Original Article

# SURFACE LIVER FAILURE IN SURGICALLY TREATED MECHANICAL JAUNDICE

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## Abstract

Principles of early diagnosis of liver failure and prevention of complications after surgical treatment of mechanical jaundice of various etiologies were studied.

In this study, the anamnesis of 87 patients with mechanical jaundice treated surgically, the occurrence and duration of jaundice, the selection of surgical methods taking into account the concentration of bilirubin, and the principles of pharmacotherapy were improved.

In addition to the measures taken for the treatment of the main disease in the patients, the patient's psychoemotional state and changes in the brain were determined by means of EEG and conditionally compared with the indicators obtained from healthy people in the control group.

**Keywords:** mechanical jaundice, psychoemotional state, liver failure.

## INTRODUCTION

Mechanical jaundice is a complex of symptoms that complicates diseases of the hepatobiliary system, in which the permeability of the main common bile ducts is disturbed, the general condition of the patient worsens, and kidney failure is observed (1, 2, 3, 4).

Unfortunately, traditional surgical treatment of mechanical jaundice is not always effective, and the biological death rate after the medical diagnosis remains high. According to the obtained statistics, the biological death rate is on average 15-45% (5). The appearance of mechanical jaundice is manifested not only by pathomorphological changes in the liver, but also by deep morphological changes in other organs. In particular, it causes multi-organ failure and increases mortality up to 53% (6). The main cause of death is the development of liver failure in the postoperative period, despite intensive treatment with drugs (7).

Currently, despite the use of new minimally invasive methods and the development of modern detoxification measures, most patients develop minor diseases before surgery under the influence of bile acid, which causes liver failure (8, 9). XX1 meeting of surgeons of the world (Zaporoje, 2005) also noted that complications of liver, pancreas, gallstone diseases, tumor diseases of the hepatopancreatoduodenal area and their septic complications are increasing in the world in recent years (10). During the study of the pathogenesis of the disease, at the expense of toxic hepatitis and mechanical jaundice, it was found that endo and exotoxins of microbes during microbial invasion, toxic substances block mediators in the hepatobiliary system, cause inflammation and its (self-destruction) apoptosis (11).

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There is information that the origin of apoptosis in the liver is individual stellate cells, which are responsible for fibrosin in the liver, that is, extracellular matrix components collagen and fibrinolytics increase (12). In the treatment of mechanical jaundice, the use of an open method or a minimally invasive method is carried out depending on the location of the pathological condition in the hepatobiliary zone and taking into account the functional state of the liver. In spite of the fact that medicine is implemented with modern technologies and new treatment methods, many deaths and complications are observed (13).

The introduction of minimally invasive retrograde X-ray endoscopic and antegrade technologies into medicine has led to positive changes in the treatment of mechanical jaundice. Choledocholithiasis, common bile duct anatomical changes, and mechanical sutures are of great importance in the application of the aforementioned technologies (14).

Despite the introduction of high technology, the use of miniinvasive technologies is limited in some diseases - Mirizzi syndrome, megocholedocholithiasis, complicated gallstone diseases and some anatomical imbalances of the biliary system (14).

Iatrogenic injuries aggravate the patient's condition more than the complications of hepatobiliary system diseases. In addition, despite the use of modern technologies and the implementation of new operational methods, it is complicated by 20-30%. Among them, anastomosis failure, complications with stenosis cause new problems for the patient and the attending physician (13).

Purpose of the research

The purpose of the study: to study the state of the liver in patients with mechanical jaundice based on instrumental examinations, anamnesis and clinical laboratory tests.

## Materials and Methods

From 2005 to 2020, 87 patients with choledocholithiasis complicated by mechanical jaundice were treated in the surgical department of the Andijan State Medical Institute clinic and Regional Multidisciplinary Medical Center (Table 1).

Table 1. Distribution of patients by age and sex

| Sex | 19-30 ages | 31 – 50 ages | 51 – 60 ages | 61 and older ages |
|---|---|---|---|---|
| Male | 3 ( %) | 11 ( %) | 17 ( %) | 2 ( %) |
| Female | 8 (%) | 15 ( %) | 23( %) | 7 ( %) |
| Total | 11 ( %) | 26 ( %) | 40 ( %) | 9 ( %) |

The patients were divided into 3 groups depending on the presence of mechanical jaundice, the level of bilirubin increase and the integral index. Group 1 included 28 patients with a total bilirubin of 110 μmol/l (average 88.4 μmol/l) and jaundice up to 10 days. 32 patients in 2 groups had bilirubin from 110 μmol/l to 200 μmol/l (average 180.5 μmol/l) and jaundice up to 15 days. There are 27 patients in 3 groups, whose bilirubin level is higher than 200 μmol/l, mechanical jaundice is 16 or more days, and the average level of bilirubin is 280 μmol/l.

The functional state of the liver was determined based on the classification of I.I.Shimanko, S.G.Musselius (10), liver and brain deficiencies were determined based on the classification of E.I.Galperina and others (5). Patients in the control group were defined by transaminase values, bilirubin, bile phosphatase, urea, cholesterol, and average molecular weight.

Blood was taken on the day the patient was admitted to the hospital, one day later, 1st, 3rd and the day before discharge from the hospital. EEG was performed on the 1st, 5th and day of hospital discharge to determine the hepatocerebral status of control patients.

Depending on the general condition of the patients in the examined group, co-morbidities and the location of the disease, the diagnosis was made by traditional or laparoscopic method. Patients with severe condition and severe comorbidities underwent percutaneous transhepatic cholecystostomy or percutaneous transhepatic external cannulation of intrahepatic bile vessels, sometimes retrograde nasobiliary cannulation.

Table 2. Changes in liver enzymes depending on the anamnesis of jaundice in patients

| Groups | Days of mechanical jaundice | Bilirubin mkol/l | AST μmol/l | ALT μmol/l |
|---|---|---|---|---|
| 1st group | up to 10 days | 88,4 | 1,0 -1,3 | 0,8 -1,8 |
| 2nd group | up to 15 days | 180,5 | 2,5 -3,4 | 1,9 -3,0 |
| 3rd group | 16 and up | 280 and above | 3,1 -4,4 | 3,0 -3,9 |

## Results and Discussion

The first group of patients had a 10-day history of jaundice at the time of admission to the hospital, and as a result of clinical and laboratory examinations, clinical signs of mild or moderate degree of hepatopathy were shown. There were symptoms such as yellowing of the sclera of the eyes, slight itching on the body, weakness, loss of appetite, and a little reddening of the urine. Blood bilirubin was on average 88.4 μmol/l, AST 1.0-1.3 μmol/l, ALT 0.8-1.0 μmol/l, mild hypoproteinemia (total protein 55-60 g/l). Abnormalities were not observed in other biochemical analyses. Hepatocerebral changes were not detected, no changes in the structure of the liver were detected on USG, the echostructure was the same, sound conduction was preserved. Intrahepatic bile ducts were enlarged up to 11 mm, concretions of different sizes were detected, no changes were detected in encephalography. The postoperative period was uneventful. The general condition became relatively satisfactory by the 3rd and 4th days. In 4-5 days after the elimination of the mechanical barrier, the yellowness of the skin returned to its normal color. Biochemical indicators approached the norm after 6-7 days.

The second group of patients had a 15-day history of jaundice when they first came to the hospital, and these patients received outpatient treatment measures at their places of residence, and came to the hospital because they were ineffective. According to the results of the clinical examination conducted on the day of arrival, the average total bilirubin was 180.5 μmol/l, AST 2.5-3.4 μmol/l, ALT 1.9-3.0 μmol/l, hypoproteinemia 55-60 g/l organized. In the ultrasound examination of the liver, it is located in the right hypochondrium, the contours are smooth and clear. The size is slightly increased, the ecostructure is diffusing heterogeneous, thin-bodied, the ecostructure is slightly enlarged, and sound transmission is preserved. It was observed that vascular architecture was preserved by color Doppler mapping. Intrahepatic bile ducts were slightly dilated, up to 0.4 mm, common bile ducts were dilated up to 11 mm, stones of various sizes and shapes were found.

Among the symptoms, yellowing of the body, symptoms of itching, yellowness in the fall, weakness, loss of appetite, symptoms similar to hepatocerebral insufficiency were not detected in the patients. As a result of examination, writing test and countdown test revealed signs of encephalopathy in 10 patients (%) and handwriting disorder in 3 patients. In the EEG, mild degree of hepatocerebral insufficiency, irregularity of alpha-rhythm, violation of theta and delta waves were found in these patients.

In the postoperative period, in 8 patients of the 2nd group, hyperfenmentemia, increased endotoxicosis occurred on days 2-5 (blood poisoning according to the paramycin test was 12 minutes on average), mental and emotional disorders (rapid mood swings, depression or euphoria, drowsiness, headache ) passed with characters like The above signs correspond to level 1-2 hepatocerebral insufficiency and are confirmed by changes in the EEG. Among them, 5 patients had previously suffered from chronic viral hepatitis type V, and in 2 of them, the period of transition to cirrhosis was determined. 3 (%) patients died, one from progressive liver failure and the other two from severe co-existing cardiovascular disease.

There are 27 patients of our 3rd group under control, 18 of them with a history of jaundice for 16 or more days, 18 of them were treated in an outpatient setting at their place of residence, 3 of them were treated in an infectious disease hospital, 6 of them were treated in a private hospital, and they were sent to the clinic after it was determined that there was a mechanical obstruction as a result of examinations. As a result of clinical and laboratory analysis, hepatopathy of the 3rd degree was determined. The amount of bilirubin in the blood is on average 280 μmol/l, hyperfermentation is highly developed. AST 3.1-4.4 μmol/l, ALT 3.0-3.9 μmol/l, hypoproteinemia 50-55 g/l, cholesterol level on average 8.5 μmol/l, urea -11.8 μmol/ l, alkaline phosphatase 4.3 μmol/l, blood poisoning according to the paramycin test lasted about 10.6 minutes on average.

Liver ultrasound test

It is located in the right hypochondrium, its contours are smooth and clear. The dimensions are slightly increased, the ecostructure is diffuse, non-homogeneous, the ecostructure is slightly enlarged, sound transmission is preserved. Color Doppler mapping revealed preservation of vascular architecture. The bile ducts in the liver are slightly dilated - up to 0.8 mm, there are several bile ducts from 1.0 cm to 2.5 cm in the right lobe, the common bile duct is dilated up to 2.0 cm, concretions of various sizes and shapes are found, internal ecostructure is not one-sided, the echo has increased (Figure 1).


Figure 1. Ultrasound based diagnosis of jaundice

Clinical signs: the patient is jaundiced, there are spots left from itching on the body, the skin is dry, the sclera is yellow

in color, the palate is also yellow, the urine is dark red in color, weak, no appetite.

Patients in this group have several severe clinical symptoms compared to the examined groups 1 and 2. Long-term mechanical jaundice, cholangitis, development of accompanying diseases due to jaundice are among them. 11 (%) patients had signs of hepatocerebral insufficiency of 1-2 degree, which were determined by writing test and counting back test, and these indicators could also be determined from EEG recordings.

Table 3. Psychoemotional changes in patients with mechanical jaundice

| № | Psychoemotional symptoms | 1st group | 2nd group | 3rd group |
|---|---|---|---|---|
| 1. | Loss of appetite | - | - | + |
| 2. | Shaking hands | + | + | ++ |
| 3. | Trembling of the lips | + | + | ++ |
| 4. | Ataxia | - | + | + |
| 5. | EEG a-rhythm<br>b-rhythm<br>delta wave | +++<br>+++<br>--- | +<br>+<br>- | ---<br>---<br>+++ |

Despite the elimination of biliary hypertension in the liver and bile ducts in patients (Figure 2), increased endotoxicosis and cytolysis were observed in the postoperative period.

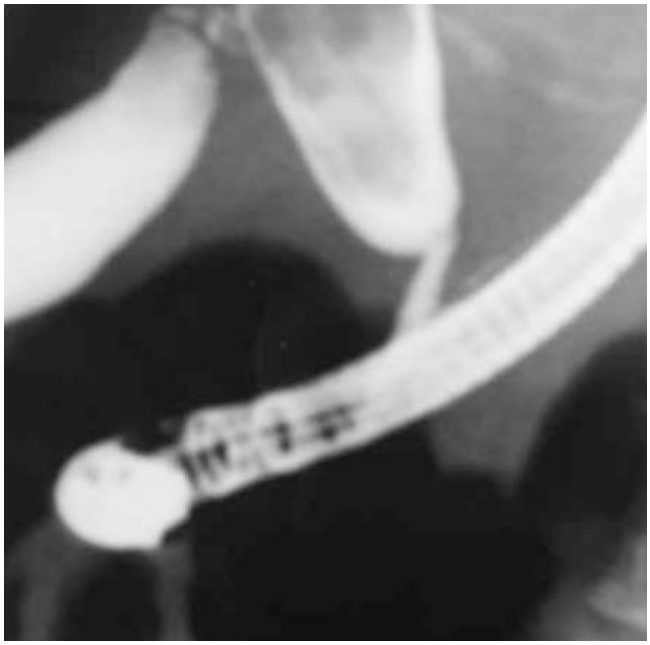

Figure 2. Endoscopic retrograde cholangiography of the patient

In patients, hyperbilirubinemia increased even more than before the operation, and 5 patients died from this group, 2 of them from progressive liver failure, symptoms of hepatocerebral failure (loss of consciousness, tremors of hands, lips, eyelids, ataxia, vision of other things in the eyes) from time to time symptoms of encephalopathy passed with short-term fainting. Slowing of alpha rhythm, bradyarrhythmia and synchronous delta waves were observed in EEG. During periods of unconsciousness, the EEG showed loss of alpha and beta activity, replaced by delta wave hypersynchronization (Figure 3).

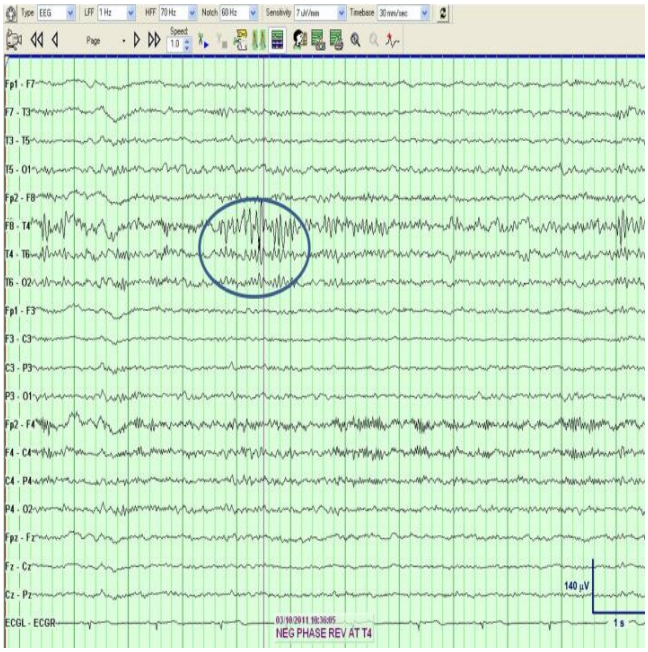


Figure 3. Beta rhythm-an overview

In the postoperative period, 1 patient was complicated by cholangitis, suppuration of the wound, and dynamic intestinal paresis was observed in 3 patients. The rest of the patients were sent to their place of residence on the 10-12th day of postoperative treatment, the functional state of the liver was monitored, and hepatotropic therapy was carried out. It was found that the changes in the liver were restored in 6-7 months when an ultrasound was performed.

## Conclusion

1. Prolonged mechanical jaundice, high levels of bilirubin in the blood lead to a violation of the morphological and functional state of hepatocyte cells in the liver under the influence of bile acids, which develop despite the elimination of the mechanical barrier in the bile ducts and cause the patient's condition to worsen or die.

2. The level of intoxication of the body develops in accordance with the level of cholestasis and bilirubinemia.

3. Severe liver failure due to cholestasis causes postoperative death.

4. If mechanical jaundice persists for a long time, symptoms of encephalopathy will develop and cause the patient to activate concomitant diseases.

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