



## EXTRA CORPOREAL KNOTTING WITH SILK VERSUS LIGA CLIPS FOR LIGATING CYSTIC DUCT IN LAPAROSCOPIC CHOLECYSTECTOMY: A COMPARATIVE STUDY.

### General Surgery

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### KEYWORDS:

#### Introduction

Cholecystectomy is the common operation of the biliary tract. During cholecystectomy cystic duct can be secured with the sutures or clips. Knot tying in open surgery can be easily be learned and performed. However, knot tying becomes challenging and frustrating when performed laparoscopically. In laparoscopy there is lack of direct manual contact with tissue, therefore the sense of feel of tissue is restricted, secondly the image is transmitted to a two dimensional video screen & the laparoscope magnifies the image. This accentuates a person's natural tremor and a two dimensional view eliminates true depth perception.[1]

#### AIMS AND OBJECTIVES

The aim of present study was as following:

To compare extra corporeal knotting with silk versus liga clips for ligating cystic duct in laparoscopic cholecystectomy in terms of:

- Feasibility
- operative time
- post-operative recovery
- operative cost
- Associated morbidity and mortality.

#### Material and Method

It was randomized prospective study done in sixty patients who underwent laparoscopic cholecystectomy in Department of Surgery, Government Medical College and Rajindra Hospital, Patiala. All the patients were assigned by randomization into either of two groups:

Group A: Patients in whom extra corporeal knotting was done for ligation of cystic duct

Group B: Patients in whom liga clips were used for clipping of cystic duct

#### INCLUSION CRITERIA

Patients with chronic cholecystitis

Patients with cholelithiasis

No clinical or biochemical or ultrasonography evidence of CBD stones.

Patients giving informed consent.

#### EXCLUSION CRITERIA

- Cardiac disease
- Pregnancy
- Unfit for general anaesthesia.
- Patients not giving consent

#### Procedure

In Group A patients for extra corporeal knotting with silk 1-0 thread, it was passed through epigastric port with help of Maryland grasper. The thread was wrapped around cystic duct and was brought out through the same port using the same Maryland grasper. Extracorporeal knot was then made. A drop of lubricating jelly was applied distal to the knot. The knot was held by the grasper and pushed into the port and tightened thus ligating the cystic duct. The duct was ligated twice, once near the CBD and the other near the gall bladder. Pushers were not used for slipping the knot and whole procedure was accomplished using Maryland grasper.

In Group B patients two proximal and one distal Stainless Steel clips were applied on cystic duct and artery after dissection of calots triangle.

#### Results

Majority of the patients in this study were females in both the groups i.e. 93.33% in group A and 83.33 % in group B. Mean age in group A was 39.73 years and in group B it was 45.96 years. Single stone was present in 36.67 % and 40 % of patients in group A and group B respectively.

#### OPERATING TIME COMPARISON

	Range	Mean	SD	t	P value	Significance
Suture	30-90	60.50	14.93	3.302	0.002	S
Clip	15-80	47.83	14.77			

The mean operative time in group A was 60.5 minutes and in group B was 47.83 minutes. The maximum time in group A was 90 minutes and in group B was 80 minutes. The statistical analysis showed that the difference was significant between the two groups ( $t=3.302$ ,  $p < 0.005$ ).

In all patients in Group A extra corporeal knotting was successful and in Group B all patients cystic duct was secured with clips. Wide cystic duct (diameter > 3 mm) was present in three patients Group B and but there was just one case in Group A. For three patients in Group B liga clips were applied in a staggered fashion to cut the cystic duct. In all patients in Group A extra corporeal knotting and in Group B clip application was successful and none of the patients in either group had cystic duct leakage.

The mean hospital stay in group A was 2.70 days and in group B was 2.73 days which was not statistically significant.

#### Cost Effectiveness

S. No	Material	Cost
1.	Mersilk 1-0	Rs 30
2.	Liga clips	Rs 350

Non absorbable suture i.e. mersilk 1-0 is much cheaper than liga clips used in this study.

#### Discussion

Gall stones have affected mankind for centuries and cholecystectomy is the treatment for symptomatic gall stone disease. Laparoscopic cholecystectomy is considered to be the procedure of choice for elective cholecystectomy .[2] Compared with open cholecystectomy, LC gives significantly better results in terms of less postoperative pain, better pulmonary function, better arterial oxygenation, and shorter hospital stay and duration of sick leave.[3]

Burke GL, introduced tantalum to surgery and resolved the problems of corrosion and infection, occurring with other metals. Tantalum is inert chemically and can only be corroded by strong alkali's and acid and is unaffected by oxidizing agents found in living tissue. [4]

Kylberg studied the use of tantalum clips (Samuel's clips) in general surgery on 200 consecutive cholecystectomy cases and concluded that Samuel's clips are very welcome and atraumatic addition to the

surgical instrument arsenal. [5]

Conventionally, titanium clips are used to ligate cystic duct during laparoscopic cholecystectomy. Recently, various methods of knotting and suturing, both intra corporeal and extra corporeal, have been described during laparoscopic surgery. Dorsey et al, 1995[6], compared the strength of laparoscopic knots with those used at laparotomy (i.e. conventional knots). They used 3 types of laparoscopic knots (Roeder, extracorporeal sliding square and intracorporeal two turn flat square) and three widely used conventional knots (Flat square, surgeon's square and sliding square) were tied using seven suture materials. Knot strengths were scored by tensiometer readings. The laparoscopic Roeder knot was significantly weaker than all other laparoscopic and conventional knots tested. Laparoscopic extra corporeal sliding square knot was significantly weaker than the conventional square knot and the conventional sliding square knot was significantly weaker than conventional flat square knot and the surgeon's knot. The laparoscopic intracorporeal, two turn flat square knot, was as strong as the strongest conventional knot. They concluded that consideration should be given to sewing the stronger laparoscopic knots, such as the intra corporeal two turn flat square knot and the extracorporeal sliding square knot, instead of the weaker Roeder knot. However only limited number of studies have been carried out to prospectively compare the outcome of cystic duct occlusion with ligature versus cystic duct occlusion with titanium clips in laparoscopic cholecystectomy.

In the present study the mean operating time in group A i.e. in extracorporeal knotting was 60.5 minutes while in group B using clips was 47.83 minutes. Statistical analysis showed that the difference between the two groups was significant. The present study was comparable to study of Seenu et al taking 13 minutes extra (58.3 minutes' vs 45 minutes) for knotting as compared to clip application [7]. Similar observation was made in study done by Avinash Rajra et al where the knotting procedure took longer than clip application [8]. The difference in mean operative time was because surgeons are not doing extra corporeal knotting as commonly as using clips during laparoscopic cholecystectomy. Also for extra corporeal knotting there is frequent changing of hands and instruments. As the experience with extra corporeal knotting increased the operative time kept on decreasing.

There was no case of cystic duct leakage in both the groups. So both extra corporeal suture ligation and clip application are safe in securing the cystic duct. Ahmed A. ElGeidie conducted a study and concluded that intra corporeal ligation of cystic duct using absorbable suture is feasible, practical, safe and economic as well [9].

Cost of Liga clips used in group B is Rs 350 while Mersilk 1-0 used in group A costs Rs 30. There is a large difference between the two. Liga clip costs about 12 times that of ligature Mersilk 1-0. Leo et al, conducted a prospective randomized study and concluded that suture ligation of the cystic duct is a very safe and secure alternative to the application of metal clips. It was also very cost-effective. They recommended it in all laparoscopic cholecystectomies, especially in difficult cases.

The main advantage of using clips is that they are easy to apply and therefore the intra operative time is less when using clips. But there is difficulty encountered for applying clips when a wide cystic duct is present in which case ligating the cystic duct with extra corporeal knotting is the best way. Also clips are costlier than Mersilk ligature 1-0. But to use extra corporeal knotting the surgeon must be trained in this technique.

So though it takes a bit longer to complete the surgery with extra corporeal knotting, it makes a substantial difference in the cost of the procedure (even after not considering the cost of the clip applicator) without compromising the safety and efficacy of laparoscopic cholecystectomy.

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