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ORIGINAL ARTICLE

Laparoscopic CBD Exploration (LCBDE) a better and safe option for large CBD stones

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ABSTRACT

Background: Conventionally, common bile duct stones (CBDS) are removed with help of ERCP. However, if CBDS are larger than 10 mm, then the ERCP failure rate to retrieve CBDS becomes high. In that case, open or laparoscopic common bile duct exploration (LCBDE) is other alternative. In this era of minimally invasive surgery, laparoscopic CBD exploration (LCBDE) seems to be a better option than open approach, but in our set up the safety of LCBDE is questioned.
Aim: To see the conversion rate as well as complications associated with LCBDE. Material & Methods:
Methods: This is a retrospective analysis of data of patients who underwent Laparoscopic Common Bile Duct Exploration (LCBDE) for large CBD stones at Fatima Memorial Hospital Lahore.
Results: Since 2012, 29 patients of large (≥10 mm) CBD stones were included in this study. Among them 20(69.9%) were females and 9(31.01%) were males. The mean CBD stone size was 13 mm. Stones were extracted transcystically in 4 case and Transcholedochal stone extraction was done in 25 cases. The average duration of surgery was 130 minutes, but all cases were completed successfully without converting to open approach. There was minor bile leak in 3 patients which was managed successfully without any further intervention. No other complication was observed with LCBDE and even no retained stone was reported.
Conclusion: Laparoscopic CBD exploration is safe and effective method of dealing CBD stones especially of large size when the chances of ERCP failure to retrieve stones are high.
Keywords: Laparoscopy, ERCP, common bile duct,

INTRODUCTION

Common bile duct stones (CBDS) are present simultaneously in approximately 10%-15% of patients with Gall stones[1]. With the introduction of laparoscopic cholecystectomy, the traditional treatment approach for CBDS is two staged that is preoperative endoscopic stone extraction (ESE) with ERCP followed by laparoscopic cholecystectomy. Depending upon the size of stone, the success rate of ERCP for CBD stone extraction varies from 81.8% with Endoscopic Balloon dilation technique 2 to 90% with mechanical lithotripter[3], but in order to achieve maximum clearance rate with ERCP, most of the time multiple attempts are required which increase the chances of complications like pancreatitis, bleeding and cholangitis[4]. Moreover, on failure of ERCP, Open CBD exploration is done to retrieve stone. In our view single stage management of CBDS should be Laparoscopic CBD Exploration (LCBDE), especially in those who have large CBD stones (≥1cm). LCBDE is as safe as open CBD exploration having better success rate & less complications than ERCP. The purpose of this study is to share our experience of Laparoscopic CBD exploration in terms of complications and conversion to open procedure especially when CBD stones are of large size (≥1cm).

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MATERIALS & METHODS

This study was conducted at Fatima Memorial Hospital Surgical Department after permission of Hospital Research & Ethical Committee. A retrospective analysis of data of patients who underwent Laparoscopic Common Bile Duct (LCBDE) Exploration at Fatima Memorial Hospital (FMH) Surgical Department from July 2012 to Dec.2019 was done. FMH Operation Theater is well equipped with advanced technology of Laparoscopy. All adult patients who underwent LCBDE and had CBD stones of 10mm size or more were included in this study. Patients who were having gallstones and concomitant large CBD stones were also included in the study. Even patients who have already undergone cholecystectomy and later on found to have large CBD stones were also included in this study. Patients with small CBD stones <10mm were excluded from the study.

All patients have been admitted and manage for obstructive jaundice according to the departmental implemented guidelines. Demographic details were recorded including age, gender, comorbidities, previous interventions like laparoscopic or open cholecystectomy or ERCP, stone size and CBD size. All Laparoscopic Common Bile Duct Explorations were performed by one surgeon. Operating surgeon is not only trained in Laparoscopy but also has experience of advanced Laparoscopic Surgery.

Five ports approach were used for LCBDE. CBD stones were removed either transcystically or via

choledochotomy. Choledochoscope is used to visualize the biliary tract and for confirmation of its clearance from stones. T-Tube is placed in CBD if choledochotomy is performed along with the drain in Morrison's pouch. But in case of conversion to open CBDE, the reasons of conversion should be noted.

Patients were kept in hospital for at least 3 days' post operatively. All patients received almost same analgesics and antibiotics cover. After 72 hours if patients remained stable and there was < 10 ml serous fluid in Drain, then Drain is removed and T-Tube is clamped and patients were discharged. On 7th to 10th post op day, T-Tube is also removed if patient was symptoms free.

Patients were followed up for 3 months postoperatively for any complication (Bleeding, Bile Leak, wound infection, Pancreatitis, Obstructive Jaundice & retained stones). Bile leak was considered if there was ≥100ml bile in drain on 1st post-operative day or ≥ 50ml on any day after that, whether it was in drain or found as intra-abdominal collection on ultrasound. So, the primary end point was conversion and secondary end points were bile leak, injury to other viscous and retained stones etc.

RESULTS

Since 2012, 56 patients presented with obstructive jaundice due to CBD stones. But 29 patients who were fulfilling the criteria were included in this study. Among these 29 patients 20(68.9%) were female and 9 (31.0%) were male with mean age of 44 years (30 to 60 years). 15 patients were diabetics, 5 were hypertensive, 2 were having IHD and 2 were asthmatic. 6(20.6%) patients had previous abdominal surgery other than cholecystectomy, while 4(13.7%) patients have recently undergone Laparoscopic cholecystectomy and 6(20.6%) underwent open cholecystectomy before LCBDE. ERCP has been tried but failed to retrieve stone in 12 (41.3%) patients.

The average CBD stone size was 13mm (ranging between 10mm to 20 mm). CBD was dilated in all cases with mean diameter of 16.8mm (range 14mm to 25mm). Transcystic stone extraction was done in 4(13%) cases while in 25(87%) cases, transcholedochal stone extraction was done. The duration of surgery varies from 110 minutes to 150 minutes with mean time (130 minutes). In all 29 cases, LCBDE was successfully completed with no conversion to open CBD exploration.

No complication like pancreatitis, cholangitis, injury to other viscera or wound infection was observed. Minor bile leak was observed in 3 patients (10.3%). One patient had 150 ml bile in drain on first post-operative day but after that, drain output reduced in next 72 hrs which settled without any intervention. The other 2 patients had drain output 60 & 80 ml on 2nd post-operative day which also settled in next 72 hrs. just by conservative treatment. All these patients were undergone transcholedochal stone extraction.

The bile duct clearance was 100%. No case of retained stone was reported. Patients returned to work 2--3 weeks postoperatively.

Table 1: Demographic Data

Gender	
Male	9
Female	20
Age	
30-40 years	8
41-50 years	16
51-60 years	5
Comorbidities	
Diabetes Mellitus	16
Hypertension	5
Ischemic heart disease	2
Asthma	2
Previous interventions	
Previous abdominal surgery	6
Laparoscopic cholecystectomy	6
Open cholecystectomy	4
ERCP failed	12
Stone size	
10-13mm	16
14-15mm	2
16-20mm	11
CBD diameter	
10-15mm	12
16-19.9mm	15
≥20mm	2

Table 2: Relationship between stone size and duration of surgery

Stone size (mm)	Duration of surgery (minutes)	Mean operating time (minutes)
19-13	120-144	128.45
14-16	110-140	128.30
17-20	115-150	138.50

Table 3: Complications of LCBDE

Complication	n	%age
Cholangitis	0	0
Pancreatitis	0	0
Bile leak	3	10.5%
Retained stones	0	0

Table 4: Specifications of patients with bile leak

Age Yrs.	Gender	Comorbidity	Size of stone	Diamete of CBD	No. of stones	Previous Surgery	ERCP Attempted	Mode of stone Extraction
39	F	Nil	1.8cm	2 cm	1	Lap chole	Failed	Trans Choledochal
45	F	Nil	1.7cm	2cm	2	Lap chole	Not attempted	Trans Choledochal
52	M	Asthma	1.6	1.8cm	>2	Lap chole	Not attempted	Trans Choledochal

DISCUSSION

Common Bile Duct Stones (CBDS) are concomitantly present with gall stones in 10-20% of cases. There are two approaches to deal with these CBDS, the most commonly used approach is ERCP followed by laparoscopic cholecystectomy, while the other way is to do Laparoscopic Cholecystectomy (LC) and Laparoscopic CBD exploration (LCBDE) as single step procedure. Both approaches are considered as equally valid treatment options5.

However, there are certain disadvantages of ERCP, among which complications related to ERCP and the failure to retrieve stone with ERCP are important ones. In addition to that sometimes multiple attempts are required to retrieve

CBD stones which not only increase the time of recovery but the chances of complications also increase.

Overall short-term complication rate of ERCP is approximately 5%–10%6. Incidence of major complications by ERCP in specialized centers was reported to be as low as 0.8%[7] and was 2.6% in a multi-center French study[8]. There are studies indicating that ERCP with papillotomy may lead to complications, including pancreatitis, bile duct stricture, and cholangitis[9]. There are also studies suggesting that an ERCP & papillotomy may predispose for pancreatic cancer and cholangiocarcinoma[10].

Those patients who underwent LC after ERCP have more frequent intra operative and post-operative complications. Moreover, the chances of conversion from laparoscopic to open cholecystectomy are also increased[11]. In the one study the rate of major complication with two-stage group was 8%[12].

According to one survey which was recently conducted showed that two-stage management was the preferred method in 99% of patients with suspected CBD stones and there was a conversion rate of 43% in patients with an attempted LCBDE[13]. We did not convert any case to open CBD exploration. This difference of conversion rate may be due to small number of patients in our study or it may be due to improvements in technique and availability of advance instruments.

In experienced hands, successful duct clearance can be achieved in over 90% 14 cases, though more than 25% of the patients requires two or more ERCPs[15].The present study shows that LCBDE can be performed safely with no significant risk for postoperative leakage, retained stones, or bile duct stricture. This is in accordance with the findings of previous studies[16-18]. Stones of ≥1cm size are difficult to extract transcystically[19].

That is why most of the stones were extracted by transcholedochal approach also in our study. Only in 4 cases where cystic duct was dilated, transcystic stone extraction could be possible. We put T-tube after LCBDE which is supported by studies and have provided strong evidence that LCBDE with T-tube drainage is safe and effective in achieving stone clearance in the patients with failed endoscopic stone extraction[20].

According to a survey in UK, now a days LCBDE is becoming common among upper gastrointestinal surgeons, 61% perform laparoscopic CBD exploration, 25% advise postoperative ERCP and 13% perform either LCBDE or ERCP when they encounter CBD stones[21].

CONCLUSION

LCBDE is a safe procedure with little risk of complications and retained stones. Although it requires a trained team, experienced surgeon and special equipment, it should be considered one of the first alternatives for managing CBDS especially of large size where the chances of ERCP failure are high. Further studies, however, are required to fully evaluate this technique. Special emphasis should be paid toward determining the risk for rare, but serious, late complications, in particular CBD stricture.

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