detected in the subhepatic space. The patient has been discharged in a satisfactory condition.

Relaparoscopy with clipping of the Lushka tract was performed on 2 more patients. In 1 patient, the cause of bile leakage was insufficiency of the bladder duct due to clipping displacement; he underwent relaparoscopic repeated clipping.

We present the clinical observation:

Patient R., 53 years old. IB No. 7351/456, was admitted to the surgical department of the SamMI clinic on June 25, 2008, for examination and planned surgical treatment for chronic calculous cholecystitis. Pain in the right hypochondrium has been bothering them for about 2 years, and in the last 3 months, there have been repeated attacks of pain in the right hypochondrium. The last attack was 7 days ago. During ultrasound examination, the size of the gallbladder was 10.2x4.1 cm, the wall was 0.5 cm, and near the bottom, there were signs of swelling in the anterior wall, with a bright echo signal up to 2.0 cm in the lumen, giving an acoustic shadow. The choledochus and intrahepatic ducts are not dilated. Conclusion: echographic picture of calculous cholecystitis. Clinical blood and urine tests within the normal range. Objective: condition satisfactory. Skin coverings of normal color, normal build, and increased nutrition. Laparoscopic cholecystectomy was performed on June 27, 2008. During the surgery, it was determined that the gallbladder wall was thickened and covered with a fibrin film. A perivesical infiltrate is detected in the area of the hepatoduodenal ligament. A cholecystectomy was performed. Drainage into the subhepatic space. The operation time is 65 minutes. On the 2nd day, up to 150.0 ml of drainage secretions with bile impurities were observed. Relaparoscopy was performed on June 29, 2008. Upon examination, there is accumulated bile in the subhepatic space; after rehabilitation, a revision of the liver gate was performed, identifying the elements of the hepatoduodenal ligament is impossible due to infiltrate, and the source of bile leakage was a vesicle duct bulge. A slippage of the clip occurred from the cystic duct. The length of the bladder duct was 0.5 cm, and the diameter was 0.7 cm. Repeated clipping of the bladder duct was performed using two clips. The postoperative period proceeded without special features; the patient was discharged on the 10th day after surgery, with positive dynamics on ultrasound. Subsequently, no complaints were filed, and no pathology was identified during follow-up examinations. Analyzing this observation, it should be noted that tactical and diagnostic errors led to complications in the postoperative period. During LCHE, gross pathological changes in the gallbladder neck area and acute phlegmonous cholecystitis were identified. Under these conditions, when the wall is thickened and the bladder duct is short, the clips do not close tightly. In cases of bile duct hypertension, the probability of clips slipping from the cystic duct is high (Fig. 4.4).

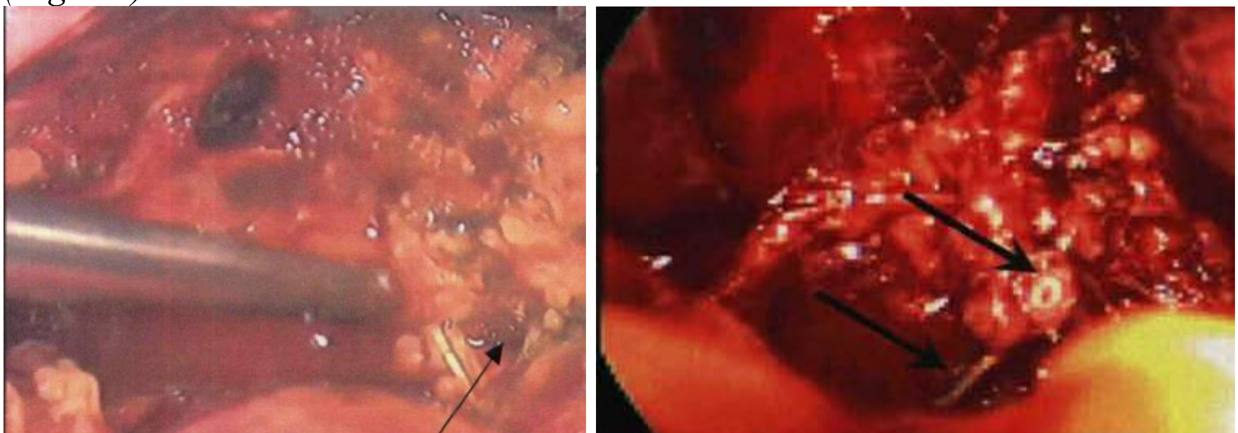


Figure 4.4. Patient R., 53 years old, condition after LCHE (2nd day). Relaparoscopy, the accumulation of bile in the subhepatic space due to insufficiency of the cystic duct.

Additional clipping of the bladder duct.

Additionally, in one case of external drainage of bile and bile accumulation in the subhepatic space due to the failure of the choledochostomy drainage, RPCG with EPST and nazobiliary drainage were the final methods for stopping bile leakage.

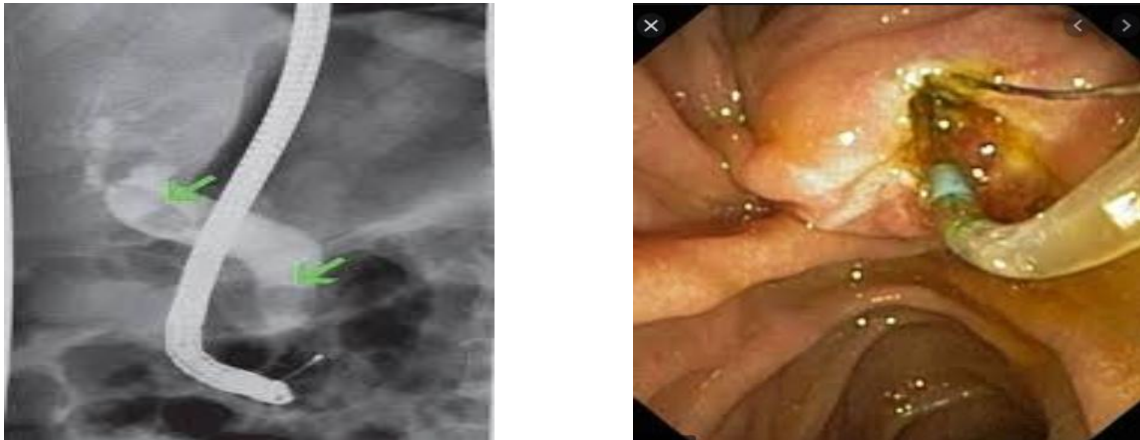


Fig. 4.5. RPXG + EPST. Patient J., 61 years old. 3 – day after LCHE. Residual choledocholithiasis, intrabiliary hypertension. Insufficiency of the bladder duct sheath.

For grade II bile leakage and local biliary peritonitis up to 500 ml according to ultrasound data in the comparison group (9 patients) with bladder duct insufficiency (7 patients) due to choledocholithiasis and biliary hypertension, 2 patients underwent RPCH with EPST and nazobiliary drainage, followed by relaparoscopy with clipping of the insufficient duct. Another 5 patients underwent abdominal sanation and repeated bladder duct clipping as the cause of postoperative biliary peritonitis. Relaparotomy, choledocholithotomy with choledochus drainage, and abdominal cavity sanation were performed in 1 patient with widespread biliary peritonitis. In another 1 patient, the cause of limited biliary peritonitis was bile leakage from the aberrant bile duct of the bladder bed, and the bilium was evacuated through repeated puncture.

We present the clinical observation:

Patient K., 35 years old, medical history No. 3948/342, was admitted to the clinic on March 12, 2015, with a diagnosis of acute calculous cholecystopancreatitis. Against the backdrop of conservative therapy, the pain syndrome has subsided, and inflammatory phenomena have subsided. On March 24, 2015, a laparoscopic cholecystectomy was performed on the patient without any technical difficulties. On the 2nd day of the postoperative period, 200 ml of bile was detected in the capture drainage of the subhepatic space. Ultrasound examination revealed signs of free fluid in the subhepatic space. Given the adequate function of the trapping drainage, the bile flow rate corresponding to grade II bile leakage, and the absence of peritoneal symptoms, it was decided to continue dynamic observation. On the 4th day after LCHE, 300 ml of bile was excreted through the trapping drainage of the abdominal cavity; the patient began to experience pain in the right hypochondrium and right mesogastric region, and her body temperature rose to 38.2 °C. Ultrasound monitoring revealed the presence of free fluid in the projection of the pelvis. It was decided to perform diagnostic laparoscopy, during which up to 500 ml of bile was detected in the abdominal cavity, predominantly in the right subdiaphragmatic and subhepatic spaces, as well as in the right lateral canal, which has been aspirated. Upon further examination, a moderately pronounced loose adhesive process was noted in the subhepatic space, involving the villi of the greater omentum. The joints are bluntly separated. An additional aberrant bile duct is detected in the bed of the gallbladder, and bile enters from the latter. The aberrant bile duct was clipped with two clips. The operation was completed by removing the trapping drainage of the subhepatic space and the right lateral canal separately from the wound. The subsequent postoperative period proceeded smoothly. Drains are removed on the 5th day. The patient was discharged on the 15th day after surgery. In this observation, widespread bile peritonitis was corrected during relaparoscopy.

With damage to the main bile ducts, grade III bile leakage and diffuse biliary peritonitis were observed in 11 patients in the main group. Of these, 4 patients were admitted from other hospitals with established drainage in the proximal lobe of the damaged hepatic duct. Of these, 3 observations were performed using high-precision GEA without frame drainage, and 1 observation was performed using high-precision GEA without frame drainage.

We present the clinical observation:

Patient N., 50 l. IC No. 7351/654 was transferred to SamMI Clinic No. 1 on May 18, 2016, with complaints of profuse bile secretion from the tube (up to 1000 ml), light stool, and general weakness. According to the medical history, the patient underwent surgery for acute cholecystitis 4 days ago. Two days after CE, relaparotomy was performed, abdominal cavity sanation, external drainage of the choledochus culture due to iatrogenic GH damage, and widespread biliary peritonitis. The patient's general condition upon admission is of moderate severity,

and the skin is pale. The abdomen is of normal shape, participates in the act of breathing, soft, and painless. The liver and spleen are not palpated. There is a drainage tube in the right hypochondrium with abundant bile secretion. Stool is acholytic. Frequent urination. General blood test: HB-86 g/l, er.-2.4x1012/mkl, CP-0.8, thrombus-230, l.-8.7x109/mkl, VSC-3'50"-4'00," p.-3%, c.-65%, eoz.-5%, lymph.-20%, mon.-7, ESR-15 mm/h. Biochemical blood test: bi.-19.0 μmol/l, ALT-0.46 mmol/l, AST-1.16 mmol/l, tim.pr.-4, urine.-4.66 mmol/l, acute nitrogen-17 g/l, creat.-82.9 μmol/l, total protein-60.5 g/l. Chest X-ray: without pathology. Ultrasound: increased liver echogenicity, intrahepatic bile ducts dilated. Hepaticocolecithin with a diameter of 10 mm. The distal part is not visible. The tube is located in the hepatocholedochus (Fig. 4.6).

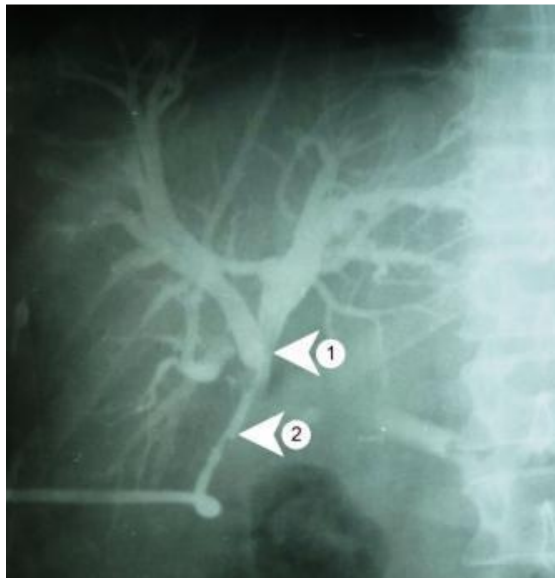


Figure 4.6 Fistulocholangiography of patient N. Drainage tube (2) is installed in the proximal GC (1)

With the clinical diagnosis: "Iatrogenic trauma of the liver, hepatocholedochus excision, type 0. External bile fistula. On May 23, 2016, under general endotracheal anesthesia, the following operation was performed: "GEA according to Ru with transhepatic framework drainage according to Seipol-Kurian." A skin incision up to 18 cm long was made parallel to the right costal arch according to Fedorov. When the abdominal cavity is opened, the liver is enlarged in size and stagnant. Liver ducts were isolated through the drainage tube. Excision of the main bile duct at the confluence level was identified. HepEA was applied end-to-end with a single-row provisional suture using proline 4-0 thread to the small intestine loop, disconnected according to Ru. The drainage tube is passed through the right hepatic duct and drained through the VI segment of the

liver. The second end of the tube is removed through the disconnected intestinal loop (Seiphol-Kurian method).

The subdiaphragmatic and subhepatic regions are drained. The abdominal cavity is drained and sewn shut in layers. The course of the postoperative period is smooth, and the wound heals with primary tension. Drains from the subhepatic and subdiaphragmatic spaces are removed on the 5th–6th day. The patient has been discharged home with transhepatic drainage in satisfactory condition. The patient was under our observation for two years. Every 2-3 months, a TPKD change was performed. After 2 years, the drainage is removed. The result is satisfactory.

In our observations, in 2 patients with complete GH intersection identified on the first day after surgery, a high GEA according to Ru was also applied without a frame. In 1 patient with biliary peritonitis, abdominal cavity sanitation and hepatic duct drainage were performed in the first stage.

We present the clinical observation:

Patient L., 43 years old. IB No. 6351. She was admitted to the surgical department of the SamMI clinic on February 15, 2008, for examination and planned surgical treatment for chronic calculous cholecystitis. Pain in the right hypochondrium has been bothering them for about 1.5 years, and the last 3 months have been constant. Ultrasound examination revealed a gallbladder measuring 8.1x3.1 cm, with a 0.4 cm wall; near the bottom, there are signs of onset of anterior wall edema; in the lumen, there is a bright echo signal up to 2.0 cm, giving an acoustic shadow without signs of displacement (a stone driven into the neck). The choledochus and intrahepatic ducts are not dilated. Conclusion: echographic picture of calculous cholecystitis. Clinical blood and urine tests within the normal range. Objective: condition satisfactory. Complaints of pain in the right hypochondrium. Skin coverings of normal color, normal build, and increased nutrition. Laparoscopic cholecystectomy was performed on February 18, 2008. During the surgery, it was determined that the gallbladder wall was thickened, and 50 ml of "white" bile was obtained during bladder puncture. Concrement is driven into the neck of the gallbladder. A cholecystectomy was performed. The bladder bed is coagulated. Drainage into the subhepatic space. The operation time is 65 minutes. From the first day, up to 500 ml of bile-induced secretions were observed. An increase in bilirubin from 23.7 mmol/L to 37.0 mmol/L. On February 22, 2008, RCPG was performed, and no contrast material

was detected in the proximal sections of the bile duct. A suspected injury to the common bile duct was identified. On February 23, 2008, an operation was performed—external drainage of the proximal hepatocholedochus. Upon examination, there is bile in the subhepatic space and in the pelvis. In the area of the hepatoduodenal ligament of the infiltrate, the distal and proximal sections of the common hepatic duct were identified, and clips were present at the intersected distal end, while the proximal section of the bile duct lacks a clip. The proximal section is 8 mm wide, and the hepatic duct to the bifurcation is 10 mm long. Due to infiltrated, bile-impregnated tissues, external drainage of the common hepatic duct was performed in the first stage. Four months later, on July 10, 2008, the patient was hospitalized for the second stage of surgery. Upon complaints of periodic chills and malaise, infusion therapy was repeatedly administered. MSCT revealed moderate expansion of intrahepatic bile ducts. On July 14, 2008, the patient was admitted for surgery with a diagnosis of external bile fistula. During the surgery, a pronounced adhesive process was identified in the subhepatic space. By orienting the drainage tube, the proximal part of the hepatocholedochus at the liver gate was identified, the drainage tube was removed, and a narrowing of the hepatic duct to 5 mm was identified, from which turbid bile enters. From the liver parenchyma, the bifurcation zone of the right and left hepatic ducts was identified, and the duct was expanded due to the longitudinal dispersion of the lateral wall of the left hepatic duct. A hepatikojejunal anastomosis was applied with separate nodular provisional sutures on a Ru loop on a transhepatic framework drainage (Fig. 1). The postoperative period was unusual; the patient was discharged on the 15th day after surgery. Analyzing this observation, it should be noted that tactical and diagnostic errors led to intraoperative complications. 1. During LCHE, gross pathological changes in the gallbladder neck area and Mirizzi syndrome were identified. Under these conditions, the incorrect identification of the anatomical structures of the Kalo triangle, the hepatoduodenal ligament, and the liver gate led to damage to the OP with its partial removal. 2. Under conditions of infiltrate in the cervical region of the gallbladder, conversion is necessary, but it has not been

performed. The surgery was completed laparoscopically.

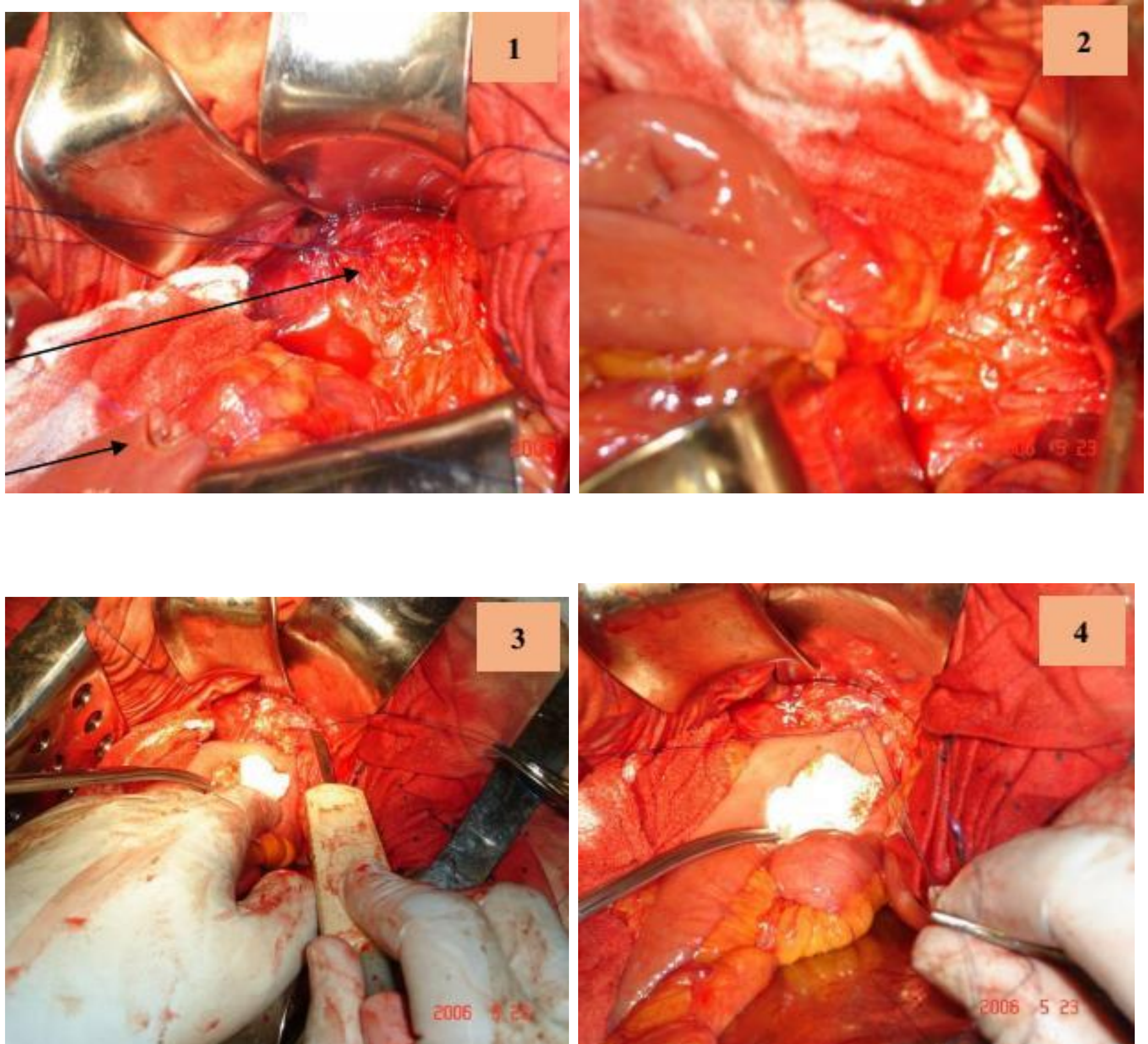


Figure 4.7 Stages of forming GepEA according to Ru on TPKD:

1 - the arrow indicates the opened GH and the "disconnected" loop of the small intestine;
2 - application of the HepEA back wall;
3 - formed posterior lip of the anastomosis,
4 - formed hepatikoid-junal anastomosis on the TPKD.

Reconstructive surgery was performed after 3 months - GEA with TPKD. Restorative surgeries were performed on 3 patients. BBA was applied to 1 patient with GH intersection. In 3 patients with edge damage not exceeding 1⁄2 of the duct diameter, duct suturing was performed in 2 cases, and in one observation, a stent was installed in the GH after RPXG.

Patient S., 50 l. IC No. 9654 was admitted to SamMI Clinic No. 1 on September 21, 2018, with complaints of a drainage tube in the right hypochondrium, excessive bile secretion from the tube (up to 1000 ml), slight pain

in the right hypochondrium, light stool, and general weakness. Based on her medical history, she underwent LCHE at her place of residence 10 days ago. The patient's general condition upon admission is of moderate severity, and the skin is pale. Auscultation reveals vesicular breathing in the lungs on both sides, with no wheezing. Heart sounds are clear and rhythmic. The tongue is wet. The abdomen is of normal shape, participates in the act of breathing, soft, with moderate pain on palpation in the right hypochondrium. The liver and spleen are not palpated. In the right hypochondrium, there is a drainage tube with an abundance of bile. Stool is acholytic. Frequent urination. General blood test: Hb-78 g/l, er.-2,2x1012/mcl, CP-0.7, thrombus-210, l.-9.1x109/mcl, VSC-2'30"-3'50," p.-2%, c.-66%, eoz.-5%, lymph.-22%, mon.-5, ESR-22 mm/h. Biochemical blood test: biol.-23.6 μmol/l, ALT-0.78 mmol/l, AST-1.09 mmol/l, tim.pr.-4, urine.-5.36 mmol/l, est. nitrogen-16 g/l, creat.-79.2 μmol/l, total protein-58.5 g/l. Chest X-ray: without pathology. Ultrasound: increased liver echogenicity, slight fluid accumulation in the subhepatic space, a drainage tube is visible in the fluid accumulation area, and intrahepatic bile ducts are not dilated (Fig. 3.16). MRPXG is a complete lesion of the hepatocholedochus in the area of the liver gate. (Fig. 3.17).

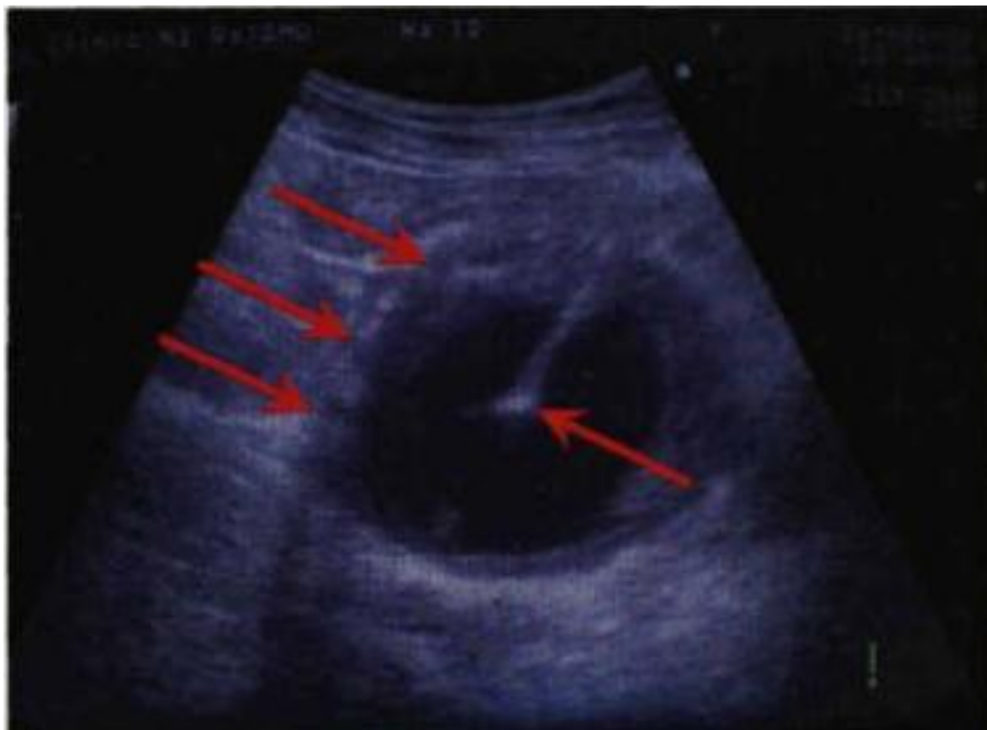


Fig. 4.8. Patient C. Echo: accumulation of fluid in the subhepatic space, drainage tube is visible.

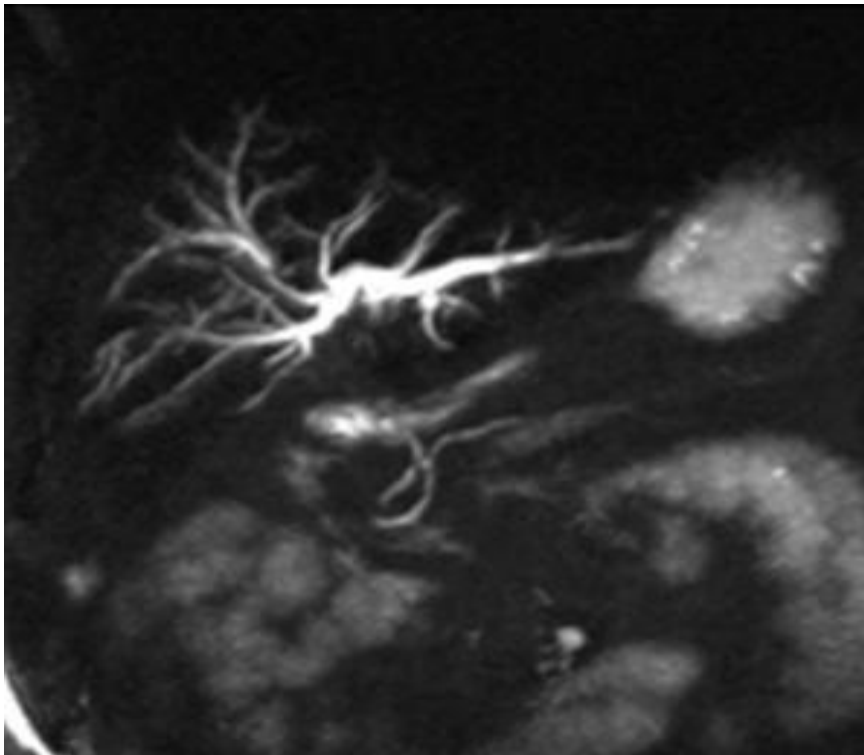


Figure 4.9 Patient C. MRPXG - intrahepatic bile ducts are visualized. Hepatocolecithin is not visualized. Damage to the "0" type of GX.

With clinical diagnosis: "GX trauma (excision) "0" type. External bile fistula. On September 25, 2018, under general endotracheal anesthesia, the patient underwent the following operation: "Application of a hepatocoeyunoanastomosis on the "deactivated" loop of the small intestine according to Ru, drainage of the subhepatic and subdiaphragmatic regions." A skin incision up to 18 cm long was made parallel to the right costal arch according to Fedorov. When the abdominal cavity is opened, the liver is of normal size, and liver ducts are identified in the area of the liver gate. Excision of the main bile duct at the confluence level was identified. GEA was applied with a single-row provisional suture using prolen 4-0 thread to the small intestine loop, disconnected via Ru with TPKD. The site for applying the biliodigestive anastomosis was created by incising the left hepatic duct,

exposing it under the ciliary plate (Hepp-Couinaud method). The subdiaphragmatic and subhepatic regions are drained. The abdominal cavity is drained and sewn in layers, sutures are applied to the skin, iodine, alcohol, and an aseptic dressing are applied. The course of the postoperative period is smooth, and the wound heals with primary tension. The drains are removed on the 5th–6th day. The patient was discharged home in satisfactory condition with TPKD.

Thus, the introduction of minimally invasive methods for correcting postoperative bile leakage into the abdominal cavity and biliary peritonitis, such as transduodenal endoscopic interventions, ultrasound-controlled abdominal puncture, and relaparoscopy, allowed patients with "small" bile duct lesions to refuse relaparotomy in 93.3% of patients. Relaparotomy was performed in only 1 patient of the main group. Relaparoscopic correction of peripheral bile leakage and biliary peritonitis was successful in 11 patients (68.8%).

In cases of biliary peritonitis resulting from "large" iatrogenic lesions of the main bile ducts, early reconstructive surgery—high-precision hepatocoenunoanastomosis according to Ru—has proven its effectiveness and allowed for the rejection of transhepatic framework drainage in 43.8%.

CHAPTER 5. COMPARATIVE ANALYSIS OF TREATMENT RESULTS IN COMPARATIVE GROUPS

5.1 Comparative analysis of treatment results for patients with biliary peritonitis as a complication of acute destructive cholecystitis

In patients of the comparison group with biliary peritonitis as a complication of acute destructive cholecystitis (33 patients), all surgical interventions (100%) were performed from a wide laparotomy approach, and depending on the volume, the performed operations were divided into 3 types: - CE, sanation, and drainage of the subhepatic space were performed for local biliary peritonitis or biloma resulting from acute cholecystitis; - CE, sanitation, and drainage of the abdominal cavity (right lateral canal and pelvis) were performed in cases of widespread biliary peritonitis or bilomas occupying 2 or more abdominal sections; - SE, choledocholithotomy, and drainage of the subhepatic space were performed in 5 patients with a combination of acute destructive cholecystitis and choledocholithiasis complicated by biliary peritonitis occupying the subhepatic region.

The most severe complication of biliary peritonitis in the studied group of patients was abdominal sepsis, which resulted in fatalities in 2 patients; the mortality rate was 6.1.

Various purulent-septic complications following surgeries for acute destructive cholecystitis and biliary peritonitis were observed in 11 patients of the comparison group, accounting for 33.3%. At the same time, bilomas were re-formed in the subhepatic region in 2 (6.1%), which were drained by contraperture recanalization. In 2 (6.1%) patients, prolonged bile leakage lasting from 2 to 4 weeks was observed from drainage tubes installed in the subhepatic space; in 4 (12.1%) patients, repeated relaparotomy operations were performed with repeated abdominal sanations due to ongoing peritonitis, and 1 - incision and drainage of subhepatic and subdiaphragmatic abscesses. Additionally, 1 patient underwent

repeat surgery for cholemic intra-abdominal bleeding. In 9 (27.3%) patients, suppuration of the postoperative wound was observed.

In the main group of patients (49 patients) with biliary peritonitis as a complication of acute destructive cholecystitis, minimally invasive interventions were used in 33 patients (67.3%) according to FTS principles.

He performed the following surgeries using videoendoscopic technology on 16 patients (32.6%): - LXE and drainage of the subhepatic space in 9 cases of acute destructive cholecystitis complicated by local biliary peritonitis; - LCHE and drainage of the abdominal cavity (right lateral canal and pelvis) in acute destructive cholecystitis complicated by diffuse biliary peritonitis; LXE and drainage of the subhepatic space, EPST 3 in cases of acute destructive cholecystitis combined with choledocholithiasis. In these patients, EPST was performed in two stages.

In 11 (22.4%) patients, diapectic technologies were used: microcholecystostomy and bilum puncture with ultrasound navigation.

In 6 patients (12.2%) with acute destructive cholecystitis combined with choledocholithiasis complicated by local peritonitis, PE was performed using minilaparotomy and choledocholithotomy, with drainage of the choledochus and subhepatic space.

At the same time, in cases of biliary-purulent diffuse peritonitis, CE and drainage of the abdominal cavity from an open laparotomy were performed in 16 patients (32.6%). Indications for surgical intervention from a wide laparotomy approach were widespread biliary-purulent peritonitis.

Thus, according to the principles of minimally invasive interventions in the main study group, 33 patients (67.3%) with acute destructive cholecystitis complicated by various forms of biliary peritonitis were operated on, i.e., 2/3 of the patients. A wide laparotomy approach was used in 1/3 of the patients in the main study group.

In the main study group, postoperative complications developed in 8 patients, accounting for 16.3%. At the same time, biolomas of the subhepatic

region were re-formed in 2 (4.1%) patients who were successfully sanitized with puncture under ultrasound control. In 1 patient, cholemic bleeding from the liver was observed from the transhepatic puncture area of the gallbladder. External bile leakage was also observed in 1 patient; during relaparoscopy, insufficiency of the bladder duct sheath was identified, which was clipped again. Duodenal bleeding was noted in 1 patient after EPST, and the bleeding was stopped by conservative measures. In 1 patient, a subdiaphragmatic abscess was formed, which was sanitized with 3 repeated punctures under ultrasound control. With persistent peritonitis, relaparotomy was performed on 1 patient, and postoperative wound suppuration was observed in 5 patients.

At the same time, in the main group, 2 out of 49 operated patients also died, with a mortality rate of 4.1%. The cause of the adverse outcome was acute pancreatitis as a complication of transduodenal endoscopic intervention in 1 patient and ongoing peritonitis in 1 observation.

A comparative analysis of the treatment results for patients with postoperative biliary peritonitis as a complication after cholecystectomy showed that in cases of grade I bile leakage with the development of local biliary peritonitis with fluid volume up to 100 ml under the liver, all 6 patients in the comparison group underwent repeated surgical interventions—3 patients underwent contraperture recanalization with subhepatic drainage, and 3 patients underwent relaparotomy. Quite opposite results were obtained in the main group, where special endoscopic and diapectic methods allowed for the avoidance of repeated surgical intervention—relaparotomy—in all 7 patients—3 patients underwent biloma puncture under ultrasound control, another 3 patients underwent correction of bile leakage into the abdominal cavity and sanation of the subhepatic region during relaparoscopy, and in one observation, the dislocation of drainage from the choledochus and bile leakage were corrected during EPST and nazobiliary drainage.

Correction of grade II bile leakage with the development of biliary peritonitis up to 500 ml in the comparison group (6 patients) was performed in

100% of cases through repeated surgical intervention - relaparotomy: - in 2 patients, abdominal sanation was supplemented with ligation of the insufficient bladder duct; – In 2 patients, abdominal cavity sanation was supplemented with choledocholithotomy and 2 more repeated drainage of the hepatocholedochus. Improving the therapeutic and diagnostic management tactics of patients in the main group (9 patients) using endoscopic transduodenal interventions - EPST and nazobiliary drainage made it possible to stop bile leakage into the abdominal cavity in 2 patients. Relaparoscopy made it possible to eliminate the cause of bile leakage in 6 observations - repeated clipping of the gallbladder duct and aberrant bile duct in the bed of the gallbladder was performed, and only 1 patient required relaparotomy with abdominal cavity sanation and choledocholithotomy due to residual choledocholithiasis.

Thus, the implementation of minimally invasive methods for correcting bile leakage into the abdominal cavity, such as transduodenal endoscopic interventions, ultrasound-controlled abdominal puncture, and laparoscopy, allowed patients with "small" bile duct lesions to avoid repeated laparotomy in 93.3% of patients. Relaparotomy was performed in only 1 patient.

In the event of damage to the main bile ducts, grade III bile leakage leading to the development of widespread biliary peritonitis, caused by damage to the main bile ducts, proved the effectiveness of high GEA according to Ru using precision techniques in detecting biliary peritonitis within the next 48 hours. All 3 patients showed good results in the immediate and long-term postoperative periods. Performing GEA on TPKD (performed in 2 patients of the main group and 2 patients of the comparison group) is unconditionally justified when applying biliodigestive anastomosis in conditions of infiltrative changes in the duct wall during biliary peritonitis identified 48 hours later after CE. A replacement transhepatic drainage, on which GEA is formed, is extremely necessary in the aforementioned situations. At the same time, in 2 patients of the main group and 6 patients of the comparison group with biliary peritonitis due to GH damage in the first stage, the proximal duct of the common hepatic duct was drained.

Reconstructive surgeries were performed on him after 3 months. BBA (imposed in 5 patients in the comparison group and 1 in the main group) and GDA (imposed in 3 patients in the comparison group) in all cases ended in GH and BDA strictures. They underwent repeated reconstructive operations. Stitching a GX defect covering less than 1⁄2 of the duct diameter is indicated only when using precision techniques.

Purulent-septic complications following repeated interventions for biliary leakage and postoperative biliary peritonitis after CE in the comparison group were observed in 8 patients (36.4%): - ongoing biliary peritonitis (2 patients); - formation of subhepatic and subdiaphragmatic abscess (2 patients); - suppuration of the postoperative wound (4 patients). Of these, 1 patient (4.5%) died. The cause of death was acute renal-hepatic failure combined with abdominal sepsis.

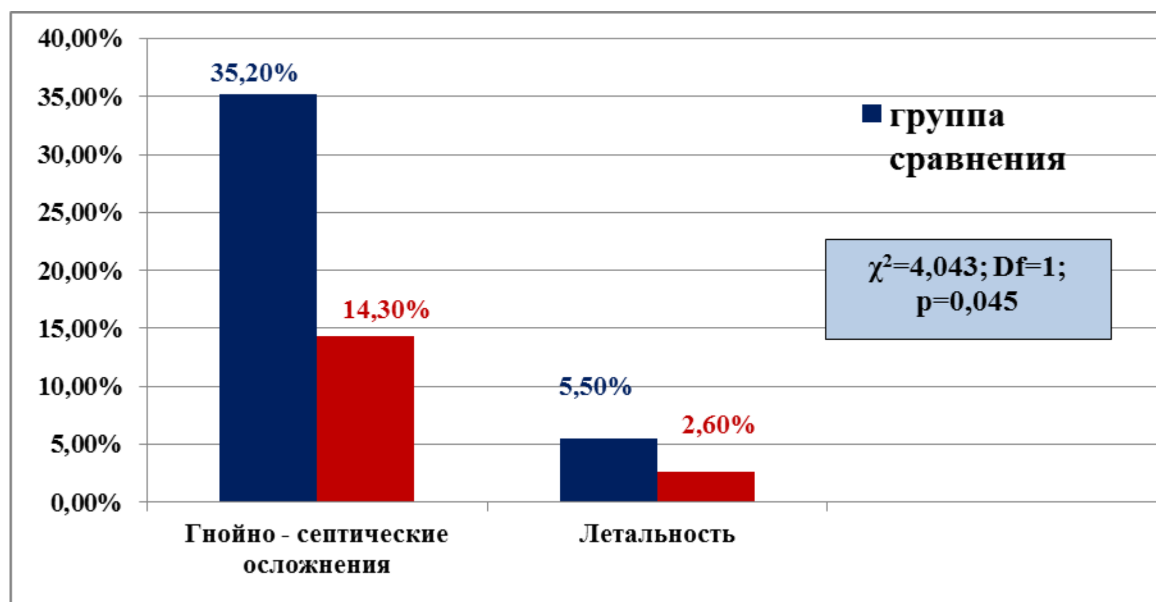


Figure 5. Results of surgical treatment for patients with biliary peritonitis in comparison groups.

In the main group, after surgical correction of biliary secretion and peritonitis after SE, complications were observed in 3 patients (11.1%). In 2 observations, there were purulent-septic complications, and in 1 - acute pancreatitis following endoscopic papillosphincterotomy. No mortality was observed in the primary group.

Thus, a comparative analysis of the results of surgical treatment for patients

with biliary peritonitis demonstrates the effectiveness of using minimally invasive diapectic puncture methods, transduodenal endoscopic interventions, and laparoscopy.

At the same time, minimally invasive surgical interventions were successfully performed in 67.3% of patients with biliary peritonitis and bilomas as complications of acute destructive cholecystitis. At the same time, in 1/3 of patients with widespread biliary-purulent peritonitis, there was a need for CE and full-fledged abdominal sanation from a wide laparotomy approach.

In the development of postoperative biliary peritonitis due to "small" bile duct lesions, minimally invasive interventions performed according to FTS principles were effective in 93.3% of observations.

In the comparison groups, all abdominal cavity sanation operations were performed from a wide laparotomy approach.

In the comparison group of 54 patients with peritonitis as a complication of acute destructive cholecystitis and postoperative biliary peritonitis, in whom common approaches to surgical treatment were used, purulent-septic complications were observed in 19 patients (35.2%), and 3 (5.5%) died.

In the main study group of 77 patients, purulent-septic complications were observed in 11 (14.3%) patients, and 2 (2.6%) died.

CONCLUSION

Bile peritonitis is a severe complication of acute cholecystitis, as well as a consequence of bile leakage into the abdominal cavity after operations on the biliary tract. At the same time, despite the seriousness of this problem, insufficient attention is paid to biliary peritonitis, although mortality from this complication, according to various authors, reaches 6.2% to 24%.

Among the causes leading to the development of biliary peritonitis, the main ones are destructive forms of gallbladder inflammation, as well as bile leakage into the abdominal cavity after surgeries on bile ducts from additional bile ducts, failure of the gallbladder duct culture after cholecystectomy (CH), dislocation of the drainage installed after choledochotomy, and intraoperative damage to the common hepatic duct. At the same time, a characteristic feature of biliary peritonitis, unlike bacterial peritonitis, is the blurring of the clinical picture, which often leads to delayed diagnosis. Depending on the sterility of the bile, choleperitoneoma most often develops, and this is quite often observed when bile passes through the wall of the gallbladder without perforation.

For the treatment of biliary peritonitis, laparotomy or relaparotomy is usually used, which in itself is a very traumatic intervention with post-operative mortality reaching 9.1–22.5%. The outcome of surgical interventions largely depends on the choice and sequence of surgical correction methods used. The further prospects for improving the results of surgical treatment of patients with biliary

peritonitis currently depend on the use of gentle minimally invasive surgical interventions - puncture-draining and endoscopic - and performing operations before the development of a systemic inflammatory reaction of the body and abdominal sepsis.

Thus, the surgical treatment of biliary peritonitis represents a complex tactical and technical task, the solution to which our study is dedicated.

The aim of the study was to improve the treatment results of patients with biliary peritonitis by optimizing diagnosis and treatment tactics with the preferential differentiated use of minimally invasive surgical correction methods.

In the surgical departments of the 1st clinic of the Samarkand State Medical Institute over the last 20 years, from 2001 to 2020, 5849 patients with cholelithiasis were operated on, of whom 1167 (19.9%) were with acute destructive cholecystitis, i.e., approximately every fifth patient. We noted a significant increase (1.9 times), i.e., nearly 2 times, in the number of operated patients with gallstone disease over the last decade between 2011-2020 (the number of operations was 3801), compared to the period between 2001-2010 (the number of operations was 2048). At the same time, the incidence of acute destructive cholecystitis in the analyzed time intervals was 19.2% (394 patients in 2001-2010), and 20.3% (773 patients in 2011-2020) of the total number of operated patients with cholelithiasis, i.e., approximately equal. At the same time, the frequency of operated patients with peritonitis decreased significantly by 8.4% (32) and 6.3% (49), as complications of acute destructive cholecystitis and postoperative bile peritonitis decreased by

1.1% (22 patients) and 0.7% (27 patients) respectively.

Based on the goal of our study, we studied the examination and treatment results of 131 patients with biliary peritonitis, which accounted for 2.2% of all 5849 operated patients with cholelithiasis. Of these, 82 (7.1%) had peritonitis as a complication of acute destructive cholecystitis, and 49 (0.8%) had peritonitis as a complication following surgery for cholelithiasis.

Among the patients with peritonitis, there were 39 (29.7%) men and 92 (70.3%) women, with a gender ratio of 1:2.5. This same ratio among all operated patients with gallstone disease was 1:6, which confirms literature data on the more complex course of cholelithiasis in men. Patients aged 60-74 years predominated—46 (35.2%) and 45-59 years—37 (28.2%). 11 (8.3%) patients were over 75 years old, 29 (22.1%) were 30-44 years old, and 8 (6.1%) were under 29 years old. The average age of the patients was 55.2±1.3 years. Distribution of patients by gender and age groups, according to WHO recommendations (2000). Comorbidities were present in 82 (62.6%) patients. Cholangitis, as a complication of the primary pathological process, was identified in 67 patients (51.1%). Chronic comorbidity of two systems was noted in 41% of patients, and three or more in 26%.

Taking into account modern trends in the development of surgery, to solve research tasks aimed at developing new therapeutic and diagnostic tactics for CP, patients were divided into two groups. Group I (comparison group) included 54 (41.2%) patients with peritonitis as a complication of acute destructive cholecystitis and postoperative biliary peritonitis operated on during the 2001-2010 period, whose complex

treatment utilized standard generally accepted approaches. To the second group (main group) – 77 (58.8%) who underwent surgery between 2011 and 2020, in whom the algorithm for conducting therapeutic and diagnostic measures was based on the principles of FTS—an accelerated recovery program (ACP) —and minimally invasive surgical interventions were used as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery - ERApoS (Enhanced Recovery After Surgery).

The first and most frequent clinical manifestation of biliary peritonitis in the examined patients was complaints of abdominal pain of varying intensity. In 41.2% of patients, they were moderately intense and localized depending on the source, while in 58.8% of cases, the pain was intense and localized in 2 or more anatomical areas of the abdomen. At the same time, the intensity of pain depended on the localization of the source and the time since the onset of the disease. In cases of widespread peritonitis lasting a day or more, the pain was intense and spread to all parts of the abdomen.

During the objective examination of patients, pain in one or more areas of the abdomen was identified in combination with muscle tension in the anterior abdominal wall. Thus, in 37.2% of patients, local pain was noted in one of the areas with a soft abdomen and combined with symptoms of abdominal irritation; in the remaining patients, the pain was widespread and localized in the right abdominal regions. At the same time, symptoms of peritoneal irritation were assessed as suspicious, and signs of anterior abdominal wall muscle tension did not

intensify over time.

All 131 patients underwent ultrasound examinations of the abdominal organs, followed by indications for fibrogastroduodenoscopy, RPXG (17), fistula-cholangiography (9), intraoperative cholangiography (24), MRPXG (21), computed tomography (19), and laparoscopy (49).

We present the results of the examination and treatment of 82 patients with biliary peritonitis as a complication of acute destructive cholecystitis who underwent surgery during the 2001-2020 period.

Group I (comparison group) included 33 patients with peritonitis as a complication of acute destructive cholecystitis operated on during the 2001-2010 period, whose comprehensive treatment utilized standard generally accepted approaches. To the second group (main group) – 49, operated on during the 2011-2020 period, in whom the algorithm for conducting therapeutic and diagnostic measures was built on the principles of FTS - an accelerated recovery program (ACP) and minimally invasive surgical interventions were used as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery – ERApoS (Enhanced Recovery After Surgery).

Based on the mechanism of bile leakage into the abdominal cavity as a complication of acute destructive cholecystitis, we observed two forms of biliary peritonitis: penetrating and sweating. Perforated bile peritonitis was found in 27 (32.9%) patients (12th comparison group, 15th main group), manifesting as an acute catastrophe in the abdominal cavity against the background of destruction and perforation of the

gallbladder wall. Propotatory biliary peritonitis developed against the background of destructive cholecystitis without perforation of the gallbladder wall, and due to the gradual transpiration of bile into the free abdominal cavity, the peritonitis was accompanied by subtle symptoms. Only when significant bile accumulation occurs in the abdominal cavity did symptoms characteristic of peritonitis manifest, which served as the reason for their transport to a surgical hospital. According to our observations, sweat-induced peritonitis occurred in 55 (67.1%) patients (21st comparative group, 34th main group). Thus, in our observations, a significant prevalence (more than 2 times) of sweat-induced bile peritonitis is noted.

Among 82 patients with destructive cholecystitis complicated by biliary peritonitis, according to the nature of the pathological process, sweat was observed in 55 (67.1%) patients, of whom diffuse was observed in 9 (16.4%) and localized in 46 (83.6%). Perforated bile peritonitis was observed in 27 (32.9%) patients, including disseminated in 10 (37.1%) and localized in 17 (62.9%).

In patients with puncture and sweat bile peritonitis upon admission to the hospital, the acute onset of the disease was noted in 27 (32.9%) and gradual progression in 55 (67.1%). The more severe form - diffuse biliary peritonitis - was observed in 23.2%, i.e., in 1⁄4 of the patients.

On the first day of the disease, 31 (37.8%) patients were admitted, on the second day – 22 (26.8%), on the third day – 18 (21.9%), from four to seven days – 6 (7.3%), and over seven days – 5 (6.1%). Thus, a significant percentage of patients are hospitalized late, which is

explained by their late seeking medical assistance as a result of inadequate assessment of their condition.

Upon hospitalization, a relatively satisfactory general condition was noted in 17 (20.7%) patients, moderate severity in 31 (37.8%), severe in 24 (29.3%), and extremely severe in 10 (12.2%) patients.

All patients exhibited symptoms of a systemic inflammatory reaction. Based on the criteria for diagnosing sepsis, systemic inflammatory response syndrome (SIRS) was observed in 114 (87%) patients, 10 of whom were in a septic state.

Of the 82 patients admitted to the hospital with biliary peritonitis, 31 (37.8%) were operated on within the first 6 hours. This group of patients was admitted in a relatively stable condition, requiring diagnostic measures and preoperative preparation. Between 6 and 24 hours, i.e., within 1 day, 43 (52.4%) patients underwent surgery. A day later from the moment of admission to the clinic, surgery was performed on 8 (9.8%) patients.

In patients of the comparison group, depending on the volume, the operations performed were divided into 3 types: - CE, sanation, and drainage of the subhepatic space were performed in 19; - CE, sanitation, and drainage of the abdominal cavity (right lateral canal and pelvis) were performed in 9; - CE, choledocholithotomy, sagnation, and drainage of the subhepatic space were performed on 5 patients. In all cases, a wide upper-middle access was used.

In the main group of patients, the following types of operations were performed: - LXE, sanation, and drainage of the subhepatic space were performed; - LCHE, sanitation and drainage of the abdominal

cavity (right lateral canal and pelvis) 4.; LCHE, sanitation and drainage of the subhepatic space, EPST–3; - Microcholecystostomy and bilum puncture under ultrasound with guidance for 11; - X-ray from mini-laparotomy access and choledocholithotomy, drainage of the choledochus and sanation and drainage of the subhepatic space 6; - CE, sanitation, and drainage of the abdominal cavity from an open wide laparotomy approach in 16 patients.

In the main study group, 11 patients with acute destructive cholecystitis and limited bile accumulation in the subhepatic space with a severe general condition underwent decompression of the gallbladder via transcutaneous-transhepatic microcholecystostomy (TCHMCS) and biloma puncture under ultrasound guidance. Bile drainage was performed through a section of the liver parenchyma to seal the duct and prevent bile leakage. In all cases, drainage was performed using an "umbrella" stiletto—a catheter with a "basket" at the end, with catheter diameters of 4F and 9F. After performing microcholecystostomy, these patients underwent bilum puncture under ultrasound supervision to evacuate the limited accumulation of fluid in the abdominal cavity. The contents of the gallbladder and bile duct were completely evacuated, the cavity was rinsed with a physiological solution until a clean discharge was obtained, and the drainage was extended. The drainage discharge was evaluated visually and sent for bacteriological examination. The full emptying of the gallbladder cavity was monitored echographically.

Laparoscopic cholecystectomy was completed by sanation and drainage of the subhepatic space in 9 patients with acute destructive cholecystitis and local peritonitis. In cases of diffuse biliary peritonitis,

LXE was supplemented by abdominal cavity sanation with mandatory additional drainage of the right lateral canal and the pelvic cavity in 4 patients. In 3 patients with choledocholithiasis after LCHE, EPST was performed, and in 6 patients with CE, choledocholithotomy was performed from an open mini-access. At the same time, in 16 patients with widespread biliary-purulent peritonitis, SE and abdominal cavity sanation were performed from a wide laparotomy approach.

Thus, according to the principles of minimally invasive interventions, 33 patients (67.3%) with acute destructive cholecystitis complicated by various forms of biliary peritonitis were operated on in the main study group.

The results of the examination and treatment of 49 patients with biliary peritonitis, which developed due to bile leakage into the abdominal cavity after operations on the bile ducts, are presented. Between 2001 and 2020, i.e., over the last 20 years, 5849 patients with cholelithiasis were operated on, and the frequency of this complication was 0.84%.

The source of postoperative bile leakage in 9 observations was additional (aberrant) bile ducts (Lyushka ducts) in the bed of the gallbladder, in 14 observations - failure of the gallbladder duct sheath due to slipping clips or ligatures, in 5 patients - biliary incontinence from a defect in the wall of the hepatocholedoch due to spontaneous falling out, i.e. dislocation of the established drainage from the hepatocholedoch, in 21 - iatrogenic damage to the main bile ducts.

Bile leakage was observed after LCHE in 2.1% (21), CHE from mini-laparotomy access in 1.1% (9), and CHE from laparotomy access

in 2.4% (19 patients).

Of the 49 patients with bile leakage, 35 (71.4%) were hospitalized and operated on urgent indications for acute destructive cholecystitis, and 14 (28.6%) for chronic calculous cholecystitis. According to our study, bile leakage was observed 3 times more frequently after emergency surgeries than after scheduled ones.

Taking into account modern trends in the development of surgery, to solve research tasks aimed at developing new therapeutic and diagnostic tactics for CP, patients were divided into two groups. Group I (comparison group) included 22 patients (1,1% of 2,048 patients) with postoperative biliary peritonitis as a complication of operations on bile ducts, operated on during the 2001-2010 period, whose complex treatment utilized standard generally accepted approaches. To the second group (main group) – 27 (0.7% of 3,801 patients) who underwent surgery during the 2011-2020 period, in whom the algorithm for conducting therapeutic and diagnostic measures was based on the principles of FTS - an accelerated recovery program (ACP) and minimally invasive surgical interventions were used as priority methods of surgical treatment. During the clinical implementation of PUV, the approach was based on the recommendations of the Society for Accelerated Recovery Surgery - ERApoS (Enhanced Recovery After Surgery).

In patients with grade I bile leakage and local biliary peritonitis up to 100 ml, according to ultrasound data in the comparison group (6 patients), 3 patients underwent contraperture recanalization with drainage of the subhepatic region. Relaparotomy was performed on 3

patients: the source of bile leakage in 1 observation was the dislocation of a drainage from the hepatocholedoch, which was re-fixed. In another 2 observations, the source of bile leakage was the failure of the vesicle duct sheath, which was re-ligated. The subhepatic region has been sanitized and drained.

In patients with grade II bile leakage and local biliary peritonitis with a volume of up to 500 ml occupying the subhepatic region and the right lateral canal, according to ultrasound data in the comparison group (6 patients), relaparotomy with repeated ligation of the bladder duct was performed in 2 patients due to bladder duct insufficiency. At the same time, in 2 patients, choledocholithiasis and biliary hypertension were the causes of bladder duct insufficiency; they underwent relaparotomy with choledocholithotomy and drainage of the choledochus. In 2 patients with spontaneous drainage loss from the biliary tract, relaparotomy with repeated drainage of the common bile duct was also performed. Surgeries were completed with abdominal cavity sanation and drainage of the subhepatic space, right lateral canal, and pelvic cavity.

Damage to the main bile ducts was the cause of grade III bile leakage and widespread biliary peritonitis in 10 patients of the comparison group. Restorative surgeries were performed in 5 cases, of which 2 patients with borderline damage to the hepatocholedochus had the defect stitched on a T-shaped drainage. With complete hepatocholedoch dissection, a biliobilliary anastomosis was applied to 3 patients. Reconstructive surgeries were performed on 5 patients: 2 underwent hepaticoduodenoanastomosis, 3 underwent external drainage of the proximal duct of the common hepatic duct in the first stage due to

peritonitis, and 3 months later underwent hepaticoduodenoanastomosis on a transhepatic framework drainage.

In the main study group (7 patients), due to bile leakage from aberrant ducts in the gallbladder bed with a volume of up to 100 ml according to ultrasound data, 3 patients required puncture under echographic control to evacuate fluid accumulation in the subhepatic space.

Another 2 patients underwent relaparoscopy with Lyushka's loop clipping. In 1 patient, the cause of bile leakage was insufficiency of the bladder duct due to clips displacement; relaparoscopic repeated clipping was performed. Additionally, in one case of external drainage and bile accumulation in the subhepatic space due to the failure of the choledochostomy drainage, RPCG with EPST and nazobiliary drainage were the final methods for stopping bile leakage.

For grade II bile leakage and local biliary peritonitis up to 500 ml according to ultrasound data in the comparison group (9 patients) with bladder duct insufficiency (7 patients) due to choledocholithiasis and biliary hypertension, 2 patients underwent RPCH with EPST and nazobiliary drainage, followed by relaparoscopy with clipping of the insufficient duct. Another 5 patients underwent abdominal sanation and repeated bladder duct clipping as the cause of postoperative biliary peritonitis. Relaparotomy, choledocholithotomy with choledochus drainage, and abdominal cavity sanation were performed in 1 patient with diffuse biliary peritonitis. In another 1 patient, the cause of limited biliary peritonitis was bile leakage from the aberrant bile duct of the bladder bed, and the bilium was evacuated through repeated puncture.

With damage to the main bile ducts, grade III bile leakage and diffuse biliary peritonitis were observed in 11 patients in the main group. Of these, 4 patients were admitted from other hospitals with established drainage in the proximal lobe of the damaged hepatic duct. Of these, 3 were implemented using high-precision GEA with TPKD, and 1 observation was performed using high-precision GEA without frame drainage.

In our observations, 2 patients with complete GH intersection identified on the first day after surgery were also assigned high GEA according to Ru without a frame. In 1 patient with biliary peritonitis, the first stage involved abdominal sanitation and drainage of the hepatic duct. Reconstructive surgery was performed after 3 months - GEA with TPKD. Restorative surgeries were performed on 3 patients. BBA was applied to 1 patient with GH intersection. In 3 patients with edge damage not exceeding 1⁄2 of the duct diameter, duct suturing was performed in 2 cases, and in one observation, a stent was installed in the GH after RPXG.

Thus, the introduction of minimally invasive methods for correcting postoperative bile leakage into the abdominal cavity and biliary peritonitis, such as transduodenal endoscopic interventions, ultrasound-controlled abdominal puncture, and relaparoscopy, allowed patients with "small" bile duct lesions to refuse relaparotomy in 93.3% of patients. Relaparotomy was performed in only 1 patient of the main group. Relaparoscopic correction of peripheral bile leakage and biliary peritonitis was successful in 11 patients (68.8%).

In cases of biliary peritonitis resulting from "large" iatrogenic

lesions of the main bile ducts, early reconstructive surgery—high-precision hepatocoenunoanastomosis according to Ru—has proven its effectiveness and allowed for the rejection of transhepatic framework drainage in 43.8%.

In patients of the comparison group with biliary peritonitis as a complication of acute destructive cholecystitis (33 patients), all surgical interventions (100%) were performed from a wide laparotomy approach, and depending on the volume, the performed operations were divided into 3 types: - CE, sanation, and drainage of the subhepatic space were performed for local biliary peritonitis or biloma resulting from acute cholecystitis; - CE, sanitation, and drainage of the abdominal cavity (right lateral canal and pelvis) were performed in cases of widespread biliary peritonitis or bilomas occupying 2 or more abdominal sections; - SE, choledocholithotomy, and drainage of the subhepatic space were performed in 5 patients with a combination of acute destructive cholecystitis and choledocholithiasis complicated by biliary peritonitis occupying the subhepatic region.

The most serious complication of biliary peritonitis in the studied group of patients was abdominal sepsis, which was the cause of death in 2 patients; the mortality rate was 6.1%.

Various purulent-septic complications following surgeries for acute destructive cholecystitis and biliary peritonitis were observed in 11 patients of the comparison group, accounting for 33.3%. At the same time, bilomas were re-formed in the subhepatic region in 2 (6.1%), which were drained by contraperture recanalization. In 2 (6.1%) patients, prolonged bile leakage lasting from 2 to 4 weeks was observed

from drainage tubes installed in the subhepatic space; in 4 (12.1%) patients, repeated relaparotomy operations were performed with repeated abdominal sanations due to ongoing peritonitis, and 1 - incision and drainage of subhepatic and subdiaphragmatic abscesses.

Additionally, 1 patient underwent repeat surgery for cholemic intra-abdominal bleeding. In 9 (27.3%) patients, suppuration of the postoperative wound was observed.

In the main group of patients (49 patients) with biliary peritonitis as a complication of acute destructive cholecystitis, minimally invasive interventions were used in 33 patients (67.3%) according to FTS principles.

He performed the following surgeries using videoendoscopic technology on 16 patients (32.6%): - LXE and drainage of the subhepatic space in 9 cases of acute destructive cholecystitis complicated by local biliary peritonitis; - LCHE and drainage of the abdominal cavity (right lateral canal and pelvis) in acute destructive cholecystitis complicated by diffuse biliary peritonitis; LXE and drainage of the subhepatic space, EPST 3 in cases of acute destructive cholecystitis combined with choledocholithiasis. In these patients, EPST was performed in two stages.

In 11 (22.4%) patients, diapectic technologies were used: microcholecystostomy and bilum puncture with ultrasound navigation.

In 6 patients (12.2%) with acute destructive cholecystitis combined with choledocholithiasis complicated by local peritonitis, PE was performed using minilaparotomy and choledocholithotomy, with drainage of the choledochus and subhepatic space.

At the same time, in cases of biliary-purulent diffuse peritonitis, CE and drainage of the abdominal cavity from an open laparotomy were performed in 16 patients (32.6%). Indications for surgical intervention from a wide laparotomy approach were widespread biliary-purulent peritonitis.

Thus, according to the principles of minimally invasive interventions, 33 patients (67.3%) with acute destructive cholecystitis complicated by various forms of biliary peritonitis were operated on in the main study group, i.e., 2/3 of the patients. A wide laparotomy approach was used in 1/3 of the patients in the main study group.

In the main study group, postoperative complications developed in 8 patients, accounting for 16.3%. At the same time, biliomas of the subhepatic region formed repeatedly in 2 (4.1%) patients who were successfully sanitized with punctures under ultrasound control. In 1 patient, cholemic bleeding from the liver was observed from the transhepatic puncture area of the gallbladder. External bile leakage was also observed in 1 patient; during relaparoscopy, insufficiency of the bladder duct sheath was identified, which was clipped again.

Duodenal bleeding was noted in 1 patient after EPST; the bleeding was stopped by conservative measures. In 1 patient, a subdiaphragmatic abscess was formed, which was sanitized with 3 repeated punctures under ultrasound control. With persistent peritonitis, relaparotomy was performed on 1 patient, and postoperative wound suppuration was observed in 5 patients.

At the same time, in the main group, 2 out of 49 operated patients also died, with a mortality rate of 4.1%. The cause of the adverse

outcome was acute pancreatitis as a complication of transduodenal endoscopic intervention in 1 patient and ongoing peritonitis in 1 observation.

A comparative analysis of the treatment results for patients with postoperative biliary peritonitis as a complication after cholecystectomy showed that in cases of grade I bile leakage with the development of local biliary peritonitis with fluid volume up to 100 ml under the liver, all 6 patients in the comparison group underwent repeated surgical interventions—3 patients underwent contraperture recanalization with subhepatic drainage, and 3 patients underwent relaparotomy. Quite opposite results were obtained in the main group, where special endoscopic and diapectic methods allowed for the avoidance of repeated surgical intervention—relaparotomy—in all 7 patients—3 patients underwent biloma puncture under ultrasound control, another 3 patients underwent correction of bile leakage into the abdominal cavity and sanation of the subhepatic region during relaparoscopy, and in one observation, the dislocation of drainage from the choledochus and bile leakage were corrected during EPST and nasaliary drainage.

Correction of grade II bile leakage with the development of biliary peritonitis up to 500 ml in the comparison group (6 patients) was performed in 100% of cases through repeated surgical intervention - relaparotomy: - in 2 patients, abdominal sanation was supplemented with ligation of the insufficient bladder duct; – In 2 patients, abdominal cavity sanation was supplemented with choledocholithotomy and 2 more repeated drainage of the hepatocholedochus. Improving the therapeutic and diagnostic management tactics of patients in the main group (9

patients) using endoscopic transduodenal interventions - EPST and nazobiliary drainage made it possible to stop bile leakage into the abdominal cavity in 2 patients. Relaparoscopy allowed for the elimination of the cause of bile leakage in 6 observations - repeated clipping of the gallbladder duct and aberrant bile duct in the bed of the gallbladder was performed, and only 1 patient required relaparotomy with abdominal cavity sanation and choledocholithotomy due to residual choledocholithiasis.

Thus, the implementation of minimally invasive methods for correcting bile leakage into the abdominal cavity, such as transduodenal endoscopic interventions, ultrasound-controlled abdominal puncture, and laparoscopy, allowed patients with "small" bile duct lesions to avoid repeated laparotomy in 93.3% of patients. Relaparotomy was performed in only 1 patient.

In the event of damage to the main bile ducts, grade III bile leakage leading to the development of widespread biliary peritonitis, caused by damage to the main bile ducts, proved the effectiveness of high GEA according to Ru using precision techniques in detecting biliary peritonitis within the next 48 hours. All 3 patients showed good results in the immediate and long-term postoperative periods. Performing GEA on TPKD (performed in 2 patients of the main group and 2 patients of the comparison group) is unconditionally justified when applying biliodigestive anastomosis in conditions of infiltrative changes in the duct wall during biliary peritonitis identified 48 hours later after CE. A replacement transhepatic drainage, on which GEA is formed, is extremely necessary in the aforementioned situations. At the

same time, in 2 patients of the main group and 6 patients of the comparison group with biliary peritonitis due to GH damage in the first stage, the proximal duct of the common hepatic duct was drained. Reconstructive surgeries were performed on him after 3 months. BBA (imposed in 5 patients in the comparison group and 1 in the main group) and GDA (imposed in 3 patients in the comparison group) in all cases ended in GH and BDA strictures. They underwent repeated reconstructive operations. Stitching a GX defect covering less than 1⁄2 of the duct diameter is indicated only when using precision techniques.

Purulent-septic complications following repeated interventions for bile leakage and postoperative biliary peritonitis after CE in the comparison group were observed in 8 patients (36.4%): - continuing biliary peritonitis (2 patients); - formation of subhepatic and subdiaphragmatic abscess (2 patients); - suppuration of the postoperative wound (4 patients). Of these, 1 patient (4.5%) died. The cause of death was acute renal-hepatic failure combined with abdominal sepsis.

In the main group, after surgical correction of biliary secretion and peritonitis after SE, complications were observed in 3 patients (11.1%). In 2 observations, there were purulent-septic complications, and in 1 - acute pancreatitis following endoscopic papillosphincterotomy. No mortality was observed in the primary group.

Thus, a comparative analysis of the results of surgical treatment for patients with biliary peritonitis demonstrates the effectiveness of using minimally invasive diapectic puncture methods, transduodenal endoscopic interventions, and laparoscopy.

At the same time, minimally invasive surgical interventions were

successfully performed in 67.3% of patients with biliary peritonitis and bilomas as complications of acute destructive cholecystitis. At the same time, in 1/3 of patients with widespread biliary-purulent peritonitis, there was a need for CE and full-fledged abdominal sanation from a wide laparotomy approach.

In the development of postoperative biliary peritonitis due to "small" bile duct lesions, minimally invasive interventions performed according to FTS principles were effective in 93.3% of observations.

In the comparison groups, all abdominal sanitation operations were performed from a wide laparotomy approach.

In the comparison group of 54 patients with peritonitis as a complication of acute destructive cholecystitis and postoperative biliary peritonitis, in whom common approaches to surgical treatment were used, purulent-septic complications were observed in 19 patients (35.2%), and 3 (5.5%) died.

In the main study group of 77 patients, purulent-septic complications were observed in 11 (14.3%) patients, and 2 (2.6%) died.

CONCLUSIONS

1. Bile peritonitis, as a complication of acute destructive cholecystitis, was observed in 7.1% of patients. The prevalence of peritonitis due to sweat was noted, observed in 67.1% of patients; bile peritonitis due to perforation of the gallbladder wall was observed in 32.9% of patients. The frequency of postoperative biliary peritonitis was 0.8%, and in 57.2% of cases, the cause was "small" injuries (failure of the bladder duct, damaged Lyushka ducts, dislocation of the drainage from the hepatocoeledoch), and in 42.8% of cases, intraoperative injuries of the main bile duct.

2. The priority use of minimally invasive surgical interventions (diapeptic and laparoscopic methods) in the treatment of local biliary peritonitis as a complication of acute cholecystitis was successfully implemented in 67.3% of patients in the main group. Performing XE and abdominal sanitation from a wide laparotomy approach was necessary in 32.7% of cases with widespread bile-purulent peritonitis.

3. The use of ultrasound-guided puncture methods, transduodenal endoscopic interventions, and laparoscopy allowed for the avoidance of relaparotomy in 93.3% of patients in the main group with postoperative biliary peritonitis due to "small" bile duct lesions. If damage to the main bile duct is detected within the first 48 hours, the best results were obtained by applying high-precision GEA according to Ru.

4. Optimization of surgical treatment tactics for patients with biliary peritonitis and postoperative biliary peritonitis based on the principles of differentiated priority use of minimally invasive surgical interventions allowed for improved treatment results in the main group

of patients, where purulent-septic complications accounted for 14.3%, and mortality was 2.6%, while in the comparison group, it was 35.2% and 5.5%, respectively.

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PRACTICAL RECOMMENDATIONS

1. For local biliary peritonitis, as a complication of acute destructive cholecystitis, in elderly and senile patients with severe comorbid conditions, diapectic treatment methods are indicated - puncture of the gallbladder and collection of bile under ultrasound guidance. Performing a radical operation is indicated after the syndrome of the systemic inflammatory reaction has subsided.

2. For biliary peritonitis (in the first 48 hours), as a complication of acute destructive cholecystitis or as a consequence of "small" bile duct lesions, laparoscopic correction of the peritonitis source with abdominal cavity sanation is indicated.

3. In cases of biliary-purulent diffuse peritonitis with massive fixed fibrinous deposits on the abdomen, correction of the peritonitis source is required through a wide laparotomy approach. The need to perform reconstructive and restorative operations on the damaged main bile duct also requires laparotomy.

LIST OF CONDITIONAL SYMBOLS

BBA Biliobiliary anastomosis

HepEA Hepaticoeyunoanastomosis

HepDA Hepaticoduodenoanastomosis

GH Hepaticocholedoch

IOCG Intraoperative cholangiography

GI Bile leakage

LXE Laparoscopic cholecystectomy

MIP Main bile ducts

MLXE Minilaparotomy cholecystectomy

MRI Magnetic resonance imaging

MRPCHG Magnetic resonance pancreatocholangiography

MSCT Multi-spiral computed tomography

NBD Nasobilliary drainage

OPD Common hepatic duct

Common bile duct Common bile duct

TPKD Transhepatic framework drainage

Ultrasound Examination

FCG Fistulocholangiography

XE Cholecystectomy

EPST Endoscopic papillosphincterotomy

ERPCG Endoscopic retrograde pancreatocholangiography

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