

Primary closure of common bile duct – Long-term results

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Citation

S Rafailidis, K Ballas, N Symeonidis, T Pavlidis, K Psarras, G Marakis, A Sakadamis. *Primary closure of common bile duct – Long-term results*. The Internet Journal of Surgery. 2009 Volume 23 Number 2.

Abstract

Background: Primary closure of common bile duct is a safe procedure following common bile duct exploration. Aim of this study is to investigate long-term results of primary choledochorrhaphy. Patients – Methods: Between 1982 and 1990, 152 patients underwent common bile duct exploration followed by primary closure of common bile duct. Their age ranged from 20 to 87 years. A dilated common bile duct (>1.2cm) was found in 105 patients. To study long-term results, a specially developed questionnaire was answered by all patients reached by phone. Any symptoms referred were carefully recorded and symptomatic patients were called for re-examination. Results: There were no major complications related to primary choledochorrhaphy. The questionnaire was answered by 129 patients. Abdominal symptoms were referred by 12 patients who were re-examined. No obvious pathology of biliary tree was revealed by clinical examination and laboratory work-up. Conclusion: Primary closure of common bile duct is a safe alternative of common bile duct restoration following exploration for lithiasis, with good results in long-term follow-up.

INTRODUCTION

Primary closure is a usual procedure following exploration of common bile duct. In 1917, Halstead first reported primary closure of common bile duct⁽¹⁾, draining the biliary tree through the cystic duct remnant. 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⁽²⁻⁶⁾.

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.

PATIENTS AND METHODS

From 1982 to 1990, common bile duct exploration with primary closure of the duct was performed in 152 patients with cholelithiasis and suspected choledocholithiasis. Eighty-eight were female (57.9%) while 64 were male (42.1%). Their age ranged from 20 to 87 years (mean age

61.9±14.15). Cholecystectomy was followed by a 2-cm longitudinal choledochotomy in all patients. Exploration of common bile duct and removal of ductal stones were performed using Fogarty catheters, grasping forceps, irrigation or stone baskets. Choledochoscopy was routinely performed in all patients to verify absence of retained calculi. Choledochorrhaphy was performed using interrupted 4-0 absorbable sutures. A closed suction drain was always positioned.

To study long-term results patients were retrospectively reached by phone. They were asked to answer a specially developed questionnaire regarding surgery-related complications. Specific questions on certain symptoms like abdominal pain, bloating, dyspepsia, fever, chills or jaundice, and their time of appearance after surgery were addressed to the patients reached. The questionnaire was preformed, the patients were interviewed by experienced surgeons and when finished, they were asked more generally to refer potential complaints which were carefully recorded and evaluated. Time between surgery and answering of the questionnaire ranged from 15 to 23 years. All patients referring any symptoms like pain in the right upper abdominal quadrant, bloating, dyspepsia, fever or jaundice in any combination and at any time after surgery were called

for clinical evaluation, comprising clinical examination, blood tests (especially evaluation of hepatic function) and ultrasonography.

RESULTS

Out of 152 patients operated, seventy-two had multiple intraductal calculi, in fifty-nine a single stone was found in the common bile duct and in five patients the common bile duct was filled by sludge, while in sixteen no calculi were found during meticulous exploration. Operative findings are summarized in Table I.

Figure 1

Table I: Operative findings (n=152)	
	Number of patients (percentage)
Common bile duct contents	
Multiple calculi	72 (47.4%)
Single stone	59 (38.8%)
Sludge	5 (3.3%)
No calculi	16 (10.5%)
Common bile duct diameter	
≤1.2 cm	47 (30.9%)
>1.2 cm	105 (69.1%)

Postoperative complications were noted in twelve out of 152 patients (7.9%) and are analyzed in Table II.

Figure 2

Table II: Postoperative complications (n=152)	
	Number of patients (percentage)
Prolonged (>48h) bile leakage	7 (4.6%)
Subphrenic abscess	1 (0.65%)
Urinary infection	1 (0.65%)
Wound infection	1 (0.65%)
Pulmonary atelectasis	1 (0.65%)
Cardiac failure (death)	1 (0.65%)
Total	12 (7.85%)

It must be mentioned at this point, that one death reported is attributed to cardiac failure and is therefore unrelated to the surgical procedure used. Prolonged (>48h) bile leakage from suction drain was recorded in seven patients, but in none of them lasted more than 7 days, and a patient with subphrenic abscess needed a second operation, from which he recovered uneventfully.

The questionnaire regarding long-term complications was answered by 129 patients (84.86%). Five patients could not be located, while eighteen had deceased meanwhile from unrelated diseases. Out of the patients reached, twelve (9.3%) mentioned abdominal symptoms. Five had postprandial pain in the right upper abdominal quadrant, while seven referred mild dyspepsia and bloating. These

patients were called for clinical evaluation. Hepatic 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⁽⁷⁻⁹⁾.

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^(8,18,19). 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⁽¹²⁾. Nevertheless, retained calculi after common bile duct exploration are referred in the literature to range from 0 to 7.5%^(3,10,13-18). In our series, choledochoscopy was performed intraoperatively in all patients and helped us to exclude presence of retained calculi. 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⁽¹⁰⁾. In a more recent study, though⁽³⁾, 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⁽¹⁰⁾ and patients with toxic cholangitis⁽¹⁹⁾, or acute calculus pancreatitis⁽²⁰⁾. 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%. 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^(21,22,23).

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.

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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