



CBD INJURY MANAGEMENT PRIMARY REPAIR VERSUS T-TUBE PLACEMENT

Surgery

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ABSTRACT

Background: CBD injury is a dangerous complication of cholecystectomy with significant postoperative sequelae in terms of morbidity, mortality and quality of life. The choice lies between primary repair and T-tube drainage which is done after CBD injury. **Aim:** To determine the safety and efficacy profile of primary repair versus T-Tube placement in the management of CBD injury. **Methods:** In a Period of 1 year, Total 40 patients with CBD injury were included in the study. Half of the patients were treated with CBD exploration and primary repair, and remaining were treated with CBD exploration and primary closure with T-Tube. **Results:** The mean age of patients in Group-A was 41.85 ± 9.33 years and in Group-B 40.35 ± 11.09 years. The mean operative time, post operative hospital stay and time for sub hepatic drain values were significantly short (p -value < 0.05) in group-A as compared to corresponding values of group-B. **Conclusion:** Primary repair is more effective and safe in comparison to T-Tube placement for treating Bile Duct Injury in terms of Leakage/biliary peritonitis, Time for subhepatic drain removal after surgery, Operative time and Post operative hospital stay. All these outcome parameters are of clinical significance for primary closure.

KEYWORDS

Primary repair, CBD injury, T-Tube drainage, Hospital stay, Post operative time

INTRODUCTION

CBD injuries are mostly iatrogenic and may infrequently be due to trauma. The most common procedure causing a bile duct injury is laparoscopic cholecystectomy. Historically the incidence of bile duct injury while performing an open cholecystectomy was as low as 0.1%-0.2% but with introduction of laparoscopic cholecystectomy, incidence has increased to 0.4%-0.6%. Laparoscopic Cholecystectomy performed for acute cholecystitis and more so for gall bladder empyema or gangrenous cholecystitis has a higher chance of bile duct injury.

Most Common treatment options for BDI are primary repair and Tube placement.

Several Studies have depicted the advantage of primary repair over placement of T-tube. Persistent drainage of bile from inside can lead to fluid and electrolytes imbalance and dietary deprivations. Mostly cholangitis and wound sepsis are notable significant complications associated with T-tube placement. T-tube removal results in leakage of biliary fluid in about 1-30% of cases³⁻¹⁰.

External loss of bile leak through T-tube may lead to slow process of wound healing, lack of appetite and constipation (post-choledocotomy acidotic syndrome). Complications like migration, fracture of tube, encrustation, hindrance in removal, and stricturing of duct are explained. The repeated formation of stones are thought to be more in T-tube drainage as the tube acts as a foreign body facilitating the precipitation of pigments and bile salts¹¹⁻¹⁶. This study was undertaken to investigate the efficacy and safety of the primary closure of CBD without T-Tube. We hypothesized that primary repair is better in terms of lesser chances of bile leakage or biliary peritonitis, shorter operative time, early removal of sub hepatic drain and lesser post operative hospital stay as compared to T-Tube.

MATERIALS AND METHODS

This randomized control trial was conducted at the department of Surgery, Sarojini Naidu Medical College Agra, Using simple Random Sampling. All patients were divided into two groups using random number table. Patients of group-A were managed with CBD exploration and primary closure without T-Tube and groups-B received treatment mode of CBD exploration and primary closure over T-Tube. A total of 40 cases 20 in each group, were taken (the sample size was calculated by the following formula keeping the power of study equal to 90% and level of significance equal to 95%).

Where n is sample size, Z is the level of confidence $\frac{Z^2 \cdot p \cdot (1-p)}{e^2}$ (1.96), p is estimated frequency and e is the precision.

All patients between 20-65 years of age and of either sex were diagnosed to have CBD stones on USG. Patients with diagnosis of Cholecystitis or Acute Gall Bladder Disease, Cholangitis, Malignancy. Hepatic failure and Immunocompromised were excluded from study.

Outcomes were measured as leakage or biliary peritonitis that was checked by applying two methods; by bile drainage through subhepatic drain and biliary peritonitis which is manifested by abdominal pain, fever ($>99^\circ\text{F}$), tachycardia, tenderness, raised TLC ($>10,000/\text{uL}$) and collection on USG abdomen. Sub-hepatic drain time was calculated in terms of days from the day of operation to the day of removal of drain. Operative time was counted in minutes and started from time of incision till the end of procedure and Hospital stay was counted in terms of days from the date of surgery of a patient till discharge. All the patients were kept in postoperative recovery room for 4 hours until they were fully conscious. They were kept in the ward till they were pain free and mobile. Device was removed when drain was nil. The patients were followed up at 7th, 14th, 21st and 30th day of the discharge for the outcome parameters. The skin stitches were removed at 7th day of surgery.

The collected data were entered in SPSS version 18 and analyzed through it. Mean and standard deviation were calculated for quantitative variables like age, time of surgery, hospital stay and time for sub-hepatic drainage. Qualitative variables, like biliary peritonitis and biliary leakage were described as frequency distribution table. Student t-test was applied for quantitative variables and Chi-square test was applied for qualitative variables like sex, infection and leakage. P -value ≤ 0.05 was considered as significant.

RESULTS

Mean age of Group-A patients was 41.85 ± 9.33 years. Minimum and maximum ages were 28 and 60 years respectively. In Group-B mean age of patients was between 40.35 ± 11.09 years. Minimum and maximum ages of patients were 28 and 65 years respectively. In Group-A gender distribution shows that 2 male and 18 female patients were selected. While in Group-B gender distribution shows that 5 patients were male and 15 patients were of female gender. Female patients were dominating male patients in both treatment groups. For Group-A mean operative time was 101.05 ± 4.96 minutes while for Group-B mean procedure time was 117.05 ± 8.12 minutes. According to p -value (<0.001) mean operative time was short for group-A (Primary closure) as compared to group B (T-Tube drain). Mean time of hospital stays in Group-A was 6.40 ± 1.39 days. Minimum and maximum hospital stay ranged between 4 and 10 days. In Group-B mean hospital stay time was 12.10 ± 3 . Minimum and maximum hospital stay was 9 days and 22 days respectively; p -value of <0.001 indicates that mean hospital stay was significantly short for group-A

(Primary closure) as compared to group-B (T-Tube drain). None of the patients had Biliary Peritonitis in both treatment groups. In Group A mean time for sub hepatic drain was 5.20 ± 1.23 days and in Group-B 10.80 ± 1.85 days. In Group-A minimum and maximum time for sub hepatic drain was 3 and 8 days while in Group-B it was 8 and 15 days respectively. Analysis of data shows that time for sub hepatic drain was significantly ($p < 0.001$) short for group-A (Primary closure) as compared to group B (T-Tube drain) (Table 1).

Table-1: Comparison Of Age, Gender And Treatment Outcome In Both Study Groups

		Treatment Group		p-value
		Group-A	Group-B	
Age (years)	Mean $\pm$ S.D	41.85 ± 9.33	40.35 ± 11.09	> 0.05
Gender	Male [n (%)]	2 (10%)	5 (25%)	> 0.05
	Female [n (%)]	18 (90%)	15 (75%)	
Operation time (hours)	Mean $\pm$ S.D	101.05 ± 4.96	117.05 ± 8.12	< 0.001
Hospital stay (days)	Mean $\pm$ S.D	6.40 ± 1.39	12.10 ± 3.0	< 0.001
Biliary Peritonitis	Yes [n (%)]	0 (0%)	0 (0%)	---
	No [n (%)]	20 (100%)	20 (100%)	
Sub hepatic drain (days)	Mean $\pm$ S.D	5.20 ± 1.23	10.80 ± 1.85	< 0.001

Group-A= Primary Repair Group- B= T-Tube

DISCUSSION

In present study mean hospital stay in Group-A was 6.40 ± 1.39 days and in Group-B mean hospital stay was 12.10 ± 3 days. Hospital stay was shorter in patients who were treated with primary closure as compared to that of T-Tube. i.e., (p -value ≤ 0.000)

Several Studies concluded that The application of a T-tube can lead to spasm or oedema of sphincter of Oddi to settle after the trauma of exploration. If the drainage of the duct is unsuccessful, it would result in creating of pressure in the extra hepatic ductal system, leading to outflow or malrepairing of duct with biliary peritonitis. Also it is used for detection and removal of retained stones through tube tract. Statistical analysis indicates that mean operative time was short in patients who were treated with primary closure as compared to that of T-tube.

Several studies reported that Bile peritonitis likely to develop in 1.0% of the patients of the primary repair group and 2.9% of the patients of the T-tube group. Biliary leakage, unrelenting biliary fistula, excoriation of epidermis and cholangitis caused by migration of microscopic creatures may prolong the hospital stay and delay recovery. T-tubes which are placed are uncomfortable, require continuous management and limit the patient's mobility because of the risk of dislodgment. Patients on free drainage with T-tubes are at risk of dehydration and electrolyte imbalance.

Some researchers found no worth mentioning difference in the mortality or morbidity between primary repair and T-tube drainage, others found higher mortality, more biliary infection, and early morbidity after T-tube drainage. There have been reports of tube displacement causing common bile duct obstruction and biliary leakage following removal of T-tube. Furthermore, the hospital admission time is prolonged after T-tube drainage.

CONCLUSION

Primary closure of CBD is superior approach to that of T-Tube drainage in terms of short operative time (101.05 vs. 117.05 days), short post operative hospital stay (6.40 vs. 12.10 days) and time for sub hepatic drain (5.20 vs. 10.80 days). On the basis of these results it is conclusive as an open fact that Primary closure of CBD is safe and effective procedure, a definite alternative to T-tube drainage.

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