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Original Research Article

Comparison between catgut endoloop versus vicryl endoloop in laparoscopic appendicular stump closure

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ABSTRACT

Background: Laparoscopic appendectomy has become the standard of care for acute appendicitis, offering numerous advantages over open surgery. The closure of the appendicular stump remains a critical step in this procedure, with various techniques available. This study aimed to compare the efficacy and outcomes of catgut versus vicryl endoloops in appendicular stump closure.
Methods: A prospective observational study was conducted at tertiary care hospitals in Mangalore from March 2022 to March 2024. Thirty-five patients undergoing laparoscopic appendectomy were included and divided into catgut (n=18) and vicryl (n=17) endoloop groups. Parameters evaluated included operative time, hospital stay duration, post-operative complications, and follow-up outcomes.
Results: The mean operative duration was comparable between groups (catgut: 1.2±0.4 hours, vicryl: 1.4±0.6 hours, $p>0.05$). The catgut group demonstrated significantly shorter hospital stays (3.0±0.8 versus 4.1±0.8 days, $p<0.05$). Post-operative complications were similar between groups, with pain being the most common (catgut: 50%, vicryl: 41.2%). Early oral intake was achieved in 60% of patients by post-operative day one. Follow-up showed good recovery in 71.4% of patients, with no reported cases of stump appendicitis among those who completed follow-up.
Conclusions: Both catgut and vicryl endoloops demonstrate comparable safety and efficacy in laparoscopic appendicular stump closure. While catgut endoloops showed advantages in hospital stay duration, both methods proved reliable with similar complication rates. The choice between materials can be based on surgeon preference and institutional protocols without compromising patient outcomes.

Keywords: Laparoscopic appendectomy, Endoloop, Catgut, Vicryl, Appendicular stump closure, Surgical outcomes, Minimally invasive surgery, Post-operative complications

INTRODUCTION

In general surgery, acute appendicitis is a common and urgently treated disorder.[1] The current standard of care for acute appendicitis is being replaced with laparoscopic appendectomy (LA), which was first suggested by Semm in 1983, according to a meta- analysis of RCTs.[2] There are many benefits of laparoscopic surgery (LA) compared to open surgery. These include fewer side effects, hospital stays shorter, faster recovery of bowel function and oral intake, less infection at the operative site, and better cosmetic results.[3-5] Nevertheless, laparoscopic treatments do have certain drawbacks, such as extended duration of surgery, increased likelihood of developing intra-abdominal abscess according to certain research, and greater expenses.[6,7]

Laparoscopic appendectomy is either as successful as open appendectomy or as effective for the majority of patients with moderate to severe appendicitis, according to many surgical outcome indicators. Hence, it might be the preferred approach irrespective of the severity of the appendicitis diagnosis.[8] During a laparoscopic appendectomy, the appendicular stump is secured using a variety of techniques.

Common surgical techniques include traditional appendix base-to-cecum invagination sutures, endoloop ligatures, laparoscopic staplers, clips made of metal or polymer, and purse-string sutures.[9] Nevertheless, the utilization of the endoloop necessitates skill and brief instruction, whereas polymer clips may offer more benefits in terms of their simplicity of administration and affordability.[10] This is particularly crucial in developing nations where there is a lack of resources for training with endoloop. The straightforward use of polymer clips can facilitate the widespread adoption of laparoscopic appendectomy as a viable strategy for treating acute appendicitis.[10] This research set intended to assess the intra- and post-operative outcomes of endoloop vicryl and endoloop catgut during appendicectomy procedures at a single tertiary care facility.

METHODS

The study was conducted as a hospital-based longitudinal observational study at Kasturba Medical College Hospital and Government Wenlock Hospital in Mangalore. The study period was from March 2022 to March 2024, with the final recruitment in March 2022 followed by follow-up until March 2024.

The study included adult patients aged 18-65 years who were diagnosed with appendicitis and confirmed via imaging. Patients had to be willing to provide informed consent and complete follow-up visits up to 2 weeks post-surgery (post-op day 3, 7, and 14). The study excluded pregnant patients, those with coagulation disorders, seropositive patients, and those with conditions like diabetes mellitus, chronic kidney disease, hypertension, tuberculosis, or septic shock. The sample size was calculated to be 34 patients (17 per arm) based on a minimum clinically important difference of 5.00 and standard deviation of 5.00 for duration of surgery, with 80% power and 95% confidence interval.

The surgical procedure involved positioning patients in Trendelenberg position under general anesthesia. A 10mm camera port was placed infraumbilically using the open Hassans method, followed by pneumoperitoneum creation. Two additional 5mm ports were placed under visual guidance - one in the lower midline on the left side and another in either iliac fossa. After identifying and freeing the inflamed appendix, the appendicular artery was cauterized and a meso-appendicular window created. The appendix base was secured using two endoloops made of either catgut or vicryl. The appendix was then cut between the loops and removed via the infraumbilical port. The 10mm port site fascial defect was closed using 2-0 vicryl interrupted sutures, and skin closure was done with 2-0 ethilon interrupted sutures.

Data collection included demographic information, clinical history, examination findings, and both intraoperative and postoperative outcomes. Special attention was paid to complications, pain, fever, intra-abdominal abscess formation, return of bowel movements, and resumption of oral intake. Patients were followed up at 7 and 14 days post-surgery with blood investigations and ultrasound to check for collections or abscess. Statistical analysis was performed using statistical package for the social sciences (SPSS) version 25, with appropriate statistical tests applied based on the nature of the data. A p value less than 0.05 were considered statistically significant.

RESULTS

Table 1 demonstrates the demographic distribution and clinical presentation of the study population (N=35). The majority of patients were young adults, with 68.6% falling between 21-40 years. There was a slight female predominance (54.3%). All patients presented with pain (100%), while associated symptoms included vomiting (25.7%), fever (22.9%), and nausea (20%). Alvarado scoring showed that 54.3% had scores <4, suggesting the importance of imaging in diagnosis.

Table 1: Demographic and clinical presentation (n=35).

Characteristics	Number (%)
Age distribution (years)	
<20	7 (20)
21-30	12 (34.3)
31-40	12 (34.3)
>40	4 (11.5)
Gender	
Female	19 (54.3)
Male	16 (45.7)
Presenting symptoms	
Pain	35 (100)
Vomiting	9 (25.7)
Fever	8 (22.9)
Nausea	7 (20)
Alvarado score	
<4 (unlikely)	19 (54.3)
5-6 (compatible)	10 (28.6)
7-8 (probable)	6 (17.1)

Table 2 outlines the operative and post-operative parameters. The mean operative duration was 1.3±0.5 hours, with hospital stays averaging 3.5±0.9 days. Early oral intake initiation was achieved in 60% of patients by POD 1. Post-operative complications were primarily pain (45.7%) and fever (17.1%).

Table 3 presents the comparative analysis between catgut and vicryl endoloops. While operative duration was similar between groups (p>0.05), the catgut group showed significantly shorter hospital stays (3.0±0.8 versus 4.1±0.8 days, p<0.05). Post-operative complications were comparable between groups.

Table 2: Operative and post-operative parameters.

Parameters	Mean±SD	Range
Intra-operative duration (hours)	1.3±0.5	1-3
Duration of hospital stay (days)	3.5±0.9	2-6
Oral intake initiation (%)	POD 1: 21 (60)	-
	POD 2: 14 (40)	-
Post-operative complications (%)	Pain: 16 (45.7)	-
	Fever: 6 (17.1)	-
	Others: 3 (8.6)	-

Table 3: Comparison between catgut versus vicryl endoloop.

Parameters	Catgut (n=18)	Vicryl (n=17)	P value
Intra-operative duration (hours)	1.2±0.4	1.4±0.6	>0.05
Duration of hospital stay (days)	3.0±0.8	4.1±0.8	<0.05*
Post-op pain (%)	9 (50)	7 (41.2)	>0.05
Post-op fever (%)	3 (16.7)	3 (17.6)	>0.05

Table 4 summarizes follow-up outcomes, with 71.4% of patients showing good recovery. The loss to follow-up rate was 28.6%. Early oral intake was comparable between groups (catgut: 61.1%, vicryl: 58.8%).

Table 4: Follow-up outcomes.

Outcome	Number (%)
Good condition	25 (71.4)
Lost to follow-up	10 (28.6)
Stump appendicitis	No: 25 (71.4)
	Unknown: 10 (28.6)
Early oral intake (POD 1)	Catgut: 11 (61.1)
	Vicryl: 10 (58.8)

DISCUSSION

Laparoscopic appendectomy has emerged as the gold standard for treating acute appendicitis.[11,12] The most critical step in this procedure is the closure of the appendicular stump, which can be accomplished through various modern techniques including endoloops, bipolar coagulation, linear staplers, ultrasonic dissection instruments, and intracorporeal sutures.[13-16] While no single method has been definitively proven superior in terms of safety and efficacy, many surgeons prefer either endoloops or staplers, with endoloops being more cost-effective despite requiring greater surgical expertise.[17-21]

The current study's comparison between vicryl and catgut endoloops revealed no significant differences in complication rates or postoperative outcomes, though catgut endoloops showed slightly shorter operating times (p>0.05). These findings align with previous research by Babu et al, which reported similar results in terms of hospitalization duration (3.24±2.57 days) and procedural time (41.83±11.91 minutes).[22] The observed complication rates and hospital stay durations (1-7 days) are consistent with existing literature.[11,23,24]

Polyglactin 910 (vicryl) offers certain advantages, including the ability to close both rectus sheath and skin with the same suture material, enhanced maneuverability for base ligation, and easier handling during the procedure. Supporting studies by Yıldız et al and Antoniou et al have demonstrated the safety and cost-effectiveness of endoloop closure, while Şimşek et al found benefits in alternative methods such as polymeric clips.[25-27] Notably, Sarkar et al reported no significant differences between different closure techniques in terms of surgical duration, hospital stay, or complication rates, with no instances of ligature slippage or stump complications in either group.[28]

CONCLUSION

Based on our study findings, both catgut and vicryl endoloops demonstrate comparable safety and efficacy in laparoscopic appendicular stump closure. While catgut endoloops showed a slight advantage in terms of hospital stay duration, both methods exhibited similar operative times and post-operative complication rates. The choice between the two materials may depend on surgeon preference, cost considerations, and institutional protocols. Our study supports the use of either endoloop type as a reliable option for appendicular stump closure in laparoscopic appendectomy, providing surgeons with flexibility in their choice of material while maintaining optimal patient outcomes.

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