



ORIGINAL RESEARCH PAPER

General Surgery

COMPARISON OF EFFICACY BETWEEN NON-ABSORBABLE POLYMER CLIPS AND ENDOLOOP LIGATION FOR APPENDICULAR STUMP CLOSURE DURING LAPAROSCOPIC APPENDECTOMY

KEY WORDS: Acute appendicitis; Laparoscopic appendectomy; Appendicular stump closure; Endoloop ligation; Polymer clip; Surgical outcomes

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ABSTRACT

Background Acute appendicitis is one of the most common surgical emergencies requiring prompt operative management. Laparoscopic appendectomy is the preferred surgical approach, and secure appendicular stump closure is a critical step to prevent postoperative complications. Various techniques are available, including endo loop ligation and non-absorbable polymer clips. This study compares the efficacy of these two methods. **Methods** This prospective comparative study was conducted at R.L. Jalappa Hospital between September 2022 and August 2024. Sixty-six patients undergoing laparoscopic appendectomy were included and divided into two groups (n=33 each). Group A underwent stump closure using non-absorbable polymer clips, and Group B underwent closure using endo loop ligation. Parameters assessed included ease of technique, time taken for stump closure, cost-effectiveness, postoperative pain using Visual Analog Scale (VAS), postoperative complications, and duration of hospital stay. Statistical analysis was performed using SPSS version 22, with $p < 0.05$ considered statistically significant. **Results** The mean time required for stump closure was significantly lower in the polymer clip group (4.63 minutes) compared to the endo loop group (5.16 minutes) ($p < 0.05$). Ease of technique showed no statistically significant difference between groups ($p = 0.228$). Postoperative pain scores and complication rates, including surgical site infection, wound dehiscence, intra-abdominal abscess, and fecal fistula, were comparable ($p > 0.05$). No significant difference was observed in postoperative hospital stay. **Conclusions** Non-absorbable polymer clips significantly reduce stump closure time compared to endo loop ligation. Both techniques demonstrate comparable safety profiles and postoperative outcomes. Polymer clips may be considered an effective and time-efficient alternative for appendicular stump closure in laparoscopic appendectomy.

INTRODUCTION

Acute appendicitis is a common surgical emergency characterized by inflammation of the vermiform appendix. Despite advances in non-operative management, appendectomy remains the definitive treatment in most cases [1,2].

Laparoscopic appendectomy has become the preferred approach due to reduced postoperative pain, shorter hospital stay, and faster recovery compared to open appendectomy [3,4]. A crucial step in this procedure is secure appendicular stump closure, as inadequate closure may result in complications such as fecal fistula, intra-abdominal abscess, or stump leak. Several techniques are available for stump closure, including intracorporeal knotting, endoloop ligation, endoscopic staplers, and surgical clips [5,6]. The ideal technique should be safe, easy to apply, cost-effective, and time-efficient. Non-absorbable polymer clips have emerged as a potential alternative to endoloop ligation.

This study aims to compare the efficacy of non-absorbable polymer clips and endoloop ligation in appendicular stump closure during laparoscopic appendectomy.

Materials and Methods

Study Design and Setting

This prospective comparative study was conducted in the Department of General Surgery at R.L. Jalappa Hospital & Research Centre, Sri Devaraj Urs Medical College, Kolar, India, from September 2022 to August 2024.

Study Population

Sixty-six patients diagnosed with appendicitis and undergoing laparoscopic appendectomy were included.

Inclusion Criteria

- Patients aged 21–70 years
- Diagnosed cases of appendicitis undergoing laparoscopic appendectomy

Exclusion Criteria

- Perforated or gangrenous appendicitis
- Appendicular mass
- Incidental appendectomy

Group Allocation

Patients were divided using the odd–even allocation method:

- Group A (n=33): Non-absorbable polymer clips
- Group B (n=33): Endoloop ligation

Outcome Measures

The following parameters were assessed:

- Ease of technique (3-point scale: 1 = difficult, 2 = moderately easy, 3 = very easy)
- Time taken for stump closure (minutes)
- Postoperative pain using VAS
- Postoperative complications (SSI, wound dehiscence, fecal fistula, intra-abdominal abscess)
- Duration of hospital stay
- Cost analysis

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 22 (IBM Corp., Armonk, NY). Continuous variables were expressed as mean $\pm$ standard deviation and compared using Student's t-test. Categorical variables were analyzed using the Chi-square test. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

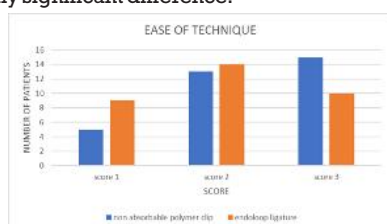
Institutional Ethics Committee approval was obtained prior to the commencement of the study. Written informed consent was obtained from all participants.

Results

A total of 66 patients were included, with 33 patients in each group.

Ease of Technique

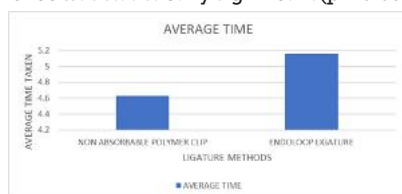
The mean ease score was 2.303 in the polymer clip group and 2.0303 in the endo loop group ($p = 0.228$), indicating no statistically significant difference.



Time Taken for Stump Closure

- Polymer clip group: 4.63 minutes
- Endoloop group: 5.16 minutes

The difference was statistically significant ($p < 0.05$).



Postoperative Pain

Mean VAS score:

- Polymer clip group: 2
- Endoloop group: 3

The difference was not statistically significant ($p = 1$).

Postoperative Complications

- Surgical site infection: 3 (polymer clip) vs 5 (endoloop)
- Wound dehiscence: 0 vs 1
- Fecal fistula: None in either group
- Intra-abdominal abscess: None reported

No statistically significant difference was observed.

Hospital Stay

No significant difference in mean postoperative hospital stay between the two groups.

DISCUSSION

Appendicular stump closure remains a critical step in laparoscopic appendectomy. An ideal method should ensure safety while minimizing operative time and cost.

In this study, non-absorbable polymer clips significantly reduced stump closure time compared to endoloop ligature. However, both techniques were comparable in terms of ease of application, postoperative pain, complications, and hospital stay.

These findings are consistent with previous literature suggesting that polymer clips provide a safe and efficient alternative for appendicular stump closure [5,6].

The study is limited by a relatively small sample size and single-center design. Larger multicenter trials may provide more robust evidence.

CONCLUSIONS

Non-absorbable polymer clips significantly reduce appendicular stump closure time compared to endoloop ligature during laparoscopic appendectomy.

Both techniques demonstrate comparable safety profiles, postoperative outcomes, and hospital stay.

Polymer clips may be considered a safe, effective, and time-efficient alternative to endoloop ligation.

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