

Primary Closure of Common Bile Duct: Our Experience

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ABSTRACT

Objective: To assess the outcome of primary closure of Common Bile Duct (CBD) after open and laparoscopic choledocholithotomy.

Method: This descriptive observational study was conducted in a private hospital in Chattogram, Bangladesh from February 2016 to June 2019. All the patients who underwent open or laparoscopic choledocholithotomy during the study period were included. Ultrasonographic findings of CBD and its stone, wound infection, operation time, bile leak, biliary peritonitis, hospital stay all were observed.

Results: A total of 35 patients were found from clinical records having male to female ratio of 1:1.9. Most of the patients were in 41- 50 years age group. Mean operating time was 135 minutes in laparoscopic type and 80 minutes in open type. Overall wound infections were in 5 patients (14.28%) and all were in open group. Bile leak were in 4 patients (11.42%). Post-operative transient jaundice in 5 patients (14.20%). Biliary peritonitis in 3 patients (8.57%).

Retained single stone in one, pelvic abscess and abortion in one. Mean hospital stay were 5days in open type and 2 days in

laparoscopic type.

Conclusion: Primary closure of common bile duct after choledocholithotomy is relatively safe and not associated with that much of complications.

Key words: Primary Closure, Common Bile Duct, Choledocholithotomy.

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INTRODUCTION

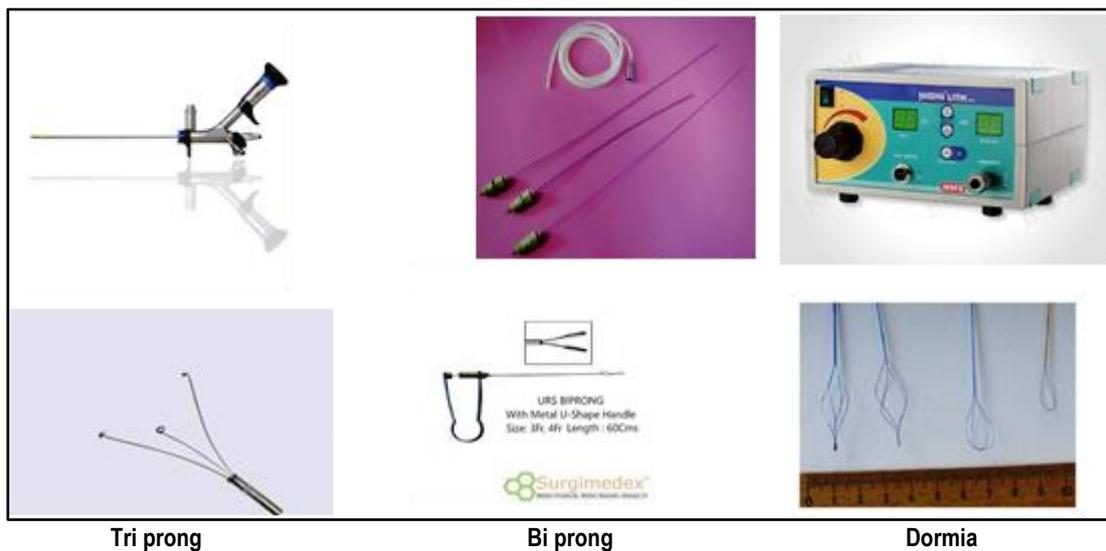
Stone in Common Bile Duct (CBD) also known as Choledocholithiasis develops in about 10–15% of patients with gall-bladder stone (Cholelithiasis).¹ CBD stones are encountered in approximately 7–15% of patients undergoing cholecystectomy.² It is managed either by endoscopic sphincterotomy and stone extraction (ERCP) or surgical exploration i.e. choledocholithotomy and closure of CBD over a T-tube.³

The recommendation for T-tube drainage is advantageous as it provides postoperative decompression of the CBD, it allows for radiological visualization of the CBD and it provides a potential route for extraction of any retained stones. The duration of T-tube drainage is variable and can range from 7–45 days depending on individual preference. A T-tube cholangiogram is usually performed during surgery or postoperatively to look for residual

stones or biliary leakage. Traditional CBD closer over T-tube carries potential complications.⁴ These include bacteremia, dislodgement of tube, obstruction and/or fracture of tube.⁵ Furthermore, leakage of bile may be encountered after removal.⁶ All of these lead to increased cost and prolong length of hospital stay.⁷ The role of T-tube has been challenged since Thornton⁸ and Halsted⁹ described primary duct closure after CBD exploration more than a century ago. Others also have challenged the utility of a T-tube^{10–17} and three randomized trials have shown benefit of primary closure over T-tube insertion.^{18–20} Primary closure of CBD has been described in literature to overcome adverse consequences of T-tube.^{21,22} But the debate has continued in the laparoscopic era and an increasing number of surgeons are favoring primary closure. The availability of choledochoscopy and

ERCP has greatly reduced the incidence of retained stones in bile duct. However, despite its obvious advantages, primary closure is not performed routinely. This study was conducted to assess the

outcome of primary repair of CBD both in open and laparoscopic technique in terms of wound infection, operation time, bile leak, biliary peritonitis and hospital stay.



Tri prong

Bi prong

Dormia

Figure 1, a: Uretero – Renoscope, Lithotripter and other instruments.

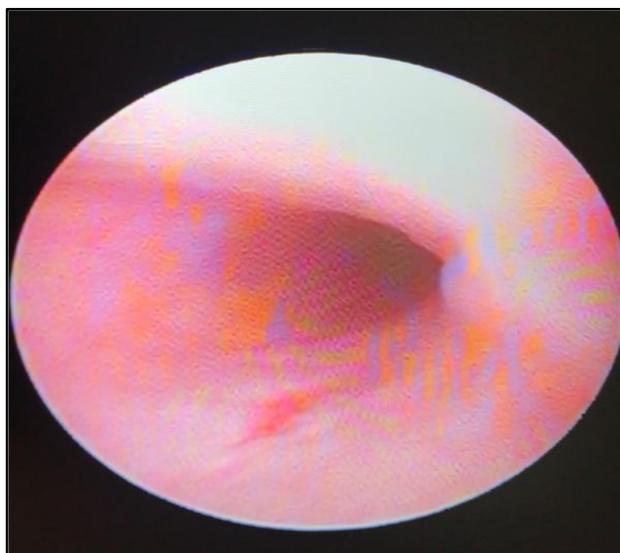


Figure 1, b: Ureteroscopic view of CBD.

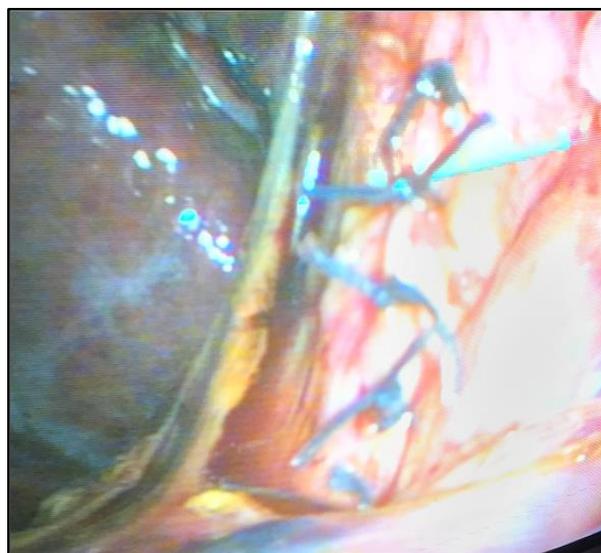


Figure 1, d: Primary closure of CBD.

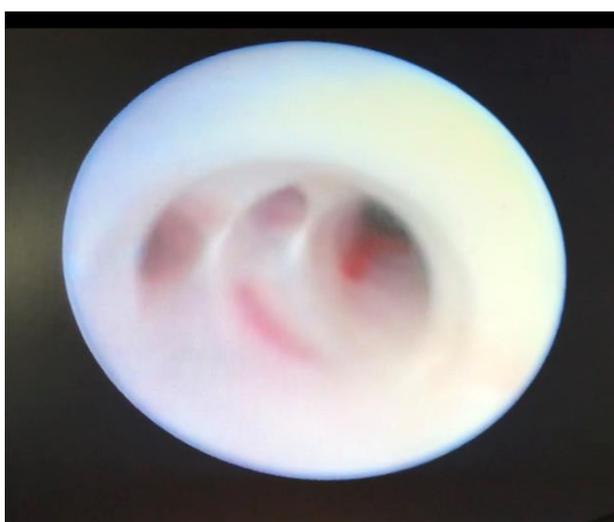


Figure 1, c: Ureteroscopic view of Intra – hepatic ducts.

METHODOLOGY

This retrospective observational study was conducted at a well-equipped private hospital in Chattogram. Clinical records of all the patients who underwent open and laparoscopic CBD exploration with primary closure between February 2016 to June 2019 were included. Demographic profile of patients (Age, Sex), size and number of stones, diameter of CBD, operation time, bile leakage, biliary peritonitis, wound infection, operation time and some other parameters were noted in preformed data record form. MRCP was done in only intrahepatic lithiasis. All 24 (68.57%) open cases were performed through right subcostal incision. In these cases, after cholecystectomy, longitudinal incision was made over supraduodenal portion of common bile duct with the help of stay suture. Stones were extracted with the help of Desjardins forceps and patency of distal passage was confirmed by negotiation of dilators into second part of duodenum. This was followed by irrigation of bile duct with normal saline via feeding tube.

Intrahepatic stones were retrieved with rigid Uretero – Renoscope (URS) and different types of forceps, suction device and dormia baskets, +/- Intracorporeal Shock Wave lithotripsy (ICPL). Details are shown in Figure 1, a. Lastly, stone clearance was checked with URS both in extra and intrahepatic biliary ducts (Figure1,b, c). Patients who had 1- 3 stones only in CBD with more than 10mm CBD diameter having no intrahepatic stone were included in laparoscopy group. All 11 (31.42%) laparoscopic cases were done with four conventional ports as done in laparoscopic cholecystectomy. After Calot’s triangle dissection cystic artery and duct ligated separately keeping the gallbladder in situ for retraction. None of the case done through trans cystic approach but supraduodenal choledochotomy approach. Stones were retrieved with URS +/- ICPL through epigastric port. All cases were checked with URS for stone clearance. URS was introduced through epigastric port for distal CBD and through right lumbar port for Common Hepatic Duct (CHD) and intrahepatic ducts. CBD were closed primarily once stone clearance was cent percent as checked and confirmed by URS. CBD were closed with 3/0 round body vicryl in interrupted fashion (Figure 1, d). Drain was in Morrison’s pouch in all cases.

After discharge most patients were recommended to attend at clinic on 7th, 14th post – operative days and three months with routine labs. Ultrasonography and in some cases MRCP were advised.

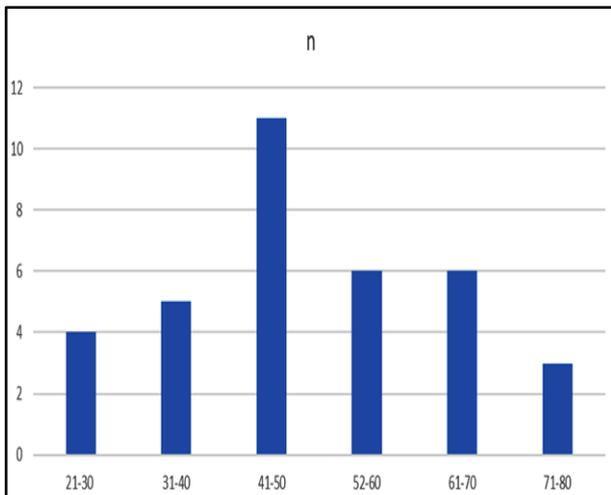


Figure 2: Age distribution of the patients.

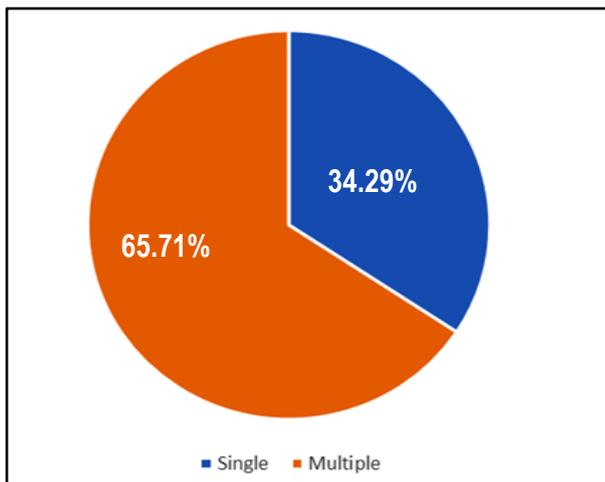


Figure-3: Distribution of the number of stones in CBD.

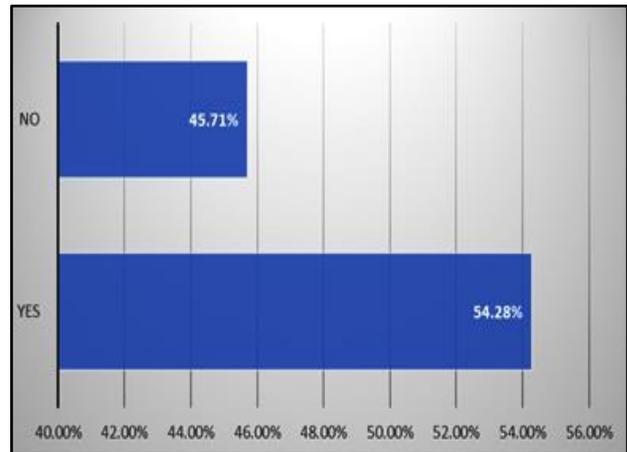


Figure 4: Intrahepatic stones of the patients.

Table I: Gender distributions of the patients:

| Gender | % |
|--------|-------|
| Male | 39.29 |
| Female | 65.71 |

Table II: CBD diameter of the patients:

| Diameter of CBD in USG | n |
|------------------------|----|
| 6-10mm | 12 |
| 11-15mm | 16 |
| 16-20mm | 5 |
| 21-25mm | 2 |

Table III: Distribution of the patients according to presence gallstone:

| Associated gall stone | % | P value |
|-----------------------|-------|---------|
| Yes | 77.14 | 0.569 |
| No | 22.86 | 0.001 |

Table IV: Distribution of the patients according types of surgery

| Surgery | % |
|--------------|-------|
| Open | 68.57 |
| Laparoscopic | 31.43 |

Table V: Postoperative complications of the patients

| Complications | % | P value |
|-------------------------------------|-------|---------|
| Wound infection | 14.20 | 0.234 |
| Wound dehiscence | 5.71 | 0.125 |
| Bile leak | 11.42 | 0.001 |
| Bile peritonitis | 8.57 | 0.001 |
| Post - operative transient jaundice | 14.20 | 0.323 |

Table VI: Operating time and hospital stay during the procedure.

| Surgery | Duration of surgery | Hospital stay |
|-----------------|---------------------|---------------|
| Open type | 80min | 5 days |
| Laparoscopytype | 135 min | 2 days |

RESULTS

Total 35 patient's profile were found in the hospital record who underwent either open or laparoscopic choledocholithotomy with primary closure of CBD during the study period. Figure-2 shows age distribution of the patients where age ranges from 22 to 80 years and most of the patients, 11 (31.42%) were in 41-50 years age group.

Table-I shows gender distributions of the patients where female predominant and were 23. Remaining 12 patients were male.

Table-II shows CBD diameter of the patients. CBD diameter was found ranging from 7mm to 24 mm. In most cases, 16 (45.71%) were between 11- 15mm.

Figure-3 shows distribution of the stones of the patients where 23 patients (65.71%) had multiple stones and 12 (34.29%) patients had single stone in CBD.

Table-III shows distribution of the patients whether they were associated with gall stone or not. Gallstone was associated in 27 patients and rest 8 patients had only CBD stone.

Figure-4 shows intrahepatic stones were present in 19 cases (54.28%) and absent in 16 cases (45.71%).

Table-IV shows distribution of the patients according to types of surgery where 24 were open case and 11 were laparoscopic.

Table-V shows postoperative complication of the patients where overall wound infections were in 5 patients. Bile leak were in 4 patients. Post-operative transient jaundice in 5 patients. Biliary peritonitis in 3 patients. Retained single stone in one, pelvic abscess and abortion in one.

Table-VI shows operating time and hospital stay during the procedures. Operation time is more in laparoscopic type but hospital stay is less.

DISCUSSION

In the modern minimally invasive approach era, the current standard protocol for the treatment of CBD stones is to clear and drain the CBD by means of Endoscopic Retrograde Cholangio Pancreatography (ERCP), followed by laparoscopic cholecystectomy.

However, these minimally invasive approaches are not widely practiced in many developing countries due to the lack of equipment and trained endoscopists. ERCP was less successful compared with open surgery in CBD stone clearance and was associated with a higher mortality rate.²³ There is also an increased recurrence rate of CBD stones after endoscopic removal.²⁴ Post ERCP pancreatitis, chance of ascending cholangitis and very rare possibility of increase chance of malignancy cannot be ignored.

Those who advocate the use of a T-tube, argue that it allows spasm or edema of sphincter of Oddi to settle after the trauma of the exploration. Postoperative T-tube drainage has been used to prevent bile stasis, decompress the biliary tree, acts as a stent in CBD and minimizes the risk for bile leakage. A T-tube has also provided an easy percutaneous access for cholangiography and extraction of retained stones. Despite these potential advantages, morbidity rates related to T-tube presence have been reported to be at a rate of 4–16%. The T-tube related complications include accidental T-tube displacement leading to CBD obstruction, bile leakage, persistent biliary fistulas, excoriation of the skin, cholangitis from exogenous sources through the T-tube, and dehydration.²⁵

As, T – tube drainage is associated with significant complications, therefore, primary repair of CBD has been advocated in literature. Zhang et al²⁶ noticed 28.6% of complications rate associated with T-tube in contrast to 11.1% in whom primary repair was performed. In this study, overall complications rate was 12.52% which is nearly comparable to the study conducted by Jahanjaib²⁷, Leida and associates.²⁸ They encountered 15% complications in those patients in whom primary closure was the method used.

Biliary complications are considered to be the major consequence after primary repair of CBD. However, their overall frequencies are much less than that of T-tube closure. In this study 4 patients had bile leak (11.42%) all were improved with conservative management and only in one case required USG guided aspiration. We found biliary peritonitis in 3 patients (8.57%). Ahmad and colleagues⁴ observed 22% and 8.9% of these complications in T-tube and primary closure groups respectively. Ambreen et al⁶ noticed one (6.3%) patient of bile leakage that subsided conservatively, which is comparable to this study. Jahazaib²⁷ found bile leak in three (7.89%) patients whereas small subphrenic collection was noticed in one (2.63%) patient. Ha et al²⁹ also encountered one patient of subphrenic collection in their series.

The mean operating time was 80 minutes. It is comparable to previous study encountered by Ha and colleagues in their retrospective case series.²¹ As a result of postoperative complications and long placement of T-tube till removal, hassle of T – tube cholangiogram, duration of hospital stay gets prolonged which is nearly 12-18 days. Of course, it is costly too. This forced surgeons to move towards primary repair technique of CBD that have been advised in literature. In our study, mean duration of hospital stay was 5 days in open cases which are nearly comparable to the study conducted by Decker et al.²⁹ But in laparoscopic cases mean hospital stay was 2 days.

CONCLUSION

We can conclude that primary closure without external drainage (T - tube) after choledocholithotomy is feasible and safe. It is cost effective too. However, randomized trials on a larger scale of patients and with a longer follow up are necessary to address the issue.

LIMITATIONS

Sample size was very small to comment on the very important and sensitive issue. Laparoscopic and open group were not analyzed separately. Patients were not followed up for long period to observe whether they develop any CBD stricture or not. Rigid URS was used for managing and checking stone clearance instead of Choledochoscope.

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