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Original Research Paper

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PRIMARY CLOSURE OF COMMON BILE DUCT AFTER STONE EXTRACTION FROM CBD IN OPEN LAPOROTOMY IN REMOTE AREA.

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ABSTRACT Primary closure of common bile duct is a safe procedure following common bile duct exploration without T-tube drainage. Aim of this study is to investigate long-term results of primary choledochorrhaphy. T tube drainage following CBD exploration has been a gold standard for a long time now. This has its own problems, mainly prolonging hospital stay and leakage around T-tube. This study was designed to assess the outcome of primary repair of CBD in terms of operating time, duration of hospital stay and postoperative complications(1). Our results indicate that the hospital stay is reduced to half in cases with primary closure and there were no significant complications resulted in primary closure cases. On the basis of the experience of open CBD exploration, T-tube drainage has been widely adopted in the past two decades. However, T-tube drainage has many problems, such as fluid and electrolyte disturbance, sepsis, premature dislodgement, bile leakage, prolonged biliary fistula, late bile duct stricture, and possible peritonitis after removal of the T-tube . These complications and the need of satisfactory follow-up cholangiography prolonged the hospital stay and increased hospital expenses.

KEYWORDS :

INTRODUCTION

Primary closure is a usual procedure following exploration of common bile duct. In 1917, Halstead first reported primary closure of common bile duct , draining the biliary tree through the cystic duct remnant(2). Shortly thereafter, any form of biliary tube drainage was abandoned in favor of a simple drain placed along side of the common bile duct. Primary choledochorrhaphy was favored by many authors in the past, while recently, in laparoscopy's era, its safety and effectiveness regained attention. Primary duct closure after open CBD exploration was first described by Halstead as early as 1917. Since then, the debate between primary closure and T-tube drainage continued even in the era of laparoscopic surgery. In the past decade, numerous studies comparing primary with T-tube were published and revealed the feasibility and safety of primary closure. Meta-analysis form Yin demonstrated that among patients with laparoscopic choledochotomy for CBD stones, primary closure of the CBD alone is superior to T-tube drainage in terms of postoperative and biliary-specific complications(3).

Although common bile duct exploration can be followed by closure of common bile duct around a T-tube, primary closure of common bile duct, or choledochoduodenostomy, we do not, in this study, attempt to compare different choledochotomy closure techniques, but to present long-term results of primary choledochorrhaphy in patients treated in our department and peripheral set up(4).

PATIENTS AND METHODS

From 2014-2019, common bile duct exploration with primary closure of the duct was performed in 49 patients with cholelithiasis and choledocholithiasis with common bile duct round worm. 35 were female (71.4%) while 14 were male (28.5%). Their age ranged from 32 to 67 years . Cholecystectomy was followed by a approximately 2-cm longitudinal choledochotomy in all patients. Exploration of common bile duct and removal of ductal stones were performed using choledocholithotomy forceps, and irrigation with normal saline through simple rubber cather. Choledochorrhaphy was performed using interrupted 2-0 absorbable sutures. A closed suction drain was always positioned.

In our institution, the indications for primary closure following open CBD exploration are as follows: (1) CBD stones are confirmed by preoperative USG or MRCP with no intrahepatic bile duct stone; (2) The diameter of CBD is more than 1 cm; (3) No obvious inflammatory changes of CBD are detected intra operatively.Two patient were accidentally detected common bile duct stone, during routine palpation of common bile duct at the time of cholecystectomy. Patients with previous biliary surgery history or converted to open surgery were excluded from this study in our institution.

The definition of bile leakage was ,patients with drainage tube, bile was detected in the drainage for more than 3 days or the volume of drainage containing bile and serous fluid was more than 200 ml/day.

RESULTS

Out of 49 patients operated, 33 had multiple intra-ductal calculi, in nine a single stone was found in the common bile duct and in 4 patients the common bile duct was filled by sludge, while in 3 patients round warm was found in CBD. Operative findings are summarized in Table I

Table 1 Operating findings

n=49

	no of patient
Common bile duct contents	
multiple stones	33(67%)
single stone	9(18.3%)
biliary sludge	4(8.1%)
CBD worm	3(6.1%)
CBD diameter	
1-1.5	7(14.2%)
>1.5	42(85.7%)
Length of choledochotomy	1.5 +/- 1 cm

Postoperative complications are analyzed in Table II.

Table 2 Post operative complication

n=49

	No of patients
Post operative bile leakage	9(18.3%)
(more than 3 days)	
Naso gastric sucction	11(22.4%)
(more than 24 hours but	
less than 48 hours)	
Post operative haemorrhage	0

Duration of abdominal drain	
(more than 3 days	7
but less than 5 days)	
(more than 5 days but	2
less than 7 days)	
Wound infection	8(16.3%)
Pulmonary infection	2(4%)
Urinary infection	3(6.1%)
Retained stones	0
Biliary stricture	0
Stone recurrence	0

Prolonged (>72h) bile leakage from suction drain was recorded in seven patients, but in none of them lasted more than 7 days(5).

Possible risk factors

Possible risk factors for bile leakage after primary closure following open CBD exploration are divided into three groups: demographic factors, preoperative condition and surgical details.

Demographic factors: (1) age; (2) sex; (3) ASA score.

Preoperative condition: (1) serum leukocytes; (2) total bilirubin; (3) diameter of CBD; (4) No. of gallstone, (6) size of stones.

Surgical details: (1) operative time; (2) total blood loss; (3) method of suture; (4) length of choledochotomy; (5) surgeon's experience.

The questionnaire regarding long-term complications was answered by 36 patients (73.4%).Seven patients could not be located, while 6 had been outside of state for job. Out of the patients reached, sixteen patients (18.3%) complained abdominal symptoms. Twelve had epigastric pain in the right upper abdominal quadrant, while 12 with mild dyspepsia and bloating with epigastric pain. These patients were called for clinical evaluation .All are treated with PPI and antacid , most of them respond with drugs. Liver function tests were normal in all patients, while ultrasonography of biliary tree revealed no obvious pathology. Consequently, there was no clinical, biochemical or ultrasonographic evidence permitting us to attribute symptoms to biliary pathology. Primary closure seems a safe procedure with no major postoperative complications or functional long-term sequelae.

DISCUSSION

Primary closure of common bile duct following choledochotomy and common bile duct exploration is a well known surgical procedure. Postoperative cholangiography for detection of retained calculi is not possible after primary closure and this is considered as a disadvantage. Compared to choledochorrhaphy using T-tube drainage of bile duct or to choledochoduodenostomy, primary closure represents a safe, less expensive alternative with fewer postoperative complications and shorter hospital stay. To accomplish a safe primary choledochorrhaphy, four strict criteria, stressed by Mayo in 1923, Mirizzi in 1942 and Edwards in 1952, must be met. These four requirements for a safe and successful primary closure of common bile duct are a patent Vater's ampulla, complete removal of all intraductal calculi, absence of pancreatic pathology and meticulous suture of the duct. In order to complete these criteria, most authors routinely use intraoperative cholangiography and choledochoscopy(6) . Nevertheless, retained calculi after common bile duct exploration are referred in the literature to range from 0 to 7.5%. . Respect to meeting the above mentioned requirements, before proceeding to primary closure of common bile duct, is probably explaining absence of retained calculi, low morbidity and mortality, and excellent long-term results in our series. Evaluation of symptomatic patients in our series consisted of clinical examination, liver function tests and ultrasonography of biliary tree. MRCP was not considered necessary as symptoms were mild, liver function tests were normal and ultrasonographic findings revealed no underlying pathology. Besides, use of MRCP would increase the cost of the study without adding any new important information but a possible anatomic stenosis of common bile duct with no functional consequences.

Recently, laparoscopic common bile duct exploration and endoscopic sphincterotomy became popular in treating choledocholithiasis, while routine use of the latter tends to minimize indications of open common bile duct exploration. Endoscopic sphincterotomy in experienced centers reaches success rates of over 85%, needs shorter hospital stay, is relatively painless, offers faster return to normal activity and is generally less expensive. In a more recent study, though, these advantages are challenged and mini-cholecystectomy followed by open exploration and primary closure of common bile duct is considered more attractive in terms of cost-effectiveness. Meanwhile, endoscopic sphincterotomy represents with no doubt the gold standard in treating patients with retained or recurrent calculi after cholecystectomy with or without common bile duct exploration and patients with toxic cholangitis, or acute calculus pancreatitis. On the other hand, laparoscopic common bile duct exploration, through cystic duct remnant or after choledochotomy, is increasingly performed lately, with success rates of 85 to 90%(7). Its success rates depend on the number, location and size of intraductal calculi, while its performance is complicated in cases of biliary tree anatomic variations or forceful cystic duct dilation.

Choice of surgical, endoscopic or laparoscopic removal of intraductal calculi must be individualized based on experience of the treating center. Endoscopic and laparoscopic removal demands special equipment and great surgical or technical experience to be safely performed. On the other hand, open exploration followed by primary closure of common bile duct represents a safe alternative in centers where experience or required equipment for endoscopy or laparoscopy is lacking(8).

Conclusively, we can claim that primary closure after common bile duct exploration represents a safe alternative to endoscopic or laparoscopic removal of intraductal calculi as it presents excellent long-term results in relation to very low to null rates of retained calculi reported in the literature as well as in our series. We can therefore safely suggest its use in hospitals lacking the required experience or equipment to perform endoscopic sphincterotomy or laparoscopic exploration of common bile duct.

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