European Journal of Molecular & Clinical Medicine
ISSN 2515-8260 Volume 07, Issue 10, 2020

MODERN APPROACH TO THE TREATMENT OF CHOLELITHIASIS COMPLICATED BY OBSTRUCTIVE JAUNDICE

Oktyabr R. Teshaev[1], M.U. Ismoilov[2], Sayfiddin R. Baymakov[3], Sh.Kh. Babakulov[4], Bekhzod Sh. Abdullaev[5]

[1]MD, Professor, Department of Surgical Diseases, GP Faculty, Tashkent Medical Academy, 2 Farobiy Str., Tashkent, Uzbekistan, 100109. Email: tma.tor@mail.ru
[2]MD, PhD, Department of Surgical Diseases, GP Faculty, Tashkent Medical Academy, 2 Farobiy Str., Tashkent, Uzbekistan, 100109. Email: info@tma.uz
[3]MD, Professor, Department of Surgical Diseases, Tashkent State Dental Institute, 103 Taraqqiyot Str., Tashkent, Uzbekistan, 100147. Email: bsayfiddin@yahoo.com
[4]MD, PhD, Department of Surgical Diseases, Tashkent State Dental Institute, 103 Taraqqiyot Str., Tashkent, Uzbekistan, 100147. Email: info@tsdi.uz
[5]MD, Teaching assistant, Akfa University, 10, 1st Deadlock Str., Kukcha Darvoza, Tashkent, Uzbekistan. Email: b.abdullaev@akfauniversity.org

Abstract : Research objective: to analyze the treatment outcomes after using various methods of biliary tract decompression in patients with cholelithiasis complicated by obstructive jaundice.
Material and methods. 446 patients with cholelithiasis complicated by obstructive jaundice underwent treatment in the Surgical Department of the 1st City Clinical Hospital in Tashkent in the period from 2006 to 2019. 388 (87.1%) patients underwent multistage endoscopic retrograde transpapillary interventions. Duodenoscopy, retrograde cholangio-pancreatography followed by endoscopic papillosphincterotomy (EPST), in combination with choledocholithoextraction (CLE), were performed in 362 patients (93.3%). Besides, we carried out laboratory studies on blood parameters: total bilirubin, ALT, AST, ALP and gamma GGT, characterizing cholestasis and the degree of damage to the liver cells, as well as assessment of specific complications and mortality.
Results. The analysis of treatment outcomes established the following: 22 (4.9%) critically ill patients were applied cholecystostomy under ultrasound control, which allowed to obtain relief of the inflammation process and biliary tract decompression. Besides, critically ill patients with hyperbilirubinemia and biliary intoxication underwent antegrade drainage of the bile duct by PTBD. In 6.5% of cases, due to large choledocholithiasis and incomplete lithoextraction, we used open cholecystectomy in combination with choledocholithotomy with drainage of CBD. Also it should be mentioned, that the conducted study revealed a significant decrease in bilirubin values in all surveyed groups, as well as significant decrease in ALT and AST values.
Conclusion. The most optimal treatment of cholelithiasis complicated by obstructive jaundice is the two-stage approach using minimally invasive methods. The operation of choice is endoscopic retrograde intervention followed by laparoscopic cholecystectomy. In cases of high hyperbilirubinemia (over 200 µmol/L), CBD enlarged diameters and critically ill patients, the method of choice for the treatment of CBD decompression is PTBD.
Key-words: common bile ducts, cholecystostomy, antegrade drainage, hyperbilirubinemia, jaundice.

INTRODUCTION

Despite significant advances in the hepato-pancreatobiliary surgery, still there is a

number of issues on the treatment of cholelithiasis complicated by obstructive jaundice. Today, an increased incidence of cholelithiasis is noted among the population. This pathology is often associated with complication in the form of choledocholithiasis, which develops in 8–20% of patients with cholelithiasis, while obstructive jaundice of varying severity develops in 60–70% of cases [1].

To date, the surgical treatment of choledocholithiasis is multivariate. Each method has both advantages and disadvantages, therefore, the treatment of obstructive jaundice requires new technical approaches and methods in removing calculi from the biliary tract.

The number of operations on the biliary tract continues to increase steadily from year to year, associated with an improved diagnosis of choledocholithiasis, as well as increase in the incidence of cholelithiasis and its complications. Cholelithiasis mainly affect people of elderly and senile age [2,3], who also suffer from numerous concomitant diseases burdening the prognosis of surgical treatment, in the form of postoperative complications 5-30% and mortality 3-10% [4].

Surgical interventions performed for jaundice are accompanied by a great number of complications, and the mortality rate can reach 15–30% [5, 6]. In this regard, minimally invasive methods of treatment became more widely used, allowing to achieve maximum results with minimal surgical trauma [5].

Recently, a two-stage approach to the treatment of obstructive jaundice with biliary tract decompression at the first stage has great success. Endoscopic papillosphincterotomy (EPST) is recognized by most authors as the optimal method of decompression [7; 8].

Some surgeons, however, have a restraint opinion on this method, due to the risk of developing a number of serious complications, such as hemorrhage, acute pancreatitis, acute cholangitis, retroduodenal perforation and other nonspecific complications occurring in 5.4-18.3% of patients. Also there are negative statements regarding the non-integrity of the sphincter apparatus of the large duodenal papilla [9; 10].

The problem of lithoextraction, when the diameter of calculi exceeds the size of the distal parts of the common bile duct (CBD), is attempted to be solved by various types of lithotripsy, the most accessible of which is mechanical. Remote types of lithotripsy are used in specially equipped centers and are unsafe procedure due to the risk of complications such as bacteremia, hemobilia and liver hematomas, especially in patients with obstructive jaundice [9].

Currently, there are reports on the possibility of the one-stage treatment of obstructive jaundice associated with choledocholithiasis, by performing laparoscopic cholecystectomy with antegrade papillosphincteroplasty [10].

Thus, the treatment of obstructive jaundice is still a rather difficult task; many issues remain controversial and far from a final solution. There is no general consensus on the role and place of X-ray endobiliary diagnostic and treatment procedures in the treatment of obstructive jaundice, and no determined indications and contraindications for percutaneous and endoscopic interventions.

RESEARCH OBJECTIVE

The aim of our study is to analyze the results of using various methods of biliary tract decompression in patients with cholelithiasis complicated by obstructive jaundice.

MATERIAL AND METHODS

We carried out the analysis of the treatment outcomes of 446 patients with cholelithiasis complicated by obstructive jaundice. Patients underwent treatment in the period from 2006 to 2019 in the Surgical Department of the 1st City Clinical Hospital in Tashkent, which is the clinical base of the Department of Surgical Diseases of the Tashkent Medical Academy.

Among them 174 men (39.0%) and 272 women (61.0%) aged 19 to 86 years, the average age is 62.3±1.8. According to the severity of jaundice, 136 (30.5%) patients had mild jaundice, 218 (48.9%) had moderate and 92 (20.6%) patients had severe jaundice.

The Clinic mainly uses a two-stage approach in the treatment of obstructive jaundice, the first stage of which is decompression and sanitation of the biliary tract. Endoscopic retrograde intervention was the method of choice. 388 (87.1%) patients underwent multistage endoscopic retrograde transpapillary interventions. Duodenoscopy, retrograde cholangio-pancreatography followed by endoscopic papillosphincterotomy (EPST), in combination with choledocholithoextraction (CLE), were performed in 362 patients (93.3%). In all cases, CBD was sanitized and the manipulation was completed without internal drainage. 58 (13.0%) cases with multiple choledocholithiasis, in case of half conviction of proper sanitation of hepatic choledochus and cholangitis, required repeated sanitation and control retrograde intervention.

After the bile passage recovery, surgical repair of jaundice was performed by laparoscopic cholecystectomy in 359 patients (80.5%). In 29 patients (6.5%), open cholecystectomy was used with drainage of CBD via the cystic duct remnant with subsequent removal of the drainage on 14-21 days after the operation.

In 22 (4.9%) patients, if it was impossible to carry out endoscopic intervention due to the acute inflammatory process of the gallbladder, general intoxication, serious general condition, elderly and senile age, then a biliary tract decompression was performed under ultrasound control applying a cholecystostomy. After normalization of total bilirubin, and relief in the inflammatory process, we performed open cholecystectomy, and choledocholithotomy with external drainage of the choledochus according to Kehr.

36 (8.1%) patients underwent percutaneous transhepatic cholangiostomy (PTBD). Percutaneous transhepatic drainage of CBD was used in case of unsuccessful attempts to cannulate the major duodenal papilla, as well as in cases of hyperbilirubinemia increase caused by inadequate decompression of bile ducts, increase in total bilirubin over 200 mmol/L, and in the extremely ill patient, contraindicated for endoscopic, retrograde intervention.

For puncture and drainage, we used catheters and drainage systems manufactured by "MIT" and "Cook". The drains were fixed according to the Seldinger method. In case of cholangiostomy, pig tail drains with variable diameter 7/9 CH or constant diameter 9 CH made of polyethylene or polyurethane with radiopaque markers were used.

Although the interventions allowed to treat obstructive jaundice, they did not resolve the problem of choledocholithiasis and papilla stenosis. All patients in this group underwent bile passage recovery by laparotomic methods: 32 of them had double internal drainage (choledochojejunoanastomosis was formed on the Roux defunctionalized loop of jejunum in combination with EPST or transduodenal papillosphincteroplasty). The indication was the dilatation of hepaticocholedochus more than 20 mm in size. In the remaining 4 patients, after the bile passage recovery, retrograde cholangiopancreatography with EPST was performed, followed by open cholecystectomy.

In the postoperative period, general tonic and symptomatic therapy was carried out until normalization of laboratory blood parameters: total bilirubin, ALT, AST, ALP and gamma GGT, characterizing cholestasis and the degree of damage to the liver cells, depending on the severity of jaundice and the type of decompression. In addition, assessment of specific complications and mortality was carried out.

RESULTS AND DISCUSSION

The use of retrograde methods for the treatment of biliary hypertension of calculous etiology is effective in 81.2% of cases. In 22 (4.9%) patients, cholecystostomy was applied

under ultrasound control, as these patients had a serious condition with a pronounced inflammatory process. The procedure allowed to obtain relief of the inflammation process and biliary tract decompression with minimal manipulations.

Besides, in case of critically ill patients with hyperbilirubinemia and biliary intoxication, for the purpose of decompression, an antegrade drainage of the bile duct by installing PTBD was performed at the first stage. In 6.5% of cases, due to large choledocholithiasis and incomplete lithoextraction, we performed a radical surgical intervention in the scope of open cholecystectomy with choledocholithotomy with drainage of CBD. We did not use the methods of remote lithotripsy and laparoscopic choledocholithotomy due to insufficient technical support.

All decompression methods contributed to the significant decrease of bilirubinemia level (Table 1), without a statistically significant difference between the techniques. As it can be seen from the bilirubin dynamics, the highest level of bilirubinemia was observed in patients who underwent PTBD. Those patients had bilirubin level 217.22±47.19 μmol/L on admission. On the 10th day after drainage it decreased to 23.6±7.2 μmol/L.

Table 1

CBD decompression methods	**Change in bilirubin depending on the treatment method**				**Changes in CBD diameter according to ultrasound study**				
	Bilirubin on admission	Bilirubin on the first day after decompression	Bilirubin on the 5th day	Bilirubin 10th day	CBD diameter at admission	CBD diameter on the first day after decompression	CBD diameter on the 5th day	CBD diameter on the 10th day	Student's coefficient
EPST	134,6±17,34	76,3±13,38	36,4±11,04	20,4±8,3	11,1±0,7	9,7±1,0	6,3±1,2	5,2±1,3	p≤0,05
Cholecystostomy	88,1±18,8	71,4±16,31	41,8±11,22	29,6±2,44	12,9±1,1	12,2±1,4	10,1±1,2	8,3±1,0	p≤0,05
PTBD	217,22±47,19	124,8±16,31	72,1±17,47	23,6±7,2	12,9±2,0	8,1±1,3	7,4±1,1	6,2±1,2	p≤0,05

Total bilirubin in patients with CBD decompression performed by minimally invasive interventions (endoscopic retrograde interventions) on admission was 134.6±17.34 μmol/L, associated with the severity of the patient's condition. Compared to other methods, on the first day after EPST, it approached the norm and amounted to 27.4±8.3 μmol/L. On the background of high bilirubinemia, 36 (8.1%) patients required PTBD. However, despite the dosed decompression with this method, there was a sharp decrease in total bilirubin to 76.3 ± 13.38 μmol/L already on the first day after drainage. On the tenth day, it reached normal values (20.4 ± 8.3 μmol/l.).

Table 2

CBD decompre	**Dynamics of AST values change depending on the**	**Dynamics of ALT values change depending on the treatment method**

ssion methods	**treatment method**								
	ALT on admission	ALT on the first day after decompression	ALT by 5th day	ALT by 10th day	AST on admission	AST on the first day after decompression	ALT by 5th day	ALT by 10th day	**Student's coefficient**
EPST	178,4±34,33	142,6±23,18	127,1±17,32	89,2±11,43	202,1±27,3	143,9±21,87	79,2±15,47	67,4±10,45	p≤0,05
Cholecystostomy	142,2±37,22	111,6±23,31	94,7±20,53	82,7±14,17	141,2±34,22	102,7±22,62	93,8±24,22	81,4±12,74	p≥0,05
PTBD	248,7±33,21	279,5±42,27	111,4±13,43	52,4±11,23	217,9±38,31	184,3±14,24	97,3±20,21	68,2±4,13	p≤0,05

When comparing the dynamics of the hepatic enzyme ALT (Table 2), we can observe a significant decrease in values in patients with CBD retrograde endoscopic decompression from 143.9 ± 21.87 U/L on admission to 67.4 ± 10.45 U/L on the tenth day.

At the same time, we didn't observe ALT values decrease in patients with cholecystostomy on the tenth day compared to the moment of admission. Probably this was due to a pronounced inflammatory process in liver.

The highest ALT values were observed in patients with high hyperbilirubinemia, who underwent PTBD. On admission, ALT in this group of patients was 184.3±14.24 U/L. However, on the tenth day, it decreased to 68.2 ± 4.13 U/L.

When analyzing AST values (Table 2), the significant decrease of values in patients with endoscopic retrograde interventions, and in patients with cholecystostomy from 178.4±34.33 U/L to 89.2±11.43 U/L and 142, 2±37.22 U/L up to 82.7±14.17 U/L and in dynamics did not have statistically significant differences. In patients with PTBD, AST values were the highest on admission - 248.7±33.21 U/L. On the tenth day, it decreased in parallel with bilirubin to normal values and amounted to 52.4±11.23 U/L.

When analyzing the dynamics of CBD diameter according to ultrasound data (Table 1), there was a significant decrease in indicators only in patients with endoscopic retrograde interventions from 11.1 mm to 5.2 mm on the tenth day after EPST.

It also should be noted that the postoperative complications when using PTBD and cholecystostomy amounted to 2.58 and 17.92%, respectively. When using endoscopic retrograde interventions, postoperative complications were minimal and amounted to 1.6%.

CONCLUSIONS

1. When analyzing the treatment outcomes of cholelithiasis complicated by obstructive jaundice, the most optimal treatment is the two-stage approach using minimally invasive methods. The operation of choice is endoscopic retrograde intervention followed by laparoscopic cholecystectomy.
2. The study and analysis of the results of research work revealed a significant decrease in bilirubin values in all surveyed groups.
3. When analyzing the liver enzymes ALT and AST, there is a significant decrease in values

only in cases with minimally invasive retrograde endoscopic interventions and PTBD.

4. In case of high hyperbilirubinemia (over 200 μmol/L), CBD enlarged diameters and critically ill patient, contraindicated for endoscopic retrograde intervention, the method of choice for the treatment of CBD decompression is the PTBD.

REFERENCES

1. Alyanov A.L., Mamoshin A.V., Borsukov A.V., Abolmasov A.V., Muradyan V.F., Rubanik D.S. Minimally invasive interventions in the diagnosis and treatment of patients with obstructive jaundice syndrome // Herald of surgical gastroenterology. 2016. No. 3. P. 43.

2. Merzlikin N.V., Podgornov V.F., Semichev E.V., Bushlanov P.S., Talacheva V.D. Method of treatment of choledocholithiasis. // Bulletin of Siberian Medicine, 2015, Vol. 14, No. 4, P. 99-109.

3. Galperin E.I., Chevokin A.Yu. Key issues of surgical treatment of cicatricial strictures of the bile ducts. // Sechenov Bulletin. 2010; 2: 75-81.

4. Gostishchev V.K, Kirillin A.V, Vorotyntsev A.S. Differential tactics for the treatment of purulent cholangitis in patients with acute cholecystitis. // Annals of Surgical Hepatology. 2004; 9 (2): 118.

5. Styazhkina S.N., Isteeva AR, Korotkova KA, Sakhabutdinova D.R., Khasanova G.F. Actual problems of obstructive jaundice in surgery. // International Journal of Applied and Fundamental Research. 2016; (7-3): 427-430.

6. El Nakeeb A, Salem A, Mahdy Y, El Dosoky M, Said R, Ellatif MA, et al. Value of preoperative biliary drainage on postoperative outcome after pancreaticoduodenectomy: A case-control study. // Asian J Surg. 2018; 41 (2): 155-162.

7. Shabunin A.V., Tavobilov M.M. Selection of decompression bile ducts in the treatment of patients with obstructive jaundice of tumor genesis. // Pavlov Russian Bulletin of Medicine and Biology. 2016; (1): 68-74.

8. Alianov A.L., Mamoshin A.V., Borsukov A.V., Abolmasov A.V., Muradyan V.F., Rubanik D.S. Minimally invasive procedures in the diagnosis and treatment of patients with obstructive jaundice. // Bulletin of Surgical Gastroenterology. 2016; (3): 43.

9. Solovev I.A., Surov D.A., Ruhljada N.V., Dymnikov D.A., Lychev A.B., Savchenkov D.K. et al. Antegrade endobiliary intervention in the treatment of obstructive jaundice of tumor genesis. // Bulletin of National Medical and Surgical Center after the name of Pirogov. 2016; 11 (2): 44-48.

10. Berci G. The Evolution of Common Bile Duct (CBD) Stone Removal. In Principles of laparoscopic Surgery. With Foreword Lawrence W. Way. Springer. 1995. 172-174.

11. Baymakov S.R., Janibekov Sh.Sh., Yunusov S.Sh., Boltaev Sh.Sh. Improvement of the results of surgical treatment of complicated forms of acute calculous cholecystitis // New Day in Medicine. 2020; No. 2.