

**PRIMARY CLOSURE OF THE COMMON BILE DUCT ALONE VERSES CLOSURE  
OVER ENDONASOBILIARY DRAINAGE TUBES: A PROSPECTIVE COHORT STUDY****<sup>1</sup>Prof (Dr) Ajaz Ahmad Malik, <sup>2</sup>Dr. Yaqoob Hassan\*, <sup>3</sup>Dr. Ifat Irshad, <sup>4</sup>Dr. Mohd Lateef Wani, <sup>5</sup>Dr. Ishfaq Ahmad Wani**<sup>1</sup>Professor, Department of General and Minimal Invasive Surgery SKIMS, Srinagar.<sup>2</sup>Registrar, Department of General Surgery SKIMS Medical College.<sup>3</sup>Senior Resident, Government Medical College Srinagar.<sup>4</sup>Lecturar CVTS, Government Medical College.<sup>5</sup>Post Graduate Scholar, Department of General and Minimal Invasive Surgery, SKIMS Srinagar.**\*Corresponding Author: Dr. Yaqoob Hassan**

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**ABSTRACT**

**Background:** Since with widespread availability of ERCP and liberal use of endoscopic sphincterotomy, more and more surgeons feel comfortable in performing primary closure which significantly reduces the hospital stay. There is however still the apprehension of a greater incidence of bile leak and post-operative cholangiogram is not possible. Therefore primary closure over an ENBD (endonasobiliary drainage) tube was attempted to overcome this difficulty. **Patients and methods:** This prospective comparative study for 6 yrs (Jan 2007- Dec. 2012) comprised of 54 patients –having primary closure of the common bile duct (CBD) over endonasobiliary (ENBD) tube (Group 1) and 50 patients –having primary closure of the common bile duct (CBD) alone (Group 2) All these patients had been taken for surgery after failed attempts at endoscopic retrieval. Preoperatively, both the groups were comparable in terms of clinical and investigational parameters. No patient in the study had cholangitis. The only notable difference in the two groups was in the method of preoperative ductal drainage. **Results:** Mean age in Group 1 was 42.34 years and in Group 2 was 41.38 Years. Females outnumbered males in both the group. CBD size in ENBD group was  $1.45 \pm 0.42$  and in primary closure alone group was  $1.46 \pm 0.29$ . Eleven patients in primary closure group, while only six patient in the ENBD closure group had solitary stones. Worms were detected in one patient in each group. Wound infection was found in two patients in ENBD group and in one in primary closure group. The ENBD tubes were removed by the 6-7 day in 80% of patients and by the 8<sup>th</sup> day in all. Patients in the Primary closure group were on average discharged 1-2 days earlier than those in the ENBD group. **Conclusion:** Primary closure of the common bile duct alone is safe and acceptable after choledocholithotomy with only a slight risk of bile leak, however postoperative cholangiogram cannot be performed. Primary closure over ENBD is safe and effective after choledocholithotomy. Additional advantages like cholangiograms and contact dissolution for retained stone can be tried.

**KEYWORDS:** Common bile duct, Stone, Cholangiogram.**INTRODUCTION**

About 5- 20% of patients with gallstones have stones in the common bile duct, which can lead to complications like obstructive jaundice, cholangitis, acute gallstone pancreatitis, biliary colics with transient jaundice and dyspepsia, indistinguishable from gallbladder disease. T-tube drainage has remained the standard after choledochotomy for over a century. Since the widespread availability of ERCP and liberal use of endoscopic sphincterotomy, more and more surgeons feel comfortable in performing primary closure which significantly reduces the hospital stay. There is however still the apprehension of a greater incidence of bile leak and post operative cholangiogram is not possible.

Therefore primary closure over an ENBD tube was attempted to overcome this difficulty. It is believed that the intra-ductal drain decreases intra-ductal pressure by draining bile until edema of sphincter of Oddi resolves, thereby preventing bile leaks. The study was conducted to compare the results of primary closure of CBD alone with that of primary closure over ENBD.

**PATIENTS AND METHODS**

This prospective study was conducted in the Department of General Surgery, SKIMS ,Srinagar from January 2007 to December 2012. Total of 104 patients were undertaken for study. Among them 54 underwent Choledocholithotomy with primary closure of the CBD

over endonasobiliary drainage (ENBD) tubes after failed endoscopic retrieval. Endonasobiliary drainage tube was placed in the CBD at the time of failed endoscopic retrieval and a cholangiogram was performed in all patients. All patients underwent routine investigations before surgery including complete blood counts, liver function tests and coagulogram. All patients were undertaken for surgery under general anaesthesia. A supraduodenal anterior choledochotomy was done. Stones were removed and saline flushing given. Flexible Choledochoscopy was performed in every patient both proximally and distally. Thorough clearing of ducts were done. The ENBD tube was repositioned in the CBD. The choledochotomy was then closed back with continuous sutures. A sub-hepatic drain was kept and the abdomen closed back in layers. Post-operative cholangiograms through the ENBD tube were performed as per routine between the 6<sup>th</sup>-7<sup>th</sup> postoperative day to image the biliary tree and demonstrate residual stones if any. The sub-hepatic drains were removed in all by the 2<sup>nd</sup> postoperative day.

In another 50 patients after failed endoscopic retrieval pigtail drain was left in place. Patients were evaluated as above preoperatively. Choledochotomy was done as above and stones were removed. Choledochoscopy performed. However CBD was closed without an ENBD in place. A sub-hepatic drain was kept in which was removed after 5<sup>th</sup> day.

The only difference in the two groups was method of preoperative drainage. One group had ENBD left in place (ENBD group) another had pigtail drain left in place (Primary Closure group).

The data of two groups one having primary closure and another having closure over an ENBD was collected and analysed statistically.

**Table 1: Post operative liver functions in two groups.**

Variable	ENBD Closure (n= 54) Mean $\pm$ SD	Primary Closure (n= 50 ) Mean $\pm$ SD	Student t (2 tail)	Sig (p<.050)
Billirubin(mg/dL)	2.690 $\pm$ 3.606	3.349 $\pm$ 2.500	-0.814	0.421 NS
ALP(U/ L)	531.454 $\pm$ 206.042	478.106 $\pm$ 184.505	1.015	0.318 NS
Albumin(gm/dL)	3.100 $\pm$ 0.536	3.130 $\pm$ 0.508	-0.342	0.735 NS
SGOT(U/ L)	50.878 $\pm$ 27.219	50.575 $\pm$ 19.981	0.070	0.945 NS
SGPT(U/ L)	56.333 $\pm$ 27.380	59.848 $\pm$ 21.870	-0.608	0.547 NS

## DISCUSSION

Endoscopic retrieval is the treatment of choice in common bile duct (CBD) stones. However CBD exploration is indicated in case of failure of endoscopic removal. T-tubes, used for about a century now, remain the preferred method of duct drainage following CBD exploration. The advantage is performing a cholangiogram and the possible use of the tract for retrieval of residual stones. However, there are many reports of complications from the use of T-tubes, including displacement, biliary sepsis,

## RESULTS

Both the groups were comparable preoperatively. Mean age in group 1 was 42.34 years and in Group 2 was 41.38 years. Females outnumbered males in both the groups.62.9% of the patient in ENBD group and 68% in primary closure group were females.CBD size was comparable in both the groups. CBD size in ENBD group was 1.45  $\pm$  0.42 and in primary closure alone group was 1.46  $\pm$  0.29. Intraoperative choledochoscopy was done in both the groups and stones retrieved. Two patients pulled out the ENBD tube in immediate postoperative period. Intra-hepatic duct stones were present in 11.11% of the patients in ENBD group and 10% in primary closure group. Two patients in ENBD group, worms were retrieved .In primary closure group worm was retrieved from one patient. None of the patients in ENBD group developed biliary leak. Postoperative cholangiogram was performed and none of these patients were documented to have biliary leak. However one patient had a residual small stone in CBD which was taken care of by saline flushes. Cholangiogram was not possible in two patients who removed ENBD tube. Ultra-sonography was done in these patients and the discharged home.

One of the patients in primary closure group developed biliary leak. He developed biliary peritonitis and needed re-exploration of CBD with T-tube drainage. None of the patients developed cholangitis in study period. Mean follow up was 3.2 years. Postoperative liver function tests were comparable in both the groups Table 1. Postoperative hospital stay was 6.23 days in primary closure group while it was 10.4 days in ENBD group. Routine work was started at an average of 4 weeks in primary closure group and at 5 weeks in ENBD group.

thromboembolism, electrolyte and fluid loss, wound infections, pancreatitis, and obstructive jaundice.<sup>[1-5]</sup> Besides T-tube placement increases the hospital stay of these patients. Keeping in view the large burden of this disease in this part of world, large number of patients needs CBD exploration. With limited tertiary care centres dealing with this problem in our state, the number of beds available for these patients are limited. The problem is further worsened by literacy rate and inability of patients to take care of tubes in homes. This prevents us from discharging patients with tubes early

from hospital. So putting tubes after CBD exploration was a problem which was telling upon our hospital resources. Keeping above in mind we performed this study in which primary closure over ENBD and primary closure alone was compared. The placement of intra-ductal drains decreases the intra-ductal pressure by draining bile freely. With time oedema resolves and incision site in CBD heals and bile leak does not occur.<sup>[6]</sup> The ampullary edema resulting from bougie dilatations (practised early) was cited as reason for drainage. However this instrumentation is no longer routinely needed and therefore many consider primary closure of the duct without intra-ductal drainage as a safe procedure. Many authors have successfully promoted primary closure of the common bile duct (CBD) without intra-ductal drainage with no significant serious morbidity.<sup>[1-5,7-11]</sup> Others have used alternative methods but maintained the principle of biliary drainage by using retrograde transhepatic biliary drainage (RTBD).<sup>[12-14]</sup> or transcystic tube drainage (C tube). Our department have previously reported the advantage of endonasobiliary (ENBD) tubes as a means of postoperative drainage which has been well taken by international community.<sup>[6]</sup> We in our department have also compared the results of primary closure of CBD on ENBD with T-tube drainage.

Primary closure of CBD without T tubes has been reported by many surgeons with good results.<sup>[6,7,9]</sup> However disadvantage being the risk of bile leak and postoperative cholangiogram cannot be performed. The advantage is less morbidity and early discharge from hospital. In our study one of the patients developed post-operative bile leak and biliary peritonitis. This patient needed exploration with T-tube insertion. None of our patients in primary closure group had retained stone in CBD. Closure over ENBD tube has been reported with success by many authors. The advantage they reported being performance of postoperative cholangiogram and removal of residual stone if any. They also reported less chance of biliary leak in this group. Cholangiography can be performed through them, missed stones identified, dissolution therapy using drugs administered and even stones retrieved via their tract.<sup>[15]</sup> However, T-tube complications like delayed track formation, delayed removal, infection, bilomas, delayed peritonitis and loss of bile are avoided in either cases.

## REFERENCE

1. Richter HM, Bushbinder JR. The omission of drainage in common duct surgery. *JAMA*, 1919; 73: 1750.
2. Mirizzi PL *Ann Surg*, Chicago, 1942; 44.
3. Edwards LW, Herrington JL. *Ann Surg*, 1953; 137: 189.
4. Herrington JL, Dawson RE, Edwards WH, Edwards LW. *Ann Surg.*, 1957; 145: 153.
5. Wilken BJ. Primary closure of common bile duct. *R Coll Surg Edin*, 1975; 20: 115.
6. Wani MA, Chowdri NA, Naqash SH, Wani NA. Primary closure of the common duct over endonasobiliary drainage tubes. *World J Surg.*, 2005; 29: 865–868. doi: 10.1007/s00268-005-7772-6.
7. Vassilakis JS, Chattopadhyay DK, Erwin TT, Duthrie HL. Primary closure of common bile duct after choledochotomy. *R Coll Surg Edin*, 1979; 24: 156.
8. DeRoover D, Vanderveken M, Gerard Y. Choledochotomy: primary closure versus T tube. A prospective study. *Acta Chir Belg.*, 1989; 89(6): 320–324.
9. Sorenson VJ, Buck JR, Chung SK, Fath JJ, Horst HM, Obeid FN. Primary bile duct closure following exploration: An effective alternative to routine biliary drainage. *Am J Surg*, 1994; 60(6): 451–455.
10. Seale AK, Ledet WP., Jr Primary common bile duct closure. *Arch Surg*, 1999; 134(1): 22–24.
11. Zhiyuan T, Jiadong L, Hailin X, Qin Z, Tongnian C. Primary choledochorrhaphy after common bile duct exploration. *Dig Surg.*, 1999; 16: 137–139.
12. Hotta T, Taniguchi K, Kobayashi Y, et al. Biliary drainage tube evaluation after common bile duct exploration for choledocholithiasis. *Hepato-Gastroenterol*, 2003; 50: 315–321.
13. Goseki N, Methaste A, Gen T, Ito K, Endo M. Extraperitoneal retrograde transhepatic biliary drainage for common bile duct exploration for prevention of tube dislodgement and its earlier removal. *Dig Surg.*, 1998; 15: 12–14.
14. Tsunoda T, Kusano T, Furukawa M, Eto T, Tsuchiya R. Common bile duct exploration--Primary closure of the duct with retrograde transhepatic biliary drainage. *Jpn J Surg.*, 1991; 21(2): 162–166.
15. Mortensen J, Kruse A. Endoscopic management of postoperative bile leaks. *Br J Surg*, 1992; 79: 1339–1341.