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Comparing T-tube drainage and primary closure of common bile duct following its exploration.

medical science

KEYWORDS :

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ABSTRACT

Background - There is a controversy amongst surgeons all over the world regarding the technique of CBD exploration i.e. whether primary closure of CBD is to be done or T-tube drainage is to be done. The purpose of this study is to direct attention towards investigative and clinical observations which have demonstrated the feasibility and distinct advantage of omitting drainage of CBD following choledochotomy

Methods - A prospective study was done on patients undergoing CBD exploration between nov 2011 to oct 2013.intraoperative findings and postoperative parameters were observed.

Results – During this study 60 patients underwent CBD exploration . The patients were randomly selected in the operation theatre for primary closure of common bile duct(Group A) and T-tube drainage (Group B).). T-tube drainage was done in 30 patients and primary closure was performed in 30 patients.

There were nine cases with T-tube in which bile culture was positive and three cases of primary closure in whom the drain fluid culture was positive.

In our series, the mean number of days for which pulse was greater than 100/min and temperature was greater than 100 degree F, was 3.7 days and 2.1 days respectively in CBD drainage cases and 1.9 and 0.7 days respectively in primary closure cases.(p<0.05)

The average duration of hospital stay was 8.2 days for those undergoing primary suture of the CBD. In those undergoing T-tube drainage the average hospital stay was 15.7 days

Conclusions- primary closure of the common bile duct, following its exploration, is a safe alternative as compare to T-tube placement.

INTRODUCTION

Cholecystectomy has become the most frequent intra abdominal procedure all over the world. In every case of cholelithiasis, there is a possibility of concomitant choledocholithiasis and indeed, common Bile Duct (CBD)stones are present in approximately one of every ten patients[1] in whom cholecystectomy is performed. To the surgeons, the dilemma of retained common bile duct stones versus unnecessary exploration of common bile duct remains an ever present problem, since sequeal of each may significantly increase morbidity and mortality in these patients.

PATIENTS AND METHODS

This study was conducted in the Department of Surgery of S.N. Medical College, Agra(UP) in period between nov.2011 to oct. 2013. . The patients were randomly selected in the operation theatre for primary closure of common bile duct(Group A) and T-tube drainage (Group B). T-tube drainage was done in 30 patients and primary closure was performed in 30 patients

A. Technique of common duct closure

After thorough exploration of the duct and removal of the intraductal calculi, a bile - tight closure of the CBD was accomplished using a continuous or interrupted suture of No. 3 -0 or 4-0 vicryl.

B. Technique of T-tube drainage

After the common bile duct is opened between two stay sutures above the duodenum, the stones are extracted. The choledochotomy is then closed after inserting a No. 12 F gauge T-tube with the T' lying along the length of the duct, shortening the limbs to 2.5 cm in either direction and splitting the horizontal limb along its length opposite the vertical tube.

The T-tube was removed on the 14th post operative day after post exploratory cholangiography was done and showed satisfactory clearance of the common duct.

Post operative care

All patients were kept nil orally and on i.v. fluids till their bowel recovered. They were monitored in the post operative period taking care to chart the pulse rate, temperature and degree of pain 4 hrly. Blood culture,bile/drain fluid culture and sensitivity and liver function tests were done on the first, fourth and tenth post-operative days following surgery

RESULTS

Age and Sex distribution

Age (Years)	Sex		Total No. of cases	Percentage
	Males	Females		
20-29	1	4	5	8.3
30-39	3	12	15	25.0
40-49	3	12	15	25.0
50-59	2	14	16	26.7
60-69	2	7	9	15.0
Total	11	49	60	100.0

Table1

Post Operative Findings Early

	T-tube	Primary Closure
Positive Bile Culture	9	3
Blood Cultures	0	0

Table 2

Early Post - Operative Variables

No. of Days	No. of Cases with pulse than 100/Min.		No. of Cases with Temp more than 100F	
	T-tube	Primary Closure	T-tube	Primary Closure
0-2	8	22	18	27
3-5	18	8	9	3
6-8	5	0	3	0

Table3

The difference between the means of the above mentioned variables was calculated and was found to be statistically significant using the 'Z' test

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Procedure	Mean No. of Days with Pulse more than 100/ Min.	S.D.	Mean No. of days temp, more than 100F	S.D.
T-tube drainage	3.7	0.40	2.1	0.49
Primary Closure	1.9	0.28	0.7	0.25
'Z' Value	'Z' calculated =18>Z Tabulated =1.96		'Z' Calculated =10>Z tabulated = 1.96	
at 'P' Value	<0.05		<0.05	

SD - Standard deviation

TABLE 4

DISCUSSION

Closure of the common bile duct following exploration has, in general, received less attention in surgical literature, although the principle is by no means new. William Halstead and John Finney[2] were among the first to challenge the necessity of routine common duct drainage.

The present trial was undertaken to test the hypothesis that primary closure of the common bile duct leads to quicker convalescence with less postoperative complications.

Both exploration of the common bile duct and retained stones in the common duct, lead to increased morbidity. Thus, various criteria have been laid down to aid in the decision to proceed with choledochotomy.

Obstructive jaundice is one of the most frequently mentioned indicators for exploration.[3,4]The predictive value for positive findings from exploration of CBD ranges from 17 to 60% in the literature.

However, in our study, 49 patients demonstrated obstructive jaundice at the time of admission and all had positive findings at exploration.

72.5% patients with dilated (>10mm) CBD were found to have CBD stones also. But small stones in gallbladder and large cystic duct did not show any association with presence of ductal calculi. Preoperative palpation of stones is said to be the most accurate indirect evidence of their presence. This was borne out by the findings in our study also.

The proponents of routine T-tube drainage have stated that if calculi are overlooked, the situation is easier to manage if a tube has been left in the duct. Since no reliable material exists to dissolve retained stones, it is difficult to see how the drainage tube can be of much benefit. Additional surgery is frequently necessary to obtain relief. Alien[5] has stated that dilatation of the papilla of Vater is effective in discharging any small Residual common duct stones since it leaves the papillary muscle flaccid for an undetermined period of time.

Sawyers, Herrington and Edwards[6] do not agree with this view. It has also been stated that postoperative cholangiograms may be performed through the T-tube to check for residual stones. However, according to Edwards andHarrington, cholangiograms made during the convalescent period are of little value, since in the majority of cases, well established clinical signs and symptoms will usually make the diagnosis of retained common duct stones apparent and the presence of a T-tube is not necessary to arrive at this conclusion.

In certain specific situations, observed per operatively, T-tube drainage of CBD is a safer procedure than primary closure. These are:

1. Whenever there has been significant trauma inflicted upon duct wall during stone removal.
2. When extensive manipulation and trauma to the pancreas or ampulla occur during the removal of an impacted stones for which transduodenal sphincteroplasty also may have to be done.

Drainage is also indicated if there is suppurative cholangitis and when the CBD wall is extensively edematous and surrounded by an acute inflammatory reaction. Reinhoff[7] felt that if CBD is filled with sludge or bile stained mud like then drainage is in order. We however, did primary closure in 2 such cases after thorough exploration and irrigation with saline.

Broadly, the indications for closure of common bile duct are;

1. When a negative exploration is performed on an otherwise normal appearing duct or even a duct that is dilated.
2. When stones are removed from the CBD without manipulation or traumatisation of the walls or lumen of the duct.
3. When the duct wall is slightly thickened but not edematous or acutely inflamed.

Postoperative morbidity is directly related to the infective complications which range from wound and drain site infection to subphrenic abscess and life threatening septicemia. CBD exploration, per se, significantly increases the morbidity and mortality because of infective complications. According to some surgeons[8,9,10,11,12], T-tube adds on to these complications.

This study was limited by the fact that a relative small sample size was taken which highlights the more prevalent use of ERCP and laparoscopy in management of CBD stones.

In our study, the postoperative course of patients who underwent primary closure of the CBD, was smooth. They experienced much less pain as compared to the patients with T-tube drainage. The temperature curve and pulse rates were significantly elevated in patients with T-tube drainage as compared to those having primary closure. Edwards and Herrington[13] reported postoperative temperature and pulse elevation (greater than 100 degree F and greater than 100/ min respectively) for 4.7 versus 2.4 days and 6 versus 2 days respectively for T-tube versus primary closure cases, In our series, the mean number of days for which pulse was greater than 100/min and temperature was greater than 100 degree F, was 3.7 days and 2.1 days respectively in CBD drainage cases and 1.9 and 0.7 days respectively in primary closure cases. Since the CBD is a sensitive structure, it is likely that the presence of an indwelling T-tube may, in part, account for temperature and pulse differences in the two groups

Unlike the experience of Keighley and Graham,[14]wound infections were equal in the 2 groups in our study.

30% cases of T-tube drainage in our study had post-operative infection which is comparable to studies by Lygidakis[20] (reported as 75%) and Keighley (reported as 73%).It appears reasonable that T-tube drainage, requiring the introduction of a foreign body, provokes exogenous acquisition of environmental/microorganisms. Apparently ascending cholangitis leads to bacteremia and distant infective complications. In evaluating the relative morbidity between the

2 groups theusual minor postoperative complications were approximately equal and this did not constitute the primary cause of increased morbidity among cases undergoing ductal drainage.

It was found in our study that in cases of primary closure, the patient's stay in hospital was 6.2 days on an average. This was considerably shorter than if intraductal drainage was used (15.8 days). This finding is in agreement with the findings of other studies[13,15,12,16,17] CBD drainage cases had a prolonged stay of more than 4.8 days as compared to cases of primary closure; 16.3 days for drainage and 11.5 days for closure; 12 days for drainage and 10 days for closure.

T-tube drainage thus places an increased demand on the nursing personnel Residual calculi were not found in any of the primary closure cases as against two cases (6.6%) of T-tube drainage cases detected on post-operative T-tube cholangiography. The incidence of residual stones detected on T-tube cholangiography is 7%, 1.5%, 7.0%, 5%, 5.5%, 4.7%, as reported in other studies[19,6,10,18,19] .Residual stones have also been reported in some series.

In the follow up it was found that none of the cases of primary closure or T-tube drainage developed CBD stricture. Herrington[15] has reported two such cases at the site of T-tube drainage in his study.

CONCLUSION

This study thus indicates that primary closure of the common bile duct, following its exploration, is a safe alternative as compare to T-tube placement.

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