"STUDY OF SINGLE HEM-O-LOK CLIPS V/S ROEDER 'S KNOT IN LAPAROSCOPIC APPENDICEAL STUMP CLOSURE"

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KEYWORDS
SINGLE HEM-O-LOK, ROEDER 'S KNOT, appendectomy,

ABSTRACT:
Introduction: Acute appendicitis, a common emergency surgery condition, requires laparoscopic appendectomy. However, it has drawbacks like longer surgery time, increased costs, and intra-abdominal abscesses. This study compares two methods for appendiceal stump closure in Laparoscopic Appendectomy: extracorporeal Roeder's knot and polymeric Hem-o-lok clip. **Aims:** This study compares the use of Hem-O-Lock and Roger's Knot in laparoscopic appendiceal step closure, aiming to compare intra-operative, post-operative, and hospital stays**. Methodology:** The study examines surgical techniques used for appendectomy in acute appendicitis patients at KVVDU hospital Karad. It involved 100 patients aged 18-60 years, with 50 using Single Hem-O-Lok clips and Roeder's knot for stump closure. The procedure involved classical three-port technique and 2/0 ethilon suture. **Results:** The study compared Laparoscopic Appendiceal Stump Closure techniques using single Hem-O-Lok Clips and Roeders Knot, involving 50 patients. Intraoperative and post-operative complications were 12%, 8%, and 4% respectively, with hospital stays 2.4 and 2.26 days.
Discussion: Acute appendicitis is a common surgical emergency, with the Hem-o-lok clip being a safe, simple, and non-absorbable method that doesn't significantly differ in complications during surgery.
Conclusion: The study found that appendicular base closure using hem-o-lok clip or Roeders knot is effective during Laparoscopic appendectomy without significant differences in intra-operative and post-operative complications or hospital stay.

INTRODUCTION:

Acute appendicitis is a prevalent emergency surgery condition worldwide, with a life-time incidence of 8%. Typically affecting individuals aged 10-2012, it is caused by lumen obstruction, with faecoliths being the most common cause. The condition has been extensively studied since Fitz's 1886 first description.[1]

Laparoscopic appendectomy (LA), first described in 1983, is the gold standard for treating appendicitis due to its advantages such as less wound infections, shorter hospital stays, and quicker recovery of normal bowel function. However, it has drawbacks like longer surgery time, increased expenses, and intra-abdominal abscesses. It is recommended for women, the elderly, and obese patients.[2,3]

The closure of the appendiceal stump is a crucial step in the laparoscopic appendectomy procedure, preventing complications like fistula, peritonitis, and sepsis. Inappropriate sealing can lead to postoperative issues. Despite the well-established surgical method, concerns persist regarding the appendiceal stump closure. Various techniques, including extra-corporeal knotting, intra-corporeal knotting, endo- loops, endo-staplers, metallic endo-clips, and hem-o-lok clips, have been used to secure the appendix base. However, no consensus exists on the best approach. New materials have been introduced to enhance and control appendiceal stump closure, but the best approach remains unknown. The ideal method should be safe, accessible, technically simple to use, and affordable.

Numerous methods have been proposed to close the appendix stump, including staplers, Endoloop, titanium clips, Hem-o-lock, extracorporeal sliding knot, intracorporeal ligation, and Ligasure. Stapling is the safest but expensive method, while Endoloop is safer and cheaper. Hem-o-lock is preferred for its ease of use, reduced operation time, and cost-effectiveness.[1,4]

This study compared two methods for appendiceal stump closure in Laparoscopic Appendectomy: extracorporeal Roeder's knot and polymeric non-absorbable Hem-o-lok clip. The Hem-o-lok clip is a biocompatible implant material made of pure titanium with a constant and high-closing force,

providing good adaptation to tissue. Its clinical use has been approved, and over a thousand surgical procedures have demonstrated its safety for ligation of arteries, ureters, and cystic ducts.[5,6,7,8]
The study compares the ease of use and safety of hem-o-Lok clips and Roeder's knot in appendiceal stump closure, examining intraoperative, postoperative, and hospital stays among patients.

AIM AND OBJECTIVES:

This study compares the use of Hem-O-Lock and Roger's Knot in laparoscopic appendiceal step closure, aiming to compare intra-operative, post-operative, and hospital stays.

MATERIALS AND METHODS:

STUDY DESIGN: Randomized comparative type of study
SOURCE OF DATA: KVVDU, Karad hospital
STUDY PERIOD: 2022 to 2023
This study focuses on 100 acute appendicitis patients at KVVDU hospital Karad, treated with laparoscopic appendicectomy between 2022 and 2023. 50 patients underwent Single Hem-O-Lok clips and Roeder's knot for appendiceal stump closure, with results analyzed for intraoperative, postoperative, and hospital complications.
INCLUSION CRITERIA: Patients diagnosed with appendicitis and suitable for Laparoscopic appendectomy, aged 18 to 60 years.
EXCLUSION CRITERIA: Patients with bleeding disorders, immunocompromised states, pregnancy, appendix perforation, local and diffuse peritonitis, fiable appendix base, and conversion to open procedure are excluded.
SAMPLESIZE:

100PatientsfulfillingtheinclusioncriteriawillbestudiedfromMARCH2022ToSEPTEMBER2023.

$$n = \frac{(SD1^2+SD2^2)*(Z_{1-\alpha/2}+Z_{1-\beta})^2}{(M_1-M_2)^2}$$

$$= \frac{(0.69^2+0.57^2)*7.84}{(1.74-1.38)^2}$$

$$= 47.79$$

$$\sim 48$$

Samplesize(n)=48
48+10%=48+5=53
This study aimed to investigate the surgical techniques used for appendectomy in patients with acute appendicitis. The study involved 100 patients admitted to the Department of General Surgery at Krishna Institute of Medical Sciences Karad, with 50 each subjected to Single Hem-O-Lok and Roeders Knot for appendiceal stump closure. Patients were diagnosed based on clinical criteria, ultrasound scan, and laboratory results.

Data collection involved informed consent from patients diagnosed with acute appendicitis and willing for laparoscopic appendectomy. Patients were divided into two groups: Group A (extra-corporeal knotting) and Group B (metallic endo-clip) groups. All patients were given general anesthesia, antibiotics (I/V ceftriaxone), and skin preparation (povidone iodine solution 10%).

Patient positioning involved placing the patient in various positions, including the supine position, Trendelenburg position, and left lateral position. The procedure was performed using the classical three-port technique, with the appendix identified and sealed by electrocautery. The appendix was removed through the umbilical port, and saline irrigation was done. Skin incisions were closed using 2/0 ethilon suture and sterile dressing was applied.

Statistical analysis involved entering data into MS Excel software, organizing it in tables and charts for frequency distribution, and performing statistical analysis using SPSS version 20. Chi-square test was used to study the association between qualitative variables. P values of <0.05 were considered statistically significant.

OBSERVATION AND RESULTS:

The study analyzed different techniques of Laparoscopic Appendiceal Stump Closure using single Hem-O-Lok Clips and Roeders Knot, involving 50 patients in each group. Data was analyzed using IBM SPSS v23, with frequencies, percentages, cross tabulation, and Chi-square analyses. Statistical significance was determined at p values <0.05, with unpaired sample t-tests and Chi-square and Fischer's Exact tests used for categorical data.

P-value	Highly significant at p < .05
P-value	No significant at p > .05

A study randomized 100 patients into Single Hem-O-Lok and Roeders Knot groups, comparing age, sex, clinical parameters, and complications. Results discussed in the text.

The study found that the average age of patients was 32.2±10.51 years in the Single Hem-O-Lok group and 32.24±9.85 years in the Roeders Knot group, with no statistically significant difference.

TABLE :1 Age Distribution

Age Group	SINGLE HEM-O-LOK CLIPS	ROEDERS KNOT	t value	p value
Mean	32.2	32.24	0.02	0.98
SD	10.51	9.85		

The study found that 46% of the Single Hem-O-Lok group had females, while 48% of the Roeders Knot group had females, with 54% of the male population belonging to the single Hem-O-Lok group.

Table 2: Sex variation

Gender	SINGLE HEM-O-LOK CLIPS	ROEDERS KNOT	Chi-square value	P Value
M	27(54%)	26(52%)	0.04	0.84
F	23(46%)	24(48%)		

Intraoperative patients experienced 12% and 8% complications in Single Hem-O-Lok clips and Roeders Knot, respectively, while no complications were reported in Single Hem-O-Lok clips and Roeders Knot.

Table 03: Intra operative Complications

Intra OP. Complications	SINGLE HEM-O-LOK CLIPS	ROEDERS KNOT	Chi-square value	p value
Present	6(12%)	4(8%)	0.44	0.5
Absent	44(88%)	46(92%)		

Table 4 shows post-operative complications were 4% single Hem-O-Lok clips and 2% Roeders Knot, with no complications in 96% and 98% of patients with Roeders Knot.

Table 4: Post operative complications

Post OP. Complications	SINGLE HEM-O-LOK CLIPS	ROEDERS KNOT	Chi-square value	p value
Present	2(4%)	1(2%)	0.344	0.558
Absent	48(96%)	49(98%)		

The average hospital stay durations for Single Hem-O-Lok clips and Roeders patients were 2.4 and 2.26 days respectively, with no statistically significant difference in duration.

Table 5: Hospital Stay

Hospital Stay	SINGLE HEM-O- LOK CLIPS	ROEDERS KNOT	t value	p value
Mean	2.4	2.26	0.58	0.56
SD	1.355	1.026		

DISCUSSION:

Acute appendicitis is a common surgical emergency, with emergency appendectomy making up 10% of all emergency abdominal surgeries. Closing the appendix stump is crucial to avoid serious complications, and there are no universally agreed-upon methods. The gold standard for appendectomy is Laparoscopic Appendectomy (LA), which has significant advantages. However, the most suitable method for stump closure remains under debate.[9,10]

The Hem-o-lok clip, a non-absorbable polymer clip, has been shown to be safe for ureters and vessels clipping in previous studies. This study compared the application of the hem-o-lok clip to the Roeder's knot in a hospital setting. There were no significant differences between the two groups regarding intraoperative complications, postoperative complications, and hospital stay.[11,12]

Hem-o-lok clip is safe, simple, and does not require advanced laparoscopic skills. Its locking mechanism provides tactile feedback and secure closure, although slightly more expensive than the Roeder's knot. In a previous study, there were no significant differences between age, gender, preoperative clinical data, or investigations.

In this study, there were no significant differences between the two groups concerning age and gender. Intraoperative complications for group A were 66%, while postoperative complications were 77%. Both intra and postoperative complications were insignificant. The mean hospital stay for both groups was 32.2 days, with no statistically significant difference between them.

SUMMARY

There is no universal consensus on the best method for laparoscopic appendiceal stump closure, despite numerous studies. Prospective randomized studies with large sample sizes compared different methods, finding similar intraoperative and postoperative complications in both groups using Single HEM-O-LOK clips and Roeder's Knot. Hospital stays were also statistically insignificant. Therefore, both Roeder's knot and Hem-o-lok clips can be used for laparoscopic appendiceal stump closure.

CONCLUSION

The study found that appendicular base closure using either hem-o-lok clip or Roeders knot is effective during Laparoscopic appendectomy, with no significant difference in intra-operative and post-operative complications or hospital stay in both groups.

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