Choledocholithotomy without T tube Drainage: Our Initial Experience

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Abstract

Introduction: Gallstone disease occurs in 3%–20% of the world population and about 15% of people with gallstone disease develop stones in the common bile duct (CBD). Smaller stones are amenable to be removed by endoscopic retrograde cholangio-pancreatography (ERCP) while larger stones require surgery—either open or by laparoscopic. **Materials and Methods:** This was a prospective study between January 2010 and December 2012 in two hospitals in Chittagong, Bangladesh, on ultrasonography upper abdomen. And where ultrasonography was not able to diagnose the location and cause of obstruction than magnetic resonance cholangio-pancreatography (MRCP) was done. To rule out malignancy, contrast enhanced computerized tomography was done in selected cases. The patients were divided into two groups on the basis of management—Group A: CBD exploration with insertion of T-tube and Group B: CBD exploration with primary closure. All operated patients underwent a longitudinal choledochotomy. Then the stones were removed and CBD was flushed with normal saline ensuring no distal obstruction. Initially we used T-tube cholangiogram to see distal clearance which was replaced by choledochoscope later on. Primary closure was done in 37 (53%) cases where T tube drainage was given in 34 (47%) cases and T-tubes were kept in situ for 9–10 days. Bile duct was closed with interrupted absorbable catgut 3–0 suture and a sub hepatic drain was kept for 48 hours. All patients were given pre-operative and post-operative antibiotics and follow up was taken for next 6 months. **Results:** Out of 71 patients, 46 (61%) were females and 29 (39%) males. In all patients cholecystectomy was done along with CBD exploration. Three patients who were planned for primary closure without T-tube, T-tubes were inserted due to CBD trauma, oozing, and gross swelling. Complication like biliary leakage was seen in only one patient with primary closure which was managed by keeping subhepatic drain for 5 days. Two patients in the T tube group developed wound infection while only one developed this complication in the primary closure group. No patient in the study developed cholangitis. No patient was expired in the study. **Conclusions:** Primary closure without external drainage after choledochotomy is feasible, safe, and cost-effective.

Key words: Gall bladder; common bile duct; T tube.

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INTRODUCTION

Gallstone disease occurs in 3%–20% of the population worldwide. It may occur in the gallbladder or in the common bile duct (CBD) or common hepatic or right or

left hepatic duct. About 15% of people with gallstone develop stones in the CBD and in our country one of the common cause of bile duct stone is billiary ascariasis. The goal of treatment is to relieve the obstruction. In case of smaller stones endoscopic retrograde cholangio-pancreatography (ERCP) is suggested and surgery for larger stone or when ERCP fails. Surgery for choledocholithotomy may be either open or laparoscopic.

After the CBD exploration, stones are removed; the choice lies between primary duct closure and T-tube drainage.[1] The purpose of using T-tube drainage after open CBD exploration are post-operative drainage of the bile duct to reduce edema and intra luminal pressure of CBD to visualize and extract retained bile duct stones.[2] Insertion of a T-tube increases post operative morbidity, psychological trauma, prolonged hospital stay, increases bed occupancy, hospital patient load and thus economic burden. Although it was thought that T-tube has definitive role after CBD clearance, some authors found no significant difference in the morbidity or mortality between primary closure and T-tube drainage,[1,3] others found higher morbidity in terms of more biliary infection, discomfort from tube, delayed hospital discharge.[4–10]

Aim of our present study is to compare removal of primary CBD stone and primary closure of CBD with a drain tube in right sub hepatic region and discharge within four days and to remove CBD stone with T-tube drainage and sub hepatic drainage, where patient has to stay for 10–12 days.

MATERIALS AND METHODS

This was a prospective study conducted from January 2010 to December 2012 in Department of Surgery, Chittagong Medical College and in a private clinic of Chittagong. A total of 71 patients were explored for CBD stones with baseline investigations which includes blood R/E, renal function tests, X-ray chest (P/A), ECG, Serum bilirubin, Serum alkaline phosphatase, SGPT, ultrasonography upper abdomen and where ultrasonography was not be able to diagnose the location and cause of obstruction than magnetic resonance cholangiopancreatography (MRCP) was done. To rule out malignancy contrast enhanced computerized tomography was done in selected cases. Patients with malignancy, renal failure, and other severe co-morbidities were excluded from study.

The patients were divided into two groups on the basis of management—Group A: CBD exploration with insertion of T-tube and Group B: CBD exploration with primary closure.

All operated patients underwent a longitudinal choledochotomy. Then the stones were removed and CBD was flushed with normal saline ensuring no distal obstruction. Initially we used T-tube cholangiogram to see distal clearance which was replaced by choledochoscope later on. Primary closure was done in 37 (53%) cases where T tube drainage was given in 34 (47%) cases and T-tubes were kept in situ for 9–10 days. Bile duct was closed with interrupted absorbable catgut 3-0 suture and a sub hepatic drain was kept for 48 hours. All patients were given pre-operative and post-operative antibiotics and follow up was taken for next 6 months.

RESULTS

Out of 71 patients, 46 (61%) were females and 29 (39%) males. The maximum number of patients were found to be in the age group 35–45 years among total range of age 31–55 years with median age 41 years. In all patients cholecystectomy was done along with CBD exploration. Three patients who were planned for primary closure without T-tube, T-tubes were inserted due to CBD trauma and oozing and gross swelling.

Complication like biliary leakage was seen in only one patient with primary closure which was managed by keeping subhepatic drain for 5 days. Two patients in the T tube group developed wound infection as documented by pus drained from the incision site while only one developed this complication in the primary closure group. Respiratory infections requiring additional treatment were noted in three patients with T tubes and in one with primary closure. However, this had no relation to the method of drainage used. No patient in the study developed cholangitis. No patient was expired in the study.

DISCUSSION

Because instrumentation of the CBD and maneuvers for stone extraction may cause edema to the papilla, leading to an increase in pressure inside the biliary tree, temporary post-operative biliary drainage is usually required and T-tube placement has been historically chosen as the drainage method of choice.

Those who advocates the use of a T-tube argue that it allows spasm or edema of sphincter to settle after the trauma of the exploration. Post-operative T-tube drainage has been used to prevent bile stasis, decompress the biliary tree, and minimize the risk of 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%

to 16.4%. The T tube-related complications include accidental T-tube displacement leading to CBD obstruction, bile leakage, persistent biliary fistulas, and excoriation of the skin, cholangitis from exogenous sources through the T-tube, and dehydration and saline depletion.[11,12]

Additionally, CBD stenosis has been reported as a long-term complication after T-tube removal. After discharge, indwelling T-tubes become uncomfortable, requiring continuous management, thus restricting patient's activity because of the risk of dislodgement.

For the above-mentioned disadvantages of T-tube use, a second option for choledochotomy closure, which is primary closure of choledochotomy with placement of biliary endoprosthesis was proposed. Biliary endoprosthesis, as with a T-tube, achieves biliary decompression and published results have suggested that this leads to lower morbidity, shorter post-operative hospital stay, less post-operative discomfort, and earlier return to full activities, compared to T-tube placement.[2]

Moreover, the presence of the endoprosthesis in the duodenal lumen makes post-operative ERCP easier, in the presence of residual CBD stones. However, the use of biliary endoprosthesis is not devoid of complications such as duodenal erosion, stent occlusion, ampullary stenosis, and distant stent migration, causing intestinal or colonic perforation.[13] Moreover, removal of biliary endoprosthesis requires second-stage endoscopic extraction.

A third option for choledochotomy closure is primary closure without the use of T-tube or biliary endoprosthesis. Favourable short-term and long-term results have been published with this technique. This option avoids the morbidities related to the use of T-tube or biliary stents. In this study, no post-operative mortality occurred. The post-operative hospital stay and the operation time were shorter.

However, our results do not match with those of some authors. A study noted higher complication and bile leakage rates after primary closure than those reported by this study, and an experimental study addressed the issue of stenosis following primary closure without some form of drainage.

We need studies with longer follow-up period for the evaluation of ductal stenosis.

At the end, according to the results of this early experience, primary closure did not increase the risk of bile leakage after the operation. Post-operative hospital stay and operation time were shorter and the hospital expenses were lower.

Additionally, with primary closure, we could definitely avoid T-tube-related complications.

Therefore, we can conclude that primary closure without external drainage after choledochotomy is feasible, safe, and cost-effective. After verification of ductal clearance, we can close the CBD primarily without the use of T-tube.

However, randomized trials on a larger scale of patients and with a longer follow-up are necessary to address the issue of stenosis and other issues after primary closure.

CONCLUSION

Therefore, we can conclude that primary closure without external drainage after choledochotomy is feasible, safe, and cost-effective. However, randomized trials on a larger scale of patients and with a longer follow-up are necessary to address the issue of stenosis and other issues after primary closure.

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