LAPROSCOPIC COMMON BILE DUCT EXPLORATION: STENT DRAINAGE VERSUS T- TUBE DRAINAGE

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Abstract

Introduction: One of the safe & feasible methods for the management of extra-hepatic bile duct calculi is laparoscopic bile duct exploration. Around 10-15% of the subjects who have surgery due to gallstone disease have choledocholithiasis associated with it. A standard procedure to prevent bile escape from the choledochotomy site is conventionally postoperative T-tube drainage following common bile duct exploration.

Aims & Objectives: Comparative study of laparoscopic common bile duct exploration using stent drainage versus t- tube drainage.

Material & Methods: The study involved a total of 46 subjects with choledocholithiasis, who were categorized in 2 categories. Category I as a drainage category of stents and Category 2 as a drainage category of T-tubes. The subjects in both classes underwent LCBDE surgery. Of the 46 subjects operated, 23 were in category I (stent drainage category) and 23 were in category 2 (T-tube drainage category).

Results: 23 subjects were categorized in the stent drainage and T-tube drainage categories, respectively. In both classes, no perioperative or postoperative mortality was reported. Subjects had hypertension in stent drainage category 4 (17.39 percent) and 5 (21.73 percent) suffered from diabetes as a comorbid disease, while 2 (8.69 percent) subjects had jaundice. Four (17.39 percent) subjects with diabetes and three (13.04 percent) subjects with jaundice were found in T-tube drainage category 3 (13.04 percent) with hypertension. In both classes, no statistically significant difference was found. In terms of organisational results and outcomes, statistically significant variations were found in both categories (Table 3). Mean operating time was 103 ± 22.4 in category I while 127 ± 32.7 (P value < 0.005) in category II. In the Stent Drainage Category, blood loss during procedure was 22 ± 3.7 ml, while in the T-tube drainage category it was 38 ± 5.1 (P value < 0.005).

Conclusion. After laparoscopic choledochotomy, primary closure of the bile duct with spontaneously reversible biliary stent placement is a viable and practicable process. With spontaneously removable biliary stents, less surgery time, less bleeding and less intestinal complications have been observed.

Keywords: stent drainage, T- tube drainage, choledochotomy

Introduction

One of the viable and practicable approaches for the management of extra-hepatic bile duct calculi is laparoscopic bile duct exploration. Around 10-15 % of subjects who have surgery due to gallstone disease have choledocholithiasis associated with it^{1,2}. A standard procedure to prevent bile escape from the choledochotomy site is conventionally postoperative T-tube drainage following common bile duct exploration. The first laparoscopic chole-cystectomy was conducted in 1985. As a result of advances in technology, surgical instruments and surgical procedures, the next stage of laparoscopy culminated in the emergence of Laparoscopic Common Bile Duct Exploration (LCBDE)^{3,4,5}. A cost-efficient, effective and minimally invasive method of treating choledocholithiasis is laparoscopic common bile duct exploration. But there are now several options available for several days, including endoscopic retrograde cholangiopancreatography (ERCP), laparoscopic CBD exploration (LCBDE) or open exploration of CBD. Laparoscopic CBD exploration does, however, benefit from limited access and cost-effectiveness^{6,7}. A viable and

practicable procedure for the management of extra-hepatic bile duct calculi has been shown to be laparoscopic bile duct exploration. After common bile duct exploration, postoperative T-tube drainage is a typical and normal technique to prevent bile escape from the site of choledochotomy, and the available drainage options include T-tube placement, main closure or main closure of the common bile duct (CBD), plus biliary stent placement. Long-term T-tube retention is often related to the patient's risk of infection, bile escape, and an awkward accessory. The risks of primary closure are stenosis and persistent cholangitis⁸. It is also recommended that the biliary stent be removed naturally within a reasonable period, without any procedures or complications. For this purpose, following Laparoscopic typical bile duct exploration, the use of spontaneously removed biliary stent evaluation was carried out⁹.

Aims & Objectives: Comparative study of laproscopic common bile duct exploration using stent drainage versus t-tube drainage.

Material and Methods

In a tertiary health centre, the present prospective, comparative, research was performed. Informed written consent was collected from all subjects involved in the study. The research procedure was accepted by the Institutional Ethics Committee. The study involved a total of 46 subjects with choledocholithiasis, who were categorized in 2 categories. Category I as a drainage category of stents and Category 2 as a drainage category of T-tubes. The subjects in both classes underwent LCBDE surgery. Of the 46 subjects who underwent surgery, 23 were in category I (stent drainage category) and 23 were in category 2 (T drainage category). In all subjects, surgical time, intraoperative blood loss, bowel function recovery time, abdominal drainage time, hospital duration period and bile escape were observed and noted. Demographic information including age, sex, comorbid conditions and clinical symptoms was collected. Surgeries under general anaesthesia under all aseptic precautions were performed.

The operation used a total of four trochars. The cystic artery and the separated and connected cystic duct. The electrocautery of the artery was separated, and the cystic duct was left intact. On its anterior surface, the typical bile duct was

incised and choledochotomy was performed with a longitudinal incision. The biliary tree was explored and calculi were removed. A T-tube or biliary stent drainage tube was placed in place prior to the choledochus closure. A guide was inserted into CBD via a choledochoscope in the stent drainage community and advanced across the papilla into the duodenum after the stent was advanced into the duodenum and the guide was removed. To confirm the proper stent placement, the choledochoscope was used and the choledochotomy was closed. The T-tube was put in the CBD within the T-tube drainage community. In both cases, the cystic duct was then separated and the chole-cystectomy was performed.

For all subjects, a subhepatic drainage tube was added, which was withdrawn after 2 to 4 days. The T-tube was cut after the surgery between days 14 and 21. Without special intervention, the biliary stent drainage tube gets expelled by defecation. In the Excel sheet, data was entered and analysed. Using SPSS programme, all statistical analyses were carried out. As mean $\pm$ standard deviation, data on continuous variables are presented,

Results

23 subjects were categorized in the stent drainage and T-tube drainage categories, respectively. In both classes, no perioperative or postoperative mortality was reported.

Table 1: Subjects characteristics

	Category I	Category II
	Stent Drainage Category (n=23)	T- tube drainage category (n= 23)
Male	13 (54.5%)	12(52.17%)
Female	8(43.47%)	9 (47.82%)
Mean Age in years$\pm$ SD	56.22 $\pm$ 17.54	57.49 $\pm$ 16.87
Mean CBD Diameter $\pm$ SD	9.7 $\pm$ 6.98	9.9 $\pm$ 9.46

There were 13 males (56.5 percent) and 10(43.47 percent) females in the stent drainage category (n=23), while 12 males (52.17 percent) and 11 females (47.82 percent) were males in the T- tube drainage category (n= 23). In the male and female classes, no statistically significant difference was observed.

Table 2: Co-morbid conditions associated

	Category I	Category II
	Stent Drainage Category (n=23)	T- tube drainage category (n= 23)
Hypertension	4 (17.39%)	3(13.04%)
Diabetes	5 (21.73%)	4(17.39%)
Jaundice	2 (8.69%)	3 (13.04%)

In stent drainage category, 4 subjects had hypertension (17.39 percent) and 5 (21.73 percent) had diabetes as a comorbid disease, while 2 (8.69 percent) subjects had jaundice. Four (17.39 percent) subjects with diabetes and three (13.04 percent) subjects with jaundice were found in T-tube drainage category 3 (13.04 percent) with hypertension. In both classes, no statistically significant difference was found.

Table 3: Operative findings and outcome in both the categorys

Parameters	Category I	Category II	P-value
	Stent drainage Category (n=23)	T- tube drainage category (n=23)	
Operation time in minutes	103± 22.4	127±32.7	<0.05
Blood loss during operation in ml	22±3.7	38±5.1	<0.05
Abdominal drainage tube removal in days	3.2	4.8	<0.05
Intestinal recovery in days	1.9	4.1	<0.05
Total hospital duration	6.9	10.0	<0.05

In terms of organisational results and outcomes, statistically significant variations were found in both categorys (Table 3). Mean operating time was 103±22.4 in category I while 127±32.7 (P value < 0.05) in category II. In the Stent Drainage Category, blood loss during procedure was 22±3.7 ml, while in the T-tube drainage category it was 38±5.1 (P value < 0.05). In the Stent drainage category, the average abdominal drainage tube removal was 3.2 days and in the T tube drainage category, 4.1 days. In the stent drainage category and T-tube drainage category, postoperative bowel function recovery period was 1.9 days and 4.1 days, respectively (P < 0.05). The overall hospital duration was in the stent drainage category for 6.9 days and in the tube drainage category for 10 days.

Discussion:

Without a standard care regimen, the management of accompanying gallbladder and common bile duct calculi differs from surgeon to surgeon in terms of surgical procedure. Endoscopic retrograde cholangiopancreatography accompanied by laparoscopic chole-cystectomy has been commonly used, but surgeons often conduct laparoscopic common bile duct exploration (LCBDE)^{10,11}. For uncomplicated common bile duct calculi, laparoscopic exploration of the common bile duct has been shown to be a successful and most favoured solution. However, there is still debate about the option of laparoscopic biliary decompression. Some authors have presented the LCBDE approach with antegrade endobiliary stent insertion and primary CBD closure using unidirectional barbed suture and observed that LCBDE with barbed V-Loc suture with endobiliary stent insertion is a secure, feasible, easily reproducible management modality^{12,13}.

In their research, Huang J and his colleague inserted a spontaneously removed endobiliary J stent in the distal CBD to decompress the biliary tract and performed a primary closure of the CBD after laparoscopic exploration of the typical bile duct and noted that spontaneously removed endobiliary J-stent drainage is a safe and efficient surgical technique that enables simple postoperative managers. It is found in surgery with T tube use that bowel absorption is impaired and peristalsis is slowed down^{14,15}. The biliary pressure is lowered in the biliary stent without bile loss, and this can help minimise postoperative complications. There is no need for a second procedure to use biliary stents and their

spontaneous removal, which decreases the risk of complications. In the Stent drainage category, the abdominal drainage tube removal was 3.2 days, and in the T- tube drainage category, it was 4.1 days. It was statistically substantial¹⁶. The use of stent drainage should be prevented in subjects with intestinal adhesion or intestinal diverticulum. Previous studies have shown that intestinal perforation occurs due to stent migration in subjects with intestinal adhesion or intestinal diverticulum, and it is also considered that spontaneous stent removal is correlated with the patient's postoperative mental state, operation, diet and gastric motility. There are synchronous common bile duct (CBD) calculi in 10-15 % of subjects who have gallstone disease. It has been shown that combined laparoscopic cholecystectomy and intra-operative laparoscopic bile duct exploration are safe and efficient for CBD stone removal. Complication rates and mortality are similar between procedures at one stage and two stages¹⁷.

In a study showing that human fibrin sealant can minimise post-operative bile escape in subjects with choledocholithiasis and primary closure of the common bile duct (CBD) without drainage, primary closure of CBD after LCBDE is considered an effective approach after laparoscopic CBD exploration (LCBDE), but the risk of post-operative bile escape is high. Mean operating time was 103± 22.4 in category I while 127±32.7 (P value < 0.05) in category II. In the Stent Drainage Category, blood loss during procedure was 22±3.7 ml, while in the T-tube drainage category it was 38±5.1 (P value < 0.05). In the Stent drainage category, the average abdominal drainage tube removal was 3.2 days and in the T tube drainage category, 4.1 days. In the stent drainage category and T-tube drainage category, postoperative bowel function recovery period was 1.9 days and 4.1 days, respectively (P < 0.05).

The overall hospital duration was in the stent drainage category for 6.9 days and in the tube drainage category for 10 days. Similar findings were observed by Tang C et al. After laparoscopic choledochotomy, postoperative bile diversion occluded by antegrade biliary stenting, it was shown to shorten procedure period and postoperative duration compared to T-tube drainage, but the issue of bile leak requires further refinement of the technique of insertion. Surgeons have performed primary closure of the CBD without drainage, and primary closure can prevent complications associated with the placement of T-tubes.

Oedema and increased biliary pressure may also occur due to CBD papilla instrumentation, and there is a related possibility of bile escape. The spontaneously removable biliary stent may also be used as an alternative. But to validate these findings, major studies are needed to confirm that the sample size in this study was small^{18,19}.

Conclusion

After laparoscopic choledochotomy, primary closure of the popular bile duct with spontaneously reversible biliary stent placement is a viable and practicable process. With spontaneously removable biliary stents, less surgery time, less bleeding and less intestinal complications have been observed.

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