

# Differentiated Approach and Steps in the Obstructive Jaundice Patients Treatment

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## Abstract

The course of obstructive jaundice (OJ) is frequently complicated by manifestations of cholangitis of different degree of expression and by progression of hepatocellular failure. Due to this, surgical interventions in patients with OJ are accompanied by significant number of complications and the lethality reaches 15–30%. Objective of the study: to evaluate effectiveness of gradual treatment and differentiated approach to the treatment of OJ patients using minimally invasive methods.

This study is based on the retrospective analysis of the result of treatment of 2254 patients admitted with diagnosis of OJ to our clinic.

In 1528 patients (67.79%) the level of bile duct block was detected in terminal part of common bile duct or on the level of the Vater's ampulla; it was the indication for primary endoscopic examination and intervention. Percutaneous transhepatic biliary drainage was performed on 589 (26.13%) patients as the primary intervention due to OJ. After endoscopic interventions in 55 (4.01%) patients we noted the following complications: hyperamylasemia and/or acute pancreatitis, intestinal hemorrhage, retroduodenal perforation of duodenum wall, "bucket and bile stone impaction", and cholangitis. Antegrade interventions resulted in complications in 74 (8.36%) patients: intraabdominal hemorrhage; migration of drainage.

Thus, differentiated approach with gradual character of treatment allows us to optimize treatment.

**Keywords:** Obstructive Jaundice; Pancreatobiliary Malignancy; Endoscopic Retrograde Cholangiopancreatography; Mechanical Lithoextraction; Percutaneous Transhepatic Biliary Drainage

## Introduction

Treatment of patients with obstructive jaundice (OJ) syndrome of different genesis is still the relevant issue of the abdominal surgery [1-3]. As a rule, the course of OJ is not accompanied by expressed pain syndrome but it is quite often complicated by cholangitis and/or progressing hepatocellular failure [4,5]. Due to this the surgical interventions performed at the jaundice level are accompanied by the large number of complications and the post-surgical mortality reaches 15-30% which is four times more than in the cases when we manage to eliminate OJ before surgery [6,7].

Nowadays the amount of surgical methods for OJ correction is rather large [3,6,8]. It includes: endoscopic sphincterotomy, endoscopic retrograde cholangiopancreatography (ERCP); mechanical lithotripsy and lithoextraction; nasobiliary drainage, endoscopic prosthetics and stenting of choledoch; percutaneous transhepatic drainage of bile ducts and gall bladder; laparoscopy-assisted and open palliative and radical surgeries for bile ducts decompression [4,7,9]. Each of these methods has its own advantages and disadvantages starting from the cost, the post-surgical level of complications and mortality, ending with the necessity of trained specialists available [1,10,11]. There is also no doubt about the fact that it is not possible and even dangerous for the patient's health to perform all the available interventions within rather a short period of time. Therefore, the treatment of OJ patients suggests a certain differential approach and staging which depends on jaundice genesis, its severity, long-term planning and further treatment of a patient [2,7].

The aim of the study is to evaluate the effectiveness of step-by-step treatment and differential approach to the treatment of OJ syndrome patients using minimally invasive methods in the conditions of a large region.

## Materials and methods

The study is based on the retrospective analyses of the treatment results of 2254 patients admitted to our clinic with diagnosis of OJ between January 2013 and December 2017. There were 797 (35.36 %) men at the age of  $64.4 \pm 2.4$  and 1457 women at the age of  $57.2 \pm 1.8$  (on the average). At the moment of hospitalization 336 (14.9%) patients had bilirubin level up to  $60 \mu\text{mol/l}$ , 1182 (52.44%) – from 60 up to  $200 \mu\text{mol/l}$  and 736 (32.65%) – over  $200 \mu\text{mol/l}$ . Due to the fact it was not possible to define the jaundice duration in the majority of patients, this parameter was not reviewed in this study.

The OJ of 1083 (48.04%) patients accompanied by systemic inflammatory reaction syndrome, caused by cholangitis. 426 (18.89%) patients had cancer intoxication symptoms, such as decreased appetite, significant loss of weight, general weakness.

Given the presence of concomitant pathology in patients, manifested or latent secondary complications of hyperbilirubinemia for the practical use and assessment of the severity of the patients' condition, a classification of E.I. Galperin *et al.* (2014) is proposed [12].

In accordance with this classification, a three-degree score estimation of the total bilirubin level is given:

- <60  $\mu\text{mol/l}$  - 1 point,
- 60 - 200  $\mu\text{mol/l}$  - 2 points,
- $\geq 200 \mu\text{mol/l}$  - 3 points.

Complications that increase the severity of OJ are: cholangitis, renal failure, liver failure, encephalopathy, gastrointestinal hemorrhage, sepsis.

These complications of OJ syndrome are compared with the level of total bilirubin with a factor of 2. Attaching two or more complications doubles or proportionally increases the number of points. Sepsis is assessed as two or more complications. Tumor genesis of the OJ is estimated as 1 complication.

With such a set of evaluation factors, 3 classes of OJ severity are distinguished:

- class "A" (mild OJ) - which included patients with a number of points  $\leq 5$ ,
- class "B" (OJ of moderate severity) - with the number of points 6-15,
- class "C" (severe OJ) - with the number of points  $\geq 16$ .

In addition to assessing the severity, the classification of E.I. Galperin (2014) allows you to determine the prognosis of surgical intervention: in OJ patients with class A— favourable, class B — questionable, depending on the general condition of patients, the duration of purulent or tumor intoxication; with OJ class "C" – unfavourable.

After hospitalization, the patients were divided into the following classes: class A (mild OJ) – 1024 (45.43%) patients, class B (medium OJ) – 659 (29.23%), class C (severe OJ) – 571 (25.33%). This classification was done according to the above mentioned one, taking into account hyperbilirubinemia level and factors enhancing it (cholangitis, renal failure, hepatic insufficiency, encephalopathy, gastrointestinal hemorrhage, sepsis, tumorous genesis of OJ).

The ultrasonography (US) and upper endoscopy (UE) were done to all the patients within the pre-hospital period. In some cases (117 patients (5.23%)) there were available data of ultrasound (EUS), computed tomography (CT) or magnetic resonance cholangiopancreatography (MRCP).

Before the hospitalization to our clinic the decompression of bile ducts (cholecystostomy, applied during "open" or minimally invasive surgery) was performed on 61 (2.75%) patients in another clinics. Almost all the drainages functioned inadequately, and their presence did not affect the tactics of further treatment of the patients.

All the OJ patients were subjected to either endoscopic transpapillary or percutaneous transhepatic biliary drainage at the first level of surgical treatment within the first day of hospitalization to our clinic. These steps were done in accordance with the block level and its supposed cause. Further tactics was determined by adequacy of decompression, the cause of the block and severity of patient's condition.

## Results and Discussion

In 1528 patients (67.79%) the level of bile duct block was detected in the terminal part of common bile duct or on the level of the ampulla of Vater; it was the cause for primary endoscopic examination and intervention. For 895 (58.57%) patients we diagnosed choledocholithiasis and made to them endoscopic retrograde cholangiopancreatography (ERCP) with lithoextraction. It was the final intervention that allowed eliminating the OJ cause. 104 (11.59%) patients needed repeated endoscopic lithoextraction because of the multiple choledocholithiasis. The attempts of endoscopic interventions were ineffective in 159 cases (10.4%), therefore, these patients were subjected to percutaneous transhepatic biliary drainage [13].

427 (39.89%) patients had neoplastic changes in the Vater' ampulla area and the lower third of choledoch when using endoscopic retrograde cholangiopancreatography. ERCP in those cases was accompanied by brush-biopsy of altered tissue. According to the histological study, in 335 (21.92%) patients malignant tissue was obtained from the Vater's ampulla area or from the distal part of common bile duct. In 137 (8.9%) patients we diagnosed benign stricture of lower and/or medium part of common bile duct.

After endoscopic interventions in 58 (3.90%) patients, we noted the following complications: hyperamylasemia and/or pancreatitis – in 30 patients (1.96%), intestinal hemorrhage - 3 (0.21%); retroduodenal perforation of duodenum wall – 1 (0.07%); impaction of endoscopic bucket with concretions after 3 (0.21%) manipulations; infectious complications (cholangitis) were noted in 16 (1.05%) patients; 5 (0.37%) patients had the drainage migration after nasobiliary drainage. Infectious complications, such as cholangitis progression within a post-surgical period were noted in 8 cases; one of the patients had fulminant development of infectious toxic shock. The fulminant course of acute pancreatitis led to the development of septic shock and lethal outcome in 2 cases (0.14%). Intestinal hemorrhages were not dangerous and, as a rule, they were stopped with the help of conservative methods. Only 5 cases required repeated endoscopic hemostasis and only 2 patients required laparotomy and duodenotomy (we connect the failure of endoscopic hemostasis with the intradiverticular location of the Vater's ampulla). The perforation of duodenum wall was treated conservatively. We removed the impaction of endoscopic bucket using endoscopic methods.

After reducing hyperbilirubinemia, laparoscopic cholecystectomy was performed on 374 patients (27.31%) (For one hospitalization). All the patients belonged to "A" and "B" groups regarding the severity class (total index did not exceed 6 points). 523 (38.2%) patients had total index (Galperin classification) over 6 points (high level of hyperbilirubinemia, the presence of cholangitis, septic state, verified oncologic pathology, severe concomitant pathology). These patients were transferred to the staged treatment in hospitals at the place of residence with the recommendations of planned surgical treatment after relief of hyperbilirubinemia and its complications.

Percutaneous transhepatic biliary drainage was performed on 589 patients (26.13%) as the primary intervention when we detected the block of proximal part of common bile duct or there was histological diagnosis of cancer of pancreatic head or the Vater' ampulla and the radical intervention was planned for the patients after OJ elimination. Transhepatic biliary drainage was performed as the final method of surgical intervention for incurable patients due to grave concomitant pathology in 137 (6.07%) cases. We had an intention to perform stenting or prosthesis of choledoch in cases for inoperable patients due to extension of tumor-process. Percutaneous transhepatic cholecystomy was not used in our study as it is ineffective method of decompression of bile ducts which does not fully provide adequate external bile outflow [14].

Percutaneous transhepatic biliary drainage was performed on 775 patients; as a gradual treatment method - in 274 (35.35%); and as the final – in 501 (64.64%) patients. In this cohort of patients, 594 (67.11) were drained once; 256 (28.92%) were drained twice; 12 (1.35%) – three times and 6 (0.67%) were drained four times. There was performed external – internal drainage in 74 (8.6%) cases and antegrade stenting was performed in 36 (4.06%) cases.

Complications developed when using antegrade interventions in 74 (8.36%) cases: intraabdominal hemorrhage – 1 (0.13%) case; migration of drainage – 36 (4.06%) cases. Bile peritonitis developed in 2 (0.22%) cases after antegrade intervention due to migration of drainage in subdiaphragmatic space. This fact required laparoscopic sanitation of abdominal cavity and re-drainage of bile ducts. 36 (4.06%) patients had the increasing of multiorgan failure (cerebral, hepatic-renal, respiratory) after antegrade intervention (biliary decompression), which was stopped successfully in 31 cases using conservative treatment and lethal outcome was in 5 cases (0.22%).

Considering the general condition severity of patients, it is necessary to note that this group (patients who underwent the primary antegrade intervention) included the greater part of patients who in accordance with the severity of their OJ belonged to "B" and "C" classes. 86 (9.71%) patients of this group (within one hospitalization) underwent endoscopic lithoextraction or choledocholithomy (the OJ severity total index of all the patients was not over 6 points) after hyperbilirubinemia decrease and cholangitis relief. 503 (56.83%) patients with total index of OJ severity over 6 points (high level of hyperbilirubinemia, presence of cholangitis, septic condition, verified oncological pathology, grave concomitant pathology) were also transferred to staged treatment with the following visit for planned surgical treatment [15].

We re-admitted 931 patients (41.3%). 427 patients (45.86%) from this group had high bilirubin levels. All the re-admitted patients had the score up to 6 points (classes "A" and "B") according to the Galperin classification. The re-admitted patients underwent the planned surgical intervention: endoscopic or antegrade stenting/ prosthetics of bile ducts – 411 (44.1%) patients, laparoscopic cholecystectomies/choledocholithotomies – 361 patients (38.77%), open or laparoscopic "extended" surgical interventions (liver resection, common bile duct resection, choledochenterostomy, proximal or total pancreatectomy) – in 159 (17.07%) patients [16].

Thus, the possibility of differentiated approach with the help of specialized treatment and stepped character of it permits us to optimize the treatment and diagnostics process reducing the quantity of complications up to 8.36% in percutaneous transhepatic biliary drainage and to 3.90% in endoscopic interventions and to decrease post-surgical mortality to 0.31% during minimally invasive interventions.

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