

**Original article:**

## **Comparison Between Primary Closure of Common Bile Duct and T-Tube Drainage After Open Choledocholithiasis: A Hospital Based Study**

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### **Abstract**

**Background:** Approximately 10% of gallstone patients have concomitant common bile duct (CBD) stones. Laparoscopic surgery for CBD stones could be categorized into transcystic and choledochotomy approaches. In laparoscopic choledochotomy for CBD exploration (LCCBDE), the integrity of the CBD is lost due to the incision over the duct. Hence; we planned the present study to assess and compare the efficacy of primary closure of common bile duct and T-Tube drainage procedure after Choledocholithiasis removal procedures.

**Materials & methods:** The present study included comparative evaluation of efficacy of primary closure of common bile duct and T-Tube drainage procedure after Choledocholithiasis removal procedures. A total of 48 patients were included in the present study that underwent surgical procedure for the removal of Choledocholithiasis. All the patients were broadly divided into two study groups as follows: Group 1: Patients who underwent primary closure of CBD, Group 2: Patients in which T-tube was inserted into the CBD. Postoperative complications and results in both the study groups were evaluated by SPSS software.

**Results:** Most common encountered symptoms of patients of group 1 and group 2 included biliary colic, acute cholecystitis and jaundice. Bile leakage was seen in 2 and 3 patients of group 1 and group 2 respectively. No significant results were obtained while comparing the postoperative complications among patients of both the study groups.

**Conclusion:** No significant difference exist while comparing the postoperative complications in between patients of the two study groups

**Key words:** Choledocholithiasis, Common bile duct, T-Tube drainage

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### **Introduction**

Approximately 10% of gallstone patients have concomitant common bile duct (CBD) stones, which are related to serious complications such as cholangitis and pancreatitis. Therefore, it is particularly important to improve and standardize the process of diagnosis and treatment of CBD stones. The conventional approach of open CBD exploration is considered an effective treatment option.<sup>1-3</sup>

Laparoscopic surgery for CBD stones could be categorized into transcystic and choledochotomy

approaches. In laparoscopic choledochotomy for CBD exploration (LCCBDE), the integrity of the CBD is lost due to the incision over the duct. In contrast, the cystic duct is used for laparoscopic transcystic CBD exploration (LTCBDE), thus minimizing the size of the incision over the CBD.<sup>4,5</sup>

T-tube choledochotomy for common bile duct (CBD) exploration was first described more than 100 years ago and has since been used by surgeons around the world for the management of biliary lithiasis. When laparoscopic cholecystectomy

became the gold standard of treatment for calculous cholecystitis, laparoscopic techniques for CBD exploration became necessary and T-tube choledochotomy continued to be a useful approach.<sup>6-8</sup>

Hence; we planned the present study to assess and compare the efficacy of primary closure of common bile duct and T-Tube drainage procedure after Choledocholithiasis removal procedures.

#### **Materials & methods**

The present study was conducted in the department of general surgery of R.B.M. Hospital, Bharatpur, Rajasthan, and included comparative evaluation of efficacy of primary closure of common bile duct and T-Tube drainage procedure after Choledocholithiasis removal procedures.

#### **Ethical clearance**

Ethical clearance was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol.

#### **Sample size**

A total of 48 patients were included in the present study that underwent surgical procedure for the removal of Choledocholithiasis. All the patients were broadly divided into two study groups as follows:

Group 1: Patients who underwent primary closure of CBD

Group 2: Patients in which T-tube was inserted into the CBD

Complete investigations were carried out in all the patients. Ultrasound was used for confirming the presence of stones in the CBD. Exclusion criteria for the present study included:

- Patients with history of pancreatitis,
- Patients with history of suppurative cholangitis,

- Patients with presence of any form of malignancy,
- Patients with presence of any other systemic illness,
- Patients with any known drug allergy

Antibiotic therapy was given to patients of both the study groups before the starting of the surgical therapy. We confirmed the clearance of the duct with a choledochoscope. In 24 patients, primary closure of the CBD was done; while in remaining 24 patients, T-tube insertion was carried out. Postoperative complications and results in both the study groups were evaluated by SPSS software. Chi-square test and student t test were used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

#### **Results**

A total of 48 patients were included in the present study. All the patients were broadly divided into two study groups with 24 patients in each group. Mean age of the patients of group 1 and group 2 were 48.5 years and 49.7 years respectively. Most common encountered symptoms of patients of group 1 and group 2 included biliary colic, acute cholecystitis and jaundice. Bile leakage was seen in 2 and 3 patients of group 1 and group 2 respectively. No significant results were obtained while comparing the postoperative complications among patients of both the study groups.

#### **Discussion**

In the present study, we observed non-significant difference while comparing the postoperative complication in between patients of the two study groups. Ambreen M et al compared the clinical results of primary closure with T-tube drainage after open choledochotomy and assess the safety of primary closure for future application on a greater mass. This comparative study was conducted at surgical unit IV Liaquat University of Medical and

Health Sciences, Jamshoro, from January 2007 to December 2007. Thirty-five patients were included in the study of which 16 patients underwent primary closure. Thirty-five patients were included in the study. The mean age of patients who had primary closure done (n = 16) was 46.0 +/-16.8 and there were two (12.5%) males and 14 (87.5%) females. After primary closure of the CBD, bile leakage was noted in one patient (6.3%), which subsided without any biliary peritonitis as compared to the T-tube group in which two patients (10.5%) had bile leakage. Postoperative jaundice was seen in one patient (5.3%) who had a T-tube because of a blockage of CBD. Not a single patient had a retained stone in both groups as well as no recurrence of CBD stones. The postoperative hospital stay after primary closure was 5.56 +/-1.1 days as compared to after T-tube drainage which was 13.6 +/-2.3 days. The total cost of treatment in patients who underwent primary closure was USD194.5 +/-41.5 but after T-tube drainage it was USD548.6 +/-88.5. The median follow up duration for both groups was 6 months. Primary CBD closure is a safe and cost effective alternative to routine T-tube drainage after open choledochotomy.<sup>9</sup>

Zhang HW et al evaluated feasibility and advantages of primary closure versus conventional T-tube drainage of the common bile duct (CBD) after laparoscopic choledochotomy. In this retrospective analysis, 100 patients (47 men and 53 women) with choledocholithiasis who underwent primary closure of the CBD (without T-tube drainage) after Laparoscopic common bile duct exploration (LCBDE) (Group A) were compared with 92 patients who underwent LCBDE with T-tube drainage (Group B). Both groups were evaluated with regard to biliary complications, hospital stay, and recurrence of stones. The mean operation time was 104.12 minutes for Group A

and 108.92 minutes for Group B (P = 0.069). The hospital stay was significantly shorter in Group A than that in Group B (6.95 days and 12.05 days, respectively; P < 0.001). In Group A, bile leakage occurred in two patients on postoperative Day 2 and Day 3, respectively. In Group B, bile leakage noted in one patient after removal of the T-tube on Day 14 after operation (P = 1.000). With a median follow-up time of 40 months for both groups, stone recurrence was noted in two patients in Group A and three patients in Group B (P = 0.672). Primary closure of the CBD is safe and feasible in selected patients after laparoscopic choledochotomy. It results in shorter duration of hospital stay without the need for carrying/care of a T-tube in the postoperative period and similar stone recurrence as that of the conventional method.<sup>10</sup> Ha JP et al conducted a retrospective analysis of patients who underwent primary closure of the CBD after successful laparoscopic choledochotomy for ductal stones between January 2000 and December 2003. A concurrent control group of patients who underwent T-tube drainage was used for comparison. Of the 64 patients that underwent laparoscopic exploration of the CBD, 24 (37%) underwent transcystic duct approach and 40 (63%) underwent choledochotomy. There were three open conversions (5%). Stone clearance was achieved in all patients with successful laparoscopic choledochotomy (100%). Of the 38 successful laparoscopic choledochotomies, 12 had primary closure of the CBD and 26 had closure with T-tube drainage. There was no mortality in both groups. One patient in the primary closure group suffered from paralytic ileus and small subhepatic collection which was treated conservatively. The median operative time (90 vs. 120 minutes, p=0.002) and postoperative stay (5 vs. 8.5 days, p=0.003) were shorter in the primary closure group when compared with the T-tube group. Primary closure

of the CBD is feasible and as safe as T-tube insertion after laparoscopic choledochotomy for stone disease.<sup>11</sup>

#### **Conclusion**

From the above results, the authors concluded that no significant difference exist while comparing the postoperative complications in between patients of the two study groups.

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**Table 1:** Details of patients of both the study groups

Parameter		Group 1(n=24)	Group 2(n=24)
Mean age (years)		48.5	49.7
Gender	Males	18	18
	Females	6	6
Symptoms	Biliary colic	14	15
	Acute cholecystitis	8	9
	Jaundice	5	4

**Table 2:** Comparison of postoperative complications

Parameter	Group 1 (n=24)	Group 2(n=24)	p- value
Postoperative jaundice	0	2	0.58
Leakage bile	2	3	
Post-operative infection	1	1	