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## PREVENTION OF THE LIVER FAILURE DEVELOPMENT THROUGH DECOMPENSATION OF THE BILIARY SYSTEM IN PATIENTS WITH OBSTRUCTIVE JAUNDICE BY PERFORMING MINIMALLY INVASIVE LAPAROSCOPIC CHOLECYSTECTOMY

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The effectiveness of the two-step method of treatment of patients with mechanical jaundice (MJ) focusing on the liver functional state during the postoperative period was assessed. Endoscopic papillosphincterotomy (EPSP) was done in 98 (59.8%) patients, 88 cases of them (53.7%) were due to choledocholithiasis. EPSP was finished by lithoextraction in 59 patients (66.0%), by mechanical lithothrpsy – in 29 patients (17.7%).

Laparoscopic cholecystectomy was done to all 98 patients 1-5 days after the EPST and to all patients in the 1st group. Surgical intervention was started laparoscopically; conversion was done in 25 patients. There were 6 cases of complications (5.9%) among the patients of 1st group which were eliminated during the postoperative period. All patients were alive at the time of 3 months after surgery. Clinical and laboratory checking confirmed the satisfactory level of liver functioning. Only 2 patients had transient hyperamylasemia. There were 12 cases (19.0%) of complications in patients of the 2nd group that was higher compared to the same index in the 1st group patients ( $p < .01$ ). The clinical indexes of hepatic insufficiency development were present in 9 patients (14.3%) of the 2nd group that was also greater compared to group 1 ( $p < .01$ ).

According to these data the authors recommend an individual approach to the selection of surgical treatment in each case, the operative interventions performed in the so-called "cold period", as well as obvious analysis of possible high operational and anaesthetic risk including the patient's age. The stages of surgical intervention in patients with obstructive jaundice and choledocholithiasis are the priority method of effective surgical treatment. The laparoscopic, but not open cholecystectomy performing at the second stage of treatment, prevents hepatic insufficiency formation in patients throughout the postoperative period.

**Keywords:** mechanical jaundice, laparoscopic cholecystectomy, open cholecystectomy, treatment stages, hepatic insufficiency.

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Even over 25 years since the first laparoscopic cholecystectomy (LCE) performed by the French surgeon F. Dubois, its indications continue to expand [1, 2]. In this regard, it is important that endovideosurgical technologies and, in particular, laparoscopy have currently occupied positions in the selection of treatment tactics for surgical patients, and have also spread to the related specialties, giving them a new impetus to development [1, 3-6]. Surgery of organs of the hepatopancreatoduodenal area served as a source of evolutionary development of laparoscopic techniques, and LCE is officially recognized as the "gold standard" in the surgical treatment of the gallstone disease (GSD) [7, 8].

When analyzing the results of many years of clinical follow-ups and surgical treatment of patients with hepatic insufficiency (PI), we came to the conclusion that certain percentage of this disease develops due to ineffective treatment (objective or subjective causes) of patients with obstructive jaundice (OJ). We consider patients with OJ to be among those with acute surgical diseases, but we believe that urgent surgery is risky in obturation of the extrahepatic biliary tract, cholangitis and others with a

prospect of a significant number of complications - up to the formation of multiple organ failure and substantial (3.5 - 4-fold) growth in mortality, comparable with the corresponding figures in the conservative treatment of OJ [9-11].

The question of choosing the surgical treatment in this group of patients is controversial, but most experts believe that the two-stage method of treating such patients is the best. On the first stage, simultaneous or prolonged decompression, as well as sanation of the gallbladder or bile ducts are usually carried out. This allows eliminating the clinical manifestations of the disease (mainly of the inflammatory origin), and preparing the patient for performing the second, main stage of surgical treatment, aimed at elimination of the causes of OJ - performing LCE.

This tactic of treatment allows decreasing the number of postoperative complications, reducing the overall mortality and also providing prophylactic effect preventing the destructive changes in the liver parenchyma, the toxic effect of accumulation of bile acids in the hepatocytes and their necrosis.

Issues directly determining the treatment strategies for this category of patients by the surgeon are debatable.

There are different views as to what kind of pathology associated with the presence of OJ is to be considered essential in each case; what treatment should be started with; whether the clinical course of the disease allows to perform one-stage surgery, or it must be performed in sequence of several stages and what stages these should be; what surgical approach should be used in the treatment of patients with dysfunction of the cardiovascular and respiratory systems; what kind of surgery - laparoscopic or traditional [open] - should be performed for better postoperative course and prevention of development of multiple organ failure - this is a list of the most important questions, the answers to which should be fast, specific and individual in each case. They determine the tactics, scope and timeliness of surgery.

### **Objective.**

Assessment of effectiveness of the two-stage method of treatment of OJ patients with a focus on improvement of the functional state of the liver in the postoperative period.

### **Materials and methods.**

During the last 3 years we have treated 164 patients with OJ aged 32 to 72. There were 121 (73.8%)



women and 43 (26.2%) men. The age of 85 patients (51.8%) was over 50, 56 patients (34.1%) were over 60 years old.

The diagnosis of OJ is based on clinical examination of patients, biochemical blood analysis, ultrasound examination of organs of the hepatopancreatoduodenal area, computed tomography, endoscopic retrograde cholangiopancreatography and percutaneous-transhepatic cholangiography.

Specific manifestations of the OJ syndrome including yellowness of the skin and sclera, were found in 138 (84.1%) patients, dark urine and feces acholia - in 69 (42.1%) patients, pain and feeling of heaviness in the right upper quadrant and in the upper abdomen - in 143 (87.2%) patients. 98 patients (59.8%) were found to have a dyspeptic syndrome (nausea, dryness or bitterness in the mouth, heartburn, belching, loss of appetite, changes in the stool character, etc.). Itchy skin with typical scratching on the body was noted in 32 (19%) patients and elevated body temperature - in 19 (11.6%).

As a result of treatment, all patients were retrospectively divided into 2 groups. A two-stage surgery with endoscopic papillosphincterotomy (EPST) at the first and LCE - at the second stage was provided to patients in the group 1 (n = 101, 61.6%). 63 patients (38.4%), expected to undergo a full open surgery for choledocholithiasis at the first stage and/or open cholecystectomy (OHE) at the second stage, constituted the group 2 for the investigation.

Monitoring of patients treated has been carried out during the first 7-10 days after surgery and 3 months after discharge.

The results obtained were processed statistically using One Way Analysis of Variance Criteria. Differences were considered significant at  $p < 0.5$ .

### Results and discussion.

Within the total number of patients with OJ the cause of obturation of the extrahepatic biliary tract was cholelithiasis and associated choledocholithiasis in 131 patients (79.9%), 17 patients (10.4%) had acute pancreatitis, the edematous form, 6 (3.7%) patients - a benign stricture

against the background of the common bile duct cholelithiasis, 5 (3.0%) patients - postcholecystectomical syndrome, choledocholithiasis, 3 patients (1.8%) - acute calculous cholecystitis, 2 patients (1.2%) - stenosis of the bile papilla.

EPST was performed in relation to 98 (59.8%) patients, 88 (53.7%) of whom were operated on for choledocholithiasis. We are active supporters of medical tactics in choledocholithiasis, despite the development of various methods of lithoextraction and lithotripsy. The arsenal of advanced tools for lithotripsy consists of hard and soft Dormia baskets and balloon catheters. We believe that it is advisable to apply hard baskets in cases when the diameter of the stone is comparable to the diameter of the terminal part of the common bile duct. Balloon catheters and soft baskets are useful for small stones, especially in floating calculi.

EPST was completed with lithoextraction in 59 patients (66.0%). Lithoextraction is indicated in patients with a burdened history when conduction of repeated control studies is undesirable, in high probability of stone impaction in the terminal part of the common bile duct in their spontaneous passage, and at presence of multitude of small stones. Lithoextraction is contraindicated in case when the calculus diameter is greater than the diameter of the terminal part of the common bile duct and size of the papillotomic orifice. Removal of stones was performed by Dormia basket Olympus, their number ranged from 1 to 11, the maximum diameter of the stone removed was 15 mm.

EPST with mechanical lithotripsy was performed in relation to 29 patients (17.7%). Mechanical lithotripsy was used in single calculi of over 10 mm in diameter in the narrow terminal part of the common bile duct, multiple stones in the hepaticocholedochus that fit tightly to each other, and in maintaining the sphincter apparatus of the big duodenal papilla in young patients.

Nasobiliary drainage for biliary decompression was performed to 7 (4.3%) patients, 3 patients

(1.8%) - balloon dilatation and stenting.

Selection of the preoperative biliary decompression method was determined by the level of localization of the bile flow obturation; hence minimally invasive procedures are performed only for making an accurate diagnosis. We believe that effective treatment of this group of patients is possible only in case of the integrated use of the above-mentioned minimally invasive techniques.

We consider it appropriate to note here that the diagnostic search in patients with cholelithiasis complicated with choledocholithiasis, especially in the presence of OJ and cholangitis, is very limited in time. The surgeon has a few hours to make a decision. Selection of surgical tactics in relation to these patients is decisive, namely, in relation to which patients should the problem of elimination of bile hypertension and cholangitis be solved at the first stage, who should be provided with staged treatment, and who should receive direct surgery. We believe EPST to be effective operation aimed at correcting the disturbed bile outflow that allows us to recommend it as the operation to be chosen for patients with OJ in the obturation of the bile duct due to choledocholithiasis, and consider it to be the main method of surgical treatment for patients with OJ having a high degree of the operational risk.

LCE was performed to all 98 patients after EPST and all patients in the group 1 in 1-5 days. Surgery started laparoscopically. 25 patients had to be resorted to conversion. The cause for conversion in 12 of them was the presence of multiple stones of different diameters, which failed to be removed laparoscopically. 5 patients had cirrhosis of the liver; thereby significant blood loss developed while performing LCE. In 5 patients, the cause of conversion was intraoperative detection of Mirizzi syndrome with severe inflammation and presence of stones in the common bile duct, and in 3 cases there were indications to the formation of biliodigestive anastomosis - choledohjejunostomosis

All patients were clinically determined to have phlegmonous gallbladder, which was confirmed

by morphological examination. Bile hypertension and intervention on the major duodenal papilla is likely to cause inflammation of the bile duct, and especially of the gallbladder wall. It once again confirms our opinion of an individual approach to operations in the biliary system, especially in elderly patients.

6 cases of complications (5.9%) were observed among the patients in the group 1, which were eliminated during the postoperative period, before discharge of the patients. All patients were still alive after 3 month follow-up after surgery. At this time, clinical and laboratory indices confirmed a satisfactory degree of the liver functioning, which was confirmed by its ultrasonography. Only 2 patients had transient hyperamylasemia.

Significantly more postoperative complications - in 12 patients (19.0%) were observed among patients in the group 2 compared to the index in the patients of the group 1 ( $p < 0.1$ ). At the time of examination in 3 months after the operation 3 patients died because of liver failure. According to medical history, as well as the clinical and laboratory examination methods, the development of liver failure in patients in the group 2 was observed in 9 patients (14.3%), which significantly exceeded this figure in the patients of the group 1 ( $p < 0.1$ ).

Thus, the data obtained allows us formulate the main conceptual approaches to the tactics of minimally invasive surgical treatment of patients if they have OJ syndrome due to bile duct obturation.

We consider it important to recommend avoiding surgical interventions at the "height" of the inflammatory period, in a maximum clinical severity of jaundice. Secondly, we note the necessity to operate on such patients in the so-called "cold" period. Thirdly, an individual approach must be an obligatory factor in choosing the tactics of the surgeon who should take into account the medical history of patients, clinical peculiarities of the disease, data from laboratory blood tests, results of preoperative diagnostic procedures, presence of concomitant medical conditions, possible high

operational risk, the functional state of the cardiovascular and respiratory systems, etc.


Fourthly, in the presence of biliary decompression a question should be solved of one-, two- or three-stage tactics of treatment of such patients. According to our data, two-stage treatment of patients with OJ is successful in the presence of choledocholithiasis, when EPST is performed at the first stage to reduce hypertension and biliary elimination of biliary decompression, and LCE performance – at the second stage.

In addition, we want to single out the aspect of the liver functioning in the postoperative period, because our data convinces that in OJ patients LCE, but not OCE is a prophylactic measure preventing the liver failure development. It is also important that patients with obstructive jaundice and choledocholithiasis in the presence of pathology of the cardiovascular and respiratory systems as well as patients over 60 are advisable to perform a three-stage surgery.


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