



STUDY OF SHORT TERM AND LONG TERM OUTCOME OF LAPAROSCOPIC CHOLEDOCHODUODENOSTOMY

General Surgery

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ABSTRACT

BACKGROUND: With the development of ERCP indications for LCDD have drastically reduced. In spite of excellent outcome of LCDD, laparoscopic common bile duct exploration (LCBDE) is being increasingly used for management of CBD stones, due to the technical challenge associated with a laparoscopic biliary-enteric anastomosis. **METHOD:** This study was done in SMIMER hospital, General Surgery department from 2012 to 2017 on the 30 patients who underwent LCDD. All patients were evaluated for immediate, early and long-term complications. **RESULT:** In our series, out of 30 patients 22(73.3%) patients were female and 8(26.6%) patients were male. All patients were operated for LCDD has excellent outcome without any significant morbidity and mortality.

KEYWORDS

LCDD =Laparoscopic choledochoduodenostomy, LCBDE= Laparoscopic common bile duct exploration, CBD= common bile duct, ERCP= endoscopic retrograde cholangiopancreatography.

INTRODUCTION

Choledochoduodenostomy (CDD) is an excellent technique for internal drainage of an obstructed and dilated common bile duct (CBD).¹⁻³ However, with the advent of endoscopic retrograde cholangiopancreatography (ERCP) and the expansion of laparoscopic common bile duct exploration (LCBDE), indications for choledochoduodenostomy have been drastically reduced.⁴⁻⁸ The first successful choledochoduodenostomy was performed in 1891 by Sprengel²⁷ while the first LCDD was reported in 1991 by Franklin et al.⁹ Indications of choledochoduodenostomy included obstruction of bile duct from un resectable tumour of CBD and pancreas, stricture of the bile duct, biliary fistulas, recurrent bile duct stone, stenosis of sphincter of oddi and choledochal cyst. In our study it was used for distal CBD stones, distal CBD stricture and failed ERCP case for CBD stones. It is most appropriately used in Post ERCP recurrent CBD stones. Choledochojunostomy and sphincteroplasty is complimentary to CDD. CDD either open or laparoscopic is technically easier, faster and require less manipulation of pancreatic duct than sphincteroplasty.¹⁰⁻¹⁴ A few points to consider before LCDD are; bile duct should be dilated and thickened and anastomosis should be minimum of 2.0-2.5 cm in length, the anastomosis should be made as distal as possible in CBD. Choledochoduodenostomy (CDD) has been the subject of considerable controversy since its first description by Riedel in 1892. Its acceptance is still debated in view of the expected complications, such as ascending cholangitis, sump syndrome and alkaline reflux gastritis. In spite of the good long-term results observed in some studies as well as our study, CDD or LCDD are considered a last resort for lower common bile duct (CBD) obstruction. The common indications for CDD or LCDD have remained unchanged over the years. Even in today's modern era of advance endoscopic surgery significant number of patients still need surgical intervention in the form of CDD or LCDD for benign biliary duct obstruction, as repeated ERCP on the CBD lead to increased morbidity and mortality, a permanent drainage procedure is indicated in all such patients. The present study was conducted to evaluate the effectiveness of LCDD in preventing the need for repeated ERCP and the prevention of its early and long-term complications. Lap CDD is also beneficial for failed ERCP cases.¹⁵ Recurrent bile duct stone formation is common following endoscopic sphincterotomy.¹⁶ The possible complications after lap CDD are cholangitis, pancreatitis, SUMP syndrome and anastomotic leak but their incidence are very rare. Madden et al.¹⁷ have suggested that descending cholangitis is more accurate term than ascending cholangitis. Contraindication of CDD or LCDD are obstruction in duodenum in which choledochojunostomy preferred.

AIMS AND OBJECTIVES

To evaluate the current status of laparoscopic choledochoduodenostomy (LCDD) for the management of multiple CBD stone with or without stricture as well as cases of failed ERCP for CBD stones and Evaluation of outcome both short term and long term.

INCLUSION CRITERIA

All patients having undergone only laparoscopic choledochoduodenostomy at smimer during 2012-2017 by the single surgeon (lead author).

EXCLUSION CRITERIA

1. Any patient with additional procedure apart from LCDD
2. LCDD performed by other surgeons.

MATERIALS AND METHOD

This retrospective observational study was done in SMIMER hospital, General Surgery department from 2012 to 2017. During this period 30 patients had been operated for LCDD. Record of all the patients were evaluated. On evaluation of record they were found to have distal CBD stones and/or stricture with jaundice. All patients had undergone routine blood investigation including LFT, RFT and radiological investigations like USG abdomen and MRCP.

Out of 30 patients for LCDD, 12 patients had h/o ERCP which failed to clear the stones. On review of OT note the procedure performed had a standard technique as all procedures had been performed by a single surgeon. The steps were-Creation of Pneumoperitoneum with veress needle followed by placement of 4 ports (two 11 mm & two 5.5 mm) as shown in image 1. Gall bladder was retracted upward through lateral most port. Callot's triangle was dissected as in standard lap. Cholecystectomy and cystic artery clipped and cut but cystic duct was clipped only. Anterior, lateral and medial CBD dissection was done followed by approx. 2 to 3 cm vertical incision over exposed lower part of CBD with monopolar-hook or active blade of harmonic scalpel. Stones were extracted and choledochoscope was routinely inserted in CBD to ensure stone clearance in both proximal and distal biliary tract. A 2 to 3 cm longitudinal incision was kept over 2nd part of duodenum and diamond shape anastomosis was done in single layer with interrupted suture using either vicryl 2-0 or PDS 2-0. Cholecystectomy was completed after dividing previously clipped cystic duct. Drain was kept in sub hepatic fossa. We have analysed the record of patients for intra-operative events, post-operative pain score, drain output and its content and other peri-operative complication in immediate post-operative period (POD 30), 1 year and on 3 year follow up.

DISCUSSION

Our study include 30 patients who had been operated for LCDD for indication of multiple CBD stone in 12 patients (40%), distal CBD stricture in 6 patients (20%) and 12 patients of failed ERCP for CBD stones. Mean age of patients was 38 year which is low comparative to other studies like Chander et al¹⁸ (48.7 year), Khajanchee et al¹⁹ (61 years), Tinoco et al²⁰ (68.7 years), Tang et al²¹ (62 years), Jayapalan et al²² (64.3 years). Male:Female ratio is 1:2.75 which is nearly similar to other studies like Chander et al¹⁸ (1:3.5), Tinoco et al²⁰ (1:3.1) Tang et al²¹ (1:3). Our study has 12 patients (40%) of failed ERCP which was

less compared to other studies like Khajanchee et al¹⁹ (75%) and Tang et al²¹ (100%). Failure of ERCP to clear the CBD stones were 4.4% to 10%²³.

In our study, majority of patients (60%) were operated under ASA grade 1 which is same as compare to other study like H Okamoto²⁵ (63%). For effective anastomosis and low long-term morbidity, the common bile duct should be dilated to at least 1.5 cm to prevent anastomotic stricture²⁴. In our study average diameter of CBD was 18 mm which is nearly similar to other studies like Chander et al¹⁸ (19.6 mm), Khajanchee et al¹⁹ (15-20 mm), Tinoco et al²⁰ (20 mm), Tang et al²¹ (20mm). We have done side to side diamond shape anastomosis with vicryl 2-0 in 70% cases and with PDS 2-0 in 30% cases, in interrupted manner. Other studies include diamond shape side to side anastomosis with different suture material like Chander et al¹⁸ (vicryl 3-0), Khajanchee et al¹⁹ (absorbable suture), Tinoco et al²⁰ (PDS 3-0), Tang et al²¹ (monocryl 2-0), Jeyapalan et al²² (silk 3-0, vicryl, monocryl). In our study blood loss during surgery was 30 ml which less compare to other studies like Sankaran RJ²⁶ (160 ml). Operative time for performing surgery was 150 minutes which was less compared to other published studies like Chander et al¹⁸ (156.3 min), Khajanchee et al¹⁹ (270 min), Jeyapalan et al²² (222min). The duration of surgery depends on factors such as stone burden, adhesions around the operative area, surgeon experience and advanced laparoscopic skills apart from mandatory good optics and equipment. No conversion from laparoscopic to open surgery has happened in our study as well as other studies like Chander et al¹⁸, Tinoco et al²⁰, Tang et al²¹, Jeyapalan et al²². In one similar study in Khajanchee et al¹⁹, conversion rate is 25%.

In our study, we have Ryle's tube removal on 3rd post-operative day and drain removal on 5th day after starting oral intake on 4th post-operative day. Hospital stay was 6 days after operation which was same compare to other published studies like Chander et al¹⁸ (6.4 days), Khajanchee et al¹⁹ (6 days), Jeyapalan et al²² (6 days). As of peri operative complications, we have reported 2 patients of urinary tract infection, 4 patients having upper respiratory tract infection and 1 patient have port site infection (epigastric port). There was no case of Re-hospitalization or Re-operation. Advantages of minimally invasive surgery was less pain, less need for analgesia, early return to home and work and less wound complications. Less pain and no major perioperative complication played vital role in discharging patients earlier. We recorded post-operative pain score with adequate analgesia on immediate post-operative day and on demand analgesia from 3rd day. No pain after 5th post-operative day recorded requiring analgesia in our study.

We have followed up all of the patients for immediate post-operative complications. On follow up investigations, decreased direct serum bilirubin 3.6±2 to 0.2±0.2, gamma-glutamyl transpeptidase 520 to 64.4 and alkaline phosphatase 352 to 127.6 has been recorded. In other similar study like – Velazquez A, Trejo-Avila³⁰ reported decreased serum direct bilirubin 2.4±2 to 0.2±0.1, gamma-glutamyl transpeptidase 611.7 to 74.6 and alkaline phosphatase 386.5 to 137.9. No any complication were noted on short term follow up. On long term follow up (1 to 3 year) 1 patients (3.3%) had cholangitis, 1 patient has sump syndrome (3.33%) and 1 patient (3.33%) has recurrent CBD stone. Other similar studies like Khajanchee et al¹⁹ noted 1 patient (5%) of sump syndrome, Chander et al¹⁸ and Tang et al²¹ noted anastomotic leak in 1 patients. In our study no anastomotic leak had happened. Anastomotic leak depends on many factors independent of technique, such as patient age, co morbidities, nutrition, and level of jaundice.

Sump syndrome is due to the retention of detritus, food particles, bacteria or gall stones in the portion of common bile duct distal to anastomotic site which lead to recurrent cholangitis and hepatic abscess. The incidence of the sump syndrome is unknown. It's reported incidence is 0%-9.6%²⁵. The side to side anastomosis is documented to be a major cause of sump syndrome. Factors like inadequate stoma size, shape and kinking, results in poor biliary drainage leading to sump syndrome²⁶. In our study no mortality reported, where as other similar studies like Khajanchee et al¹⁹ has reported 5% mortality, Tinoco et al²⁰ reported 4% mortality while Jeyapalan et al²² has reported 16.67% mortality.

CONCLUSION

Laparoscopic choledochoduodenostomy is a safe, single-stage and feasible surgical procedure for cases of CBD stones with or without

distal stricture and for cases of failed ERCP for CBD stones with low morbidity and no mortality and predictable post op course.

Epigastric 11 mm port

(Right hand working port site)

Mid clavicular 5 mm port

(Left hand working port site)



5 mm anterior axillary port site

(Assistant port for retraction)

11mm Umbilical port site(Camera port)

IMAGE 1: port placement sites



IMAGE 2: STONE REMOVAL THROUGH INCISED LOWER CBD



IMAGE 3: 2ND PART OF DEODENUM INCISED

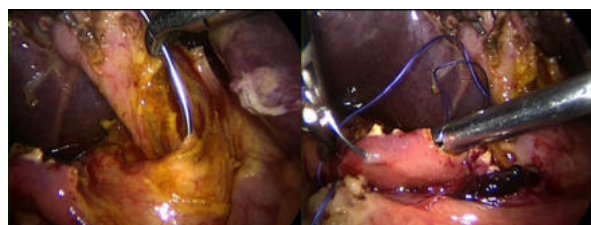


IMAGE 4:

IMAGE 5:

Image 4 And Image 5 Shows First Bite Through Lower Edge Of Incised Cbd And Centre Of Lateral Wall Of Incised Deodenal Edge

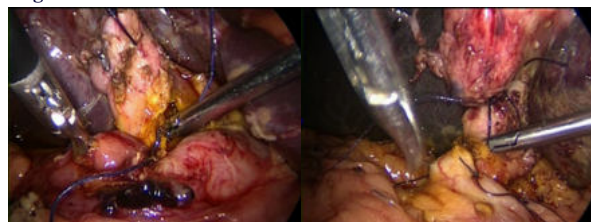


IMAGE 6:

IMAGE 7:

Image 6 And Image 7 Shows Last Few Stitches Of Choledochodeodeno Anastomosis



IMAGE 8:

IMAGE 9:

Image 8 Shows Completed Anastomosis With Intact Gall Bladder And Image 9 Shows Gb Fossa After Removal Of Gall Bladder

RESULT

Table 1: Operated Case Of Lcdd Year Wise

years	No of case operated for LCDD
2012	4
2013	6
2014	3
2015	5
2016	4
2017	8

Table 2: demographic profile of patients

Total No of patients	Mean age	sex	Indication of surgery	H/O cholecystectomy
30	38 year (range 18-60 years)	22 female patients, 8 male patients	Multiple CBD stones (12 pt.) Failed ERCP for CBD stone(12 patients) Benign CBD stricture (6 pt.)	2

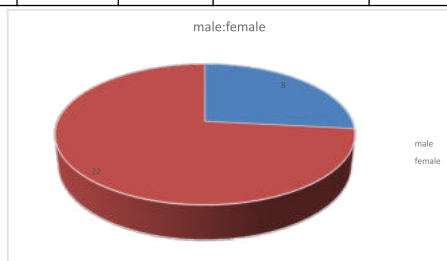


CHART 1: sex ratio

Table 3: Asa Grades Of Patients

ASA grade	No of patients
Grade 1	18
Grade 2	9
Grade 3	3
Grade 4	0

Table 4: Operative Details

No of patients	Diameter of CBD	Anastomotic technique	Suture for anastomosis	Operating time	Conversion rate	Blood loss
30	18 mm (range 14-22 mm)	Diamond shape	Vicryl 2-0 Interrupted suture (21 patients) PDS 2-0 Interrupted suture (9 patients)	150 min (110-190min)	Nil	30 ml (range 22ml-50 ml)

Table 5: Peri Operative Outcome

Ryle's tube output	120 ml/day (range 50-190 ml)	Removed on 3 rd POD
Drain output	40 ml/day (range 20-60 ml)	Removed on 5 th POD
Start of oral intake	4 th POD (range 3-5 days)	

Post-operative hospitalization	6 days (range 5-7 days)	
Port site infection	1 patient(epigastric port)	
UTI	2 patients	
Respiratory complication	4 patients (URTI)	
Re-operation	nil	
Re-hospitalization	nil	
Mortality	Nil	

Post op pain was observed and recorded according to visual analogue scale given below.

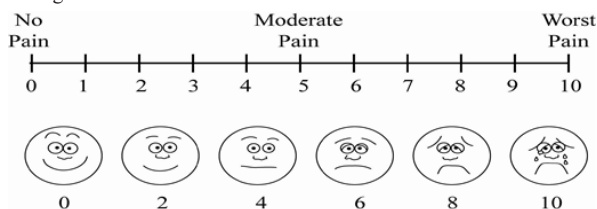


Figure 1: visual analogue scale

Table 6: Average Pain Analogue Score Day Wise

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
5.3	4.2	1.9	0.3	0	0	0

Table 7: Pre-operative, Post-operative And 1st Follow Up Details OfLft

characteristics	Pre-op	Post-op day 6	Post-op day 15
S.Direct Bilirubin, mean(SD)	3.6(±2)	0.6(±1)	0.2(±0.2)
GGT, mean (min-max)	520(80-780)	168.2(30-380)	64.4(15-178)
Alkaline phosphatase, mean(min-max)	352(70-850)	154.2(78-436)	127.6(60-250)

Table 8: Short Term Follow Up (30 Days)

No of patients	Post-operative stay	complication	Mortality	Recurrence of symptoms or cholangitis
30	6 days	nil	nil	nil

Table 9: Long Term Follow Up (1 To3 Yrs)

No of patients	cholangitis	Sump syndrome	Anastomotic stricture	Recurrent stones
30	1	1	nil	1

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