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Research Paper

Minimally Invasive (Endo-Laparoscopic and Laparosopic Choledochotomy) Versus Open Choledochotomy for The Management of Cholelithiasis With Choledocholithiasis: Where Do We Stand

Medical Science

KEYWORDS : Choledocholithiasis, ERCP, Laparoscopic choledochotomy, Open bile duct exploration.

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ABSTRACT

Common bile duct stones have been reported in approximate 5-15% of population. At present, preoperative ERCP-S with LC is the treatment of choice for CBD stones at most centers. This study was undertaken to compare the management of choledocholithiasis between the different existent modalities. This study was conducted in the department of General Surgery, SRMS IMS Bareilly from August 2010 for a period of 2 years. Operating times (p=0.01.), postoperative hospital stay duration (p=0.01), mean days of rest after discharge (p=0.04) and total man days lost (p=0.01) were found to have statistically significant difference when compared amongst the three different modalities. Thus, we conclude that though open procedure is poorly accepted cosmetically, but in terms of clearance of stones and complications it is comparable to other two modalities and superior in terms of operating time and cost.

Introduction

Common bile duct stones have been reported in approximate 5-15% of population[1]. At present, preoperative ERCP-S with LC is the treatment of choice for CBD stones at most centers. During the early years of LC, the common bile duct was considered out of reach of the laparoscopic surgeons, because of the higher level of expertise needed for Laparoscopic Common Bile Duct Exploration. With the development of better techniques and instrumentation, LCBDE is a feasible option now. Subsequent studies showed that LCBDE has similar duct clearance rate and morbidity as compared to ERCP-S followed by LC.[2, 3]

Thus, this study was undertaken to compare the management of choledocholithiasis between the different existent modalities viz; ERCP-S with Laparoscopic cholecystectomy, Laparoscopic CBD exploration with cholecystectomy and Open cholecystectomy with CBD exploration and to compare their outcomes.

Materials & Methods

This study was conducted in the department of General Surgery, SRMS IMS Bareilly from August 2010 for a period of 2 years. Adult patients (>18 years of age) for the study were selected from those attending the surgical outpatient the with clinical diagnosis of choledocholithiasis.

A total 75 patients were studied, 25 in each group (25 in ERCP-S and LC, 25 in LCBDE, 25 in open CBD Exploration). Diagnosed cases of choledocholithiasis with gall bladder in situ were included. Patients with non-gallstone cause of obstructive jaundice (such as malignancy, CBD stricture, parasitic infestation), CBD diameter more than 2 cm, (as biliary bypass surgery becomes the treatment of choice then), patients with co-morbid conditions and patients who have already undergone cholecystectomy, and have developed primary CBD stones, were excluded from the study. The workup of the patients was divided into preoperative evaluation, operative procedure and post operative monitoring and follow up.

All descriptive data was expressed as mean and standard deviation. For comparison of binominal or discrete variables Chi square test was used, while for continuous variables ANOVA was used. Probability value ('p' value) was calculated with the help of software, SPSS 16.0 for windows, 2007 SPSS Inc. Chicago. Illinois. 'p' value < 0.05 was considered to be significant.

Results

There was no significant difference in **sex** predisposition (p value >0.05) and **mean age of presentation** between the three groups. The **mean CBD diameter** also did not show significant variation between the three groups.

The **operating time** for ERCP-S and LC ranged from 100 to 210 minutes with a mean of 141 minutes. The operating time for LCBDE group was 130 to 205 minutes with a mean of 167.80 minutes. The operating times of open CBDE ranged from 70 to 180 minutes with a mean of 100.80 minutes. Analysis showed the operating times to be significantly more in LCBDE group compared with the open category (p value <0.01).

In group of ERCP-S and LC **failure rate** was 12%, hence 12% of cases were subsequently managed by open route. Similarly in LCBDE group failure rate was also 12%, hence conversion to open route was 12%. Primary failure of open CBDE was seen 8% cases. These results were however statistically insignificant (p value=0.8).

Auxiliary procedure was required in 12% each in ERCP-S + LC and LCBDE groups and in 8% cases open CBDE.

In ERCP-S and LC group 4% patients developed hyperamylasemia, 8% developed pancreatitis, but for none of the **complications** surgical intervention was required. Similarly in another group LCBDE 12% patient developed pancreatitis as a complication, but were managed conservatively. In case of open CBDE group 8% developed hyperamylasemia, 4% developed cholangitis and 8% developed seroma formation, all the complications were managed conservatively.

There was significant difference between the duration of post operative drain removal in our study (p value=0.01). In ERCP-S and LC group 80% did not require drain at all, but 20% (5 cases) required drain ranging from 2 to 4 days, with mean of 0.64 ± 1.35 days. While drain was put in all cases of LCBDE and open CBDE. Drain was removed in 84% (21 cases) in two days while in 16% (4 cases) in three days in case of LCBDE. In open CBDE group 56%(14 cases) drain was removed in four days, 28%(7 cases) in three days , 12%(3 cases) in five days and 4%(1 case) in seven days.

A T- tube was placed in all patients undergoing LCBDE and open CBDE. In LCBDE T-tube was removed on average by 16.20 ± 5.2 days (range 14 to 30 days) whereas in 14.20 ± 0.707 days

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(range 14 to 17 days) in case of open CBDE.

Following ERCP-S and LC the **postoperative hospital stay** varied from 5 to 9 days with an average stay of 6.08±1.44 days. In LCBDE group mean hospital stay was of 4.56 ± 0.50 days, ranged from 4 to 5 days. In open CBDE group mean hospital stay ranged from 5 to 9 days, with an average of 6±0.91 days. The difference was significant statistically (p value= 0.01).

Following ERCP-S and LC the **mean days of rest after discharge** were 7.04±3.19 days, ranging from 4 to 16 days. In LCBDE group the mean rest days after discharge were 13.56 ±1.47 days, ranging from 12 to 17 days. In open CBDE group this range varied from 16 to 25 days with an average of 17.84±2.26 days. When analysed this difference was statistically significant (p value=0.04).

Following ERCP-S and LC the **total man days lost** varied from 11 to 26 days, with mean 13.60 ± 3.97 days. In LCBDE group it varied from 16 to 23 days, with mean of 19.56 ± 1.80 days and in open CBDE group it varied from 21 to 30 days, with mean of 22.88 ± 2.10 days. When statistically analysed the difference was significant (p value= 0.01).

96% of the patients in ERCP-S and LC were satisfied with cosmetic results, 4% (1 case) was dissatisfied with the cosmetic outcome, because conversion to open. Ninety two percent patients of LCBDE group were satisfied with the cosmetic outcome, 8% (2 cases) were dissatisfied due to conversion to open. 84% patients of open CBDE group were satisfied with the cosmetic outcome, rest 16% (4 cases) were dissatisfied. Younger patients especially female were more in dissatisfied group.

Discussion

In this study there were 72 % females and 28 % males. This in accordance to the published literature in that the incidence of GB stones is higher in females as compared to males. Some of the series are Schirmer et al (Cates et al (70% females , 30 % males)[4], Sherman et al (69.9 % females, 30.1%males)[5].

Age of the patients in this study ranged from 22 to 72 years with a mean age of 44.36±12.9 years. Western studies have reported the average age ranging from 52 to 62 years such as those by Sherman S et al (19 to 86 years, mean age 55.6 years)[8] , Rhodes et al (24 to 83 years, mean age 62 years)[6]

There is inadequate analysis of the site and number of stones removed and their relation to the operating time and conversion to open CBDE in reported literature. This study however found that the relation between the sites, number of stones and the operating times and conversion to open CBDE was statistically not significant.

The operating time in ERCP-S and LC group was comparable to those reported in various studies such as Stanley (106 to 281 minutes , mean 183 minutes)[7] , Ghazal (100 to 150 minutes , mean 119± 14.4 minutes)[8]. The operating time in LCBDE was comparable to those reported in various studies such as Stanley (77 to 395 minutes , mean 174 minutes)[7], Lo (190 minutes)[9] .Operating time in open CBDE was comparable to various studies such as Grubnik (60 to 150 minutes , mean 90 minutes)[10] , Shojaiefard (128±23 minutes)[11].

In this study failure rate in ERCP-S and LC was 16% (3 cases) which is comparable to studies conducted by Verbesy (10-30%)[12] and Samardzic (18%)[13]. Failure rate of LCBDE in our study is 12% which is in accordance with Lo (10%) [9] and Verbesy (4-17%) [12] but higher as compared to Gurbnik (6%) [10].

The postoperative analgesia was provided by parenteral route initially followed by oral Diclofenac sodium given only on patient's demand and documented. In this study the I.V. analgesic requirement in ERCP-S and LC was from 2 to 4 days with mean of 2.28 ± 0.50 days, this however does not include the analgesia and sedation given during and after ERCP-S. In case of LCBDE it was from 2 to 3 days (mean 2.64 ± 0.48 days) and in open group it was little more i.e. 3 to 4 days (mean 3.40 ± 0.50 days). This however cannot be compared with other studies reported in literature, as there is inadequate documentations of the analgesics requirement in these prior studies.

The higher requirement for analgesics can be explained by

1. The greater amount of dissection required, ERCP-S and LC < LCBDE <open CBDE.

2. Presence of the T-tube in situ, which is fixed to the skin by sutures.

Complication rate in this study is less as compared to study conducted by Christensen (15.9%)[14].The percentage of pancreatitis in Christensen study is 3.8% which is similar to study conducted by Penston (3%)[15] also, but comparable to Mishra (5 to 7.6%)[16]. In LCBDE group the overall complication rate is 12% (3 cases), all the three developed post operative pancreatitis (12%), which is, however, more as compared to study conducted by Grubnik (6.5%)[10]. In open CBDE group overall complication rate was 20% (5 cases) of which 8% (2 case) developed hyperamylasemia, 8% (2 case) developed cholangitis and 4% (1 case) developed seroma. None of the patients required surgical intervention or readmission. This was more than study conducted by Grubnik (12.7%) [10] and Ahmed (16.5%) [17].

In today's hospital scenario with an ever rising patient load there is an increasing pressure for rapid patient turnover and hence shorter hospital stay. The post operative hospital stay in ERCP-S and LC group was 5 to 9 days (mean 6.08 ± 1.44 days) which is in accordance to the study done by Stanley (6.6 days) [8], but it is more as compared to study done by Clayton (4.3 days) [19],Ghazal (2.55±0.89 days) [8]. In LCBDE group mean hospital stay is 4.5 ± 0.50 days (4 to 5 days) which is in accordance to the study conducted by Grubnik (4.2 ± 1.8 days)[10] , Stanley (5.3 days)[7] , Lo (6 days)[9] and Topal (6 days)[20] In open CBDE group mean hospital stay was 6 ± 0.9 days (5 to 9 days) comparable to the study conducted by Shojaifard (6.8 ± 3.8 days)[11].

After having undergone intervention all the patients of different groups were questioned about whether they were satisfied with the treatment offered and whether they would have preferred to undergo the same treatment modality if given an option or would they want to change to the other available option. 80% patients in ERCP-S and LC were satisfied, but 20% were not, because of conversion to open and multiple attempts of ERCP-S and because of discomfort experienced during ERCP because the procedure was done under sedation only. 96% of LCBDE group were satisfied, while in case of open CBDE, 84% were satisfied and the patients who were dissatisfied were due to cosmetic reasons, pain and failure of the opted category.

Conclusions

Incidence of choledocholithiasis is more common in females. Operating time is shortest in open procedure as compared to other two minimally invasive procedures. The open procedure causes more analgesic requirement and blood loss, but none required blood transfusion. Even then complications were comparable. In term of return to work, ERCP-S and LC group was faster as compared to open and LCBDE. In term of cosmesis open procedure was poorly accepted, but cost wise open procedure which costs less was well accepted by a sizeable number of patients.

Abbreviations used;

ANOVA – Analysis of Variance

CBD – Common Bile Duct

ERCP-S – Endoscopic Retrograde Cholangio-Pancreaticographic – Surgery

LC – Laparoscopic Cholecystectomy

LCBDE – Laparoscopic Cholecystectomy with Bile Duct Exploration

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