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Surgical Tactics for Early Postoperative Complications in The Biliary Tract

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Abstract

This article presents the results of diagnosing and treating early postoperative bile duct complications in 92 patients. Following minimally invasive surgical interventions, the number of postoperative complications decreased from 16 (33.3%) to 3 (6.8%), and the average length of hospital stay reduced from 15.8±2.32 days to 8.41±0.32 days. Additionally, postoperative mortality declined from 12.5% to 2.3%. These outcomes demonstrate the effectiveness of the performed minimally invasive surgical interventions.

Keywords: Biliary fistula, peritonitis, surgical tactics.

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1. Introduction

Advances in abdominal surgery over the last decade have not diminished the urgency of issues related to the tactics and strategies for treating patients with early postoperative intra-abdominal complications. This is due to the challenges of timely diagnosis and adequate treatment of intra-abdominal complications in the early postoperative period, their frequency of occurrence, and high mortality rates that show no tendency to decrease [1, 3, 5, 8].

Despite all the achievements of modern surgery, in a significant number of patients, operations for postoperative intra-abdominal complications are performed late, and sometimes without justification. This is largely because the clinical picture of complications arising in the early postoperative period is often obscured by intensive therapy in intensive care and anesthesiology units, and particularly by the surgical trauma following major open-method surgeries [2, 4].

The subjective aspects of the postoperative period are not insignificant, with both the patient and the surgeon often expressing a negative attitude toward re-intervention [6, 7, 8].

Despite considerable positive experience from initial research in this field, many questions remain unresolved. For instance, optimal criteria for diagnosing early postoperative complications and selecting a treatment method have not been developed, and the immediate and long-term outcomes of using minimally invasive technologies have not been established. Furthermore, a viewpoint currently exists regarding the questionable applicability of these methods in clinical practice and the inappropriateness of using expensive technologies. All

these circumstances underscore the relevance of the issue under study and the necessity of our scientific research.

Purpose of the research. To improve treatment outcomes by rationally applying minimally invasive methods for the diagnosis and treatment of early postoperative complications of the biliary tract.

2. Methods

The study is based on an analysis of the examination and treatment results of 92 patients with biliary complications in the early postoperative period following various types of biliary tract surgery. These patients were treated at the multidisciplinary clinic of the Center for the Development of Professional Qualifications of Medical Workers in Tashkent.

To address the research objectives aimed at developing new treatment and diagnostic tactics, taking into account current trends in the development of modern emergency surgery, the patients were divided into two groups. Group I (the control group, comprising patients from 2010 to 2016) included 48 (52.2%) patients with various complications of biliary tract surgery, whose comprehensive treatment involved standard, generally accepted approaches. The second group (the main group, comprising patients from 2016 onwards) included 44 (47.8%) patients for whom the algorithm of therapeutic and diagnostic measures was based on the principles of an enhanced recovery program (ERP), and minimally invasive surgical interventions were used as the primary methods of surgical treatment.

In the main group, women comprised 28 (63.6%) and men 16 (36.4%) of the participants, while in the control group, these figures were 31 (64.6%) and 17 (35.4%), respectively ($\chi 2=0.0089$; $p=0.92$). The ratio of women to men was 2:1, which corresponds to the average statistical data on the incidence of cholelithiasis. The age of the patients ranged from 21 to 81 years, with a mean age of 51.2±13.8 years in the main group and 49.7±9.72 years in the control group ($t=0.09$; $df=90$; $p=0.93$). The compared groups were representative in terms of sex and age ($p>0.05$). Statistical analysis of the obtained results was performed using the STATISTICA 8 software package.

3. Results And Discussion

A total of 48 patients with postoperative biliary peritonitis underwent surgery based on emergency indications. These patients constituted the control group. The indications for emergency surgery were the clinical, laboratory, and instrumental signs of postoperative biliary peritonitis (n=38), hemoperitoneum (n=8), and a combination of biliary peritonitis and hemoperitoneum (n=2). In this group, postoperative biliary peritonitis occurred in 11 patients due to cystic duct stump insufficiency, in 4 patients due to biliodigestive anastomosis insufficiency, in 6 patients from aberrant bile ducts in the gallbladder bed, and in 17 patients following choledochal injuries (n=7) and various drainage tube placements (Kehr - 7, Pikovskiy - 3). In 2 patients, both bleeding and biliary peritonitis were caused by biliodigestive anastomosis insufficiency. The causes of bleeding into the biliary tract in 8 patients were identified as hemorrhage from the cystic artery (n=6) and the abdominal wall.

In 9 patients who underwent open surgery for biliary peritonitis, multiple inter-intestinal abscesses were detected intraoperatively. Bacteriological analysis of their contents revealed the presence of infection - Staphylococcus aureus and Escherichia coli - in all cases. In 25 patients, external drainage of the abscess cavity and drainage of the abdominal cavity were performed using dual-lumen drainage tubes with active flow-aspiration lavage.

The probability of resolving postoperative biliary peritonitis in a single surgical intervention was high in 25% of cases; for postoperative decontamination, we used the method of flow-aspiration fractional abdominal lavage. In cases where the severity of peritonitis prevented a rapid result from a single procedure, a strategy of planned relaparotomy for abdominal sanitation was employed in 60% of cases.

In this group of 48 patients, an active surgical approach was used in 43 patients, while an active surveillance surgical approach was used in 5 (Table 1).

Table 1

Active Surgical Approach for Postoperative Biliary Complications Following Biliary Tract Surgery

Type of operation	n	%
Suturing of the bile duct	7	30,4

Reconstruction of the common bile duct	5	21,7
Resuturing of a failed biliodigestive anastomosis	1	4,3
Suturing of the gallbladder artery	3	13
Choledochal reconstructive surgery	4	17,4
Paracentesis and intubation of the abdominal cavity	23	100

The need for external drainage in this group of patients arose from their severe condition, which was caused by intoxication due to persistent bile leakage along with insufficiency of bile and small intestine contents. Since a significant concentration of bile in the exudate considerably reduces the likelihood of isolating pathological contents from the free abdominal cavity, the preferred drainage method was drainage with active aspiration. Separate drainage of opened inter-intestinal abscess areas was not performed. However, a drain was placed in the pelvic cavity for 24 hours, as bile leakage into the abdominal cavity caused significant chemical exudation at a rate that exceeded the aspiration capacity of the peritoneum.

In the early postoperative period, 6 patients underwent reoperation on the 2nd, 3rd, 5th, and 6th days after the initial surgery. The indications for relaparotomy were the emergence of peritoneal symptoms in 3 patients and collapse accompanied by a decrease in hemoglobin levels in 2 patients.

During the reoperations, complete obstruction of the drainage cavity with necrotic masses and the leakage of purulent exudate from alongside the drain into the free abdominal cavity were noted in all patients. In 2 patients, on the 3rd-4th postoperative day, a recurrence of bile leakage was observed from the liver injury at the site where percutaneous transhepatic biliary drainage had been placed.

After the drains were removed, external biliary fistulas formed in 3 patients. In 2 of these patients, the fistulas closed spontaneously, and only one required excision of the abscess cavity along with the fistula tract.

The frequency and nature of postoperative complications in the control group patients after external laparotomic drainage are presented in Table 2.

Table 2

Post-laparotomy complications in the early postoperative period

Types of complications	n	%
External biliary fistula	12	75
Primary or recurrent erosive bleeding	6	37,5
Hepato-renal failure	5	31,3
Diffuse biliary peritonitis	4	25
Laparotomy wound suppuration	7	43,7
Acute ulcers of the stomach and duodenum	2	12,5
Total	16	100

In the control group, a total of 6 (12.5%) patients died. For 3 patients, the cause of death was abdominal sepsis. Two patients died from acute cardiovascular insufficiency secondary to anemia and intoxication, and 1 patient died from progressive hepato-renal failure.

However, a comparison of the groups based on the operations performed is not possible. This is because the procedures in the control group were performed via laparotomy (with the exception of 3 patients under active observation), whereas minimally invasive methods were used in all cases for the patients in the main group. This, in

turn, reduced the length of hospital stay by 53% (8.41±0.32 days in the main group vs. 15.8±2.32 days in the control group) (t=3.16; df= 49; p=0.003).

A comparison of patients based on postoperative complications shows that complications were observed in 3 (6.8%) patients in the main group. This figure was 16 (33.3%) in the control group. As is evident, postoperative complications in the main group were significantly reduced by nearly fivefold compared to the control group ($\chi 2$=9.85; p=0.002).

Simultaneously, when comparing the mortality rates between the groups, the number of deaths in the main group was 1 (2.3%), whereas this figure was 6 (12.5%) in the control group. Consequently, the mortality rate decreased from 12.5% to 2.3% (a 10.2 percentage point reduction) ($\chi 2$=3.4; p=0.032).

4. Conclusion

Thus, biliary complications following operations on the bile ducts occurred due to cystic duct stump insufficiency, biliodigestive anastomosis insufficiency, aberrant bile ducts in the gallbladder bed, choledochal injuries, and after various types of extrahepatic duct drainage (Kehr, Pikovsky, Vishnevsky) for Mirizzi syndrome. Furthermore, bleeding and bile peritonitis were caused by biliodigestive anastomosis insufficiency, and isolated bleeding manifested from the cystic artery and the abdominal wall. In the control group, an active surgical approach was applied to 43 of the 48 patients, while an active surveillance ("watchful waiting") approach was used for 5. This group of patients underwent relaparotomy, suturing of the cystic duct, re-drainage of the common bile duct, re-suturing for biliodigestive anastomosis insufficiency, suturing of the cystic artery, choledochal reconstructive surgery, and abdominal cavity sanitation and drainage. In contrast, patients in the main group underwent minimally invasive procedures in all cases: relaparoscopy for cystic duct stump insufficiency, with re-clipping of the cystic duct; relaparoscopic primary closure of the choledochal injury in patients with such injuries; relaparoscopic choledochal drainage according to Kehr and Vishnevsky along with relaparoscopic suturing of the common bile duct; relaparoscopic sanitation of the gallbladder bed with coagulation of the leakage source in a patient with bile leakage from aberrant ducts; relaparoscopic re-drainage of the common bile duct in patients with bile peritonitis after biliary drainage for Mirizzi syndrome; relaparoscopic sanitation and drainage of the abdominal cavity (subhepatic space and pelvic cavity) in patients with bile peritonitis, as the bile leakage was localized and contained; relaparoscopic sanitation and coagulation in patients with bleeding from the gallbladder bed; relaparoscopic sanitation for a patient with bleeding from the gallbladder site; and percutaneous puncture and drainage in patients with bile leakage from a biliodigestive anastomosis, as the leakage was contained and localized. Additionally, 5 patients underwent ERCP+EPST, after which bile flow from the drains ceased.

Following the minimally invasive surgical interventions, postoperative complications decreased from 16 (33.3%) to 3 (6.8%) ($\chi 2$=9.85; p=0.002), and the patients' length of hospital stay decreased from 15.8±2.32 days to 8.41±0.32 days (t=3.16; df= 49; p=0.003). At the same time, the postoperative mortality rate decreased from 12.5% to 2.3% (a 10.2 percentage point reduction) ($\chi 2$=3.4; p=0.032). This demonstrates the advisability of using minimally invasive surgical procedures.

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