TRANSHEPATIC ENDOBILIARY INTERVENTION IN THE MANAGEMENT OF PERIAMPULLARY TUMORS COMPLICATED BY MECHANICAL JAUNDICE

Sh. Karimov, M. Khakimov, A. Adilkhodjaev
Tashkent Medical Academy,
29-30, Mustakillik Avenue, Tashkent 100100 Uzbekistan
askar1981@mail.ru

Abstract. The analysis of treatment of 262 patients with periampullary tumors complicated by mechanical jaundice, who were on hospitalization in 2 clinics of the Tashkent medical academy in 2002-2014, is carried out. All patients executed percutaneous transhepatic biliary drainage. The smallest number of complications was observed at patients with the compensated stage of a liver insufficiency. Among complications prevailed – migration of a biliary drainage. (11 patients), a ghemobily (4 patients), 5 – the progressing liver insufficiency. Total numbers of complications did not exceed 14.5%.

Keywords: transhepatic endobiliary intervention, periampullary tumors, mechanical jaundice.

Relevance
Mechanical jaundice (MJ) represents itself as one of the earliest and most frequent clinical signs of periampullary tumors (PAT). By the time of its development, radical surgical interventions are available just in 10-20% of the cases; the incidence of postoperative complications is 10-68% (Andren-Sandberg, 2011; Aranha, Aaron and Shoup, 2006; Ball and Howard, 2010; Ford, 2011; Hashimoto and Traverso, 2010; Kubyshkin and Vishnevsky, 2003; Patyutko and Kotelnikov, 2007). Primarily, this condition might occur due to presence of MJ syndrome, its prolonged course, frequent and concurrent liver insufficiency (LI), cholangitis, and cancer intoxication.

Experience of transhepatic drainage of bile ducts as a preoperative and palliative measure of tumor induced MJ was represented in a number of fundamental works, reflecting general issues of endobiliary interventions in patients with malignant tumors (Ribero, et al, 2012; Van Berge et al, 2010; Z’graggen et al, 2012).

However, a variety of clinical situations often complicates the choice of inappropriate method for drainage of the bile ducts to provide optimal conditions for bile diversion.

Improvement of the transhepatic biliary drainage depending on the nature and the stage of pathological process is one of the urgent problems of surgery and oncology, which forced us to refer to this issue.

Objective
Improvement of the treatment results in patients with periampullary tumors complicated by mechanical jaundice, optimizing the performance tactics for transhepatic endobiliary interventions.

Material and methods of research
We have analyzed the treatment experience of 262 patients with PAT receiving in-patient treatment in the 2nd Clinic of the Tashkent Medical Academy from 2002 to 2014. The age of patients ranged from 28 to 84 years. All patients were hospitalized with MJ, with course duration ranged from 18 to 45 days.

All patients received percutaneous transhepatic biliary drainage (PTBD) with decompression purpose, which admitted subsequent radical surgery in 46 (17.5%) patients, 20 (7.6%) patients were imposed an internal bypass; surgical treatment will be a definitive measure in other cases.

Prior to percutaneous transhepatic endobiliary intervention (PTEI) a comprehensive examination was performed, including laboratory data, ultrasound, magnetic resonance pancreatocholangiography (MRCP). All the measures allowed us to determine the stage of liver insufficiency (LI), anatomical features of the biliary tract and outline of the PTEI plan.

Thus, based on these studies, most patients had sub- and decompensated stage of LI according to the classification by K.Z. Minin (1988). Compensated stage of LI was diagnosed in 56 (21.4%) patients,
subcompensated – in 168 (64.1%) and decompensated stage – in 38 (14.5%). Signs of suppurative cholangitis were in 120 (45.8%) patients, mainly in patients with sub- and decompensated LI stage.

MRCP as an instrumental method was performed on «SignaHDe», power field 1.5 T with an empty stomach, in the horizontal position of the patient in the following pulse sequences: T-2 coronar (T-2 fatsat) and dual echo (T1 in phase out phase) in axial projection followed by MRCP 3D-reconstruction. During the test, the pancreatoduodenal area and the retroperitoneal space were examined, followed by a 3D-reconstruction of the biliary tree, determined by the level of the block, with the presence of hepatic cysts, metastatic lesions and their relation to the trunk biliary tracts.

Percutaneous transhepatic cholangiography (PTC) was performed under local anesthesia on «ECORAY» with X-ray control, i.e. diagnostics step in the implementation of drainage interventions. Lateral access was used in the VII-VIII intercostal space on the right axillary line. Needle biopsy of liver and bile ducts was performed with Chiba needles (22G).

Basic information was obtained by pacification of ductal system determines the degree of violation of the passage of bile in the form of a narrowing or complete block with the expansion of the bile ducts proximal to the block. After determining the degree of expansion of the intrahepatic bile ducts, block-level percutaneous transhepatic biliary drainage (PTBD).

In postoperative period the effectiveness of decompression of the biliary tract was evaluated, blood bilirubin decrease, liver enzymes (ALT, AST), total protein, alkaline phosphatase (ALP). Biliary tract sanitation and efforts to restore the passage into the intestine. In this case, the effective decompression of the bile ducts after PTEI was considered a condition where noted improvement in general well-being of patients, characterized by a decrease in pain, dyspepsia, weakness, appearance of appetite, decreased levels of liver enzymes, bilirubin, bile flow adequate to cholangiostomy tube.

With effective decompression of biliary tract, sanitation of bile ducts, biliary elimination of hypertension, PTEI was repeatedly executed, aimed at restoring the natural passage of bile into the intestine, in order to avoid the loss and restoration of its natural circulation by percutaneous internal frame transhepatic drainage.

This technique was applied after external drainage of bile ducts, and depended on the stage of LI, regress of cholangitis and applying the measure to replace the drainage tube with diameter of 3-4 mm in the common bile duct. Recanalization block in the distal common bile duct was performed along with the introduction of a catheter into the intestine. The distal portion of the catheter was free of lateral openings to avoid reflux of duodenal contents into the intestine. The outer lumen of cholangiostomy overlaps and used for sanitation of ducts and control studies.

This technique has been used as the primary method of bile abstraction in patients with locally advanced forms of PAT, as well as the purpose of preoperative preparation of patients for radical surgery.

After performing PTEI and arresting events of MJ, full range of diagnostic interventions aimed at determining the stage of disease, tumor site was performed and choice of the final method of surgical treatment of patients with PAT. 164 (62.6%) patients were diagnosed with impairment of pancreatic head, 46 (17.5%) – tumor of Vater’s papilla, 38 (14.5%) – cancer of the terminal part of the common bile duct, and 14 (5, 4%) – tumor of the duodenum.

Results and their discussion

PTEI analysis showed that the most optimal results were observed in patients with compensated stage of LI and were characterized by improved health state, reducing pain, weakness, appearance of appetite, normalization of sleep, increased bile excretion occurred at 4-5 hours. Activity of intracellular liver enzymes (ALT and AST) began to decline during the first two days, followed by the end of the first week performance reduced by half and normalized to 8-9 days after PTBD.

There was a significant decrease and normalization of total bilirubin in 5-7 days observed after decompression of the biliary tract. Volume of excreted bile increased and was due to 500-700 ml for 3-4 days after PTBD, followed by a decrease to 400-450 ml per day. Bile color, its viscosity became normal. The level of alkaline phosphatase in this stage of LI was 364.2 ± 36.4 U/L. On the 3rd day, this figure dropped to 311.4 ± 28.4 U/L, 7-8 days the figure is closer to the norm – 278.5 ± 26.8 U/L. By the 14th and 21st day of studies, measures were within normal limits. Morbidity and mortality in this group of patients has not been revealed.

Rapid regression of MJ and LI will reduce the time to conduct preoperative preparation and perform radical operation in 38 (14.5%) patients, with palliative operations of biliary tract in 6 (2.3%) patients.
Patients in subcompensated stage of LI also showed positive dynamics of general condition, although somewhat slower in terms. Pain, itching disappeared in 2-3 days. Detoxification and infusion therapy for 15-17 days resulted in disappearance of weakness, malaise, restoring appetite. By this time in most cases normal sleep, marked regression of muscle weakness, the patient becomes more active. Volume of bile secretion, as in the compensated stage of LI, progressively increased, leaving the level of 500-600 ml for 8-9 days after PTBD, followed by a decrease to 3 weeks to the level of 400-450 ml per day. The progressive purification of bile and normalization of color, clarity and viscosity. Reduction of ALT and AST was not significantly different from that of the compensated stage of liver insufficiency, characterized by a decrease of enzyme activity level during 14-15 days, and 20 days for normalization after application and adequate drainage of hepatotropic and detoxication therapy. Reduced levels of bilirubin, at the outcome-level more than 150 mkmol/l in patients with subcompensated stage of LI were noted in 10-11 days after the imposition of PTBD. AP level on PTBD was equal to 392.4 ± 33.1 U/L. On the 3rd day, the index dropped to 333.9 ± 34.2 U/L, by 7th and 8th day – down to 292.4 ± 31.21 U/L. By 21st day alkaline phosphatase index finally approached its normal value, i.e. 234.2 ± 27.1 U/L.

Analysis of postoperative complications in patients with subcompensated stage of LI showed cholangiostomy migration in 6 (2.3%) cases; 18 (6.8%) patients had progression of LI in the first 2 days after PTEI, the use of conservative therapy resulted in LI regress and health state improvement by 3-4 days. 1 (0.4%) case was a fatal outcome, caused by acute myocardial infarction. One patient, due to the refusal of the proposed surgical treatment, was released for systemic chemotherapy at place of residence after PTBD. 28 days after the abrupt change in body position a migration of cholangiostomic tube with wicking of bile into the abdominal cavity, development of bile peritonitis and progressive of MJ and LI symptoms were observed. Repeated X-ray endobiliar intervention due to complete migration cholangiostomy, as well as narrow intrahepatic bile ducts (less than 2 mm) were unsuccessful.

The patient had been taken to emergency surgery. Laparoscopic sanitation of abdominal cavity with redrainage common bile duct through the existing channel under video laparoscopic and X-ray television control was performed (Fig. 1-2).

![Fig. 1-2. View after postoperative redrainage of the biliary tract](image)

The use of minimally invasive treatment allowed us to avoid the fatal consequences; the patient was discharged in satisfactory condition at the 8th day after the operation.

Longer regression of MJ and LI with correction of internal homeostasis, leading to progression of the tumor process, as reflected in the performance of radical surgery. Thus in these patients, radical operations were performed only in 8 (3.0%) cases, whereas palliative biliary surgery – in 14 (3.8%) cases.

Patients with decompensated and terminal stage of LI, had significantly different regression of LI. Pain syndrome, general intoxication, skin itching persisted for 8-10 days, amid ongoing detoxification therapy. In
In the majority of cases, there was a long period of gradual decline in the concentration of bilirubin, approaching the normal values by 30-35 days after PTBD. Discharged bile also had not exceeded 300 ml for the first 8-10 days, gradually increasing to 400 ml by the end of three weeks. Consistency of bile remained thick, viscous, and the dark-colored for a long time. Indicators of ALT and AST were characterized with persistent and prolonged rise, with a gradual regression and normalization by 30 days after PTBD. ALP values in this group of patients equaled to 436.8 ± 31.8 U/L before PTEI. By the 3rd day, this value did not significantly decrease and was equal to 421.4 ± 35.8 U/L. There was a slight decline by 382.4 ± 28.4 U/L on the 7-8th day. On the 14th day, the level of alkaline phosphatase was equal to 344.9 ± 24.8 U/L, and by 21 day– 295.7 ± 21.1 U/L, with gradual regression and normalization of the end of 4 weeks after the TEBI (p <0.05) (Fig. 3).

![Figure 3](image-url)  
**Fig. 3.** Terms of alkaline phosphatase reduce according to the LI stage

Analysis of postoperative complications in this group showed prominent hemorrhagic complications, we believe that it was due to the hidden syndrome of intra vascular folding, which caused intrahepatic bleeding from an arteriobiliary fistula (in 4 (1.5%) cases), as well as restless state of patients, leading to migration of cholangiostoma (5 (1.9%) cases), due to the initial presence of hepatic encephalopathy.

One patient with terminal stage of LI, died in 4 days after PTBD due to progressive renal hepatic insufficiency. This outcome did not result from previous endobiliary interventions.

Preoperative intensive infusion, antibacterial, hemostatic, anti-inflammatory and hormonal therapy of patients with signs of cholangitis, as well as reduction of contrast material injected when performing cholangiography allowed us to avoid septic shock in patients with supplicative cholangitis, noted in 21 patients.

Thus, increasing the overall hemostatic therapy and the use of local hemostatic allowed hemobilia arrest in 2 patients conservatively. In one case, because of the lack of conservative therapy effect we had to replace the drainage to a larger diameter, which mechanically compressed arteriobiliary fistula, thus prevented hemobilia.

One patient with inefficient conservative therapy and drainage of larger diameter had to perform endovascular embolization of the right hepatic artery (Fig. 4-5).

In 5 (1.9%) cases, the patients had migration of cholangiostoma, characterized by an increase of jaundice, increased pain and of intoxication. In this case, the tip of the catheter is in the liver parenchyma or under diaphragm representation space. Repeated endobiliary intervention would eliminate this kind of complications.

It should be noted that all patients who have developed some complications, received endobiliary repeated intervention quietly and without major complications. None of the cases of deaths from repeated endobiliary interventions was observed.
As the regression of MJ and restore of liver function locally advanced process was diagnosed in the diagnostic phase, these patients were released for regional or general chemotherapy at the place of residence.

**Discussion**

At the moment, diagnosis and treatment of complications of PAT complicated with MJ is an actual problem of modern surgery and oncology. Invasive diagnostic intervention for MJ aggravates the course of the underlying disease (Ford, 2011; Kubyshkin and Vishnevsky, 2003). Choice of adequate diagnostic and treatment tactics help to improve the treatment outcomes.

Two-stage medical-diagnostic tactics at PAT complicated with MJ, applied in this study, allowed the first stage to unload the biliary tract, eliminate biliar hypertension, sanitize the bile ducts and prepare the patients for radical, palliative surgery.

Thus, elimination of bile hypertension by imposing PTBD, was accompanied by a gradual recovery of the functional state of liver structure, characterized by an increase in the bile volume, lowering of intoxication, improving general state of patients.

The use of internal drainage after external drainage bypassing intermediate position (external-internal drainage) drainage of the bile ducts in order to avoid the loss and restore its natural circulation, along with the beneficial effects on digestion and detoxification, reduced functional load on the liver cells, required for synthesis of additional components of bile and contributed to a more rapid recovery of patients.

In patients with prolonged wearing of cholangiostoma, drainages were replaced within a period of 3-4 months, due to possible obstruction of cholangiostomic tube by bile salts and fibrin. Moreover, repeated manipulations did not require additional pain relieving, last 10-15 minutes, were easily tolerated and provided a longer survival of fainting patients.

Analysis of the data showed that in PAT tumors PTEI is an efficient way to eliminate MJ, the total numbers of complications did not exceed 14.5%. The greatest number of complications in patients with PAT complicated by MJ was observed at decompensated stage of HI. Patients with compensated and subcompensated HI stage-managed to quick preparation for radical surgery, primarily due to rapid recovery and a minimum number of complications.

**Conclusions**

1. In the diagnostic phase patients with PAT complicated by MJ must include MRCP that allows assessing the condition of the biliary tract and choosing adequate access to PTEI.
2. The greatest number of complications after PTEI observed in patients with decompensated LI stage is due to severe somatic status, DIVS and hepatic encephalopathy.
3. PTEI should be performed in two stages. First stage – percutaneous transhepatic drainage of biliary tract with their sanitation, the second stage – internal drainage.

4. The use of minimally invasive methods for correction of complications after PTEI grants avoiding fatal consequences.

5. PTEI is an effective treatment for mechanical jaundice caused by PAT, providing to prepare patients for radical surgery, and in locally advanced process shall be the definitive surgical treatment.

References