

## LAPAROSCOPIC COMMON BILE DUCT EXPLORATION A BETTER PROCEDURE THAN ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN CASES OF COMMON BILE DUCT DIAMETER >10MM

### Surgery

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### KEYWORDS

#### INTRODUCTION

Cholelithiasis (Common Bile duct stones) along with cholelithiasis is a commonly diagnosed problem in adults in 4<sup>th</sup> -5<sup>th</sup> decade of life. 10-15% cases of cholelithiasis are associated with common bile duct stones. Cholelithiasis are generally silent and seen in up to 10% patients undergoing biliary imaging. Primary common duct stones arise de novo in bile duct and are generally brown pigment stones, a combination of precipitated bile pigments and cholesterol. Brown pigment stones are associated with bacterial infections where free bilirubin is formed by hydrolysing enzymes released by bacteria and then precipitates. Brown pigment stones are more common in Asian population. Secondary common duct stones pass from gallbladder into bile duct. Secondary stones are common in western countries. Retained stones are secondary stones found in bile duct within 2 years of cholecystectomy and occur in 1 to 2% of patients. Cholelithiasis represents a significant danger to patients as it can lead to biliary colic, obstructive jaundice, cholangitis or pancreatitis. Various treatment modalities available for diagnosed case of common bile duct stone are Endoscopic retrograde cholangiopancreatography accompanied with sphincterotomy with or without stone extraction/stenting, Laparoscopic CBD exploration with stone extraction, open CBD exploration or other biliary drainage procedures.

With the growing expertise of surgeons in various lucrative minimally invasive techniques targeted to achieve cure with least discomfort in terms of morbidity, mortality, cost effectiveness, the hassle-free utilisation of endoscopy over laparoscopy is debated over in the management of common bile duct stones.

#### CLINICAL FEATURES-

Recurrent abdominal pain was most common presenting complaints with nausea, vomiting and jaundice. Average duration of complaint was 6.5 months.

**Table 1**

| Sl no. | Clinical Feature      | No. Of Cases | Percentage |
|--------|-----------------------|--------------|------------|
| 1.     | BILIARY COLIC         | 57           | 53.3%      |
| 2.     | JAUNDICE AT ADMISSION | 67           | 62.6%      |
| 3.     | PRURITUS              | 40           | 37.3%      |
| 4.     | FLATULENT DYSPEPSIA   | 50           | 46.7%      |

#### Methods

The current prospective study was conducted by the Department of General Surgery, GSVM Medical College, Kanpur, India.

In this study patients with common bile duct stone diagnosed preoperatively by radiological evidence confirmed by clinical laboratory investigations are chosen for either ERCP or LCBDE from 1<sup>st</sup> Jan 2018 to 1<sup>st</sup> January 2022.

#### INCLUSION CRITERIA-

- Patient age more than 18 years old.
- Radiological evidence of CBD stones with cholelithiasis.
- Patients with CBD diameter more than 10mm.

#### EXCLUSION CRITERIA-

- Patients less than 18 years of age.
- CBD of diameter less than 10mm.

- Clinical or radiological evidence of cirrhosis.
- CBD stone with carcinoma of GB or having major cardiovascular or renal diseases.

Clinical data including detailed history, clinical examination, laboratory investigations which included liver function tests for total bilirubin, conjugated bilirubin, alkaline phosphatase, hepatic transaminases SGOT and SGPT, total serum proteins and serum albumin were done. Other relevant investigations such as haemoglobin count, total leukocyte count, prothrombin time, international normalised ratio and blood urea, creatinine, electrolytes were also taken into consideration.

USG of the abdomen was done in all patients when they presented in the out-patient department or in the emergency with complaints suggestive of cholecystitis or obstructive jaundice. By this any abnormality of the gallbladder, CBD, liver, pancreas was detected.

During the study period a total of 107 patients visited this tertiary care centre whose data was analysed. On the basis of CBD diameter division into group 1 and group 2 is done. Group 1 is with CBD diameter more than 10mm and group 2 is with CBD diameter less than 10mm. group 2 are excluded from study. In group 1 total patients were 70, with CBD diameter more than 10, and were divided into subgroups A and B with 35 patients each, on the basis of surgical management of CBD stone. Group A which included 35 patients were subjected to LCBDE and group B which included 35 patients were subjected to ERCP. (table 2)

After compilation of collected data, analyses were done using SPSSv13.0 for Windows. The results were expressed using appropriate statistical methods. The present trial is to compare both the procedures in terms of success rate, mortality, morbidity, cost effectiveness and patient acceptance.

**TABLE 2**

| USG FINDING                   | NO OF CASES  |                |       |
|-------------------------------|--------------|----------------|-------|
|                               | SINGLE STONE | MULTIPLE STONE | TOTAL |
| CBD STONE WITH CHOLELITHIASIS | 53           | 54             | 107   |
| DIAMETER OF CBD >10MM         | 33           | 37             | 70    |
| DIAMETER OF CBD <10MM         | 20           | 10             | 30    |

#### PROCEDURE-

During ERCP endoscope introduced through mouth opening under sedation with patient in left lateral or semi prone position up to 2<sup>nd</sup> part of duodenum. With side viewing endoscope, bile duct opening i.e. papilla identified as small hole with surrounding induration. Through the operating channel of endoscope guidewire introduced up to duodenum, then papillary opening, it is advanced into biliary duct over guide wire. Bile duct then cannulated and dye injected, then X-rays taken to look for biliary tree anatomy or CBD stone as filling defect. Then a papillotome is introduced and papilla cut longitudinally, then stone extractor is used to retrieve the CBD stone. In case of large multiple stones, not extracted by above method CBD stone crushed or lithotripsy done by mechanical, laser method and then stone removed

and again dye injected and X -rays taken to look for residual stones. After satisfactory results, the endoscope was taken out and the patient kept in the recovery room under observation till sedative drugs effects were resolved.

Fig1

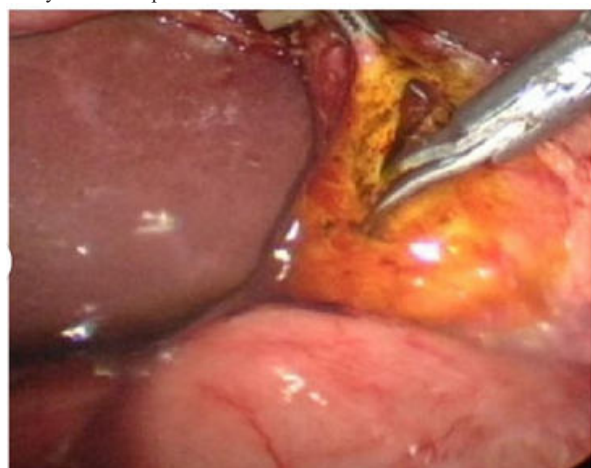


#### ERCP SPHINCTEROTOMY STONE EXTRACTION

Patients with radiological evidence of CBD stone with CBD diameter more than 10mm with or without GB stone were planned for laparoscopic CBD exploration in the same sitting of laparoscopic cholecystectomy.

During LCBDE supraduodenal choledochotomy is done at most dilated part of CBD or over the stone. Then the choledochotomy wound extended along CBD up to 1 to 2 cm by laparoscopic scissors. All biliary sludge and small stones were flushed with saline. In case of large stone or impacted stone not removed by flushing, stones are removed by stone extractors. Then a rigid nephroscope or ureteroscope introduced through choledochotomy proximally and distally into bile duct to ensure clearance from duct.

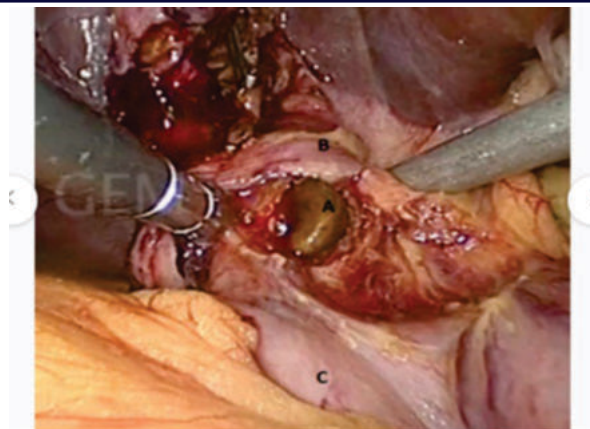
After thorough exploration of bile duct and removal of CBD calculi a watertight closure of CBD was accomplished using a continuous or interrupted vicryl suture of no 3-0 or 4-0 absorbable sutures. Then GB removed from GB fossa after clipping the cystic duct and artery. Drain was placed in GB fossa.



**Fig-** Laparoscopic choledochotomy. A longitudinal supraduodenal choledochotomy was made using micro scissors. The length of incision was based on size of stone

#### TYPES OF OUTCOMES- PRIMARY OUTCOME-

- Peri operative morbidity and mortality, that is within 30 days of the procedure, requiring readmission.
- Mortality at maximal follow up.
- Bile leak requiring reoperation.



**Stone extraction by milking. A Stone. B Common bile duct. C Duodenum**

(fig3)

#### Secondary outcomes-

- Operating time.
- Hospital stays.
- Conversion rate.
- Requiring 2<sup>nd</sup> operation.
- Complications like wound infection, stent migration leading obstructions, persistent biliary fistula, residual stone, septicemia, subphrenic abscess in case of LCBDE are common.

Pancreatitis, cholangitis, duodenal perforation and haemorrhage are complications in case of ERCP.

#### RESULTS-

In our study 35 patients were subjected to LCBDE and stone clearance occurred in 32 (91.4%) patients and among 35 patients subjected to ERCP stone clearance occurred in 31 (88.5%) patients with p value 0.88, i.e. there is no significant difference in two groups. But it was found that among LCBDE group, in 3 patients' conversion to open procedure has occurred due to extensive adhesions around CBD. In ERCP group failure of stone clearance occurred in 4 patients due to Stone size more than 10mm which were difficult to retrieve even after dilation of sphincter and CBD exploration is needed in later dates. (TABLE 3)

**Table 3**

| Procedure | Total No. | Stone Cleared | Percentage |
|-----------|-----------|---------------|------------|
| ERCP      | 35        | 31            | 88%        |
| LCBDE     | 35        | 32            | 91.4%      |

In the ERCP group, the mean stay in hospital was 2 days, but this value increased to 7 days in cases developing pancreatitis as a complication, which was managed conservatively.

In LCBDE group wound infection occurred in 12 patients, bile leak in 6 patients. Overall complication developed in 14 patients (13.4%), which was significant p-value 0.023. Postoperative hospital stay was 2 days (2-7 days) and 5(3-9) days in ERCP and LCBDE groups respectively, but if ERCP was followed by laparoscopic cholecystectomy this hospital stay has increased to 6 days. Mean operative time in the ERCP group was 39 minutes. BUT in the LCBDE group this time increased to 124 minutes, which had a significant difference, p value of 0.009.

#### COMPLICATION IN ERCP VS LCBDE-

| Complication         | LCBDE (primary Closure) | ERCP |
|----------------------|-------------------------|------|
| WOUND INFECTION      | 12                      | -    |
| BILE LEAK            | 6                       | -    |
| BILIARY PERITONITIS  | -                       | -    |
| SUBPHRENIC ABSCESS   | -                       | -    |
| SEPTICEMIA           | -                       | -    |
| ACUTE PANCREATITIS   | -                       | 2    |
| DUODENAL PERFORATION | 1                       | -    |
| HEMORRHAGE           | -                       | -    |

The success rate of stone clearance was not significantly different in both groups. But with a stone size more than 10mm it was unable to retrieve stone by ERCP, so LCBDE preferred when stone size reached 10mm or more.

The operative time was significantly low in the ERCP group with little risk of anaesthetic procedure as it is done under sedation, but in case of ERCP another procedure of cholecystectomy is needed which predisposes it to another anaesthetic procedure burden.

The morbidity like wound infection, bile leak, are higher in the laparoscopic group whereas these are never found in the ERCP group. In ERCP serious complications like pancreatitis, duodenal perforation, haemorrhage can occur.

The postoperative stay and return of work were in favour of the ERCP group but there is always a need for a second procedure like cholecystectomy, which increased total stay in hospital to 6-7 days.

#### AVERAGE LENGTH OF HOSPITAL STAY-

| PROCEDURE                              | MEAN STAY |
|----------------------------------------|-----------|
| ERCP WITH LAPAROSCOPIC CHOLECYSTECTOMY | 6-7 DAYS  |
| LCBDE                                  | 4-5 DAYS  |

ERCP along with laparoscopic cholecystectomy gives patients the burden of two procedures, hence more complications, more postoperative stay, twice exposure to anaesthetic procedures, and more costlier than LACBD due to two procedures being performed, limitation in removal of stone more than 10mm in size, which need LACBD and statistically increasing the likelihood of complications due to two procedures. Complications in ERCP like pancreatitis and duodenal perforations are more severe as compared to complications in LCBDE.

The quantum improvement in laparoscopic techniques and with increasing expertise, surgeons were comfortable with laparoscopic techniques of CBD surgery. A single procedure (both for gallstones and CBD stones) which could be performed by minimally invasive technique was an attractive proposition compared with multiple interventions with risk in endoscopy followed by laparoscopic cholecystectomy. Though laparoscopic CBD surgery is time consuming and requires patience and expertise with frequent use of laparoscopic techniques, increasing expertise in laparoscopic procedure with high success rate and no need for second procedure LCBDE with laparoscopic cholecystectomy becoming treatment of choice in expert hands.

#### CONCLUSION-

A prospective study has been done with 107 patients having CBD stones demonstrated preoperatively by USG whole abdomen. 35 patients among these were subjected to LCBDE and 35 patients were subjected to ERCP.

The postoperative hospital stay was significantly more in the ERCP group with more anaesthetic procedure complications as patients had been exposed to two procedures of ERCP followed by laparoscopic cholecystectomy. Morbidity like wound infection, bile leak, are higher in the laparoscopic group, which were absent in ERCP, but Serious complications like pancreatitis, duodenal perforation, haemorrhage, occur in ERCP.

ERCP along with laparoscopic cholecystectomy gives patients the burden of two procedures, hence more complications, more postoperative stay, twice exposure to anaesthetic procedures, and costlier than LACBD due to two procedures being performed, limitation in removal of stone more than 10mm in size, for which LACBD is needed and statistically increasing the likelihood of complications due to two procedures. Severe complications in ERCP like pancreatitis and duodenal perforations are more common as compared to complications in LCBDE.

The improvement in laparoscopic technique and with increasing expertise, surgeons were comfortable with laparoscopic techniques of CBD surgery. A single procedure (both for gall stone and CBD stone), which could be performed by minimally invasive technique was an attractive proposition compared with multiple interventions. Though laparoscopic CBD surgery is time consuming and requires patience and expertise with frequent use of laparoscopic technique, increasing

expertise in laparoscopic procedures with high success rate and no need for second procedure LCBDE with lap cholecystectomy becoming choice of treatment in expert hands.

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