Translated by A.P. Strelkova

Research Article

https://doi.org/10.23934/2223-9022-2024-13-1-123-127

Acute Cholangitis GRADE II–III. The View of an Interventional Radiologist

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AIM OF STUDY To evaluate the safety and efficacy of percutaneous transhepatic cholangiostomy (PTC) as a first-line intervention in the treatment of patients with acute cholangitis (AC) Grade II–III (TG 13/18).

MATERIAL AND METHODS The results of treatment of 42 patients with AC Grade II–III, who underwent PTC, were analyzed.

The criteria for non-inclusion were the presence in patients of destructive cholecystitis and (or) acute pancreatitis, AC due to proximal block of the bile ducts, regardless of etiology, as well as the presence of cholangiogenic liver abscesses. Literature data were used as reference results of the use of endoscopic techniques. AC was diagnosed and its severity was determined in accordance with the diagnostic criteria TG 13/18.

The control points of the study were the frequency of post-manipulation complications associated with PTC, as well as the immediate efficacy of cholangiostomy, assessed by the dynamics of Grade-status within 24 and 48 hours.

RESULTS In all 42 patients, PTC was technically successful. Major complications that might require a change in treatment tactics (significant hemobilia, bile peritonitis, bleeding into the abdominal cavity) were not observed. Two complications occurred: subcapsular hematoma (2.4%) and right-sided pleurisy (2.4%).

When assessing the dynamics of Grade status, its significant decrease was found in the group of patients with initial Grade III after 24 hours (from 16 to 9 hours) and 48 hours (from 9 to 4 hours). In patients with initial Grade II status, in three cases it worsened to Grade III, which still persisted in one patient even in 48 hours. There was no in-hospital mortality in the examined patients.

CONCLUSION Antegrade endobiliary intervention for acute cholangitis involves performing real-time monitored biliary decompression. Experience with the use of percutaneous interventions does not confirm the high risk and frequency of post-manipulation complications in comparison with endoscopic retrogradeprocedures. It seems obvious that there is a need for and the possibility of choosing both retrograde and antegrade methods of emergency biliary decompression in the arsenal of treatment for patients with acute cholangitis.

Keywords: acute cholangitis, percutaneous transhepatic cholangiostomy, biliary decompression, post-manipulation complications

For citation Okhotnikov OI, Yakovleva MV, Shevchenko NI, Grigoriev SN, Okhotnikov OO. Acute Cholangitis GRADE II–III. The View of an Interventional Radiologist. *Russian Sklifosovsky Journal of Emergency Medical Care.* 2024;13(1):123–127. https://doi.org/10.23934/2223-9022-2024-13-1-123-127 (in Russ.)

Conflict of interest Authors declare lack of the conflicts of interests

Acknowledgments, sponsorship The study had no sponsorship

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AC – acute cholangitis

PTHC – percutaneous transhepatic cholangiostomy

INTRODUCTION

In 2018, the next edition of the Tokyo Guidelines for acute cholecystitis, acute cholangitis *TG* 13/18 was published. In severe and less severe cases of cholangitis (*Grade II–III),* biliary decompression of the bile ducts is recommended for emergency indications, and the intervention of choice is endoscopic assistance, which is today considered as a paradigm for providing emergency care for acute cholangitis [1, 2].

Percutaneous transhepatic biliary decompressive interventions are traditionally recommended as "second-line interventions" when endoscopic transpapillary intervention is impossible or ineffective. At the same time, the format of using *"salvage therapy"* is also considered for antegrade transhepatic decompressive interventions, which a priori assumes their high clinical effectiveness and predictability in combination with qiuck implementation and, moreover, does not indirectly confirm that retrograde techniques have an unconditional advantage in all cases in adequate resolution of biliary hypertension in the course of acute cholangitis, even with condition of transpapillary accessibility of the bile tree [3].

On the other hand, effective retrograde endoscopic assistance involves immediate effective resolution of biliary hypertension in combination with temporary endobiliary stenting or nasobiliary drainage, or immediate elimination of the cause of biliary obstruction, which requires adequate qualifications of an endoscopist in combination with modern technical support for manipulation around the clock.

A significant limiting factor for the widespread initial use of percutaneous drainage techniques is the risk of alleged post-manipulation complications, primarily hemorrhagic, as replicated in the literature, as well as high in-hospital mortality rates.

At the same time, it is obvious that there is a need for a non-discriminatory presence in the arsenal of a clinic providing care to patients with acute cholangitis, both retrograde and antegrade methods of emergency biliary decompression.

The aim of this study was to evaluate the safety and immediate result of percutaneous transhepatic cholangiostomy (PTHC) as a "first-line" intervention in the treatment of patients with acute cholangitis *Grade* II–III (*TG* 13/18).

MATERIAL AND METHODS

The results of PTHC in 42 patients with acute cholangitis *Grade* II–III (*TG* 13/18) who were treated in the surgical departments of the Kursk Regional Multidisciplinary Clinical Hospital in 2019–2022 were subjected to a retrospective and prospective analysis.

Acute cholangitis was diagnosed and its severity was determined in accordance with the diagnostic criteria *TG* 13/18 [4].

A- Systemic inflammation:

A-1 fever and (or) chills;

A-2 laboratory data: evidence of an inflammatory response.

B- Cholestasis :

B-1 jaundice;

B-2 laboratory data: abnormal liver function tests.

C- Visualization data:

C-1 dilatation of the biliary tree;

C-2 visualized verification of etiology (stricture, stone, stent , etc.).

Final diagnosis = *A*+*B*+*C*

Presumable diagnosis = *A* +(*B* or *C*)

Grade III (*severe*) – organ (multiple organ) dysfunction.

Grade II - (*moderate*) – combination of any two criteria.

The number of peripheral blood leukocytes is less than 4,000 or more than 12,000 per ml.

Hyperthermia not less than 39°C.

Age over 75 years.

The level of total bilirubin is over 50 μmol/l.

Hypoalbuminemia.

Grade I (*mild*), outside the criteria *G* II-III.

Of the 42 patients, in 34 the diagnostic formula of acute cholangitis was represented by *A*1+ *B*1+ *C*1, in 8 — *A*1+ *B*1+ *C*2. There were 16 patients with *Grade* III cholangitis, 26 wit*h Grade* II.

The criteria for inclusion of patients in the study group were:

— acute cholangitis *G* II–III (*TG* 13/18), in the treatment of which PTHC was primarily used.

Non-inclusion criteria were:

— the presence in patients, in addition to acute cholangitis, of clinical and instrumental manifestations of destructive cholecystitis and (or) acute pancreatitis;

— acute cholangitis in the course of proximal blockade of the bile ducts, regardless of etiology (in such patients, percutaneous transhepatic drainage of the biliary tree);

— presence of cholangiogenic liver abscesses.

Exclusion criteria were:

— use of PTHC as a "second-line" intervention if retrograde endoscopic intervention is ineffective;

— cases of using PTHC after endoscopic intervention in the *"salvage" mode therapy*.

Thus, in the analyzed group of patients, both endoscopic retrograde and transhepatic decompression could equally likely be used for biliary decompression as a "first-line intervention" antegrade interventions, which made it possible to compare the results of X-ray surgery in our clinic with the results of endoscopic practices known from the literature. We considered it appropriate to use literature data based on best practices as reference results for the use of endoscopic techniques in order to neutralize the negative impact of subjective factors in the use of endoscopic techniques in one particular medical organization.

According to literature data, the risk of developing post-manipulation pancreatitis and bleeding can reach 12%, and the risk of duodenal perforation reaches 0.1–0.6% [5–7].

The first control point of the study is the frequency of post-manipulation complications associated with PTHC.

The second control point is the immediate effectiveness of PTHC, assessed by the dynamics of *Grade* status over 24 and 48 hours.

RESULTS

In all 42 patients, PTHC was technically successful. "Major" complications that might require a change in treatment tactics (significant hemobilia, bile peritonitis, bleeding into the abdominal cavity) were not recorded. Two complications occurred: subcapsular hematoma (1–2.4%) and right-sided pleurisy (1–2.4%).

When assessing the dynamics *of Grade* status, its significant decrease was found in the group of patients with initial *Grade* III in 24 hours (from 16 to 9 hours) and 48 hours (from 9 to 4 hours). In patients with an initial status *of Grade* II, we noted a multidirectional change in status: in 3 cases it worsened to *Grade* III, which persisted in one patient even after 48 hours. There was no in-hospital mortality in the examined patients.

Literature data were used as reference values for the incidence of complications of endoscopic interventions. According to literature data, the risk of developing post-manipulation pancreatitis and bleeding can reach 12%, and the risk of duodenal perforation can reach 0.1–0.6% [5–7].

When assessing Fisher's exact criterion (0.0183, p <0.05), the frequency of "major" post-manipulation complications according to the literature data with endoscopic retrograde assistance is significantly higher than when using PTHC for emergency biliary decompression of severe and less severe acute cholangitis in our observations.

DISCUSSION

During the next revision of the Tokyo recommendations for the diagnosis and treatment of acute cholecystitis and acute cholangitis in 2018, the absolute need for biliary drainage was confirmed, and this position was further developed, and biliary decompression is no longer directly dependent on the effectiveness of primary conservative therapy, but is assumed to be immediate for *Grade* II cholangitis and emergency for *Grade* III cholangitis. At the same time, the priority of endoscopic drainage is declared, and percutaneous Transhepatic techniques are proposed to be used as a "second-line" intervention if endoscopic assistance is ineffective or impossible. This position is reflected in domestic clinical guidelines for acute cholangitis, and even in a more categorical form, regarding percutaneous interventions as potentially dangerous.

At the same time, the experience of using percutaneous interventions for obstructive jaundice of a benign and malignant nature at various levels of obstruction of the biliary tree and the severity of dilation of the bile ducts, including the absence of it, does not confirm the high frequency of post-manipulation complications. On the other hand, retrograde endoscopic interventions are also flawed from the point of view of post-manipulation complications. Moreover, the severity of these complications is not commensurate with the adverse consequences of percutaneous interventions. In antegrade endobiliary interventions, the most dangerous are hemorrhagic complications and biliary peritonitis. In accordance with the recommendations of the Society of Interventional Radiologists (*SIR*), the expected frequency of post-manipulation bleeding should not exceed 2.5%, and the value of this indicator more than 5% becomes the subject of departmental investigation, and this complication itself, even caused by an arteriobiliary fistula, is corrected by minimally invasive endovascular intervention [8]. Bleeding into the abdominal cavity during PTHC is casuistry, just like the formation of a subcapsular hematoma of the liver, and is caused by damage to the arterial plexus of the liver capsule. The bleeding is not profuse. Leakage of bile into the abdominal cavity, as a rule, is localized and can again managed using minimally invasive methods.

The situation is different with complications of transpapillary interventions. The most dangerous of them are retroduodenal perforations, profuse gastroduodenal bleeding and pancreatic necrosis. Each of these complications is potentially fatal for the patient.

In addition, the ideology of endobiliary intervention for acute cholangitis involves performing controlled and real-time controlled biliary decompression. Endoscopic retrograde intervention in this regard is worse predicted than antegrade. With percutaneous access, puncture and drainage of the bile tree is carried out obviously proximal to the obstruction zone, and installation of an 8Fr drainage in this position allows immediate sanation of the bile ducts under visual guidance "to clear waters." During endoscopic intervention, the operator manipulates obviously distal to the occlusion of the biliary tree and the obstruction zone must still be passed through, and the success of this measure is not obvious in all cases (large multiple stones, tumor obstruction), while at the same time, with percutaneous intervention, the technical

success of cholangiostomy for dilated bile ducts is approaching 100%.

It is interesting that in 3 patients out of 26 with initial *Grade* II status, the severity of clinical manifestations of cholangitis to *Grade* III was registered against the background of percutaneous biliary drainage, which may be associated with transient hepatic dyscirculation in the course of biliary decompression.

CONCLUSION

Thus, from the point of view of the predictability of biliary decompression and its rapid implementation in acute cholangitis, antegrade interventions a priori look preferable than endoscopic ones. However, in *TG* 13/18 and domestic recommendations, priority as a "first-line" intervention is given to endoscopic retrograde interventions, suggesting fewer complications, as well as greater availability of qualified endoscopic care than radiological care. Our small number of observations does not claim to be systemic generalizations, but also does not confirm the expected high risk of severe post-manipulation complications.

It seems obvious that there is a need for a non-discriminatory presence in the arsenal of a clinic providing care to patients with acute cholangitis, both retrograde and antegrade methods of emergency biliary decompression, especially taking into account cases of using percutaneous transhepatic cholangiostomy after endoscopic intervention in *"salvage"* mode therapy.

Percutaneous use transhepatic cholangiostomy as a non-discriminatory first-line intervention in the treatment of patients with acute cholangitis *Grade* II–III (*TG* 13/18) is safe and effective, since it is not associated with a high risk of serious complications, and allows guaranteed achievement of biliary decompression.

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Received on 01/12/2023
Review completed on 10/20/2023
Accepted on 10/20/2023