

## A Clinical Study on the Management of Choledocholithiasis in a Tertiary Care Center

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### Abstract:

**Background:** Choledocholithiasis is the 2<sup>nd</sup> most common complication of gallbladder stone disease and its incidence increases with age. There are different modalities of treatment ranging from endoscopic techniques to open and minimally invasive surgery.

**Aim of the study** was to evaluate various modalities of surgical treatments for CBD Stones at Super Speciality Hospital and Department of General surgery, Kadapa.

**Methodology:** This was a retrospective analysis of all the patients who underwent surgery for common bile duct stones during the study period. The parameters analyzed were epidemiological data, clinical parameters, surgical details and any complications.

**Results:** A total of 20 patients were included in the study with a M: F ratio of 1:2. The most common presenting complaint was pain abdomen and jaundice. Majority of the patients underwent an open surgery and a drainage procedure in the form of choledochojejunostomy. Laparoscopic exploration showed advantage in form of shorter hospital stay, early return to activity. There were one case with retained stones in the liver and the complications were limited to wound complications.

**Conclusions:** In the era of advanced endoscopy, surgery still holds an eminent place in the management of Choledocholithiasis. With growing expertise, the complication and clearance rates are better than endoscopy. Laparoscopic exploration can be the single best treatment for patients with both Cholelithiasis and Choledocholithiasis.

**Keywords:** Choledocholithiasis, Endoscopic retrograde cholangiopancreatogram, Laparoscopic surgery, T Tube.

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### Introduction

Gall stone disease has been one of the most commonly diagnosed abdominal condition worldwide in recent times. It is the leading cause for hospital admissions related to gastrointestinal problems. Choledocholithiasis is one of the common complications of gallbladder stone disease. The incidence varies between 5% and 33% according to age. [1,2] Around 3-5% of patients with CBD stones are asymptomatic and spontaneous passage through the papilla occurs and may not be without risk of complications. The European association for endoscopic surgery (EAES) recommends all patients with symptomatic gallstones should be assessed for the presence of CBD stones and treated based on the patient's risk classification. [3,4] Ultrasound abdomen and magnetic resonance cholangiopancreatography (MRCP) are the most common pre-operative imaging modalities for detection of CBD Stones. However, endoscopic retrograde cholangiopancreatography (ERCP) is the most common

invasive tool for their detection. Treatment is advisable to prevent further complications such as obstructive jaundice, acute cholangitis and pancreatitis. [5,6] There are different modalities of treatment ranging from endoscopic techniques to open and minimally invasive surgery. However, the single best modality has remained a point of major speculation over a period with each modality having its merits depending on the patient presentation.

**Aims and objectives:** The aims and objectives were to assess the various presentations of CBD Stones and to assess the various modalities of surgical treatment for CBD Stones.

**Materials and methods:** This was a retrospective study done in 20 cases admitted to the Department of General Surgery and Surgical Gastroenterology, Super Speciality Hospital Kadapa with CBD Stones for a period of one year. All patients above 18 years undergoing surgical treatment for Chole-

docholithiasis during the study period were included in the study. Patients below 18 years; patients who had bile duct surgery for any other indication than Choledocholithiasis were excluded.

**Methodology:** The demographic, epidemiological data were collected and presenting symptoms, course of treatment, complete details of surgery and post-operative morbidity and mortality if any was made.

### Results

A total of 20 patients were studied. There were 6 males and 14 females and majority of the patients were in 40-60 years age group. The most common presenting complaint was pain abdomen, followed by obstructive jaundice. Other features like cholangitis and pancreatitis were noted in 2 cases. 3 patients presented after a failed ERCP. 2 cases had multiple sessions of ERCP, for large stones. Post-operative analgesia was given through the epidural catheter and the patient was encouraged to ambulate at the earliest.

Liver Function Tests were altered with raise in ALP was seen in 12 patients, neutrophilic leucocytosis was seen in 10 patients. The initial imaging of choice was USG abdomen. USG identified a dilated CBD in 16 cases and stones in 8 patients. MRCP was performed in all these patients that in turn confirmed the diagnosis.

In the total of 20 patients, 12 patients underwent open exploration, while 8 patients underwent laparoscopic exploration. A drainage procedure in the form of choledochojunostomy was done in 10 patients who underwent open exploration and in 6 patients who underwent open exploration. In 2 patients in each group, a T tube was placed that was left in place for 3 weeks.

The main indication for T tube drainage was comparatively small size of the CBD. Drain from the T tube is observed for a week and a Tube cholangiogram was done to confirm the distal patency and was removed after 3 weeks.

The patients were started on oral feeds 2days after surgery. The abdominal drain was removed once patient was passing stools. The patients who underwent laparoscopy were discharged within a week while those who underwent open surgery had a longer hospital stay an average of 10 days. The patients who underwent laparoscopy also had faster return to normal activity.

Post-operative complications were minimal in our study and were limited to wound complications. Wound infection was seen in 5 patients who underwent open surgery and among these 1 patient who had a T tube placement. There were no complications in the laparoscopy group. There was no observed mortality in the present study. There were

no incidents of residual or leftover stones in either group.

### Discussion:

Common bile ducts are usually treated by ERCP with or without sphincterotomy. ERCP can fail to extract stones that may be due to failed cannulation (Juxta-papillary diverticulum, intra-diverticular papilla or small papilla) or failed extraction. [7,8] The failed extraction occurred with difficult stones (Mirizzi's syndrome, stricture of the lower CBD, impacted, large (<15 mm), multiple (<3) or intra-hepatic duct/cystic duct stones), especially when using standard methods (balloon or basket after sphincterotomy or endoscopic papillary balloon dilatation (EPBD)).

Post ERCP complications vary widely in the literature between 5 and 38%; due to pancreatitis, duodenal perforation, bleeding, cholangitis and papillary stenosis. [9] It had been reported that sphincterotomy may cause recurrent ductal stones, stenosis of the papilla with cholangitis and late development of bile duct cancer, which was a cause of concern particularly in younger patients. [10]

The treatment options for failed ERCP included surgical interventions either open or laparoscopic. Open CBD exploration had been the standard of care since very long. Cochrane database review published in 2006 had suggested that ERCP was less successful than open surgery in CBD stone clearance and was associated with a higher mortality. [11] There was also an increased recurrence rate of CBD stones following endoscopic removal. [12] Campagnacci et al reported the retained stones percentage after ERCP was 9% and 13.5% respectively. [13] When ductal clearance was unsuccessful, temporary stenting can serve as a bridge preventing stone impaction and cholangitis by relieving biliary obstruction and ensuring biliary drainage for further planned endoscopic stone removal or operation. Furthermore, biliary stenting had some therapeutic benefit in case of difficult stones (difficult stones became smaller, fragmented and easier to remove at repeat ERCP or even absent after a period of stenting). [8,14]

In our study, three of the patients were post failed ERCP. Two patients had multiple sessions of ERCP. The most common cause for failed ERCP in our study was multiple or impacted stones followed by failed cannulation and very large stones.

For decades, open exploration was the standard of care, with clearance rates around 95% to 97%. It had its set of complications, morbidity and mortality. Laparoscopic surgery for CBDS was first described in 1991. Ever since, the technique, equipment and expertise have evolved leaps and bounds. Laparoscopic common bile duct exploration (LCBDE) had become the main treatment for CBD

stones associated with cholelithiasis. [15] The role of intra-operative cholangiogram had been controversial. CBD stones have been shown to be present on intraoperative cholangiography at the time of laparoscopic cholecystectomy in up to 13% of patients who had preoperative ERCP, due to interval passage of stones or to false-negative completion cholangiogram after ERCP. [16]

Puhalla et al stated that intraoperative cholangiography was a fundamental prerequisite of LCBDE, recommending routine intraoperative cholangiography allowing the surgeon to verify bile duct anatomy and thereby guiding the surgical approach to bile duct exploration and preventing bile duct injury.<sup>17</sup> It also allowed the evaluation of the size of the CBD and stone location. Collins et al found a 25% false-positive rate of CBD stones at intraoperative cholangiography and persistent CBD stones likely to cause morbidity postoperatively in 2.5% of patients only.<sup>3</sup> One major advantage of using IOC routinely was that the sensitivity (97%) and negative predictive value (99%) were high. Therefore, if CBD stones were present they should be detected on IOC and a normal IOC almost always meant that the CBD was clear. A negative IOC can prevent patients from undergoing unnecessary attempted at CBD clearance and patients can be reassured that the risk of complications from retained CBD stones was extremely low.<sup>18</sup>

The ductal stone clearance rate was approximately 95% to 97% and had an associated morbidity of 4%. The overall length of stay was shorter in LCBDE compared to open group. LCBDE was associated with a shorter hospital stay, lesser cost, no manipulation of the sphincter of Oddi resulting in less bacterial colonization, less risk of cholangitis, less risk of malignant transformation and pancreatitis.<sup>19</sup>

There were two approaches for LCBDE, the transcystic approach (LTCE) and the Trans choledochal approach (LCD). The success rate of bile duct clearance of choledochotomy was higher than the transcystic approach (93.3-97.1% versus 63-84%).<sup>20</sup>

In our study, 12 patients underwent open exploration. We have done a chodochojunostomy in 10 cases and 2 cases had T tube drainage. In 1965, Sawyers et al documented the advantages of primary closure of the CBD and recommended that routine use of a T tube following CBD exploration be abandoned.<sup>23</sup> A meta-analysis by Guruswamy et al in 2007 showed no statistically significant difference in any of the outcomes between T tube and primary closure of choledochotomy, apart from the hospital stay which was significantly lower in the primary closure group.<sup>21</sup> Current literature only supported placement of T tubes in case of pronounced CBD inflammation.<sup>22</sup> In a single-center

retrospective study by Hua et al additional indications for T tube placement were inflammatory stricture of the sphincter of Oddi and unremovable small mural stones.<sup>23</sup> Tranter et al reported the combined morbidity rate for ERCP with ES followed by LC was from 1% to 19% (median, 13%) and from 2% to 17% (median, 8%) for LCBDE.<sup>24</sup> In our study wound infection was the only complication encountered.

### Conclusion:

In the era of advanced endoscopy, surgical management of common bile duct stones still holds pivotal in selected cases especially in areas with no access to advanced care. We presented our experience with surgical management of stones in CBD over a period of two years. Both laparoscopy and open surgery are equally effective with respect to surgical outcomes, while laparoscopy has shown benefit in reducing the hospital stay, costs and early return to normal activity. LCBDE is the standard of care whenever the expertise and equipment are available.

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