

Laparoscopic Primary Repair of Common Bile Duct: Does the Suture Size Matter?

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ABSTRACT

Background: Laparoscopic common bile duct exploration and primary closure is being popular method of management for common bile duct stone. As the standard method of procedure is yet to be established, we have compared the outcome of using different size suture for the closure of choledochotomy wound.

Methods: Prospective cross-sectional study was conducted where patients were categorized in two groups. Those with 3-0 suture were grouped "A" and those with 5-0 in "B". Outcome regarding the suturing time, cost, post-operative bile leak and hospital stay were compared between two groups.

Results: Total 42 cases were included, twenty-one in each group. Mean age in group A is 38.6yrs and in group B is 44.24yrs. The sex ratio is comparable. Mean time taken for suturing is almost same (34.4 mins Vs 32.6 mins). The Post-operative bile leak is significantly for shorter duration in 5-0 group than 3-0 group. But there is no difference in overall hospital stay.

Conclusions: Post-operative bile leak is significantly less when common bile duct is sutured with thinner needle and suture. This does not increase the cost, does not prolong the operating time and is not associated with other complications. Although the overall hospital stay is same. Further large scale study is needed.

Keywords: bile, choledocholithiasis, laparoscopiccholedocholithotomy, suture

INTRODUCTION

Ten to 18% of patients undergoing laparoscopic cholecystectomy (LC) for gall bladder stones have synchronous common bile duct (CBD) stones and according to current guidelines these should be treated even if asymptomatic.¹⁻² Since the introduction of single stage laparoscopic common bile duct exploration, it has offered many advantages over conventional open surgery and endoscopic two stage procedures (Endoscopic sphincterotomy and laparoscopic cholecystectomy).³⁻⁵ With the continual improvement in the technology and expertise in laparoscopic techniques, laparoscopic common bile duct exploration (CBDE) is becoming more popular and may be the next paradigm in the management

of choledocholithiasis.⁶ In our institute, we do laparoscopic primary bile duct closure after exploration. Although the number of publications regarding the laparoscopic common bile duct exploration and primary closure is increasing day by day with acceptable results, there is lack of consensus regarding the standard methodology. In this study, we have tried to compare feasibility and outcome of using suture materials of different size.

METHODS

A prospective cross-sectional study carried out at Kathmandu Medical College Teaching Hospital during the

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period of 1 year (2009 to 2010). The permission was taken from ethical committee and informed consent taken from every patient included in the study. The objective of the study is to compare the outcome of different size of suture materials in closure of common bile duct after exploration. The study has included the patients who underwent laparoscopic Common bile duct exploration successfully during this period. Total numbers of patient included were 42.

All the patients undergo preoperative workups. CBC, LFT, USG, CXR are done and the patients who need exploration of common bile duct are explained about the procedure and study.

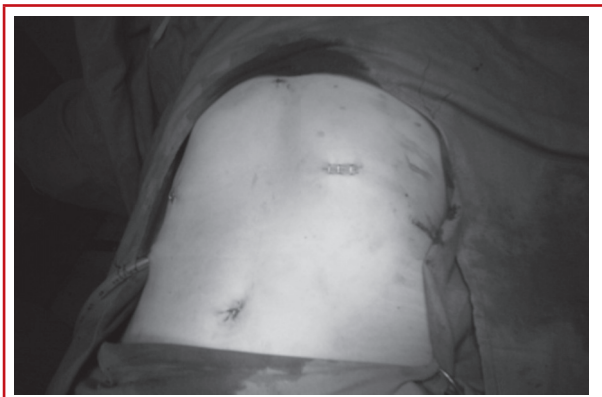


Figure 1. Port placement

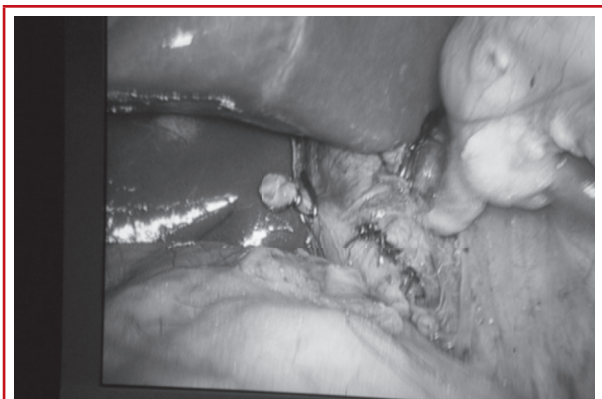


Figure 2. Closure of common bile duct 5-0.

Operative technique: Laparoscopic choledocholithotomy is performed with four port technique. Umbilical port is camera port which is made by Hasson Technique.⁷ Two working ports are at sub-costal region along mid-clavicular line on each side. Left sided is 10mm right handed working port. Another port is at right lumbar region along anterior axillary line for retraction of gallbladder (Figure 1). Pneumoperitoneum is created by Carbon dioxide insufflations and upper limit is maintained at 14mm of Hg. Calot’s triangle is dissected cystic artery is clipped and divided. Cystic duct is

clipped distally so that small stones donot slip through it during the procedure. Hartmann’s Pouch is grasped and retracted upwards and laterally. Anterior aspect of common bile duct is dissected at supraduodenal area. Duct is incised and stones are removed. Impacted stones are fragmented by pneumatic lithotripsy. Author uses the semi-rigid ureterorenoscope for choledochoscopy and stone fragmentation and removal. For this, a small 3mm port is made in the midline near xiphisternum.⁸ Stone clearance is assured. At the completion of choledocholithotomy, common bile duct is closed using either 3-0 or 5-0 polyglactin suture material with round body needle. Suture applied were interrupted polyglactin (Vicryl-Ethicon) suture in all included cases. Those with 3-0 polyglactin were grouped “A” and with 5-0 were grouped “B” (Figure 2). Average time taken for suture, cost of suture material, post operative bile leak and hospital stay is recorded and compared between two groups. Data were statistically analyzed using SPSS 17.

RESULTS

Total 42 consecutive cases were included in the study. Twenty-one were in group A and 21 in group B. Two cases had to be converted during this period so excluded from the study. None of the cases required blood transfusion. Male and female ratio in group A was 8:13 and in group B was 1:2 (Figure 3). Age incidence ranges from 27 yrs to 50yrs (Mean 38.67yrs SD±7.323) in group A and 26yrs to 65yrs (44.24yrs SD±8.432) in group B. Time taken for the closure of CBD and average expenses was noted. Post-operative bile leak and post-operative hospital stay was recorded. Comparison and analysis is given in table A. There is no statistical difference between two groups regarding Age, sex ratio, time taken for common bile duct suturing, operative cost and overall hospital stay. Only the incidence of post operative bile leak has shown significant difference between two groups.

Table 1. Comparison between two groups.			
	Group A (N=21)	Group B (N=21)	P value
M:F (male female ratio)	8:13	1:2	0.748
Age (years)(mean±SD)	38.67±7.323	44.24±8.432	0.053
Time taken for closure of CBD (minutes) (mean±SD)	34.43±8.31	32.62± 8.46	0.514
Post operative bile leak (Days)	2.59	1.29	0.032
Hospital stay (Days)	4.05	3.38	0.095

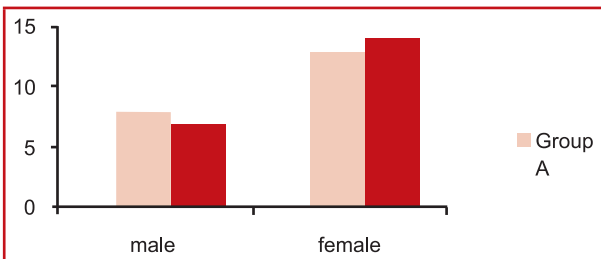


Figure 3. Sex ratio in two groups.

DISCUSSION

Choledocholithiasis is the second most frequent complication of cholelithiasis and the incidence is 10% to 15%.⁹⁻¹⁰ There has not been any unanimous consensus regarding the ideal management of gall bladder associated with common bile duct stones. The old and new approaches are open surgery, endoscopy and laparoscopy.^{1,11,12} Since the 1980s, endoscopic retrograde cholangiopancreatography (ERCP) followed by sphincterotomy (Endoscopic Sphincterotomy; ES) had been the most widely used method for imaging and treating CBD stones.¹³⁻¹⁴ Long term results after ES have been proved to be poorer than after the open surgery because of increased number of procedure related complications and the need of further procedures.^{1,15}

With the development of instruments and the perfection of operative skills, laparoscopic common bile duct exploration (LCBDE) for choledocholithiasis is feasible and has become increasingly popular.¹⁶ The standard method and proper technique is yet to be established. There are lots of differences in techniques described by various authors in different published series. In most of the literature, suture material used is 3-0, 4-0 polyglactin.^{3,16-19} But the experimental results have shown that the thinner the needle or suture size, the better the results.²⁰ J B Patelin have presented large series with very good results and have used 5-0 polyglactin.²¹ We started laparoscopic common bile duct exploration in our institution in 2008. Since then, majority of the cases undergo successful common bile duct exploration and primary closure. Our method of stone clearance is by using semi-rigid ureterorenoscope. Our comfort level is high with this instrument. For closure of the choledochotomy wound, in the beginning we started with 3-0 polyglactin with our assumption that larger the needle, easier to handle by long laparoscopic instruments. In a thick, chronically inflamed common bile duct, we did not have any problem with this suture but in a thin walled non-inflamed duct, most of the time we observe bile leaking through needle puncture site. These patients often have bile leak post-operatively for longer duration. So, the comparative study between the suture materials of different size was carried out. In both the groups,

sex ratio is comparable. Age incidence is slightly higher in group B. Time taken to suture the choledochotomy wound in both the groups is almost similar. The operative cost is also similar because the market price for these two different types of suture material is almost equal and other procedures are same. Post-operative bile leak was found significantly for longer period in group A in comparison to group B. This shows that the smaller size suture is associated with lesser complication. In our unit we have a policy to keep abdominal drain at least for 3 days even if there is no bile leak and we tend to discharge the patient next day. This is the reason why the mean hospital stay is slightly longer. This study shows difference in the incidence of post-operative bile leak; however it is unable to show any difference in overall hospital stay in both the groups.

Much thinner needle (6-0) had also been tried by author but could not continue because the standard needle holder available in our set up is larger size and tends to crush the needle and suture. Magnified view of laparoscopy has been quite helpful to use the smaller size needle and for the precise placement of sutures.

The procedure has been done by single operator so, there is no operator bias. The effort we have taken, we consider would be helpful in future for the standardization of the procedure. The sample size is smaller and we have not selected the similar type of common bile duct regarding the wall thickness, dilatation and presence of chronic inflammation in both groups. These are few drawbacks of the study.

CONCLUSIONS

Using the smaller size suture is advantageous to give satisfaction to the surgeon at the end of the procedure and is associated with lesser bile leak post-operatively. Although overall morbidity and hospital stay is not much different we recommend the use of smaller size suture for laparoscopic primary duct closure. Larger scale study is needed to testify the result.

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