Original Article

IMPROVING THE IMMEDIATE RESULTS OF SURGICAL TREATMENT OF ACUTE CHOLECYSTITIS IN PATIENTS WITH LIVER CIRRHOSIS

Urokov Sh. T[1], Saidov I.K[2], Hamroyev Kh.N[3], Saidov Sh.I[4]

[1] Doctor of Medical Sciences, Associate Professor, Head of Department; Department of Surgical Diseases and Resuscitation, Bukhara State Medical Institute named after Abu Ali ibn Sina, Bukhara, Republic of Uzbekistan.
[2] Bukhara branch of the Republican Scientific Center for Emergency Medical Care.
[3] Bukhara branch of the Republican Scientific Center for Emergency Medical Care.
[4] Bukhara State Medical Institute named after Abu Ali ibn Sina, Bukhara.

DOI: 10.47750/pnr.2023.14.02.211

Abstract

Acute cholecystitis and some conditions associated with gallbladder stones, such as depressed common bile duct stones, cholangitis, and biliary pancreatitis, are common diseases in daily practice. Early cholecystectomy or placement of a drain, a procedure with delayed cholecystectomy, is the current standard of care based on published clinical guidelines. Chronic diffuse liver disease is not only a state of chronic liver dysfunction, but also has systemic effects in patients. In individuals with chronic diffuse liver disease, several predisposing factors, including changes in bile acid composition, increased bile nucleation, and decreased gallbladder motility, contribute to the formation of gallstones and the possibility of symptomatic cholelithiasis, which is an indication for surgical treatment. In addition to these predisposing factors for gallstone disease, the systemic effects and local anatomical consequences associated with chronic diffuse liver disease, in particular liver cirrhosis, lead to anesthetic risks and perioperative complications in patients with liver cirrhosis. Therefore, the treatment of the aforementioned biliary conditions in patients with liver cirrhosis has become a challenging task.

Keywords: Acute cholecystitis, chronic diffuse liver disease, laparoscopic cholecystectomy.

Introduction

Cirrhosis is one of the most complex human diseases and causes significant physiological changes, local anatomical changes, changes in immune status and other associated risks that affect the life expectancy of patients. It has been recognized that gallstone disease, a common disease, is more common in patients with cirrhosis than in the general population [11, 18].

Currently, surgical treatment, laparoscopic cholecystectomy (LC) or open cholecystectomy (OC), minilaparotomic cholecystectomy are the standard of care for symptomatic gallbladder stones (GB stones), including in cases with attacks of pain, gallbladder, choledocholithiasis with or without cholangitis[20, 22].

In surgical publications of the 80s of the last century, a high incidence of complications (from 5 to 23%) and deaths (from 7 to 20%) was reported in open surgical interventions on the gallbladder and bile ducts in patients with cirrhosis, with the main causes of adverse outcomes were excessive blood loss, postoperative liver failure and sepsis [6, 7]. Initially, cirrhosis with portal hypertension was considered a contraindication for laparoscopic

cholecystectomy (LC) due to potential bleeding risks [8]. With the accumulation of experience in laparoscopic surgery, this minimally invasive approach began to be used in a number of difficult situations associated with the gallbladder, including cholelithiasis in patients with cirrhosis. At the same time, recent publications [9] reported a fairly wide range of postoperative complications (6.6-47.3%) and mortality (0-4.3%) in HL in patients with cirrhosis. The first report on the results of HL in patients with cirrhosis was published in 1993 [9]. Subsequently, data from several meta-analyses and randomized controlled trials appeared, confirming the benefits of HL in carefully selected patients with cirrhosis [10-13]. In the present study, we tried, based on our own experience, to assess the feasibility and reliability of HL in the treatment of cholecystolithiasis in patients with cirrhosis.

Gallstone disease occurs in approximately 1/3 of patients with liver cirrhosis (LC) [1]. Increased lithogenesis in such patients is presumably associated with an increase in the secretion of unconjugated bilirubin, a decrease in the content of bile acids and phospholipids in bile, and hypomotility of the gallbladder [2]. Gallstones in the gallbladder rarely migrate in patients with cirrhosis, and therefore gallstone disease in most of them is asymptomatic [3]. The need for cholecystectomy in patients with cirrhosis arises, as in patients without cirrhosis, when symptoms of biliary colic, acute cholecystitis appear [4]. It is well known that cirrhosis with portal hypertension increases the risk of intraoperative and postoperative complications in any type of surgical intervention, especially in operations on the biliary tree [5].

Material and methods

The case histories of 177 patients with cirrhosis who underwent HL in the clinical bases of the Department of Surgical Diseases and Resuscitation of the Bukhara Medical Institute were subjected to a retrospective analysis for the period from June 2017 to December 2021. The age of patients, gender, etiology of cirrhosis, the nature of gallbladder disease, duration of surgery, intraoperative and postoperative complications, conversion rate to laparotomy, length of hospital stay. There were 115 women (65.2%), men - 62 (34.8%), their mean age was 56.6±12.5 years (range 23-74 years). Hepatitis C was the cause of cirrhosis in 15 (32.6%) patients, hepatitis B in 12 (26%), hepatitis B and C in 5 (10.9%), alcohol abuse in 5 (10.9%) , fatty degeneration of the liver - in 7 (15.2%) patients. The etiology of cirrhosis could not be established in 2 patients. The severity of cirrhosis was classified according to Child-Pugh, according to which 34 (73.9%) patients were included in class A, 32 (26.1%) patients were included in class B. There were no patients with decompensated cirrhosis (class C Child—Pugh) in our study. (Table 1).

Table 1. Distribution of patients with ACC against the background of CDLD depending on the functional state of the liver according to Child-Pugh in the control group (n=82)

Clinical forms of ACC and its complications	Functional state according to Child-Pugh			Total
	Class A	Class B	Class C	
Acute Calculous Cholecystitis + Chronic Hepatitis	32(39%)	2(2,4%)	-	34(41,5%)
Acute Calculous Cholecystitis + cirrhosis of the liver	3(3,6%)	13(15,8%)	6(7,3%)	22(26,8%)
Acute Calculous Cholecystitis + Chronic Hepatitis + Obstructive jaundice	-	8(9,7%)	-	8(9,7%)
Acute Calculous Cholecystitis + cirrhosis of the liver + Obstructive jaundice	-	3(3,6%)	4(4,8%)	7(8,5%)

Acute Calculous Cholecystitis + cirrhosis of the liver + Obstructive jaundice + decompensation	-	-	5(6%)	5(6%)
Acute Calculous Cholecystitis + cirrhosis of the liver + decompensation + peritonitis	-	-	6(7,3%)	6(7,3%)
Total	35(42,7%)	26(31,7%)	21(25,6%)	82(100%)

In a retrospective analysis of the case histories of 82 operated patients with ACC and its complications in the form of destruction of the gallbladder and mammary glands against the background of CKD showed that the functional state of the liver at the time of surgery and the Child-Pugh scale was as follows.

In patients in the ACC group against the background of chronic hepatitis (CH) on the Child-Pugh scale, class A was in 32 (39%), class B 2 (2.4%), which accounted for more than 40% of all patients in this group. When studying the case histories, these patients did not have life-threatening complications.

In patients in the ACC group against the background of the formed cirrhosis according to the functional state of the Child-Pugh scale, only 3 (3.6%) patients were characterized as class A, in most cases there was class B 13 (15.8%) and in 6 (7, 3%) of class C patients.

Special preoperative preparation using hepatoprotectors, albumin solution, diuretics for 2-4 weeks was performed in patients admitted with jaundice and ascites (Child-Pugh class B). These patients were operated on after elimination of ascites and correction of liver function parameters. LH was performed under general anesthesia, as standard, by the four-port method, in the American version with some modifications. Placement of ports in patients with cirrhosis not diagnosed before surgery was performed as in patients without cirrhosis.

In the case of the installed CP, the first trocar was inserted subumbilically, three other trocars under laparoscopic control through the avascular areas of the abdominal wall, while the subxiphoidal port was placed slightly to the right of the midline to avoid damage to the vessels in the round ligament of the liver. They tried to maintain the pressure in the abdominal cavity within 8–10 mm Hg, taking into account its possible negative effect on hemodynamics of the liver [14]. Adhesions with the gallbladder, which in some patients were highly vascularized, were dissected by electrocoagulation using a hook-shaped electrode, a dissector, or an ultrasonic scalpel. Blunt tissue dissection was avoided whenever possible to minimize bleeding. In 5 patients, a fifth, additional 5 mm trocar was inserted in the right hypochondrium to retract the hypertrophied segment of the left lobe of the liver, covering the field of view of the video camera. According to intraoperative visual assessment of the liver, macronodular cirrhosis was noted in 15 patients, micronodular cirrhosis - in 31 patients. Changes in the gallbladder, such as catarrhal cholecystitis, were regarded in 40 patients, as phlegmonous - in 5, as gangrenous - in 1 patient. Accumulation of turbid serous fluid in a small amount in the area of operation was noted in 4 patients. Expansion of blood vessels on adhesions with the gallbladder and liver occurred in 14 patients, including 6 in the area of the hepatoduodenal ligament. In the presence of an enlarged strained gallbladder, it was emptied by a thick-needle puncture or opening the lumen and evacuating the contents with an electric suction. The cystic duct and cystic artery were isolated using a hook-shaped electrode or a dissector connected to an electrocoagulator. The separation of tissues in a blunt way was carried out here using a dissector or a suction tip, making sure that there were no dilated vessels.

Bladder removal usually started from the neck. Dissection of tissues in the region of the Kahlo triangle was performed in small portions closer to the gallbladder after their identification and clipping. Isolation of the gallbladder from the bed in the liver was performed submucosally, if possible, which made it possible to avoid significant bleeding. When the majority of the gallbladder was located in the liver tissue or with dense adhesions of its wall to the liver, subtotal cholecystectomy was performed, leaving a section of the bladder wall on the liver (in 6 patients) . The use of ultrasonic scissors made it possible to cut the bladder wall almost bloodlessly. The

mucous membrane of the left wall of the bladder was subjected to mucoclasia in chronic cholecystitis, curettage with a gauze ball moistened with iodine solution, in acute cholecystitis.

Bleeding from the bladder bed was stopped by electrocoagulation, pressing a gauze strip or a hemostatic sponge. At the end of the operation, a piece of the liver was excised for histological examination. Before removing the ports, the reliability of hemostasis was monitored for 3–5 min. The abdominal cavity was drained in all cases. The ports were removed under visual control to exclude bleeding from the puncture points.

Results

Under our supervision there were 95 patients with CDLD: according to the scale of severity of Child-Pugh compensation of liver function, class A - 51 or 53.7% of patients, class B - 30 or 35.6% and class C - 14 and 14.7%.

Table 2. Clinical signs of patients with ACC on the background of CDLD

Symptoms	Chronic diffuse diseases of the liver	
	I - group (control n=82)	II - group Main n=95)
Sharp pain in the right hypochondrium	72(88%)	83(87,4%)
Acute pain in the epigastric region	10(12%)	12(12,6%)
Yellowness of the skin, sclera	8(9,7%)	15(15,8%)
Muscle tension in the right hypochondrium	28(34%)	32(33,6%)
Positive symptom of Shetkin-Blumberg	8(9,7%)	12(12,6%)
Skin itching	3(3,6%)	3(3,6%)
Increased bleeding	7(8,5%)	9(9,5%)
Hepatomegaly	56(68,3%)	48(50,5%)
Nausea, vomiting, dyspepsia	78(95%)	82(86,3%)
Weakness, malaise, apathy	76(92,7%)	82(86,3%)
Splenomegaly	35(42,7%)	65(68,4%)
Subfebrile condition	22(26,8%)	42(44,2%)

Of these, 28 men and 67 women. Clinical symptoms in patients with chronic hepatitis differed in variety: from minor manifestations in chronic hepatitis of a low degree of activity to a vivid clinical picture, including the entire picture of CDLD in chronic hepatitis with severe activity and cirrhosis.

Careful history taking in the main group showed that out of 95 (100%) patients, 59 (62%) patients had previously had acute viral hepatitis (AVH), 12 (12.6%) patients had previously undergone surgical invasive interventions with blood transfusions, 6 indicated prolonged intake of alcoholic beverages.

The main feature of the complexity of diagnosing CDLD in patients with ACC is that in most cases in clinical and biochemical

In blood parameters, pathological changes in the liver are not detected or are not very pronounced. Only with the progression of CDLD changes in the biochemical parameters of the liver are noted. Often, these progressions are associated with complications of ACC in the form of destructive lesions of the gallbladder and the development of complications in the form of obstructive jaundice (OM) or after surgical treatment under anesthesia, as a result of the impact of narcotic drugs on the damaged liver parenchyma.

In the blood tests of patients with ACC + CG, a moderate increase in aminotransferases, the presence of slight dysproteinemia with normal levels of total protein were revealed. Other indicators of liver function did not have significant differences from the norm.

The assessment of the functional state of the liver in ACC + CG of a moderate degree of activity using a complex of biochemical research methods revealed the inhibition of its functions, which was expressed by a significant increase in bilirubin due to both fractions and aminotransferases more than 3 norms. Dysproteinemia was noted with a decrease in albumin / globulin ratio with relatively normal total protein levels (Table 5.).

It has been recognized that gallstone disease, a common disease, is more common in patients with cirrhosis than in the general population.

Although the etiology of cirrhosis, such as chronic viral hepatitis and alcoholic cirrhosis, may enhance lithogenesis, deteriorating liver function in patients with cirrhosis alters the bile biochemistry and, in combination with other physiological changes, is a major causative factor, especially for the formation of pigmented (black) stones. associated with the destruction of red blood cells.

Also, hemolysis is an important factor, and this is consistent with the fact that black pigmented stones are the main type of stones found in patients with cirrhosis. While hypersplenism associated with portal hypertension may increase the destruction of red blood cells (namely, hemolysis), a change in the ratio of cholesterol and phospholipids in the membrane of red blood cells due to impaired liver function can change the physiology, increasing their destruction.

Table 3. Complete blood count in patients with ACC against the background of CDLD in the control group (n=82)

Indicators	Chronic diffuse diseases of the liver			
	Acute stone cholecystitis + chronic hepatitis n=33	Acute stone cholecystitis + liver cirrhosis + compensation n=28	Acute stone cholecystitis + liver cirrhosis + decompensation n=6	Acute stone cholecystitis + liver cirrhosis + mechanical jaundice n=15
Hemoglobin, g/l	115,2± 5,0	100,4 ±2,0	92,6±1,2*	90,2± 3,0
erythrocytes, 1012/l	3,55± 0,2	3,20±0,2	2,8±0,18*	3,2±0,2
Leukocytes 106/l	8,2± 0,5	9,0 ±0,6	9,2 ±0,6	9,8±0,8
Platelets /l	240±8,0	180 ±6,0	175±8,0*	177±9,0

Note: the table contains reliable data, but in relation to the norm - * ($p < 0.05$)

A general analysis of red blood was carried out, while in patients of the main group with ACC combined with CG, the indicators of red blood and hemostasis were closer to normal (hemoglobin 100.2±4.0; erythrocytes 3.5±0.2), then, as in patients with ACC, combined with cirrhosis, tangible changes in these indicators were

observed. So, in these patients, there was a decrease in the number of erythrocytes (2.8±0.2x10 in 12/l) and hemoglobin level (93.4±3.0 g/l). (Table 4).

When analyzing the case histories of the retrospective (control) group, the same changes were found in red blood indicators. (Table 3).

Table 4. Complete blood count in patients with ACC against the background of CDLD in the main group (n=95)

Indicators	Chronic diffuse diseases of the liver			
	Acute stone cholecystitis + chronic hepatitis n=41	Acute stone cholecystitis + liver cirrhosis + compensation n=31	Acute stone cholecystitis + liver cirrhosis + decompensation n=8	Acute stone cholecystitis + liver cirrhosis + mechanical jaundice n=12
Hemoglobin, g/l	100,2± 4,0	98,4 ±3,0	86,8+1,2*	93,4±3,0
erythrocytes, 1012/l	3,5± 0,2	3,08±0,2	2,8±0,18*	2,8±0,2
Leukocytes 106/l	8,5± 0,5	9,3 ±0,6	9,0 ±0,6	10,2±0,8
platelets, /l	250±8,0	220 ±4,0	170±5,0*	176±3,0

Note: the table contains reliable data, but in relation to the norm - * (p <0.05)

Table 5. Biochemical parameters of the liver in patients with ACC against the background of CDLD in the control group (n=82)

HDZP indicators	HDZP indicators				
		Acute stone cholecystitis + chronic hepatitis n=33	Acute stone cholecystitis + liver cirrhosis + compensation n=28	Acute stone cholecystitis + liver cirrhosis + decompensation n=6	Acute stone cholecystitis + liver cirrhosis + mechanical jaundice n=15
bilirubin total	bilirubin total	23,4±0,7	32,0± 1,6	45,0+6,24*	125±10,24*
µmol/l	µmol/l	11,8±0,42	17,8±0,8	18,2± 2,2*	102±8,6
straight	straight	62,3 + 6,4	132,3 ± 11,2*	156,2±12,3*	162,2±12,3*
µmol/l	µmol/l	66,4±4,0	98,8±16,4*	125,6±18,4*	145,2±8,3*
transaminase ALT u	transaminase ALT u	75,4±0,8	70,2±1,0	50,2±0,6	56,2±0,6
ASAT unit	ASAT unit	51,2±1,6	40,3+1,4*	35,8±0,82*	35,8±2,82*
squirrels	squirrels	1,3 ±0,06	1,1±0,08	0,86±0,22	1,1±0,08
plasma total, g/l	plasma total, g/l	21,0±1,2	22,3±1,0*	25,5±0,6*	22,5±0,6*
albumen%			8,8±1,25	14±2,1	12±1,8

A/G coefficient		6,03±0,73	11,0+0,5*	10,5±1,8
gamma-		IV	III-IV	II-III
globulins %		9,0±1,7	75,8±1,5	85,2±2,2*

When analyzing the parameters of the general blood from the side of leukocytes, there was a shift towards leukocytosis, as the inflammatory process in the gallbladder increased and complications increased, leukocytes increased from 8.5 ± 0.5 to 10.2 ± 0.8 in the main group, similar indicators were in patients in the control group. In both groups, according to the deterioration of liver function, thrombocytopenia was noted, which was clinically manifested by skin hemorrhages and bruising.The analysis of red blood parameters was carried out, while in patients with ACC combined with CG, the erythrocyte and hemoglobin values were in within the normal range, while, as in patients with ACC, appreciable shifts in these indicators were observed against the background of cirrhosis. The portal hypertension observed in cirrhosis and the hypersplenism associated with it enhances the destruction of red blood cells (namely, hemolysis). Changing the ratio of cholesterol and phospholipids in the erythrocyte membrane due to impaired liver function can change the physiology, elasticity and morphology of erythrocytes and increase their destruction. In addition, hemolysis is also an important factor, and this is consistent with the fact that black pigmented stones are the main type of stones found in ACC patients with cirrhosis. So, in patients of the control group, in patients with ACC + CG, hemoglobin values were higher (115.2 ± 5.0) than in patients with ACC + cirrhosis of decompensation 92.6 ± 1.2; there was also a decrease in the number of erythrocytes 3.55±0.2x1012/l to the level of 2.8±0.2x1012/l in patients with ACC+LC decompensation. There were also signs of hypersplenism in terms of platelets from 240±8.0 in patients with ACC+CHG to 175±8.0 in patients with ACC+LC decompensation. Only the indicators of leukocytes were higher in patients with ACC + LC decompensation 9.8±0.5x109/l, due to inflammatory processes in the wall of the gallbladder and its complications than in patients with ACC + CG - 8.2±0.5x109/l. (Table 3 - 4).

The above changes in general blood tests would be identical in patients of the main group. Patients with ACC+LC had signs of hypochromic anemia, moderate thrombocytopenia, increased ESR, and leukocytosis. (Table 3 - 4). A deeper depression of liver function was characterized by hyperbilirubinemia, increased transaminase levels, decreased albumin levels, hyperazotemia, increased thymol test values, decreased thrombotest and prothrombin index in both study groups. (Table 4 - 5). Under our supervision there were 51 patients with cirrhosis of the liver, there were 22 men, 25 women aged 48 to 78 years. Inactive cirrhosis (class A according to Child) was detected in 10 patients, in 27 patients - cirrhosis at the stage of subcompensation (class B according to Child) and 14 patients with decompensated liver cirrhosis (class C according to Child) with an advanced cirrhotic process. Patients with CG amounted to 44 patients and 95 patients in total. The control group consisted of 50 patients with cirrhosis, of which cirrhosis (class A according to Child) was detected in 3 patients, in 26 - cirrhosis at the stage of subcompensation (class B according to Child) and 21 patients with decompensated liver cirrhosis (class C according to Child) with advanced cirrhotic process. Patients with CG amounted to 32 patients and 82 patients in total. It was found that pain symptoms in the epigastrium and in the right hypochondrium occurred in both groups in 100% of cases, severe weakness and decreased appetite in groups I and II 76 (92.7%) and 82 (86.3%), respectively; nausea, vomiting and dyspepsia - in 78 (95%) and 82 (86.3%); jaundice - in 8 (9.7%) and 15 (15.8%); pruritus associated with jaundice in 3 (3.6%) and 3 (3.6%); muscle tension in the right hypochondrium was noted in 28 (34%) and 32 (33.6%); a positive symptom of Shetkin-Blumberg associated with destructive changes in the walls of the gallbladder was noted in 8 (9.7%) and 12 (12.6%); ultrasound revealed splenomegaly in 35 (42.7%) and 65 (68.4%); hepatomegaly in 56 (68.3%) and 48 (50.5%) cases, respectively. The rest of the general symptoms had minor clinical characteristics and frequency.

It should be noted in patients with symptoms of increased bleeding in 7 (8.5%) and 9 (9.5%) cases in groups, which indicates a violation of liver function associated with CDLD. More than 70% of patients by the time of admission to the surgical hospital from the anamnesis did not note any liver diseases. The severity of the condition of the patients was more pronounced among the patients of the second group, and the age of the disease was considered the determining factor in terms of the prognosis of the disease. From the case histories, it was retrospectively revealed that, in the control group of patients out of 50 patients, only 10 (20%) knew that they had

cirrhosis, in 13 (26%) patients cirrhosis was detected in the preoperative period during ultrasound, in most patients 27 (56%) cirrhosis was detected intraoperatively. From the anamnesis of the disease in the main group, it was revealed that in the main group of 51 patients with cirrhosis, 12 (23.5%) only knew that they had cirrhosis, the remaining 31 (61%) were diagnosed with cirrhosis before surgery using, in addition to ultrasound, also elastometry and MRCP and only 8 (15.5%) patients did not undergo the above-mentioned (MRCHG) diagnostic methods during the operation.

In patients of the main group with ACC, in whom ultrasound revealed diffuse changes and induration of the liver, MRPCG was additionally performed. In 22 (23%) patients, gallstones were found in the bile ducts, which were not previously detected on ultrasound.Clinical characteristics of patients with LC in the control and main groups are shown in Table 3.6.Evaluation of the results of a blood test established: a decrease in the level of hemoglobin and erythrocytes and moderate dysproteinemia in patients with cirrhosis of the liver Child-Pugh A and B, with Child-Pugh C the decrease in these indicators was more pronounced. Revealed

Discussion

Cholecystectomy is the most common surgical intervention in patients with cirrhosis [15]. It can be dangerous in end-stage liver disease and in portal hypertension due to the greater likelihood of serious complications, especially bleeding and hepatocellular insufficiency. Perhaps for this reason, HL was initially contraindicated in patients with cirrhosis. Later, with the accumulation of experience, as well as the improvement of equipment in laparoscopic surgery, the minimally invasive method gradually replaced open cholecystectomy in this group of patients and became the preferred intervention for cholelithiasis. Recent publications have confirmed the safety and good tolerability of HL in patients with compensated liver cirrhosis [12,14]. The advantages of HL in cirrhosis are a reduction in the incidence of postoperative bleeding, infection, liver failure, and death [10, 11]. In this study, we presented our own experience of LC performed in 46 patients with compensated cirrhosis, paying special attention to the indications for this operation, the technique of intervention, and complications. The cause of cirrhosis in most of the patients we observed was hepatitis B and C. (32.6%) cirrhosis of the liver was an unexpected operational finding. The diagnosis of early cirrhosis before surgery for HL is not established, according to some authors, in 18.5-40% of cases [16, 17].

Ultrasound, as the most accessible non-invasive method, is highly informative in advanced forms of cirrhosis, while its value in the diagnosis of early cirrhosis is still debatable. Perhaps, with the introduction of a relatively new non-invasive method for assessing liver fibrosis, ultrasound elastography (Fibro Scan) will fill the gap in this area. The duration of the operation, the frequency of complications, and the conversion rate for HL in patients with cirrhosis are significantly higher than in patients without this disease [10, 11]. The duration of HL in our observations averaged 75 min, which differs little from similar indicators given by other authors [18]. In 4.34% of our observations, a transition to an open operation was required. In recent reports, the conversion rate to laparotomy in HL ranged from 0 to 15.7% [14]. Absolute indications for changing the method of surgery for HL in patients with cirrhosis are bleeding that cannot be stopped by endoscopic means and the risk of manipulations in the hilum of the liver due to varicose vasodilation and anatomical complications.

Despite a significant decrease in the frequency of deaths in HL in patients with cirrhosis, postoperative complications in these patients remain at a fairly high level (7.8-35%) [8]. Most often after these operations, liver failure, bleeding, development of ascites, wound infection are noted.

In total, we noted complications in 23.9% of patients. In most cases, they were minor, only in one patient the complication turned out to be serious, and a transition to an open operation was required.

After surgery, the frequency of deaths in HL in the group of patients with cirrhosis varies, according to the literature, from 0 to 4.3%, averaging 0.45% [14]. Most published studies report no deaths in compensated cirrhosis [19]. There were no deaths in our observations.

LH is by far the best option for cirrhosis surgery primarily due to the excellent focal visibility and magnified image provided by the monitor to clearly see the dilated vessels, as well as the availability of appropriate endoscopic hemostatic instruments (ultrasonic scissors, argon plasma coagulator).

In addition, with the endoscopic method, the risk of infection of the operating team with hepatitis B and C viruses, which may be in patients with cirrhosis, due to injury with piercing and cutting instruments, is significantly reduced. After HL, there are almost no adhesions in the abdominal cavity, which, probably, may be important in the future for liver transplantation in these patients. At the same time, there are some technical difficulties in LC with CP. The nodularity, hardness of the cirrhotic parenchyma may interfere with the removal of the gallbladder behind the fundus in the cranial direction, which is a necessary maneuver in HL. In addition, in patients with cirrhosis, hypertrophy of the left lobe of the liver, which covers the gate of the liver, is often observed. To eliminate these inconveniences, we, like other authors [8, 12], use an additional 5 mm trocar or the introduction of a retractor.

Of particular danger in HL in patients with cirrhosis is bleeding from dilated venous collaterals located at the hilum of the liver. The use of ultrasonic scissors allows the dissection to be relatively bloodless. In the absence of confidence in the safety of work in the area of the Kahlo triangle, some authors suggest using options for subtotal cholecystectomy [17].

The results of our study and data from other authors show that HL is most suitable for the treatment of symptomatic cholecystolithiasis and acute cholecystitis in patients with mild to moderate cirrhosis (Child-Pugh class A and B).

At the same time, cholecystectomy in patients with decompensated cirrhosis (Child-Pugh class C) is a difficult task due to the very high risk of bleeding and liver failure, often leading to an unfavorable outcome [19, 20].

According to the generally accepted opinion of researchers, elective cholecystectomy in this group of patients should be avoided, and emergency operations should be performed according to emergency indications in the absence of the effect of conservative therapy in progressive cholecystitis [14].

Several published studies have shown the effectiveness of percutaneous transhepatic cholecystostomy in such patients [21]. Even attempts were made to endoscopically stent the cystic duct as an alternative to cholecystectomy in patients with cirrhosis [22]. HL in patients with cirrhosis differs in some features that should be taken into account when performing this operation. First, rigorous patient selection is required based on Child-Pugh operative risk assessment or end-stage liver disease (MELD) model. Secondly, a good surgical technique is needed to skillfully circumvent the difficulties and complications to which patients with cirrhosis are especially prone. Thirdly, modern equipment should be used, such as an ultrasonic scalpel or argon plasma coagulator, to minimize bleeding from incised tissues. Finally, great patience is required in this operation in order to successfully complete it laparoscopically, since the transition to open surgery may not always be successful with some complications, such as bleeding due to coagulopathy.

Conclusion

In the control group operated on an emergency basis, 57% is more than in the urgent, delayed period and TCEK in 28% of cases. In this regard, complications were noted in the form of intraoperative bleeding from the bed of the removed gallbladder, hepatoduodenal zone, suppuration of wounds, eventration, progression of postoperative liver failure, which amounted to 56%.

In patients with ACC against the background of cirrhosis, surgical interventions are accompanied by technical difficulties due to increased bleeding. Of the intraoperative complications in the control group, bleeding and bile leakage from the bed of the removed gallbladder were most often noted. In patients of the main group, the use of an ultrasonic dissector of harmonics of these complications was not observed.

References:

1. Acalovschi M. Gallstones in patients with liver cirrhosis. Incidence, etiology, clinical and therapeutical aspects. *World J Gastroenterol.* 2014;20(23):7277-7285.doi: 10.3748/wj9.v.20.i.2D.i.23.7277

2. Fornari F, Lodi L, Bodini P, Buscolini L. Close relation between cirrhosis and gallstones: crosscectional and longitudional survey. *Arch Intern Med.* 1999;159:49-52.

3. Maggi A, Solenghi D, Panzeri A, Borrani G, Cazzangia M, Sangiovanni A, De Fazio C, Salerno F. Prevalence and incidence of Cholelithiasis in patients with liver cirrhosis. *Ital J Gastroenterol Hepatol.* 1997;29:330-335.

4. Attili AF, De Santis A, Repire AM, Maseli S. The natural history of gallstones: the GREDCO experience. The GREDCO grup. *Hepatology*. 1995;21:655-660.

5. Laurence JM, Tran PD, Richardson AJ, Pleass HCC, Lam VWT. Laparoscopic cholecystectomy in cirrhosis: a symptomatic review of outcomes and meta-analysis of randomized trials. Oxford: HPB; 2012;14(3):135-161.doi: 10#1111/114.77-2574

6. Douard R, Lentschener C, Oziyer Y, Dousset B. Operative risk of diqestive surgery in cirrhotic patients. *Gastroenterol Clin Biol.* 2009;33(6-7):555-564. doi: 10.1016/j.gcb.2009.03.012

7. Aranha GV, Sontag SJ, Grenlee HB. Cholecystectomy in cirrhotic patients, a formidable operation. *Am J Surg.* 1982;143(1):55-60.

8. Dixon JM, Armstrong CP, Duffy SW, Davies GC. Factors affecting morbidity and mortality after surgery for obstructive jaundice: a review of 373 patients. *Gut.* 1983;24(9):845-852.

9. Morino M, Cavnoti G, Girando G, Sinone P. Laparoscopic cholecystectomy in cirrhosis; contraindication or privilege indication? *Surgigal Laparoscopy, endoscopy, Percutaneus techniques ato.* 2000;10:6:360-363.

10. Yerdel MA, Tsuge H, Mimura H, Sanagami K, Mari M, Orita K. Laparoscopic cholecystectomy in cirrhotic patients: expanding indications. *Surg Laparosc Endosc.* 1993;3:180-183.

11. Puggoni A, Wong L. A meta-analysis of laparoscopic cholecystectomy in patients with liver cirrhosis. *J A Coll Surg.* 2003;197:921-926.

12. Laurence JM, Tran PD, Richardson AJ, Pleass HE, Lam VW. Laparoscopic or open cholecystectomy in cirrhosis: a symptomatic review of outcomes and meta-analysis of randomized trials. Oxford: HPB; 2012;14(3):153-161.

13. Cheng Y, Xiong XZ, Wu SJ, Lin YX, Cheng NS. Laparoscopic vs. open cholecystectomy for cirrhotic patients: a systematic review and meta-analysis. *Hepatagastrroentrelogy.* 2012;59(118):1727-1734

14. de Goede B, Klitsie PJ, Hagen SM, Van Kempen BJ, Spronw S, Metselaar HJ, Lange JF, Kazemir G. Meta-analysis of laparoscopic versus open cholecystectomy for patients with liver cirrhosis and symptomatic cholecystolithiasis. *Br J Surg.* 2013;100(2):209- 216.

15. Machado NO. Laparoscopic cholecystectomy in cirrhotics. *JSLS.*

2012;16(3):392-400. doi: 10.4293/108680812x 13462882736493

16. Chmiecki DK, Hagopian FJ, Kuo Jen-Hong, Kuo YL, Davis JM. Oxford: HPB; 2012;14(12):848-853. doi: 10.1111/i1477-2574-2012.00562x

17. Tayeb M, Khan MR, Riaz N. Laparoscopic cholecystectomy in cirrhotic patients. *Feasbility in a Developing Country Saudi J Gastroenterol.* 2008;14(2):66-69.

doi: 10.4103/1319-3767.39620

18. Palanivelu C, Rajan P, Sani K, Shetty AR, Sendhilkumar K, Senthilnathan P., Parthasarthi R. Laparoscopic Cholecystectomy in Cirrhotic Patients: The of Subtotal Cholecystectomy and it's Variants. *J Am Coll Surg.* 2006;203:2:145-151.

19. Bessa SS, Abdel-Razek AH, Sharaan MA, Bassioni AE, EL-Khishen MA, El-Kayol el SA. Laparoscopic cholecystectomy in cirrhosis: A prospective randomized study comparing the conventional diathermy and the harmonic scalpel for gallbladder dissection. *J laparoendosc Adv Surg Tech A.* 2011;21(1):1-5.

20. Curro G, Lapichino G, Melita G, Lorenzini C, Cucinotta E. Laparoscopic cholecystectomy in Child—Pugh class C cirrhotic patients. *JSLS.* 2005;9(3):311-315.

21. Berman M, Nudelman IL, Fuko Z, Madhala O, Neuman-Levin M, Lelcun S. Percutaneus transhepatic cholecystectomy: effective treatment of acute cholecyctitis in high risk patients 1sr Med. *Assoc J.* 2002;4:331-333.

22. Conway JD, Russo MW, Shresta R. Endoscopic Stent insertion into the galebladder for symptomatic gollbladder discase in patients with end-stage liver dislase. *Gastroinrest Endosc.* 2005;61(1):32-36.