

Laparoscopic Choledochoduodenostomy for Treatment of Benign Common Bile Duct Strictures

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Abstract: Objective. This article presents the results of laparoscopic choledochoduodenostomy (CDD) applied to 25 patients with benign strictures of distal part of common bile duct (CBD) and its dilatation. Material and methods. 23 patients had combination of distal stricture of CBD and stones in gallbladder and CBD (2 patients -in CBD, 12- in gallbladder, 9- both in CBD and gallbladder), 2 patients had acalculous postcholecystectomy stricture. Laparoscopic CDD was performed by 5 trocars. 4 trocars were placed in the standard points for cholecystectomy, the 5-th trocar was placed by the right pararectal line at the umbilicus level and used for traction of duodenum and continuous aspiration. 2 sm length CDD was applied side-to-side by 4/0 vikryl or PDS interrupted sutures. 1, 3, 6 and 12 months after the surgery patients underwent USG examination and liver function tests, 6-12 months later endoscopic investigation to evaluate the anastomosis. Results. 23 patients underwent laparoscopic cholecystectomy and choledochoduodenostomy, 2 patients-choledochoduodenostomy only. The mean duration of operation was 127±36 min (90-205 min). There was no conversion. The mean hospital stay was 4.5 days (3- 9 days). There was no mortality. 2 patients developed an anastomotic leak. One of them underwent relaparoscopy and T- drainage, in another patient the biliary leakage ceased spontaneously. 6 – 12 months later 19 patients were examined by endoscopy. In 4 of them anastomosis was not visualized, 15 had working anastomosis 6-10 mm diameter. Thus, after 25 laparoscopic CDD executed due to benign pathologies complications were noted in 2 patients (8%), excellent and good outcome in 21 (84%) patients, poor in 3 (12%) and very poor in 1 (4%) patient. Conclusion. Laparoscopic choledochoduodenostomy performed by experienced surgeons in selected patients provides good long-term results and could be the alternative to endoscopic sphincterotomy.

Key words: Laparoscopic choledochoduodenostomy • Endoscopic sphincterotomy • Benign strictures
• Common bile duct.

INTRODUCTION

Choledochoduodenostomy (CDD) has been widely applied as a biliary-enteric bypass in case of stones, benign and malign obstructions of common bile duct (CBD). The first information about the execution of open CDD was presented by Reidel in 1892 [1] and the laparoscopic CDD in 1993 [2].

The history of the management of fibrotic strictures and obstructions of distal part of CBD could be divided to several stages. In the pre-endoscopic period the most widely-used methods for treatment of distal strictures of CBD were open biliary-enteric bypasses (CDD, choledochojejunostomy) and transduodenal sphincteroplasty. In that period the indications for CDD were determined (diameter of CBD > 12 mm, multiple

stones, impacted stone, strictures > 1- 1.5 sm length), technique of operation improved (single layer suture, side-to-side and end-to-side anastomosis, anastomosis over 2 sm length) [3]. In case of not dilated CBD and not extensive strictures the transduodenal sphincteroplasty was preferred.

Progress of laparoscopy and endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES) started the period of less invasive two-stage management of cholelithiasis complicated with choledocholithiasis and distal strictures of CBD. This two-stage strategy consists of endoscopic treatment of pathology of common bile duct and laparoscopic cholecystectomy and is accepted as a standard method of treatment in the majority of clinics [4,5]. However, the two-stage strategy has many disadvantages as well [6].

First, in 5-15% of patients ES is inexecutable or unsuccessful because of significant strictures, impacted stones, edema, previous gastric surgery, pyloric stenosis, patient's anxiety and so on [7]. Secondly, though ES is a less invasive procedure, in 10% cases some complications are noted, especially acute pancreatitis and duodenal perforation [8,9]. Thirdly, the two-stage method increases the cost and duration of treatment, for example at least 1-2 days must be waited after the preoperative ES till the laparoscopy execution [10,11].

These disadvantages of two-stage approach and increased experience of laparoscopic common bile duct exploration the interest to less invasive and one-stage intervention raised up in the recent years. Particularly, simultaneously with laparoscopic cholecystectomy and common bile duct exploration the intraoperative ES [10] and CDD [12-18] are executed. Though the one-stage laparoscopic cholecystectomy and endoscopic sphincterotomy ("rendezvous" technique) seems more attractive, in cases when ES is inexecutable the need for "old friend"'s help – choledochoduodenostomy appears. In this article we present our experience of laparoscopic choledochoduodenostomy (LCDD) operation and its results.

MATERIAL AND METHODS

The results of management of 25 patients with laparoscopically applied CDD (LCDD) during the period 1998 – 2011 have been evaluated. Information on patients is presented in the Table 1.

The indication to CDD operation was the stones and benign distal stricture of CBD and its dilatation. The distal stricture of CBD was diagnosed preoperatively by magnetic-resonance cholangiography (MRCP) in 10 patients and by intraoperative cholangiography in 15 patients.

In 23 patients the distal stricture of CBD was combined with stones of CBD and gallbladder (in 2 patients in CBD, in 12 patients in gallbladder, in 9 patients both in CBD and gallbladder), in 2 patients an acalculous postcholecystectomy stricture was found. In 1 patient CDD was executed because of periampullar tumor, results of his treatment are not included into this research. In 4 patients the preoperative ERCP was unsuccessful, in 2 patients the recurrent stricture after ES was found. The postcholecystectomy stricture was diagnosed in 2 patients (in one of them with stone, in two without stones).

Table 1: Description of patients

INDEX	RESULT
Males/females	5/20
Age	45±14 (14-72)
Stricture	2
Stricture + choledocholithiasis	2
Stricture + cholecysto-choledocholithiasis	9
Stricture + cholecystolithiasis	12
Gallbladder stone	21
Postcholecystectomy syndrome	2
Jaundice	12
Pancreatitis	4
Concomitant diseases	6
Diameter of CBD >10 mm	15
Diameter of CBD >15mm	10

The preoperative check-up was executed according to the standard protocol: clinical examination, ultrasonography, liver function and cholestasis tests, MRCP. LCDD was performed by 5 trocars. 4 trocars were placed in the standard points for cholecystectomy, the 5-th trocar placed by the right pararectal line at the umbilicus level and used for traction of duodenum and continuous aspiration. After the inspection of abdominal cavity and porta hepatis the dissection in the Calot triangle was conducted, cystic artery clipped and cystic duct separated. Cholangiography performed by catheter through the cystic duct in order to specify the strictures and other pathology of CBD. The width of CBD over 1 sm, absence of contrast passage into the bowel, absence of ampoule's peristalsis with the presence of its stricture was accepted as the indication for CDD application. After the longitudinal 2 sm incision of supraduodenal part of CBD stones were washed out or evacuated by the basket. Choledochoscopy was conducted for CBD inspection routinely lately. 2 sm length CDD was applied side-to-side by separate sutures 4/0 vikryl or PDS. Operation was finished by cholecystectomy and drainage of the anastomosis area.

After 1, 3, 6 and 12 months the patients were examined by ultrasonography, liver function tests and an endoscopy was performed after 6 – 12 months in order to inspect the anastomosis. The long-term results of management were evaluated as perfect (normal findings of clinical, laboratory, ultrasound and endoscopic examinations), good (no signs related to the operation, minor gastro-intestinal complaints are present), poor (complaints are present, examination reveals the reflux or signs related to the CBD stump) and very poor (continuous complaints, recurrent stones or stricture are revealed, repeated intervention is necessary).

RESULTS

Twenty five patients underwent laparoscopic choledoco-duodenostomy, of wich 23 patients underwent laparoscopic cholecystectomy and choledochoduodenostomy, 2 patients- only CDD (Table 2). The duration of operation was 128±36 minutes mean (90 – 205 minutes). There was no conversion. Hospital stay was 4.5 days mean (from 3 to 9days, case with serious complications are excluded). There was no mortality. Repeated pain after the food intake was noted in 1 patient during 3 months, reflux gastritis in 1 and cholangitis signs in 2 patients. These complications were treated conservatively. Recurrent stone was observed in one patient, which treated by open hepatico-jejunostomy.

Anastomotic leak occurred in 2 patients. One of them had 30-70 ml biliary fluid discharge from the subhepatic drainage during first 2 days, ceased spontaneously.

Another patient (major leak) had signs of peritonitis and sepsis since the first day, ultrasonography revealed the fluid in abdominal cavity. After 36 hours the re-laparoscopy was conducted, defect of 1/3 of anastomosis detected and T-shape tube inserted. A phlegmon of the right abdominal wall developed in this patient in next days and stripe incisions were applied. The patient was discharged from the hospital after 28 days in stable condition, T-shape tube removed after 45 days.

19 patients after 6- 12 months underwent the endoscopic investigation. In 4 of them anastomosis was not visualized, in 15 found 5-10 mm length functioning anastomosis (Fig. 1).

Elevation of cholestatic enzymes after 6 months was noted in 2 patients, after 1 year in 1 patient.

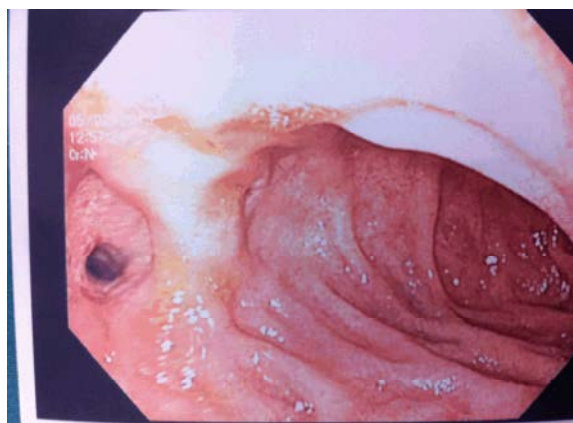


Fig. 1: Endoscopic view of laparoscopically performed choledochoduodenostomy after 6 month.

Thus, after 25 laparoscopic operations of CDD application due to benign pathologies complications were observed in 2 patients (8%), perfect and good result noted in 84% of patients, poor in 3 (12%) patients (reflux, cholangitis), very poor in 1 (4%) patient (recurrent stones) and there was no mortality.

DISCUSSION

In the period before the endoscopy CDD was widely used for biliary bypass in patients with CBD stones, distal strictures, malign obstructive jaundice and CBD dilatation. After the appearance and wide application of ERCP the endoscopic papillotomy became a standard method of management for stones and distal strictures of CBD [4]. Particularly, in case of combination of gallbladder stones and choledocholithiasis or stricture the most widespread approach was the two-stage intervention, consisted of pre- or postoperative ERCP + ES and laparoscopic cholecystectomy [5]. Currently this approach is accepted as the method of choice of initial treatment in postcholecystectomy strictures and stones and is successful in 80-95% cases [4]. However, the cases unsuitable for ERCP (extensive strictures, impacted stones, difficult cannulation, previous gastric surgery, anxiety of patient), risk of complications (perforation, pancreatitis etc), the necessity of two-stage management in concomitant gallbladder stones gives the premise for alternative methods search [7]. In the recent years the interest to one-stage laparoscopic interventions in cholecystolithiasis and strictures of CBD has grown [12-18].

Though CDD is accepted as technically simple and providing good early results operation, there is some

Table 2: Operations and postoperative results

INDEX	RESULT
Laparoscopic cholecystectomy + CDD	23
Laparoscopic CDD	2
Duration of operation	127±36 min (90-205 min)
Hospital stay	4.5 days (3-9)
Minor leak of anastomosis	1
Major leak of anastomosis	1
Postoperative cholangitis	2
Abnormal liver function tests after 6 months	2
Abnormal liver function tests after 1 year	1
Postoperative endoscopy (6-12 months)	19
Anastomosis is open	15
Anastomosis is closed	4
Chronic pain	1
Recurrent stone	1
Reflux gastritis	1

concern among surgeons about such complications as reflux cholangitis, reflux gastritis, distal stump problem. However, the previous and recent studies has shown that even open CDD remains a relatively safe and effective surgical option for the treatment of obstructive jaundice in both benign and malignant disease [19,20]. In one study after open CDD overall hospital morbidity was 13% with zero mortality, after a mean follow up of 7.8 years, 96.3% patients had 'good' or 'fair' and 3.7% experienced 'poor' results [21]. Most of studies reported laparoscopic choledochoduodenostomy as a useful technique in patients with benign and refractory common bile duct obstruction with low morbidity (3,7-13%) and mortality (0-5,6%), high stone clearance rate (90-100%) and good long term (80-100%) results [12-18].

According to our study the long-term results of laparoscopic CDD could be evaluated as satisfactory, however the operation itself has some complications. Particularly, the rate of cholangitis, reflux gastritis, choledocholithiasis is not very high and 84% patients show perfect and good results of treatment.

The small series and absence of randomized clinical trials do not permit to clarify adequately the value of LCDD in the management of benign biliary pathology. Medline database search shows 12 researches and total of 162 LCDD for management of benign CBD obstruction. Future studies are needed for this purpose. But it is clear that when ERCP+ST has failed LCDD remains a very useful tool for management of CBD obstruction with good early and long-term results.

CONCLUSION

Laparoscopic choledochoduodenostomy performed by experienced surgeons in selected patients provides good long-term results and could be the alternative to endoscopic sphincterotomy.

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