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MINIMALLY-INVASIVE TECHNOLOGIES IN THE TREATMENT OF CHOLEDOCHOLITHIASIS COMPLICATED BY PURULENT CHOLANGITIS

I. M. Deikalo, D. V. Osadchuk, O. I. Karel, M. B. Handzhalas

The National Higher Education Institution «I. Horbachevsky Ternopil National Medical University of the Ministry of Health of Ukraine», Ternopil, Ukraine

Deikalo Ihor Mykolaiovych - Honored Doctor of Ukraine, Doctor of Medicine, Professor of Surgery, Head of the Department of General Surgery of I. Horbachevsky Ternopil National Medical University. Tel. 067 257 82 96.
Osadchuk Dmytro Vasyliovych – Candidate of Medical Sciences, Associate Professor of the Department of General Surgery of I. Horbachevsky Ternopil National Medical University, Head of the Department of Surgery of Ternopil City Municipal Emergency Hospital. Tel. 067 208 69 43.
Karel Oleh Ihorovych – Surgeon of Ternopil City Municipal Emergency Hospital. Tel. 097 589 28 32, kareloi@ukr.net
Handzhalas Mykola Bohdanovych - Surgeon of Ternopil City Municipal Emergency Hospital.Tel. 096 995 89 31

Abstract

Minimal invasive endoscopic technologies are used in the treatment of patients with choledocholithiasis with complicated cholangitis and biliary sepsis. 56 patients were treated for the period 2014 - 2018, aged 65.5 ± 15.18 years. ERCP was performed in 31 (55,3%) patients, in 13 (23,2%) - surgical intervention was performed without contrast of extrahepatic bile ducts.

Papillotomy in 52 cases (96,4%) was performed by string papilloma and in 4 (7,1%) - by needle. In all cases, subtotal papilloprotectomy was performed [1], supplemented by balloon sphincteroplasty. In the I group, the patients included patients with acute cholangitis clinic, in group II patients with clinic of biliary sepsis, in the III group patients with purulent cholangitis clinic, biliary sepsis and septic shock. In the 1st and 2nd groups of patients, mortality was not observed. In the 3rd group, 3 patients died (37,5%). The rest of the patients are discharged from the hospital in a satisfactory condition. A decrease in the level of markers of hepatitis cytolysis (AlAT, AsAT, GGTP, L-FABP) was observed during surgical procedures without ERCP, indicating the toxic effect of contrast on the liver parenchyma. L-FABP is a highly informative marker for hepatocyte cytolysis and can be used as a criterion for hepatic insufficiency and prognosis of biliary sepsis. The high efficiency of transpacillary endoscopic surgical techniques in the treatment of cholangitis and biliary sepsis was noted.

Keywords: cholecholithiasis; purulent cholangitis; biliary sepsis; septic shock; endoscopic retrograde pancreatic cholangiography; endoscopic papillomotorotomy.

Introduction. All over the world, among the countries with a high level of economic development, there is a steady increase of the incidence of gallstone disease [2, 3]. Today, acute cholecystitis and acute cholangitis remain a pressing problem in surgery. In terms of frequency, acute cholecystitis ranks third among all acute diseases of the abdominal cavity. In Ukraine, the incidence of acute cholecystitis is 6.25 per 10 thousand population, in different regions ranges from 1.48 to 10.8 per 10 thousand population. For 94-96% of patients, the cause of acute cholecystitis is gallstone disease [20, 21]. The percentage of late medical treatment is increasing, which leads to an increase in the frequency of complicated forms of gallstone disease in the form of choledocholithiasis, biliary pancreatitis, cholangitis, biliary sepsis, septic shock [6, 7]. The percentage of hospitalized patients after 24 hours from the onset of the disease ranges from 10.1 to 66.8% in different regions and the average in Ukraine is 46.5% [20, 21]. Choledocholithiasis occurs in 20% of patients with gallstone disease. 8.1–26.8% of the elderly patients and 30-35% of the patients of senile age are diagnosed with stonemia in the biliary tract [4]. Surgical activity in acute cholecystitis averages 57.5-58.0% [20, 21]. Complications that occur in the postoperative period in the treatment of patients with calculous cholecystitis with choledocholithiasis were found in 10-15% of patients [5]. Postoperative mortality ranges from 0.28 to 3.01% (average in

Ukraine 0.81-0.94%), and in late hospitalization - from 10.1 to 66.8% (average in Ukraine 46.3-46.5%). Acute cholangitis is observed in 10-12% of patients with acute cholecystitis, and elderly and senile patients account for 70%. Exacerbation of cholangitis after cholangiopancreatography is 0.5-2.4% of cases. Purulent cholangitis ranks first among the causes of death after surgeries on the biliary tract. The mortality rate from acute cholangitis is 2.7-10%, reaching 40% with the generalization of the process in the form of multiple cholangiogenic liver abscesses and biliary sepsis. After endoscopic transpapillary interventions in 2.5-15 years, cholangitis may recur in 7-47% of cases. Acute cholangitis remains the most severe complication of benign and malignant stenotic diseases of the biliary tract and occurs in 15-93.1% of cases. Biliary septic shock as a consequence of translocation of microorganisms from bile into the systemic circulation occurs in 10-30% of patients with acute cholangitis [30, 31]. Without surgical correction, acute purulent cholangitis and biliary sepsis lead to 100% of patients' deaths. [8 - 12]. Postoperative mortality, according to various authors is from 12 to 60%. [13 - 17]. Taking into consideration the availability of a wide range of highly informative, non-invasive diagnostic methods such as pre-amplified CT and magnetic resonance cholangiopancreatography, the difficulties in diagnosing the causes of cholestasis are becoming less [18]. Endoscopic retrograde cholangiopancreatography remains the most reliable method in the diagnosis of hepatopancreatobiliary diseases, but this method is invasive and increases the risk of specific complications [17, 19]. Acute cholangitis remains a complex and far from being solved surgical problem.

Materials and methods: The work presents materials of clinical observation, laboratory and instrumental methods of studying the functional state of hepatocytes in 59 patients with cholangitis due to gallstone disease. Patients diagnosed with cholelithiasis complicated by choledocholithiasis and cholangitis were selected for the study group. Patients with uncomplicated choledocholithiasis and biliary sepsis were not included into the study group.

At the prehospital and hospital stages, patients underwent the following laboratory and instrumental methods of examination: general blood test (Erba Mannheim Elite 3), general urine test (microscopy), diastasuria and amylase level (SpineLab scientific and Alpha-ECG600G kit), biochemical blood test (LabLine - 70), coagulogram (LabLine - 70), blood group and rhesus affiliation (according to the AB0 system by the coliclone method). All patients underwent ultrasound of the abdominal cavity (ESAOTE MY LAB 7). Spiral CT of the abdominal cavity

with prenatal amplification (Siemens Somatom Emotion, 16-slice) was performed in 18 (30.5%) patients and magnetic resonance cholangiography was performed in 3 (5.08%)) by the apparatus (Siemens Magnetom Avanto 1.5 T).

The following markers were used to study the cytolytic syndrome of hepatocytes: alanine aminotransferase (ALT), reference values for men up to 40, for women up to 32 U/l .; aspartate aminotransferase (AST), reference values for men up to 38, for women up to 31 U/l .; gamma-glutamyl transpeptidase (GGTP) by kinetic analysis, Master "T" apparatus, reference values for men 11 - 50, for women 9 - 32 U/l; and the modern marker L-type fatty acid-binding protein (L-FABP) by enzyme-linked immunosorbent assay, the apparatus Multiscan FC, the reference values of which are up to 20 ng/ml. Diastasuria was also not noted.

Total blood bilirubin, urinary diastase, ALT, AST, GGTP and L-FABP were monitored at 18 and 42 hours of postoperative period.

In the general analysis of blood in all 30 patients, leukocytosis was from 10.8 to 13.1 x 10^9/l, the average value was 11.2 x 10^9/l, and the shift of the leukocyte formula to the left, the level of rod-shaped neutrophils ranged from 6% to 20%, on average 11.5% were noted,. In the general analysis of urine in all patients significant deviations were not noted.

All patients underwent intensive infusion therapy for preoperative preparation, lasting from 2 to 12.1 hours, an average of 4.61 hours, aimed at correcting comorbidities and, more importantly, to prepare the hepatopancreatobiliary system for surgery. In our opinion, due attention should be paid to the aspect of preoperative preparation. For this purpose, we prescribe the following groups of drugs: antispasmodics, proton pump inhibitors, protease inhibitors, nonsteroidal anti-inflammatory drugs, broad-spectrum antibiotics (cephalosporins of the third generation). Premedication included a standard set of drugs: belladonna alkaloids, antihistamines, anxiolytics. Surgery was performed under ataranalgesia with anxiolytics (sibazon), ketamine, propofol.

Results of the surveys and discussion of the results: all 59 patients were divided into two groups: the first (I) - 30 (50.85%) patients with cholangitis, who were treated by conventional methods, which included preoperative preparation, ataranalgesia, endoscopic retrograde cholangiopancreatography (ERCP), endoscopic papillosphincterotomy (EPST), lithoextraction (LE), endobiliary stenting of hepaticocholedochus with a polypropylene stent, 10 Fr 8 cm long; second group (II) - 29 (49.15%) patients treated with a method that included

preoperative preparation, ataranalgesia, EPST, LE, endobiliary stenting of hepaticocholedochus with a polypropylene stent, 10 Fr 8 cm long.

As patients in group I were treated by conventional methods, it was considered to be a control group.

The I group, patients with gallstone disease complicated by choledocholithiasis and cholangitis, who were treated by traditional methods using ERCP, EPST, LE and stenting of the extrahepatic bile ducts. 30 patients were selected for this group, including 18 women (60%) and 12 men, which was 40%. The age of patients in this group ranged from 33 to 90 years, the average age was 64.5. The duration of the period of jaundice until hospitalization in a specialized hospital ranged from 1 to 8 days, an average of 3.9 days. Periods of diagnostic search at the outpatient and hospital stages are not taken into account. Body temperature ranged from 36.8 to 39,3 ^{0}CC., the average value is 37,96^{0}C. Among patients in this group, 22 (73.3%) were diagnosed with anamnesis of gallstone disease and 8 (26.7%) were diagnosed for the first time. Nausea was observed in 7 (23.3%) patients, and vomiting in 2 (6.6%). In all patients of this subgroup, dark brown urine and hypo-, acholic feces were noted. 20 (66.6%) had itchy skin. Heart rate (HR) ranged from 68 to 93 beats per minute, with a mean of 78.2. Tachycardia was noted in 2 patients, which is 6.6%.

The surgery was performed in the Sims' position - intermediate between the supine position and the one on the left side, using an Olympus video endoscopic rack and X-ray C arch Mobile X-Ray system IMAX 112C Scientific. At the first stage, selective cannulation of hepaticocholedochus was performed using a 0.25 guide with a hydrophilic flexible X-ray contrast tip. After receiving the so-called "working intersection" of the duodenoscope and the guide (Figure 1), which indicated that the guide is in the extrahepatic bile ducts, continued to perform the following stages of surgery.

Subsequently, an aspiration test was performed, upon receiving of bile, ERCP was performed with 5% triombrast solution, followed by subtotal papillosphincterotomy. Upon the guide left, the instrument was changed from a papillotome to a lithoextractor balloon. Hepaticocholedochus revision and lithoextraction were performed with the balloon of 10-15 mm in diameter.Considering the presence of purulent discharge from the ductal system of the liver, the stenting of hepaticocholedochus with a polypropylene stent 10 Fr, 8 cm long was performed. The operation lasted from 25 to 60 minutes. In 4 cases (13.3%), when selective guide cannulation

of hepaticocholedochus was not possible, the surgical intervention was started with papillotomy using the needle papillotome, and then all the steps described above were carried out.

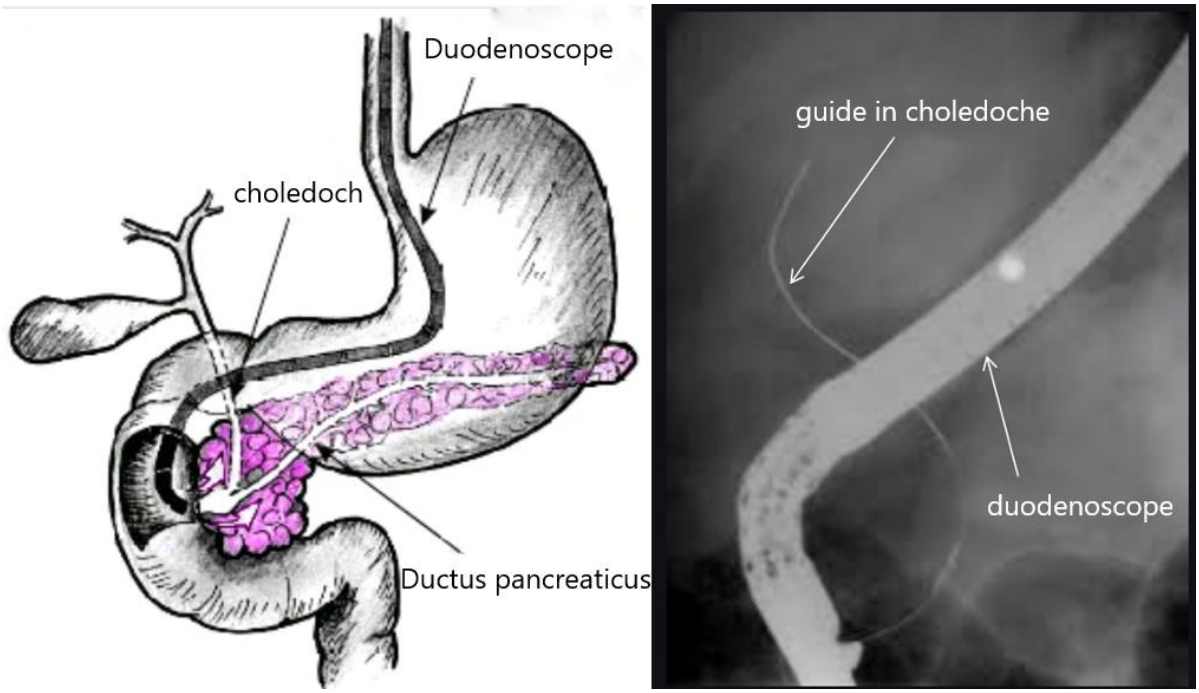

Figure 1. Working intersection

Group II, patients with gallstone disease complicated by choledocholithiasis and cholangitis, who underwent EPST, LE and stenting of the extrahepatic bile ducts.

29 patients were selected for this group, including 18 women (62%) and 11 men, which was 38%. The age of patients in this group ranged from 35 to 90 years, the average age was 62.5. The duration of the jaundice period before hospitalization in a specialized hospital ranged from 2 to 14 days, an average of 6.45 days. Periods of diagnostic search at the outpatient and hospital stages are not taken into account. Body temperature ranged from 36.4 to 39.3^{0}C., The average value is 37,82^{0}C. In two patients, at the time of admission to the specialized hospital, no increase in body temperature was noted, but there was a history of hyperthermia with chills. Among patients in this group, 17 (58.6%) were diagnosed with a gallstone disease and 12 (41.4%) were diagnosed for the first time. Nausea was observed in 8 (27.5%) patients, and vomiting in 1 (3.4%). In all patients of this subgroup, dark brown urine and hypo-, acholic feces were noted. 19 (65.5%) had itchy skin. Heart rate (HR) ranged from 68 to 96 beats per minute, with a mean of 79.93. Tachycardia was noted in 5 patients, which is 17.2%.

The surgery was performed in the Sims position, using an Olympus video endoscopic stand and X-ray C arch Mobile X-Ray system IMAX 112C Scientific. At the first stage, selective cannulation of hepaticocholedochus was performed using a 0.25 guide with a hydrophilic flexible X-ray contrast tip. After receiving the so-called "working intersection" of the instruments, the following stages of surgery, aspiration test continued to be performed, once bile was got, the subtotal papillosphincterotomy was performed. Upon the guide left, the instrument was changed from a papillotome to a lithoextractor balloon. Hepaticocholedochus revision and lithoextraction were performed with the balloon of 10 mm in diameter. Considering the presence of purulent secretions from the ductal system of the liver, stenting of hepaticocholedochus with a polypropylene stent 10 Fr, 8 cm long was performed. The operation lasted from 15 to 43 minutes. In 2 cases (6.9%), when selective guide cannulation of hepaticocholedochus was not possible, surgery was started with papillotomy using the needle papillotome, and then all the steps described above were carried out.

Dynamics of indicators of hepatodepressive syndrome. As can be seen in table 1, in the comparison groups before surgery, the activity of GGTP and total bilirubin were almost the same (p_1>0.05), which confirms the representativeness of the formed clinical groups.

Table 1 - Features of hepatodepressive syndrome in patients with acute cholangitis who underwent contrast cholangiography (M±m)

Period	With contrast (n=30)	Without contrast (n=29)	p_1
GGTP , U·l^{-1}			
Before surgery	439,4±19,2	446,9±21,1	>0,05
18 h	368,2±21,9*	355,0±18,8*	>0,05
42 h	317,3±26,7*	280,1±18,6*	>0,05
p_2	>0,05	<0,05	
Total bilirubin, mmol·l^{-1}			
Before surgery	188,1±15,7	226,7±18,3	>0,05
18 h	198,1±15,2	165,8±15,7*	>0,05
42 h	164,1±11,9	110,9±12,8*	<0,05
p_2	>0,05	<0,05	

Notes. Here and in other tables:
1 * - differences in data before surgery are statistically significant (p<0,05).
2. p_1 - difference in groups of patients who used contrast.
3. p_2- differences in relation to 18 and 42 hours of the postoperative period.

In the patients who underwent contrast cholangiography, the activity of serum GGTP after 18 and 42 h was significantly reduced compared with the preoperative period (accordingly by 16.2 and 27.8%, $p<0.05$). Despite the fact that the average value of serum GGTP activity after 42 h became smaller compared to 18 h, the differences were not statistically significant ($p_2> 0.05$). In the group of patients who did not perform contrast cholangiography, in the postoperative period, the rate also decreased: after 18 hours - by 20.6% ($p<0.05$), after 42 hours - by 37.3% ($p<0.05$) . It should be noted that the decrease in the activity of the studied enzyme in this group after 42 h was significantly less than after 18 h (by 21.1%, $p_2<0.05$). Comparison of the experimental groups did not reveal significant differences in the value of the studied indicator after 18 and 42 h of the postoperative period ($p_1> 0.05$).

Similarly, there were no significant differences in the value of the average ratio of individual values of GGTP serum activity to the average value of the preoperative period (Fig. 2) both after 18 h and 42 h postoperative period ($p>0.05$).

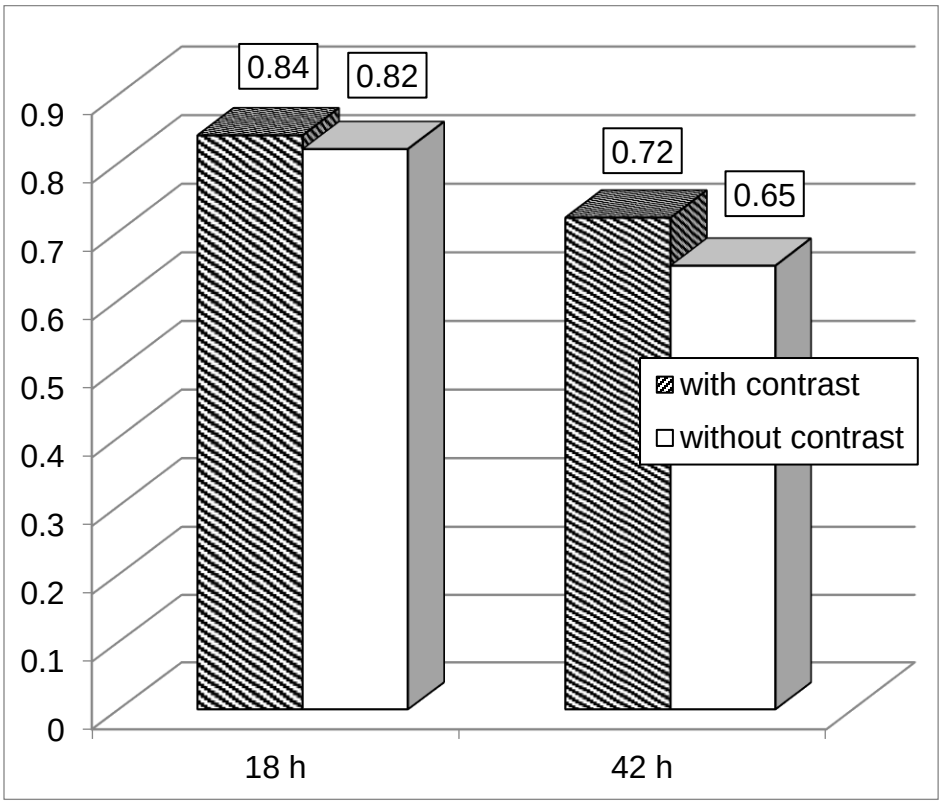

Figure 2 - Dynamics of the average ratio of individual values of serum GGTP activity to the average value of the preoperative period in patients with acute cholangitis who underwent contrast cholangiography.

At the same time, the content of total bilirubin in the blood of patients who underwent contrast cholangiography in the postoperative period after 42 h decreased, but the result was not statistically significant ($p>0.05$). Similarly, in this group there were no significant differences compared with 18 h postoperative period ($p_2> 0.05$). At the same time, in the group of patients who did not perform contrast cholangiography, the rate after 18 h became statistically significantly lower than in the preoperative period by 26.9% ($p<0.05$), after 42 h - by 51.1% ($p<0.05$). It should be noted that the content of total bilirubin in the blood serum in this group after 42 h was significantly lower than after 18 h (33.1%, $p_2<0.05$).

Comparing the experimental groups with each other, it was found that the value of absolute indicators of total bilirubin in the serum of patients who did not perform contrast cholangiography after 48 h was statistically significantly lower than the value of the group in which contrast diagnostic cholangiography was performed (for 32.4%, $p_1<0.05$). However, the analysis of the dynamics of the mean ratio of individual serum GGTP activity to the mean preoperative period showed (Fig. 3) that the value of this indicator in patients without contrast cholangiography was after 18 and 42 h less than the one in the group of patients who performed contrast cholangiography (30.5 and 36.9%, $p<0.05$, respectively).

Thus, regardless of the performance of contrast cholangiography, the activity of GGTP in serum in the postoperative period was significantly reduced, and in patients without contrast cholangiography, after 42 hours the indicator became significantly lower than after 18 hours. Statistically, the absolute value of the studied indicator, as well as the degree of its decrease after 18 hours and after 42 hours of the postoperative period in the comparison groups did not differ significantly. At the same time, the content of total bilirubin in the serum in both groups also decreased compared to the preoperative period. However, only in the group of patients without contrast cholangiography this result was statistically significant.

The absolute value of the studied indicator in this group after 42 h of the postoperative period was significantly less than the one in the comparison group, and the degree of decrease was statistically significantly higher after 18 and 42 hours.

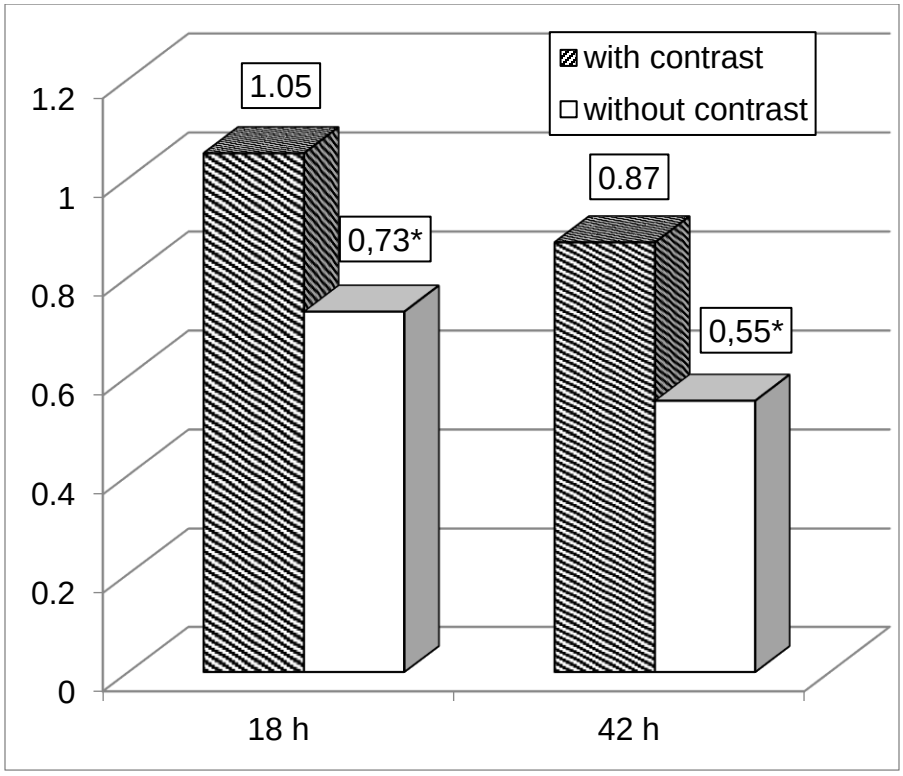

Figure 3 - Dynamics of the average ratio of individual values of total serum bilirubin to the average preoperative period in patients with acute cholangitis who underwent contrast cholangiography

Dynamics of cytolytic syndrome. An important diagnostic value for assessing the functional state of the liver belongs to the indicators of cytolysis (Table 2). Formating the clinical groups, we were able to distribute patients so that in the preoperative period in the comparison groups, the content of serum L-FABR, ALT and AST activity were almost the same ($p_1 > 0.05$).

In the postoperative period in patients who underwent contrast cholangiography, the content of L-FABR up to 18 h postoperative period was statistically significantly reduced compared to its level before surgery (by 12.6%, $p<0.05$), but by 42 h - increased and did not differ significantly from the preoperative period ($p> 0.05$) and compared with 18 hours of observation ($p_2 > 0.05$).

Similarly, the content of L-FABR decreased in the group of patients who did not perform contrast cholangiography, but after 18 and 42 h of the postoperative period, the rate was statistically significantly lower than before surgery (respectively 24.3 and 34.0%, $p<0.05$). The differences between the observation times were insignificant ($p_1>0.05$).

Comparison of absolute values of L-FABR content in blood serum showed that in both terms of observation the studied indicator in the group of patients who did not perform contrast cholangiography was statistically significantly lower than in the comparison group (after 18 h - by 15.7%, $p_2 < 0.05$, after 42 years - by 30.6%, $p_2 < 0.05$). Similarly, in this group the average ratio of individual values of L-FABR serum content to the average value of the preoperative period was significantly lower (Fig. 4): after 18 h - by 12.6% ($p<0.05$), after 42 h – by 28.3% ($p<0.05$).

In turn, the activity of the ALT serum (Table 2) in patients who underwent contrast cholangiography in the postoperative period also decreased. The result was statistically significant after 42 h of the postoperative period (17.7%, $p <0.05$) and did not differ significantly from the previous term ($p_2 > 0.05$). In patients who did not perform cholangiography, the rate after 18 h became significantly lower than in the preoperative period (27.2%, $p <0.05$), after 42 h - even more decreased - by 43.1% compared with preoperative period ($p <0.05$) and by 21.8% compared to the previous observation period ($p_2 <0.05$).

Table 2 - Features of cytolytic syndrome in patients with acute cholangitis who underwent contrast cholangiography (M±m)

Period	With contrast (n=30)	Without contrast (n=29)	p_1
L-FABR, $nm \cdot ml^{-1}$			
Before surgery	341,4±10,5	332,1±14,1	>0,05
18 h	298,2±15,0*	251,4±12,9*	<0,05
42 h	315,6±16,4	219,1±13,8*	<0,05
p_2	>0,05	>0,05	
ALT, $U \cdot l^{-1}$			
Before surgery	83,13±3,61	87,59±5,35	>0,05
18 h	74,83±3,70	63,72±4,65*	>0,05
42 h	68,40±3,32*	49,83±3,76*	<0,05
p_2	>0,05	<0,05	
AST, $U \cdot l^{-1}$			
Before surgery	68,43±2,93	70,48±3,57	>0,05
18 h	59,57±3,07*	59,17±3,33*	>0,05
42 h	53,50±3,05*	47,17±3,02*	>0,05
p_2	>0,05	<0,05	

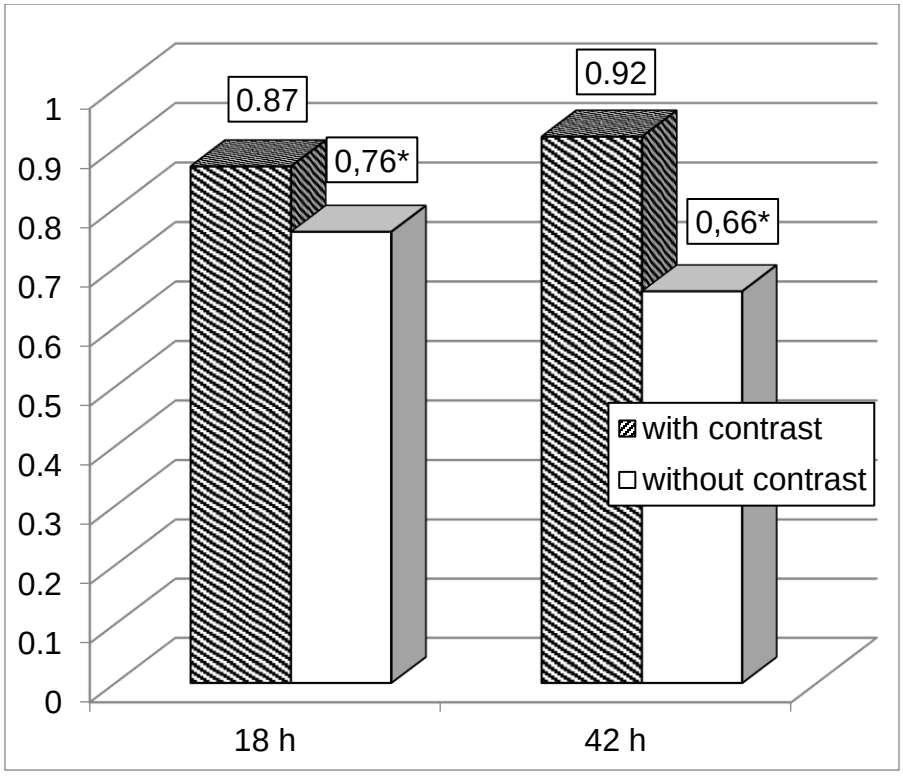

Figure 4 - Dynamics of the mean ratio of individual values of L-FABR serum to the mean value of the preoperative period in patients with acute cholangitis who underwent contrast cholangiography

Comparison of observation groups showed that the absolute values in the group of patients without cholangiography after 42 h were significantly lower than in the group with cholangiography (27.1%, $p_1<0.05$). At the same time, the mean ratio of individual values of serum ALT activity to the mean preoperative period (Fig. 5) in the group of patients without cholangiography after 18 and 42 h was statistically significantly lower than in the comparison group (accordingly by 18.9 and 30, 5% ($p<0.05$).

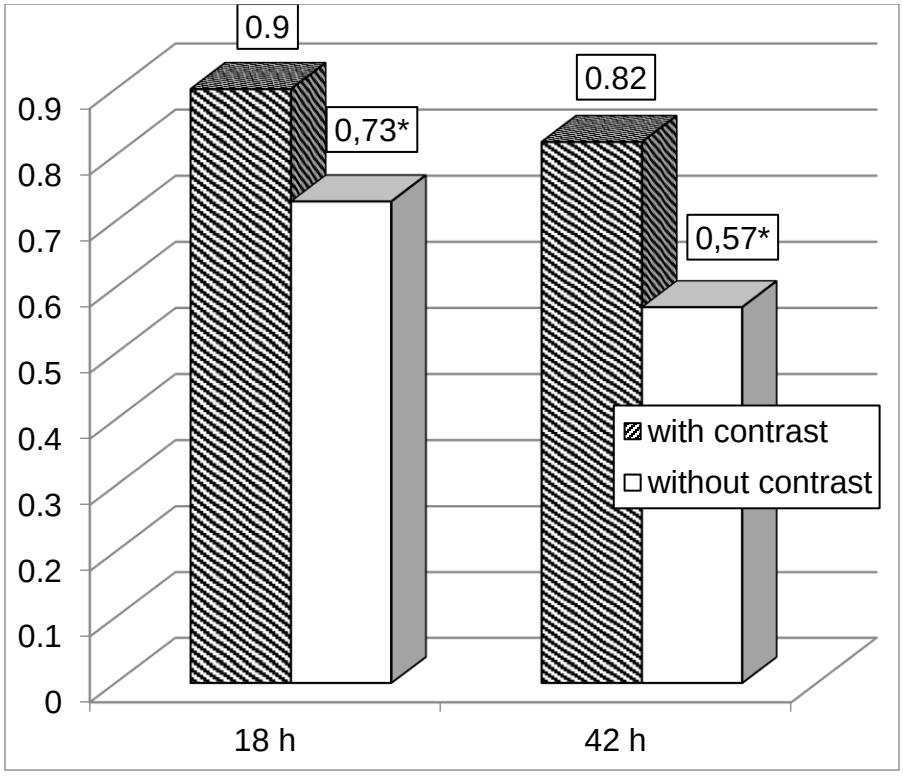

Figure 5 - Dynamics of the average ratio of individual values of serum ALT activity to the average value of the preoperative period in patients with acute cholangitis who underwent contrast cholangiography

Serum AST activity (Table 2) in patients with cholangiography after 18 h of the postoperative period increased, which was statistically significant compared with the preoperative period (by 47.8%, $p<0.05$). By 42 h, the indicator decreased, became significantly lower compared to the previous observation period (by 20.7%, $p_2<0.05$) and reached the preoperative level ($p>0.05$).

In patients without cholangiography, in the postoperative period the rate gradually decreased and after 42 h became significantly lower than in the preoperative period (29.9%, $p<0.05$), but did not differ significantly from the previous observation period ($p_2<0.05$).

Comparison of the studied groups of patients showed that the absolute values (Table 2) and the values of the average ratio of individual values of serum AST to the average value of the preoperative period and after 18 and 42 h (Fig. 6) between the compared groups of patients did not differ ($p_1> 0.05$).

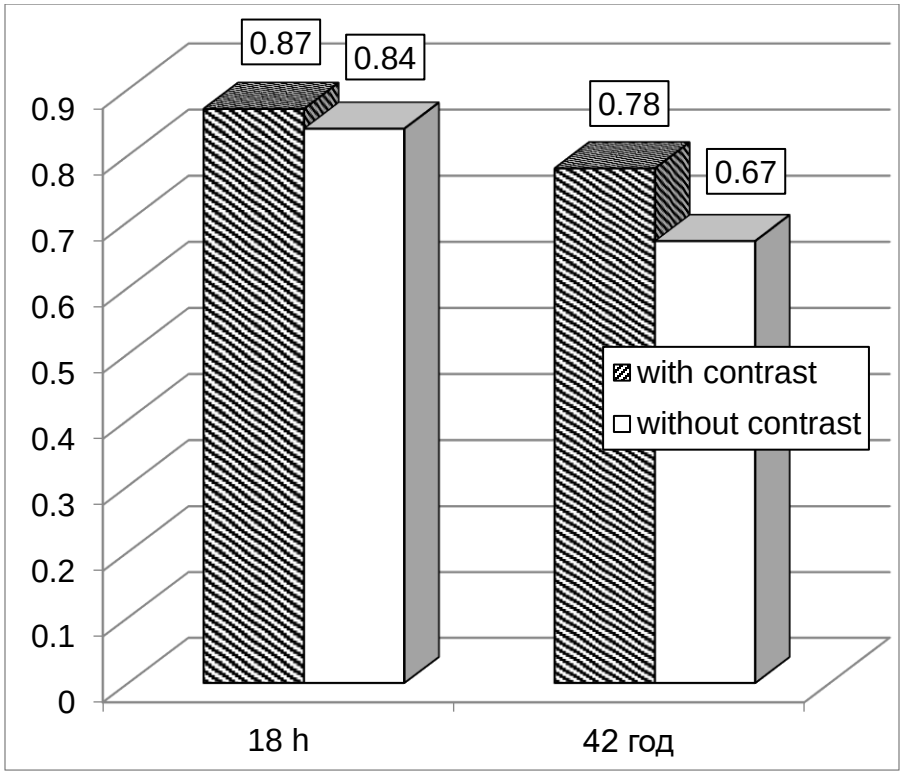

Figure 6 - Dynamics of the average ratio of individual values of serum AST activity to the average value of the preoperative period in patients with acute cholangitis who underwent contrast cholangiography

Thus, in patients with cholangitis, regardless of the performance of diagnostic cholangiography in the postoperative period, there is a decrease in serum L-FABR and ALT and AST activities. At the same time, patients who did not perform cholangiography in the preoperative period and during surgery, compared with patients who underwent this diagnostic procedure in the postoperative period, and after 18 and 42 hours was significantly lower serum L-FABR content , after 42 hours - ALT activity. At the same time, the activity in the serum of AST between the studied groups of patients in these terms did not differ significantly. It is noteworthy that in the absence of diagnostic cholangiography, the degree of decrease in L-FABR and ALT was significantly greater in all periods of the postoperative period, compared to patients whom cholangiography was performed in.

Dynamics of diastasuria. Our studies showed that in the preoperative period, the differences in the value of diastasuria (Table 3) in both groups of patients were statistically insignificant ($p_1>0.05$).

Table 3 - Dynamics of diastasuria. ($g \cdot l^{-1} \cdot h^{-1}$) in patients with acute cholangitis who underwent contrast cholangiography (M±m)

Period	With contrast (n=30)	Without contrast (n=29)	p_1
Before surgery	269,6±23,0	295,9±25,8	>0,05
18 h	398,6±23,2*	238,4±20,6	<0,05
42 h	316,0±20,8	207,3±17,5*	<0,05
p_2	<0,05	>0,05	

In patients with diagnostic cholangiography, the rate increased significantly after 18 h of the postoperative period (by 47.8%, $p<0.05$). By 42 h of the postoperative period, the indicator decreased and did not differ significantly from the value of the preoperative period ($p>0.05$), but became significantly less than after 18 h (by 20.7%, $p_2<0.05$).

In patients who did not perform cholangiography, in the postoperative period, the value of diastasuria gradually decreased compared to the preoperative period, but only after 42 h the result was statistically significant (29.8%, $p<0.05$).

Comparison of experimental groups showed that the absolute values of diastasuria in patients without diagnostic cholangiography were statistically significantly lower: after 18 h - by 40.2% ($p<0.05$), after 42 h - by 34.4% ($p<0.05$). Similarly, in patients without cholangiography was lower in both terms of the postoperative period and the average ratio of individual values of diastasis to the average value of the preoperative period (Fig. 7) (accordingly 45.3 and 40.2%, $p<0.05$).

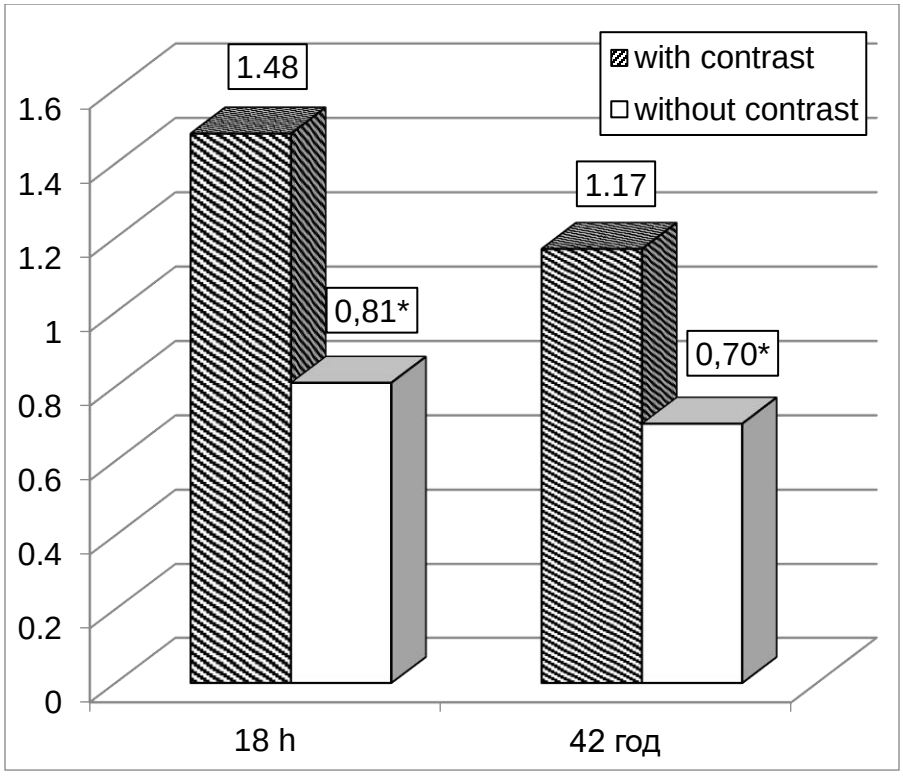

Figure 7 - Dynamics of the average ratio of individual values of diastasuria to the average value of the preoperative period in patients with acute cholangitis who underwent contrast cholangiography

Thus, the absence of cholangiography has a significant positive effect on the value of diastasuria, which in this group is more pronounced in absolute terms, and the degree of its reduction is greater compared with patients who underwent this procedure.

Conclusions and prospects of further developments. 1. Regardless of the performance of contrast cholangiography, in the postoperative period the activity of GGTP in the serum was significantly reduced, and in patients without contrast cholangiography, the figure after 42 hours became significantly lower than after 18 hours. The absolute value of the studied indicator, as well as the degree of its decrease after 18 and 42 hours of the postoperative period in the comparison groups did not differ statistically significantly. At the same time, the content of total bilirubin in the serum in both groups also decreased compared to the preoperative period. However, only in the group of patients without contrast cholangiography this result was statistically significant.

2. In the patients with cholangitis, regardless of the performance of diagnostic cholangiography in the postoperative period, there is a decrease in serum L-FABR and ALT and AST activities. At the same time, patients who did not perform cholangiography in the preoperative period and during surgery, compared with patients who underwent this diagnostic procedure in the postoperative period, and after 18 and 42 hours was significantly lower serum L-FABR content , after 42 hours - ALT activity. At the same time, the activity in the serum of AST between the studied groups of patients in these terms did not differ significantly. In the absence of diagnostic cholangiography, the degree of decrease in L-FABR and ALT was significantly greater in all postoperative periods, compared to patients whom cholangiography was performed in.

3. The absence of cholangiography has a significant positive effect on the value of diastasuria, which in this group is more pronounced in absolute terms, and the degree of its reduction is greater compared to patients who underwent this procedure.

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