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Original Research Article

Study on 60 cases of common bile duct stone, there different modality of management and its inference

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ABSTRACT

Background: The aim of the study was to determine the best treatment modality for common bile duct stone become more challenging as large number of options available such as endoscopic, laparoscopic or open surgical methods, we need to choose specific therapy according to patient's clinical conditions, and individual expertise.
Methods: It is prospective study including 60 patient having common bile duct stone along with gall bladder stone, its different modality of management and its inference, conducted in Bhopal Memorial Hospital and Research Centre, Bhopal, during period of January 2017 to January 2020.
Results: In 60 cases 41 patients undergoes to endoscopic retrograde cholangio pancreatography (ERCP) first, stone successfully removed in 34 patients and stent placed, one patients developed pancreatitis after ERCP, managed conservatively, In 6 patients retained stone after ERCP procedure, one patients developed surgical emphysema after procedure, managed with ICD and conservatively, and one patient had bleeding during sphincterotomy so its procedure abandoned and one of the patient failed to cannulate common bile duct (CBD). 21 patients undergo laparoscopic common bile duct explorations, 2 lap CBD exploration converted to open CBD exploration with cholecystectomy, due to adhesion at hepatocystic triangle. Five patients undergoes open CBD exploration, in one patient hepaticojejunostomy was done as patient was having CBD stone with stricture. No mortality during and after procedure.
Conclusions: Management of CBD stone is depends upon individual expertise and available modality. If surgeons are expertise then lap CBD exploration with cholecystectomy without attempting to ERCP guide stone removal is best approach in majority of patients.

Keywords: Common bile duct stone, Laparoscopic CBD exploration

INTRODUCTION

The incidence of choledocholithiasis in patients undergoing cholecystectomy varies with age, ranging from 6% in patients younger than 80 years of age to 33% in patients older than 80 years.[1] It is estimated that 5% to 12% of patients with choledocholithiasis may be completely asymptomatic, with normal liver function tests.[2–5] Most CBD stones originate from the gallbladder, and only a small percentage of patients develop CBD stones de novo.

The evaluation and treatment of choledocholithiasis has evolved over the 100 years. As newer and less invasive techniques emerge, the surgeons will find a variety of options that can lead to the successful treatment of a patient with CBD stones. The diagnosis of choledocholithiasis cannot be made on the basis of

history, physical examination, and laboratory investigations alone. Moreover, the distinction between the symptoms of bile duct stones and gallbladder stones often is difficult. Increasing age, history of fever, cholangitis, and pancreatitis are risk factors for bile duct stones, whereas elevations of serum bilirubin, aspartate aminotransferase, or alkaline phosphatase are independent positive predictors.[6,7] Transcutaneous ultrasound has been the traditional method of evaluating patients with biliary diseases.The ability of transcutaneous ultrasound to establish the diagnosis of choledocholithiasis is only about 50%, varying from 30 to 90%.[8,9]

In 1968, ERCP was introduced as a diagnostic tool to aid in the management of biliary and pancreatic diseases.[10] Along with the ability to diagnose bile duct stones, ERCP has the advantage of offering therapeutic intervention. CT with intravenous (IV) biliary contrast material in other studies has been found to have a sensitivity of 71–85% and a specificity of 88–95% when there is doubtful of malignancy then CT abdomen advised.[11]

Magnetic resonance cholangiopancreatography (MRCP) is non- invasive method to detect stones as small as 2 mm can be detected even in the absence of biliary dilatation. In one study of 97 patients, sensitivity of MRCP was 100% for stone diameters of 11–27 mm, 89% for stone diameters of 6–10 mm, and 71% for stone diameters of 3–5 mm.[12] Another sensitive method of evaluating the biliary system for common bile duct stones is Endoscopic ultrasound (EUS).

Factor that favor EUS over MRCP are that it can be performed in presence of intracranial metallic clips, cardiac pacemakers, mechanical heart valves, claustrophobia and morbid obesity. Factor that favor MRCP over EUS include its wide availability, minimally invasive nature, ability to image the intrahepatic ducts, cost effectiveness, and suitability for patient with altered gastric or duodenal anatomy.[13] In addition, all images can be captured allowing for review by other clinician at later date.

In patients for whom ERCP is not available, not possible secondary to anatomic considerations, or not successful, an alternative method of cholangiography and non-surgical therapy is percutaneous trans-hepatic cholangiography (PTC) followed by transhepatic methods of stone removal. Treatment may be endoscopic, percutaneous, open, or laparoscopic. Given the multiple alternatives available, sometimes it is difficult to decide on the right one for a particular patient. Frequently, the best path is the one the surgeon is most adept at or the one that local expertise can accomplish most safely.[14]

After bile duct clearance is achieved by non-operative methods, cholecystectomy generally is recommended in younger patients to decrease the risk of future cholecystitis and recurrent biliary colic. The first surgical exploration of the CBD was done in 1890 by Ludwig Courvoisier, a Swiss surgeon who made an incision in the CBD and removed a gallstone.[15,16]

Laparoscopic choledochotomy is an excellent approach to the CBD. It is indicated when the CBD diameter is larger than 6 mm, in cases when calculi are larger than 1 cm, when there are multiple calculi, or when lithotripsy is required for impacted calculi. It is contraindicated in small ducts because of the risk of stricture secondary to otomy closure.

Surgical biliary drainage procedures must be considered in situations of multiple stones; incomplete removal of all stones; impacted, irremovable distal bile duct stones; markedly dilated CBD; distal bile duct obstruction from tumor or stricture; and reoccurrence after previous bile duct exploration. The methods of surgical drainage include transduodenal sphincteroplasty, choledo-choduodenotomy, and choledochojejunostomy (CDJ). Patients presenting with CBD stones after cholecystectomy generally are treated with ERCP.[15]

Objective of the study was to determine best modality of treatment for common bile duct stone with gall bladder stone, on basis of available modality and expertise of surgeons. And to aware of complications arising during and after the procedure, so as to decreases such complications in further patient's management.

METHODS

This prospective study was conducted in department of Gastro-surgery including 60 patients in Bhopal Memorial Hospital and Research Centre Bhopal, Madhya Pradesh, India over period of January 2017 to January 2020. Following written informed consent with patients to undergo procedure.

Patients included in study are those presented to OPD or emergency department from different regions of Madhya Pradesh, India.

Inclusion criteria's included, all patients referred from other hospital with diagnosed case of CBD stone, patients having cholecystitis, cholangitis, fever, gallstone pancreatitis, biliary colic and jaundice with raised alkaline phosphate, direct bilirubin with USG abdomen suggesting of CBD stone or dilated CBD, patient detected on intraoperative cholangiography or postoperative on MRCP and all patients suspected of choledocholithiasis and diagnosed on MRCP as CBD stone. Exclusion criteria have included, cirrhosis/portal hypertension, suspicious of hepatobiliary malignancy, pregnancy, age less than 13 yrs.

Patients suspected to common bile duct stone if presented with cholangitis, fever, pancreatitis, or jaundice with increase bilirubin, AST and ALT. Then trans-abdominal ultrasound done, if patient detected common bile duct

stone or having intrahepatic/Extra-hepatic biliary dilatation then MRCP advised to confirm the ultrasound report, missed stone or other pathology and after confirmation with MRCP patient planned for procedure according to available modality as we are not having facility of Endoscopic ultrasound, Laparoscopic ultrasound, intraoperative ultrasound and spyglass cholangioscopy.

In our setup we did two stage procedures that is ERCP guided stone removal followed by laparoscopic cholecystectomy. Patient undergoes ERCP guided stone retrieval if stone present in CBD, <1.5 cm size, not impacted and no other contraindication. ERCP done under sedation, CBD cannulate, Sphincterotomy done, with help of ballon catheter or Dormia basket stone retrieved, if fail to removal of stone then patient planned for laparoscopic CBD exploration.

If patient having large stone >1.5 cm, dilated CBD >2 cm, failed ERCP guided stone removal, or any CBD stone then laparoscopic CBD exploration planned. Port inserted same as laparoscopic cholecystectomy, choledochotomy done on anterior surface of CBD with endoblade/endoscissor limited to size of largest stone, bile duct cleared of stone, choledochoscopy done in evaluating the duct system during and after clearance of residual stone and making sure that there is no other pathology. If fail to clear duct stone then procedure converted to open otherwise CBD primary repair and if required then CBD stent same as ERCP placed antegrade manner and checked with upper GI Endoscopy, its one end visible in duodenum. Cholecystectomy done, port closed and patient discharge on 3-4 days.CBD stent removed after 21 days.

If patient having previous history of abdominal surgery or fail to retrieve stone by ERC/LCBDE or impacted stone in lower CBD then open surgery was done.

RESULTS

In 60 cases 41 patients undergoes to ERCP first, stone successfully removed in 34patients and stent placed, one patients develop pancreatitis after ERCP, managed conservatively. In 6 patients retained stone after ERCP procedure, these are those patients who have multiple stone in CBD or having large and impacted stone, stent placed but one patients develop surgical emphysema after procedure, managed with ICD, and one patient had bleeding during sphincterotomy so its procedure abandoned, One patient failed to cannulate CBD due to edematous duodenal wall and hanging papilla. 21 patients undergoes laparoscopic common bile duct exploration, out of which seven patients are those in which ERCP guided stone removal failed, CBD stent placed antegrade manner after laparoscopic CBD exploration in 4 cases, other cases CBD primary repair (Figure 1 and 2).

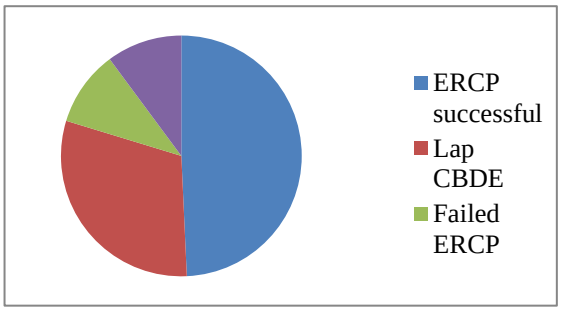

Figure 1: Modality of management applied in CBD stone.

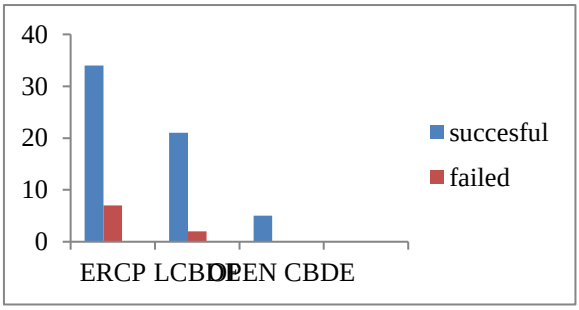

Figure 2: Modality of treatment applied in CBD Stone.

Lap CBD explorations converted to open CBD exploration with cholecy-stectomy, due to adhesion at hepatocystic triangle. Five patients undergo open CBD exploration, one patients' hepaticojejunostom was done as patient having CBD stone with stricture. One patient developed incisional hernia after surgery. No mortality during and after procedure (Table 1, Figure 3).

Table 1: Modality of treatment applied for CBD stone management.

Variable	Modality of treatment		
Procedure	ERCP guide stone removal	Lap CBD exploration	Open CBD exploration
Outcome	Successful-34 Failed-7 (6-retained stone, 1 failed CBD cannulation)	21 successful and 2 case converted to open	5-Successful
Complications	Pancreatitis-1 Bleeding from papilla-1 Surgical emphysema-1	Stent migration-1 Lap converted to open -2	Incisional hernia-1

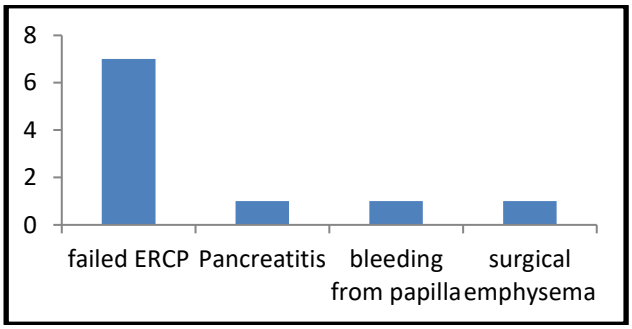

Figure 3: Complications of ERCP guided common bile duct stone removal.

DISCUSSION

Although in past various studies published on management strategies of common bile duct stone, I am discussing the various outcome of applied procedure, although we are having limited resources of common bile duct stone management. To determine the best treatment modality for common bile duct stone become more challenging as large number of options available such as endoscopic, laparoscopic or open surgical methods, we need to choose specific therapy according to patient's clinical conditions, and individual expertise.

If we compare two stage procedure that is ERCP guided stone removal with stenting followed by lap cholecystectomy with laparoscopic common bile duct exploration, then it is found that in our cases there are more complications in ERCP such as bleeding during sphincterotomy, retained stone after procedure, surgical emphysema in rare circumstances, and exposure of anesthesia during ERCP and during cholecystectomy. The average hospital stay and cost effectiveness are more in comparison to single time Laparoscopic common bile duct exploration with cholecystectomy. Although there is need of expertise in Laparoscopic CBD exploration and skills in endo suturing and availability of choledo-choscopy. The complications of bile leak, pancreatitis, retained stone are less as compare to ERCP followed by laparoscopic cholecystectomy. The stone which cannot we remove by ERCP as stone in right hepatic duct or left hepatic duct, large stone, impacted stone can be removed by laparoscopic CBD exploration. But if single stage procedure that is laparoscopic cholecystectomy with intraoperative ERCP and laparoscopic CBD exploration with cholecystectomy has same outcome in terms of hospital stay and cost effectiveness.

A laparoscopic procedure that treats both cholelithiasis and choledocholithiasis in a single setting would be the best approach in the majority of patients. This strategy appears to be cost-effective and associated with a shorter hospital stay than with a two-stage procedure (preoperative ERCP with sphincterotomy followed by laparoscopic cholecystectomy).[17,18]

Several authors have advocated primary closure of the CBD without the use of T-tubes during laparoscopic choledochotomies with comparable results in selected groups of patients. Noted advantages of this technique include decreased morbidity from external biliary drainage (as high as 15%), and shorter length of hospital stay. After closure of the CBD, a combination of methylene blue dye and hypaque contrast can be injected through a transcystic cholangiogram catheter to assess for leakage or excessive narrowing of the CBD closure.[19]Another alternative technique to CBD closure over T-tube and primary CBD closure is laparoscopic placement of an endobiliary stent with primary closure of the choledochotomy.[20] The stent, typically 10 French, is advanced into the duodenum until the proximal end is positioned distal to the lower edge of the choledochotomy.

In patient undergoing laparoscopic CBD exploration for single stage of CBDS with removal of gall bladder as a part of same procedure. There are now sufficient number of studies to determine that there is no significant difference in clinical outcome between LCBDE and laparoscopic cholecystectomy combined with preoperative or postoperative ERCP.[21] Studies have shown that single stage LCBDE is associated with a reduction in overall hospital stay and cost compared with two stage approach of ERCP and laparoscopic cholecystectomy.[22]

In cases of open procedure, the average hospital stay are more, there is more chances of wound infections, incisional hernia compare to lap procedure, but for open procedure we not need a complex operation theatre setup as well as expertise in endoscopy and laparoscopy, and we can deal with complex cases, and if needed drainage procedure easy to perform in open procedure.

Limitation

No endoscopic ultrasound, laparoscopic ultrasound and spyglass cholangioscopy facility, which are used in management of CBD stone. Modality applied was ERCP, intraoperative choledochoscopy, cholangiography, lap-aroscopic surgery and open surgical setup.

CONCLUSION

If the patient having large stone >1.5 cm, intrahepatic or impacted stone and CBD diameter >2 cm, multiple stone and surgeons are expertise in laparoscopic CBD exploration and facility of choledochoscopy available then surgeon can proceed to lap CBD exploration with cholecystectomy without attempting to ERCP guided stone removal. It has lesser complications, lesser chance of failure of procedure and lesser hospital stay, although it's not a protocol and recommendation it will not replace individual expertise and available modality. There is no significant difference in outcome of single stage

laparoscopic cholecystectomy with ERCP and laparoscopic CBD exploration.

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Ethical approval: Not required

REFERENCES

1. Johnson AG, Hosking SW. Appraisal of the management of bile duct stones. Br J Surg. 1987;74:555-60.
2. Acosta MJ, Rossi R, Ledesma CL. The usefulness of stool screening for diagnosing cholelithiasis in acute pancreatitis. A description of technique. Am J Dig Dis.1977;22:168-72.
3. Murison MS, Gartell PC, McGinn FP. Does selective preoperative cholangiography result in missed common bile duct stones?. J R Coll Surg Edinb.1993;38:220-4.
4. Rosseland AR, Glomsaker TB. Asymptomatic common bile duct stones. Eur J Gastroenterol Hepatol. 2000;12:1171-3.
5. Sarli L, Pietra N, Franze 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;50:200-8.
6. Ko CW, Lee SP. Epidemiology and natural history of common bile duct stones and prediction of disease. Gastrointest Endosc. 2002;56:165-9.
7. Abboud PA, Malet PF, Berlin JA, Staroscik R, Cabana MD, Clarke JR, et al. Predictors of common bile duct stones prior to cholecystectomy: a metaanalysis. Gastrointest Endosc. 1996;44:450-5.
8. Eisen GM, Dominitz JA, Faigel DO, Goldstein JL, Kalloo AN, Petersen BT, et al. An annotated algorithm for the evaluation of choledocholithiasis. Gastrointest Endosc. 2001;53:864-6.
9. Kohut M, Nowak A, Marek T, Chávez MÁ. Evaluation of probability of bile duct stone presence by using of non-invasive procedures. Pol Arch Med Wewn. 2003;110:691-702.
10. Mallery JS, Baron TH, Dominitz JA, Goldstein JL, Hirota WK, JacobsonBC, et al. Standards of Practice Committee, American Society for Gastrointestinal Endoscopy. Complications of ERCP. Gastrointest Endosc. 2003;57:633-8.
11. Mark DH, Flamm CR, Aronson N. Evidence-based assessment of diagnostic modalities for common bile duct stones. Gastrointest Endosc. 2002;56:190-4.
12. Cohen S, Bacon BR, Berlin JA, Fleischer D, Hecht GA, Loehrer PJ, et al. National Institutes of Health Stateof-the-Science Conference Statement: ERCP for diagnosis and therapy, January 14-16, 2002. Gastrointest Endosc. 2002;56:803-9.
13. Morris S, Gurusamy KS, Sheringham J. Cost-effectiveness Analysis Endoscopic ultrasound versus Magnetic resonance cholangiopancreatography in patients with suspected common bile duct stone. PLoS ONE. 2015;10:e0121699.
14. Zinner MJ, Stanley WA. choledocholithiasis and cholagitis maingot's abdominal operations 12th Edition : McGraw-Hill; 2013: 1028-1040.
15. Petelin JB. Laparoscopic common bile duct exploration. Surg Endosc. 2003;17:1705-15.
16. Tai CK, Tang CN, Ha JP, Chau CH, Siu WT, Li MKW. Laparoscopic exploration of common bile duct in difficult choledocholithiasis. Surg Endosc. 2004;18:910-4.
17. Cuschieri A, Croce E, Faggioni A. EAES ductal stone study. Preliminary findings of multi-center prospective randomized trial comparing two-stage vs. single-stage management. Surg Endosc. 1996;10:1130.
18. Cuschieri A, Lezoche E, Morino M, Toouli J, Faggi-oni A, Ribeiro VM. Multicenter prospective randomized trial comparing two-stage vs. single stage management of patients with gallstone disease and ductal calculi. SurgEndosc. 1999;13:952.
19. Decker G, Borie F, Millat B, Deleuze A, Drouard F, Guillon F, et al. One hundred laparoscopic choledochotomies with primary closure of the common bile duct. SurgEndosc. 2003;17:12-8.
20. Isla AM, Griniatsos J, Karvounis E, Arbuckle JD. Advantages of laparoscopic stented choledochor-rhaphy over T-tube placement. Br J Surg. 2004;91:862-6.
21. Desari BV, Tan CJ, GurusamyKS. Surgical versus endoscopic treatment of bile duct stone. cochrane data base syst rev. 2013;(12):CD003327.
22. Rhode M, Sussman L, Cohen L, Lewis MP. Randomised trial of Laparoscopic exploration of common bile ductversus postoperative endoscopic retrograde cholangiography for common bile duct stone. Lancet. 1998;351:159-61.

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