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Titanium Endoclips vs Endoloop Closure of Appendix Stump in Laparoscopic Appendectomy

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Abstract: ***Introduction: Stump ligation & burial which was a standard technique in open appendectomy is now replaced by various methods of stump closure in laparoscopic appendectomy. Techniques commonly employed are Endoloop, Endoclips made of Titanium or Polymer, Intracorporeal suturing, Endostaplers etc. Our Study is conducted in a tertiary care centre where 196 diagnosed patients of appendicitis were subjected to laparoscopic appendectomy in last 2 years & divided in 2 groups. Material and Method: In our series stump was managed by using 1) Endo-loop 2) Endoclip and were followed for period of 3 months. Inclusion criteria 1 Patients of acute/recurrent appendicitis after valid informed consent. Exclusion criteria1) Patients who are unfit for laparoscopic procedure 2) Patients with appendicular lump/ gangrenous base/ dense adhesions. Results: Results were compared on following parameters 1) Operative time 2) Complications 3) Hospital Stay 4) Cost. The results are compared& it was observed that the technique of stump closure using Titanium Endoclips in laparoscopic appendectomy is found to be safe &effective, easily performed & reduces the cost. Conclusion: Titanium Endoclips are considered to be safe, time saving method of stump closure.***

Keywords: Laparoscopic Appendicectomy, Titanium Endoclip, Endoloop

1. Introduction

Acute appendicitis is the most common surgical emergency in our country. The overall incidence is about 7 - 8% in adult population[1] with peak incidence between the age of 10 and 30 years [2]. Open appendicectomy has been the treatment of choice for it since its introduction by McBurney in 1884.With rapid improvement and innovations in medical technology and after introduction of Laparoscopic Appendicectomy (LA), first performed by a German Gynaecologist Curt Semm in 1983 [3,4], it has rapidly gained popularity as method of choice for appendicectomy. Laparoscopic Appendicectomy has a potential advantage of shorter hospital stay, early mobilization, early return of bowel activity, less post operative pain and acceptable complication rate [5,6].The argument infavor of open procedure is less time consumption during surgery and cost of surgery. In this study we tried to reduce the intraoperative time and the cost of surgery without increasing any complication rate

2. Aims and Objectives

To study the difference in time taken in laparoscopic appendicectomy using Titanium Endoclip VS Chromic Catgut Endoloop for closure of appendiceal stump.

3. Materials and Methods

We conducted a study of 196 laparoscopic appendicectomies performed in our department, a tertiary care institute, from September 2015 to March 2017. Patients who underwent LA were considered for the study and those who underwent open appendicectomy or who were converted from laparoscopic to open method were excluded from our study.A diagnosis of acute appendicitis was established by detailed history taking, clinical examination and by using RIPASA and ALVARADO scores and radiological examination.After establishing the diagnosis patient were asked to pass urine and were taken to operating room.

Patient was kept in supine position on operating table. After proper scrubbing, painting and draping Veress needle introduced through a supraumbilical incision by closed or open method. Pneumoperitoneum created. 10 mm port introduced through the incision, laparoscope introduced. Peritoneoscopy done, especially right iliac fossa examined for any pus or collection. Any other pathology ruled out especially in women of child bearing age group.One 5 mm port made in right iliac fossa and another 10 mm port made in suprapubic region 2 cm above pubic symphysis.Scope shifted to suprapubic port.Any adhesions present between Caecum and abdominal wall were broken by blunt and sharp dissection. Appendix identified and lifted up using babcock forceps. Mesoappendix cut using harmonic scalpel from tip towards the base. Two Titanium clips (LT 400 , Jhonson and Jhonson) applied at the base at a gap of about 2 - 3 mm and one applied about 5 mm above them towards specimen side. Specimen cut in between the clips and removed through the umbilical port. If the specimen is too bulky or friable, an indegenously made endobag made of glove finger was used to remove it.Stump and cut ends of mesoappendix looked for any bleeding or leakage. If any pus or spillage was present, it was aspirated.Drain ,if required, was put as per the surgeon's preference.Patients with very friable, gangrenous appendix at the base or very inflamed caecum or with dense adhesions and lump formation were converted to open appendicectomy. Such patients were excluded from this study.

This method of clipping the base was compared to another method of ligating the base using Chromic Catgut. In this method, a loop was prepared using Chromic Catgut 1,0 and introduced into abdomen through umbilical port using knot pusher. This endoloop was looped over the specimen and tightened at the base. Another loop tied about 5 mm above

the previous loop. If the base was too thick or inflamed, than two loops were used to ligate the base. Specimen cut in between and removed through umbilical port directly or by using endobag.Both the methods were explained to the patients and proper informed consent were taken.

Time taken for surgery using both methods was recorded and compared. Any difference in postoperative complications were noted. If no complications occurred, patient were discharged on 7th or 8th postoperative day after removal of sutures.

4. Results

The disease was seen more commonly in males as compared to females, 61% and 39% respectively. In the study by Hasan Erdem et el. (2013) out of 113 patients with suspected acute appendicitis, 62 were males and 51 females[7].The most common age group involved were 10 - 30 years age group about 76%[2].The most common perioperative findings was acutely inflamed appendix,182 cases (82.7%) followed by perforated appendix 21 cases(9.5%), gangrenous appendix 11 case(5%) and appendicular lump in 6 cases(2.7%)The conversion rate from laparoscopic to open appendicectomy was about 10.9%. The national average is 8.6% [8]. The main reason for conversion was gangrenous or perforated appendix with severe inflammation of caecum. In 3 cases conversion was due to very dense adhesions around caecum and appendix.The average time taken for LA using endoclips from skin incision to port closure was about 38 minutes. The average time taken for LA using endoloops was 56 minutes. Even if we exclude complicated cases like lump and gangrene, the average time taken using endoloop was 54 minutes.

5. Discussion

During the last decade, LA has emerged as the preferred method for appendicectomy. Almost 50% of appendicectomies at our institute is being performed laparoscopically. LA has several advantages like less post operative pain, early return of bowel movements, less surgical site infection, early mobility and early return to work [9].Several methods have been introduced for ligation of appendicular stump using Titanium clips, Endoloops, endosuturing, endostaplers etc [10,11]. Any of these method can be used for stump closure with their own advantage and disadvantage.Use of Titanium endoclips is a safe and time saving method for stump closure. However, the major limitation is severely inflamed or gangrenous base, severely inflamed caecum or wide base more than 10 mm. In such situations, intracorporeal suturing is a better method. In cases where endoclips were used, it significantly reduced intraoperative time. It was also an easier method to use by resident doctors. Preparing indigenous endoloop is little tricky and time consuming[12]. Also failure of loop to slide may lead to wastage of suture or pose risk of loose knotting. Sometimes leakage of CO2through port when knot pusher is introduced makes surgery time consuming and difficult. Thus the use of Titanium clips is a fast and effective method for stump closure in laparoscopic appendicectomy.

6. Tables

Table 1: Age wise distribution of cases in study group

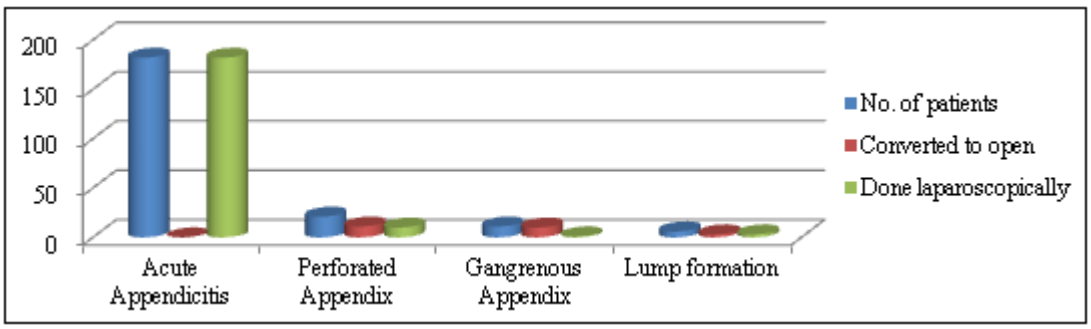
Age (years)	*No. of cases*	*Percentage*
<10	8	4
11 – 20	55	28
21 – 30	94	48
31 – 40	21	11
>40	18	9
Total	196	100

Table 2: Introperative finding and conversion from Laparoscopic to open appendicectomy

Intraop diagnosis	*No. of patients*	*Converted to open*	*Done laparoscopically*
Acute Appendicitis	182	0	182
Perforated Appendix	21	11	10
Gangrenous Appendix	11	10	1
Lump formation	6	3	3
Total	220	24	196

Table 3: Time taken for laparoscopic appendicectomy

Intraop Diagnosis	*Endoclips used*		*Endoloop used*	
	No. of cases	*Time taken(min)*	*No. of cases*	*Time taken(min)*
Acute appendicitis	100	38	80	54
Perforated appendix	0	-	10	67
Gangrenous appendix	0	-	3	77
Appendicular lump	2	48	1	66
Total	102		94	



Graph 1: Intraoperative finding and conversion from laproscopic to open appendicectomy

7. Conclusion

Laparoscopic Appendectomy has become the method of choicefor Appendectomy. With easy availability of instruments and teaching at medical college using laproscope, it is bound to become gold standard for the treatment. The steps for LA needs to be standardized as in cholecystectomy. Many methods are used for stump closure, here we have compared the result of stump closure by titanium endoclips in comparison with chromic Catgut endoloop. Here we have found out thatthe Titanium Endoclips for closure of appendiceal stump is easier and less time consuming, without increasing the complication rates, as compared to ligation with endoloop. However in case of gangrenous or inflamed base other methods of stump closure are preferred.

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