ORIGINAL ARTICLE

ROLE OF CHOLEDOCHODUODENOSTOMY REVISITED IN THE ERA OF MINIMAL INVASIVE PROCEDURES

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Background: Present era of endoscopic and laparoscopic approaches have revolutionized surgical management of Common Bile Duct (CBD) stones. Open procedures like Choledochoduodenostomy (CDD) have become a rarity but are not completely obsolete. It may be considered a relatively safe alternative when dealing with recurrent, too large or impacted stones, a failed ERCP, and CBD stricture with stones. The aim of this study was to establish safety, efficiency, cost effectiveness and easy availability of CDD in selected patients. Methods: In this observational study, the outcome of 90 consecutive patients undergoing CDD between 1st January 1995 and 31st Dec, 2016 in surgical unit C, Ayub Medical Complex, Abbottabad was reviewed. Choledochoduodenostomy was offered to patients who refused or had a failed ERCP and when CBD size was more than 1cm. Common Bile Duct was anastomosed to Duodenum using standard technique. Results: Medical records of 90 patients (age range 34–96 years) were reviewed; 5 were excluded and 85 were included in the study. Complication rate was 31.76% (n=27) including respiratory complications in 16.47% (n=14), wound infection in 10.6% (n=9), anastomotic leak in 2.35% (n=2) and Cholangitis in 1.18% (n=1) and Mortality in 1.18% (n=1). There was no evidence of Sump Syndrome. Total cost of procedure was Rs.50 as admission fee, which included daily provision of food and there were no room charges. **Conclusion:** Choledochoduodenostomy is a safe procedure, with fewer complications and significantly low cost. In case of ERCP failure, CDD is recommended.

Keywords: Choledochoduodenostomy; Failed ERCP; Open Surgery; Safe; Sump Syndrome; Reflux Cholangitis

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INTRODUCTION

Common Bile Duct stones usually occur as a complication of cholelithiasis[1,2] with an incidence rate of 7–20%[2–5]. Rarely, it can occur primarily due to infection and stasis.[6,7] Treatment aims at complete elimination of stones, removal of cause of stone formation and ensuring/establishment of free drainage of the CBD. Retained stones may require revision surgery or procedure, thereby increasing overall morbidity and mortality, especially in older age group.[7–9]

The advent of minimally invasive techniques such as endoscopy and laparoscopy has revolutionized the management of bile duct stones. Presently, endoscopic sphincterotomy followed by laparoscopic cholecystectomy is a common practice to deal with CBD stones and is considered gold standard.[10,11] Nevertheless, ERCP may fail to eliminate CBD stones. It is relatively expensive and in our healthcare setup, it is not uniformly available. Other treatment options are open bile duct exploration or laparoscopic cholecystectomy combined with laparoscopic common bile duct exploration (LC+LCBDE). The latter requires skilled personnel and expensive equipment.[11,12]Among the open biliary surgeries, Choledochoduodenostomy (CDD) remains one of the useful alternatives despite the small risk of reflux Cholangitis and Sump Syndrome (5%).[13] The rate of retained stones is less as compared to ERCP, thus revision surgeries are usually not required.[14] This operation is indicated in patients with recurrent stones, big stones and CBD strictures with stones. In our scenario, a number of patients opted for the open procedure to avoid expenditure, travel and other inconveniences. Long-term results of the operation generally suggest that it is a safe procedure that may be considered in selected cases of Choledocholithiasis.[14] This study was done to evaluate the outcome of CDD in terms of safety, efficacy and cost effectiveness in today's era of endoscopic interventions in selected patients.

MATERIAL AND METHODS

This observational study was conducted at Surgical Unit C, Ayub Medical Complex Abbottabad (previously Department of Surgery DHQ Abbottabad) from 1st Jan 1995 to 31st Dec, 2016. Patients who presented with obstructive jaundice due to stones in CBD and refused ERCP, had failed ERCP, very large (>1.5 cm) or multiple CBD stones,

recurrent stones, barrel shaped stones and impacted stones were offered CDD provided the size of CBD was more than 1 cm. Patients with incomplete medical records, those lost to follow-up, CDD for malignant diseases, Re-do surgeries, and concomitant stones in CBD with malignancy or other pathologies were excluded from the study. Informed consent was obtained.

In all cases, abdomen was approached by generous extended Kocher's incision followed by cholecystectomy if not done previously. CBD was delineated and duodenum Kocherized. Choledochotomy was done by making a vertical incision of 2.5 cm in lower end of CBD and 2 stay sutures of silk 2/0 placed. CBD was cleared of stones and debris thoroughly and its lower end was dilated with Beck's dilator. A transverse incision of 2.5 cm was made in superio-anterior aspect of duodenum that was in proximity to CBD. The two openings were anastomosed with a single layer of interrupted, Silk 2/0 sutures, creating a side-to-side Choledochoduodenostomy. All the knots were kept on the outside. A large-bore drain was placed. NG tube was kept for 5–6 days. Patients were managed in the surgical ward usually till 6–7th post-op day. All the patients were reviewed at 10 days, 1/12, 3/12 and 6/12 and thereafter yearly. By 3/12, patients were shifted to full normal diet. Patients coming back with any complaints were fully investigated for late complications. All the data was recorded on a predesigned pro forma.

RESULTS

During this study period, the records of 90 consecutive patients who underwent CDD were reviewed: 3 were lost to follow-up, 2 had incomplete records. These 5 patients were excluded: 85 were included in the study. Out of these 30.59% were males (n=26) and 69.41% were females (n=59). Age range was from 34 to 96 years with mean age being 48.01. The most common indication was failed E.R.C.P in 37.65% (n=32), followed by 28.24% patients (n=24) who refused ERCP due to cost and out of city travel inconvenience. 17.65% had recurrent stones (n=15).8.24% had missed stones (n=7), 5.88% (n=5) had very large stones that could not be retrieved endoscopically.

Stricture at ampulla and CBD confused with choledochal cyst due to large size accounted for 1.18% each (n=1) (Figure-1). Drain was taken out after about 2–3 days in all patients as drainage was nil except for 2 patients in whom it was kept for a prolonged period of 7 days due to continuous drainage of serous discharge. Patients were reviewed clinically in O.P.D on day 10, then 1, 3 and 6 months and thereafter yearly. Lab investigations were ordered when indicated. Complication rate was 31.76% (n=27) including respiratory complications in 16.47% (n=14), wound infection in 10.59% (n=9), anastomotic leak in 2.35% (n=2) and Cholangitis in 1.18% (n=1) and mortality in 1.18% (n=1). There was no evidence of Sump Syndrome. All the patients were managed conservatively.

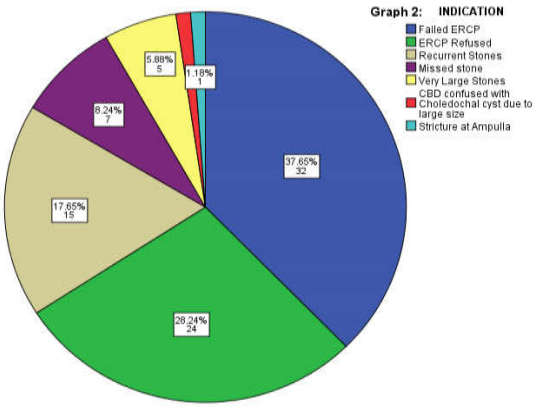

Figure-1: Indication for choledochoduodenostomy

DISCUSSION

Cholelithiasis occurs in 10–15%[1] of adults. It may lead to complications in up to 3–5% per year[2–5]: slipping of stones into the common bile duct leading to Cholangitis and obstructive jaundice being one of the major complications.[2–4] The incidence of choledocholithiasis in patients undergoing cholecystectomy for gall stones is about 10–20%.[2–5]

Rarely choledocholithiasis may occur de-novo without evidence of gall stones.[6,7] Early treatment of Choledocholithiasis is required to avoid further complications like Cholangitis, pancreatitis etc.

Minimal invasive techniques (Lap chole with lap CBD exploration OR ERCP followed by Lap chole) revolutionized the treatment of gall stones and CBD stones. ERCP with sphincterotomy followed by Lap cholecystectomy, being safe and effective, is the standard for choledocholithiasis.[10,11] However, expertise and equipment for such minimally invasive procedures may not be available in some parts of the world and if available, may be expensive, as was the case in our setup. During our study period, ERCP was available at another larger centre in another city and required referral. Some of our patients could not afford the cost of travel and procedure which was approximately Rs. 40,000 as compared to Choledochoduodenostomy for which the cost was

Rs.50. (which was totally free in our public-sector hospital)

Complication rate of ERCP is variously reported at 0.9–13% with retained stones/failed procedure, recurrent stones, CBD stricture, perforation and other similar complications accounting for 3–12 %.[8]

In such cases re-do ERCP may be considered. However, open surgical techniques like CBD exploration and Choledochoduodenostomy present a useful alternative.

Riedel was the first to perform Choledochoduodenostomy in 1888 but it was not reported until 1892. Sasse recommended its use routinely in patients with common duct stones to preclude the retention of an "overlooked" or residual stone.[15]

A small but significant risk of reflux Cholangitis and sump syndrome which is variously reported around 2.5%[13,14] has set barriers in wider acceptance of choledocholithiasis. In CDD the bile does not drain through the usual path i.e. the distal common bile duct to duodenum. Instead the flow is through the surgically fashioned stoma. Consequently, the CBD distal to anastomosis transforms into a poorly drained reservoir, making this so-called "sump" prone to accumulation of debris from bile stasis. Moreover, the reflux of duodenal contents into this part of CBD further results in bacterial overgrowth[13] rendering patients prone to infection and inflammation of CBD, (i.e., ascending Cholangitis).[13,14]

A few factors have to be considered to avoid sump syndrome. The proper functioning of sphincter of Oddi is of paramount importance as it ensures adequate drainage of bile and enteric contents into duodenum.[16,17] The CDD stoma should be as low as possible with size measuring at least 2.5 cm.[17] Sphincter should be dilated with Bake's dilator of up to 3mm.[18] It's difficult to fashion an adequate stoma if CBD size is less than 1 cm thus was one of our exclusion criteria.

The study conducted by Martin DJ *et al*[19] concludes that CDD is superior to ERCP in clearing CBD stones. Our study results so far have been encouraging as there was a single case of Cholangitis and no evidence of Sump Syndrome. Other complications like chest, wound etc were comparable to any general surgical procedure complications. All complications could be managed conservatively. There was only a single operation related mortality and re-do surgery was not required in any case.

Therefore, CDD may not be considered obsolete as it still has important place in this fairly advanced era of laparoscopy and endoscopy.

CONCLUSION

CDD is a safe, cheap and effective method of decompressing the distal common bile duct. It may be performed at any general surgical unit.

AUTHORS' CONTRIBUTION

SA: Data collection, literature search. BG: Data collection. ZQ: Proof reading, data interpretation. SA: Data collection, proof reading. ZH: Literature search, data collection, analysis, interpretation and write-up. IUDK: Data analysis, interpretation & proof reading.

REFERENCES

1. Canena J. Once upon a Time a Guideline Was Used for the Evaluation of Suspected Choledocholithiasis: A Fairy Tale or a Nightmare. GE Port J Gastroenterol 2018;25(1):6–9.
2. Magalhães J, Rosa B, Cotter J. Endoscopic retrograde cholangiopancreatography for suspected choledocholithiasis: From guidelines to clinical practice. World J Gastrointest Endosc 2015;7(2):128–34.
3. Ghazal AH, Sorour MA, El-Riwini M, El-Bahrawy H. Single-step treatment of gall bladder and bile duct stones: A combined endoscopic–laparoscopic technique. Int J Surg 2009;7(4):338–46.
4. Sarli L, Pietra N, Franzé A, Colla G, Costi R, Gobbi S, *et al*. Routine intravenous cholangiography, selective ERCP, and endoscopic treatment of bile duct stones before laparoscopic cholecystectomy. Gastrointest Endosc 1999;50(2):200–8.
5. Gollan JL, Bulkley GB, Diehl AM, Elashoff JD, Federle MP, Hogan WJ, *et al*. NIH Consensus conference. Gallstones and laparoscopic cholecystectomy. JAMA 1993;269(8):1018–24.
6. Kim DI, Kim MH, Lee SK, Seo DW, Choi WB, Lee SS, *et al*. Risk factors for recurrence of primary bile duct stones after endoscopic biliary sphincterotomy. Gastrointest Endosc 2001;54(1):42–8.
7. Konstantakis C, Triantos C, Theopistos V, Theocharis G, Maroulis I, Diamantopoulou G, *et al*. Recurrence of choledocholithiasis following endoscopic bile duct clearance: long term results and factors associated with recurrent bile duct stones. World J Gastrointest Endosc 2017;9(1):26–33.
8. Trikudanathan G, Navaneethan U, Parsi MA. Endoscopic management of difficult common bile duct stones. World J Gastroenterol 2013;19(2):165–73.
9. Nzenza TC, Al-Habbal Y, Guerra GR, Manolas S, Yong T, McQuillan T. Recurrent common bile duct stones as a late complication of endoscopic sphincterotomy. BMC Gastroenterol 2018;18(1):39.
10. Bektas H, Duzkoylu Y, Cakar E, Buyukasık K, Colak S. Giant choledochal calculosis: surgical treatment. N Am J Med Sci 2014;6(10):536–9.
11. Berthou JC, Drouard F, Charbonneau P, Moussalier K. Evaluation of laparoscopic management of common bile duct stones in 220 patients. Surg Endosc 1998;12(1):16–22.
12. Berci G, Morgenstern L. Laparoscopic management of common bile duct stones. Surg Endosc 1994;8(10):1168–75.
13. de Aretxabala X, Bahamondes JC. Choledochoduodenostomy for common bile duct stones. World J Surg 1998;22(11):1171–4.
14. Malik AA, Rather SA, Bari SU, Wani KA. Long-term results of choledochoduodenostomy in benign biliary obstruction. World J Gastrointest Surg 2012;4(2):36–40.
15. Aramaki M, Ikeda M, Kawanaka H, Nishijima N, Tsutsumi N, Kano T. Choledochoduodenostomy: simple side□to□side anastomosis. J Hepatobiliary Pancreat Surg 2000;7(5):486–8.

16. Abraham H, Thomas S, Srivastava A. Sump Syndrome: A Rare Long-Term Complication of Choledochoduodenostomy. Case Rep Gastroenterol 2017;11(2):428–33.
17. Qadan M, Clarke S, Morrow E, Triadafilopoulos G, Visser B. Sump syndrome as a complication of choledochoduodenostomy. Dig Dis Sci 2012;57(8):2011–5.
18. Block MA, Brush BE, Ponka JL, Chepeau A. Stenosis of the sphincter of Oddi as a cause of jaundice. AMA Arch Surg 1958;76(6):888–94.
19. Martin DJ, Vernon D, Toouli J. Surgical versus endoscopic treatment of bile duct stones. In: The Cochrane Collaboration, editor. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2006.

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