

Original Article**Clipless Laparoscopic Cholecystectomy: An initial experience of 50 cases in Bangladesh**

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Abstract

Background: Laparoscopic cholecystectomy (LC) is one of the most common general surgical procedure. **Objective:** The purpose of the present study was to observe the surgical outcomes of the patients after clipless laparoscopic cholecystectomy. **Methodology:** This case series were performed in the Department of Surgery at Shaheed Suhrawardy Medical College & Hospital, Dhaka from June 2014 to April 2015. After several modifications, the success of intracorporeal “separate knotting of cystic artery and duct” was observed with Vicryl and was successfully used separate ligation of cystic artery and duct (SLAD) with Vicryl 1/0 in symptomatic cholelithiasis patients. **Result:** A total number of 50 cases were undergone elective laparoscopic cholecystectomy. Most of the patients were female (80.0%). Average age of patients was 39 yr (15-65). There was no bile leak or other complications related to ligation. The time taken for tie varied from 2 to 4 minutes (average 3 min). There were 10(25.0%) acute calculus cholecystitis, including empyema, gangrenous cholecystitis. No patient had port infection. **Conclusion:** Clipless LC is a safe and effective method. [*Journal of Science Foundation, 2015;13(1):11-14*]

Keywords: Clipless; Laparoscopic cholecystectomy; cystic duct; artery; laparoscopic cholecystectomy; intracorporeal knotting

Introduction

Laparoscopic cholecystectomy (LC) is simple, safe and economical (Saha 2000). There are several techniques of securing cystic duct and artery in laparoscopic cholecystectomy (LC), like clips, intra or extra corporeal ligation, harmonic scalpel or LigaSure (Meng and Stoller 2002). Intracorporeal knotting is superior to extra corporeal knotting in assessing appropriate tension without the risk of cutting through the tissue. Similarly the more advanced harmonic scalpel and LigaSure are expensive for developing country like Bangladesh (Gaur 1998).

Laparoscopic cholecystectomy (LC) was started in 1998, with average of 500 LC per year in the Department of Surgery at Shaheed Suhrawardy Medical College & Hospital, Dhaka, Bangladesh. Titanium clips were used to secure cystic duct and artery. In view to expand laparoscopic surgery, intracorporeal ‘separate

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ligation of cystic artery and duct (SLAD)' was started as no clip LC (NCLC). Furthermore, by gaining expertise in intracorporeal knotting, it will further broaden the scope of laparoscopic surgery beyond routine LC (Amman et al., 2000). In laparoscopic cholecystectomy (LC), cystic duct and artery are normally secured with titanium clips. Intracorporeal knotting is normally superior to extra corporeal knotting. SLAD do not increase operative time if surgeon is intracorporeal knot expertise (Wise et al., 1996). This no clip laparoscopic cholecystectomy (NCLC) eliminates the clip related complications. In this prospective observational study, after several modifications, SLAD was successfully used as technique of intracorporeal ligation of cystic artery and duct. Therefore, the purpose of the present study was to observe the surgical outcomes of the patients after clipless laparoscopic cholecystectomy.

Methodology

This case series were performed in the Department of Surgery at Shaheed Suhrawardy Medical College & Hospital, Dhaka from June 2014 to April 2015. Intracorporeal separate ligation of cystic artery and duct (SLAD) was used successfully in 50 patients with symptomatic GB stones undergoing laparoscopic cholecystectomy (LC). We used 4 ports; three 5-mm ports, and one 10 mm umbilicus port for camera. In SLAD, the GB was grasped at fundus on a grasper passed through the most lateral port to create right amount of tension on the Hartmann's pouch and cystic duct. Through 5 mm 3rd port another grasper held in left hand was used to hold Hartmann's pouch. This facilitated skeletalisation of callot's triangle of proper identification of cystic duct and artery. A 12-15 cm 1/0 Vicry was held in needle holder in such a way that about 1 cm of the end of tie was protruding from the jaw. The tie was introduced on needle holder through the epigastric port, and pushed through window created behind cystic duct. The protruding end of the tie was grasped with the help of a dissector passed through the 3rd port. The long arm of inverted C-loop was held by grasper and 2 over-wrap created over tip of the needle holder. The short-free end of the suture was grasped by the needle holder and pulled in opposite directions to grasper to make a square knot at 0.5 to 1 cm from the junction to the common bile duct. The long arm of the suture was looped on the needle holder to create 2nd and 3rd square knots completing the SLAD. After cutting of cystic duct, the same procedure was done for securing the cystic artery. Cystic duct and artery were divided at a safe distance approximately 1 cm away from the ligation. The grasper is used to create appropriate tension moving in different angles required during dissection of the GB. After freeing GB from the bed, a 30° angle camera was introduced through epigastric port and by direct vision GB was out through the umbilical port it was pushed out under vision, by 5 mm camera through epigastric port and pushing the GB through the umbilical port with the help of grasper locked at Harman's pouch. Umbilical port fascial defect was closed by vicryl suture. Postoperative management was similar to conventional LC, starting oral liquid after 4-6 hr of surgery, and discharged on 1st POD. Patients were called back for 1st OPD visit by two weeks for the histopathology report. This also served as post-operative follow up.

Results

SLAD was performed in 50 patients with symptomatic GB stones. Females were 80.0% (n=40). Average age was 39 yr (15-65) (Table 1). There was no bile leak or other complications related to ligation. The time taken for tie varied from 2 to 4 minutes (average 3 min). The cystic duct and artery were tied in separate knotting. There were 10 (20.0%) cases of acute calculus cholecystitis, including mucocele, empyema and gangrenous. There were no complications (Table 2).

Table 1: Age and sex of the study population (n=50)

Variables	Values
Age (mean±SD)	39.2±7.55
Female	40 (80.0%)

Discussion

Though rare, clips in LC have complications like ulcerating through the duodenum causing sever hemorrhage, internalization into the common bile duct, bile leak secondary to displacement, and clip-induced biliary stone (Ng et al., 1999; Chong et al., 2004). Besides the common use of clips, various other

techniques of securing cystic duct and arteries have been introduced. Harmonic scalpel and 'LigaSure' in LC has come up recently (Kandil et al., 2010; Huscher et al., 2009). Cost of equipment is the main prohibitory factor in developing country like Bangladesh. Also, these appliances are not recommended for division of the cystic duct greater than 6 mm in diameter for safety reason (Matthews et al., 2001). Other associated risks are injury to bowel and bile ducts (Champault et al., 2002).

Table 2: Surgical Outcomes of the Study Population (n=50)

Surgical Outcomes	Values
Time for Tie Knotting	2 to 4 min. (ave 3 min)
Bile leak	0(0.0%)
Others Complications	0(0.0%)

With increasing experience and at the same time with aim to further advance the field of laparoscopic surgery, intracorporeal suture/knotting is necessary. We believe that intracorporeal knot tying will be useful in advancing laparoscopic procedures. Economic benefit is also an added advantage by cutting the cost of clips without compromising efficiency and safety, as reported by other authors (Seenu et al., 2004).

We believe that intracorporeal knot ligation should be the recommended training in basic laparoscopic surgery. Suture ligation uses separate and multiple ligatures for cystic duct and artery, requiring all most same time compared to clipping. We had no complication related to separate ligature. On the contrary, we had 5 cases out of 10 cases of acute cholecystitis, with thick, edematous, friable duct/artery complex which would have been normally converted to OC because of difficulty or unsecure clipping.

In 5 cases of acute cholecystitis we were done single ligature of duct and artery. There was no bile leak in this series. However, like in clips, bile leak following ligature may occur in up to 3.8% (Hanazaki et al., 1999). Leak from cystic duct when using clips may be because of a variety of reasons, like inadequate closure of the duct due to mismatch of the clip arms, necrosis of the duct at the site of clipping, or slippage of the clips and migration into the biliary tract (Nelson et al., 1992; McMahon et al., 1995; Reis 2000). SLAD avoids these clip related complications and more cosmetic, less pain and less chance of port site infection.

Conclusion

In conclusion, intracorporeal 'separate knotting of artery and duct (SLAD)' is easy to learn and do not increase operating time if surgeon is expert enough regarding intracorporeal knot to secure both cystic duct and artery. SLAD is feasible, cost effective and safe alternative method to secure cystic artery and duct in LC.

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