



A COMPARATIVE STUDY OF LAPAROSCOPIC AND OPEN APPENDECTOMY IN COMPLICATED APPENDICITIS

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ABSTRACT This 18-month prospective study at NMCHRC, Raichur, compared 36 laparoscopic and 36 open appendectomies in complicated appendicitis. Laparoscopic appendectomy showed significantly less blood loss, earlier diet resumption, shorter hospital stay, better cosmesis, and lower pain scores. Two cases (5.56%) required conversion to open. Fewer complications occurred in the LA group, confirming it as a safe, effective alternative in selected cases.

KEYWORDS : Open-Appendectomy(OA), Laparoscopic-Appendectomy (LA), Complicated Appendicitis

INTRODUCTION

Appendicitis affects about 7% of people, mostly aged 10–30, making appendectomy the most common emergency abdominal surgery. Complicated appendicitis occurs in 4–25% of cases, with one-third presenting with perforation, abscess, or peritonitis on admission.^[3,4,5]

Open appendectomy was long the standard, but laparoscopic appendectomy is now preferred due to less pain, quicker recovery, fewer infections, and recent evidence showing reduced early postoperative complications, including intra-abdominal abscesses.^[2]

Laparoscopic appendectomy offers better access and visualization, but may need conversion in cases with adhesions, perforation, or difficult anatomy^[4].

Despite these challenges, LA is now increasingly considered the first-line approach for complicated appendicitis, provided appropriate available surgical expertise and resources^[3].

MATERIALS AND METHODS

A Prospective comparative study Navodaya medical college hospital and research centre, Raichur for a duration of 18 months.

Inclusion Criteria

1. Those admitted in Navodaya Hospital and consented for laparoscopic appendectomy or open appendectomy
2. Patient aged 5–70 years
3. Appendicular abscess
4. Gangrenous appendix
5. Perforated appendix
6. Appendicitis with peritonitis
7. Appendicitis with extensive adhesions.
8. Early Appendicular mass

Exclusion Criteria

1. Patients not consented for inclusion in the study.
2. Age < 5 years and >70 years.
3. Pregnant females.
4. Malignancy.
5. Late appendicular mass.

Sample Size and Study Method

72 cases of complicated appendicitis were taken for comparison.

Eligible patients diagnosed with complicated appendicitis were randomly allocated into two groups.

Group LA: Laparoscopic Appendectomy (n = 36)

Group OA: Open Appendectomy (n = 36)

Data were analyzed using SPSS v16; Chi-square test applied, with $p < 0.05$ considered statistically significant.

Patients diagnosed with acute appendicitis at Navodaya Hospital (July 2023–December 2024) were assessed clinically and via imaging (USG/CT) for complicated appendicitis. Eligible patients gave informed consent. Diagnosis was based on clinical, radiological, and lab findings. All received pre-op evaluation, IV fluids, and antibiotics. Patients then underwent laparoscopic or open appendectomy, with intraoperative findings documented.

Open appendectomy used a gridiron or Rutherford-Morrison incision; appendix was removed, lavage done, and drain placed if needed.

Laparoscopic appendectomy was performed under GA with a 10 mm umbilical optic port and two 5 mm working ports. Intraoperative findings like perforation, abscess, or peritonitis were noted. Appendectomy and warm saline lavage were done. Antibiotics were given for 5–7 days based on severity. All surgeries were performed by two consultants, with me assisting.

Operative time, return to oral feeds, and pain (VAS on POD 1, 3, 15, and 6 weeks) were recorded. Discharge was based on clinical recovery. Follow-up at day 7, 15, and 6 weeks assessed wound healing, pain, and complications like infection or abscess. Ultrasound was done if intra-abdominal collection was suspected. Minimum follow-up was 6 weeks.

RESULTS

Seventy-two patients were put into two groups of 36 each and evaluated using SPSS-generated sequence for study outcome comparison.

Table 1: Demographic, Intraoperative, Post Operative, Pain score Outcomes.

Parameter	LA (n=36) (mean SD)	OA (n=36) (mean SD)	p-value	Not Significant (NS) Significant (S) (CI) Confidence interval
Age Groups	5-25:15; 26-50: 14; 51-70: 5	5-25:19; 26-50: 14; 51-70: 5	-	-
Gender	M:19 (52.78%) F: 17 (47.22%)	M:7 (19.44%) F:29 (80.53%)	-	-

Type of Complicated appendicitis	Perforation:10 Adhesions:16 Gangrenous:3 Abscess:2 Early Mass formation:2 Sub Hepatic Extension/Pulled up caecum:1	Perforation: 12 Adhesions: 16 Gangrenous: 3 Abscess: 1 Early Mass formation: 2 Sub Hepatic Extension/Pulled up caecum: 2	-	-
Operative time (mean SD)	55.74±16.7 mins	54.87±11.88 mins	0.7989	NS
Intraoperative Blood loss (mean SD)	71.43 28.12 mL	117.5 38.79 mL	<0.001	Significant
Conversion to open	2 cases (5.56%)	-	-	-
Drains inserted	9 (26.47%)	10 (27.78%)	0.9881	Significant
Return to liquid diet	Day 1: 34	Day 1:20 Day 2: 16	<0.00035	Significant
Return to soft diet	Day 1:34	Day 2: 23 Day 3: 13	<6.31x10 ⁻¹⁶	Significant
Post op Complications	Nil	Ileus: 2.78% Wound site Infection: 13.89%	0.0451	Significant
Hospital stay (mean SD)	4.09 1.19 days	6.58 1.08 days	<0.0001	Significant
Cosmesis	4.56	2.42	0.0074	Significant
Pain scores Day 1	5.91	7.19	0.0034	-1.80 to -0.76 CI
Day 3	2.97	5.56	0.0005	-3.11 to -2.07 CI
Day 15	1.21	2.64	0.0181	-1.88 to -0.98 CI
6 weeks	0.09	1.83	<0.0001	59.0 to 89.9% CI

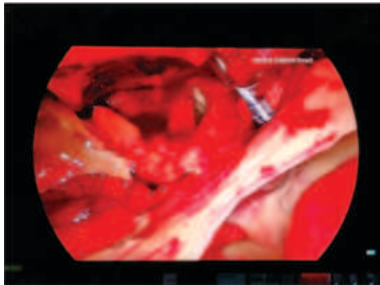


Figure 1: Dense Adhesions



Figure 2: Incision Extended in Open Appendectomy for Subhepatic Appendix

Seventy-two patients were randomized into LA and OA groups (36 each). Mean operative time was similar (LA: 55.74±16.7 mins; OA: 54.87±11.88 mins; $p=0.7989$), but LA had less blood loss (71.43±28.12 mL vs. 117.5±38.79 mL; $p<0.001$). LA showed faster diet resumption ($p<0.0001$), fewer complications ($p=0.0451$), shorter stay (4.09±1.19 vs. 6.58±1.08 days; $p<0.0001$), lower pain scores, and better cosmesis ($p=0.0074$).

DISCUSSION

Laparoscopic appendectomy is increasingly preferred for complicated appendicitis due to faster recovery, fewer complications, and better cosmesis. Though once controversial, recent studies support its safety and efficacy. This study compares LA and OA outcomes across various clinical parameters.

Most patients were 5–25 years. LA had equal gender distribution, while OA showed male predominance (81.6%). Adhesions (45.71%) were most common, followed by perforation (31.43%); other findings were evenly distributed. Mean operative time was similar: LA 55.74 mins, OA 54.87 mins ($p=0.7989$), unlike Kiriakopoulos et al.^[19] LA showed significantly lower blood loss (71.43 ml) than OA (117.5 ml), highlighting LA's minimally invasive advantage ($p<0.001$). Conversion occurred in 2 LA cases (5.56%) due to adhesions and poor visualization. No major complications followed. Reported rates vary (0–47%), largely influenced by surgeon experience.^[16,12]

Drain usage was similar (LA: 26.47%, OA: 27.78%; $p=0.9881$), indicating surgical approach didn't influence drainage. Overall, LA proved safe and effective, with comparable or better outcomes than OA, dependent on surgeon expertise and judgment.

Patients in the LA group resumed diets significantly earlier than those in the OA group. For liquids, 94.4% of LA patients restarted on Day 1 vs. 55.6% in OA ($p=0.00035$), with a 5.8-hour mean difference. All LA patients resumed soft diets by Day 1, confirming faster GI recovery compared to OA ($p<6.3\times10^{-16}$).

Excluding conversions, LA had no complications, while OA had six ($p=0.0451$). Converted LA cases developed ileus. Findings align with studies showing lower postoperative morbidity with LA.^[8,15] No intra-abdominal abscesses occurred in LA patients, likely due to early surgery, thorough lavage, selective drains, and strict care—contrasting prior reports of higher abscess rates. Pain scores were consistently lower in LA patients. Day 1 showed a mean difference of -1.28 ($p=0.0034$), Day 3: -2.59 ($p=0.0005$), Day 15: -1.43 ($p=0.0181$). At 6 weeks, 91.18% of LA patients were pain-free vs. 16.67% in OA ($p<0.0001$). LA patients had shorter hospital stays (4.09 vs. 6.58 days; $p<0.0001$), consistent with prior studies. Contributing factors include reduced pain, earlier diet resumption, and fewer wound complications, supporting LA's role in faster recovery.^[12,13] LA showed superior cosmetic outcomes, with more patients rating scars as acceptable ($p=0.0074$), confirming aesthetic benefits.

Two LA cases (5.56%) required conversion due to adhesions and poor visualization. Despite longer operative times, no major complications occurred. Reported conversion rates (0–47%) highlight the crucial role of surgeon experience. Drain use was similar in both groups (LA: 26.47%, OA: 27.78%; $p=0.9881$), reflecting clinical judgment. This study supports LA as a safe, effective option for complicated appendicitis, offering better recovery, less pain, fewer complications, and improved cosmesis without prolonging operative time—consistent with existing literature.

Study limitations include small sample size, single-center setting, and short 6-week follow-up, possibly missing late complications. Surgeon skill variability may also affect outcomes like operative time and conversion rates.

CONCLUSION

Our study confirms laparoscopic appendectomy as a safe, effective approach for complicated appendicitis, offering faster recovery, less pain, and fewer infections. Despite technical challenges, low conversion rates and favorable outcomes support LA as the preferred surgical option where expertise and resources are available.

Ethical clearance and informed consent were obtained from all participants before starting the study at Navodaya Medical College. We thank Navodaya Medical College, surgery staff, students, and

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