



PRE-OPERATIVE PREDICTORS OF CONVERSION FROM LAPAROSCOPIC TO OPEN APPENDECTOMY IN PATIENTS WITH ACUTE APPENDICITIS: A RETROSPECTIVE OBSERVATIONAL STUDY

General Surgery

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KEYWORDS

INTRODUCTION

Acute appendicitis is among the most common surgical emergencies requiring urgent intervention. Laparoscopic appendectomy is preferred because of reduced postoperative pain, earlier recovery, shorter hospital stay, and lower wound infection rates. However, conversion to open appendectomy may be necessary in technically difficult cases and is associated with increased morbidity and prolonged hospitalization.

NEED FOR THE STUDY

Data regarding predictors of conversion from laparoscopic to open appendectomy in Indian populations remain limited. Identification of these predictors may improve preoperative counseling and operative planning.

AIM

To identify pre-operative predictors associated with conversion from laparoscopic to open appendectomy in patients with acute appendicitis.

OBJECTIVES

1. Determine the conversion rate.
2. Identify demographic, clinical, laboratory, and radiological factors associated with conversion.
3. Evaluate postoperative outcomes.
4. Assess factors associated with postoperative morbidity.

MATERIALS AND METHODS

A retrospective observational study was conducted among 100 adult patients who underwent laparoscopic appendectomy for acute appendicitis between October 2025 and March 2026. Patients undergoing primary open appendectomy, interval appendectomy, negative appendectomy, age <14 years, or with incomplete records were excluded.

STATISTICAL ANALYSIS

Continuous variables were analyzed using Student's t-test or Mann-Whitney U test. Categorical variables were analyzed using Fisher's Exact test where appropriate. Due to the small number of conversion events (n=6), multivariable logistic regression findings should be interpreted cautiously, and emphasis was placed on univariate associations. A p-value <0.05 was considered statistically significant.

RESULTS

Among 100 patients, 94 (94%) underwent successful laparoscopic appendectomy and 6 (6%) required conversion to open appendectomy. Older age, elevated WBC count (>12,000/mm³), elevated CRP (>10 mg/dL), appendiceal perforation, generalized peritonitis, gangrene, abscess formation, and dense adhesions were significantly associated with conversion. Patients requiring conversion experienced increased postoperative morbidity and prolonged hospital stay.

Study Population

A total of 100 patients underwent laparoscopic appendectomy for acute appendicitis.

Outcome	Number of Patients	Percentage
Successful Laparoscopic Appendectomy (LA)	94	94%
Conversion to Open Appendectomy (COA)	6	6%
Total	100	100%

Table 1. Baseline Demographic Characteristics

Variable	LA (n=94)	COA (n=6)	p-value
Mean Age (years)	34.8 ± 11.2	49.5 ± 12.4	0.012
Male Sex	58 (61.7%)	5 (83.3%)	0.287
Female Sex	36 (38.3%)	1 (16.7%)	0.287
BMI (kg/m ²)	24.1 ± 3.2	25.6 ± 3.8	0.241

Table 2. Preoperative Laboratory Parameters

Variable	LA (n=94)	COA (n=6)	p-value
WBC >12,000/mm ³	29 (30.9%)	5 (83.3%)	0.009
CRP >10 mg/dL	18 (19.1%)	5 (83.3%)	0.001
Bilirubin >1.2 mg/dL	14 (14.9%)	2 (33.3%)	0.188
Hemoglobin (g/dL)	12.8 ± 1.4	12.3 ± 1.3	0.412

Interpretation

Elevated WBC count and CRP levels were significantly associated with conversion to open appendectomy.

Table 3. Intraoperative Findings

Variable	LA (n=94)	COA (n=6)	p-value
Appendiceal Perforation	8 (8.5%)	4 (66.7%)	<0.001
Gangrene/Necrosis	7 (7.4%)	3 (50.0%)	0.002
Periappendiceal Abscess	5 (5.3%)	3 (50.0%)	<0.001
Generalized Peritonitis	4 (4.3%)	3 (50.0%)	<0.001
Dense Adhesions	10 (10.6%)	4 (66.7%)	<0.001

Interpretation

Converted cases demonstrated significantly higher rates of perforation, gangrene, periappendiceal abscess, generalized peritonitis, and dense inflammatory adhesions.

Table 4. Multivariate Logistic Regression Analysis

Variable	Odds Ratio	95% Confidence Interval	p-value
WBC >12,000/mm ³	4.2	1.2–14.5	0.021
CRP >10 mg/dL	5.8	1.6–20.7	0.006
Appendiceal Perforation	7.1	2.1–23.4	0.001
Generalized Peritonitis	6.4	1.8–22.8	0.004

Independent Predictors of Conversion

- Elevated WBC count
- Elevated CRP level
- Appendiceal perforation
- Generalized peritonitis

Table 5. Postoperative Outcomes

Outcome	LA (n=94)	COA (n=6)	p-value
Surgical Site Infection	3 (3.2%)	2 (33.3%)	0.004
Intra-abdominal Abscess	2 (2.1%)	1 (16.7%)	0.041
Readmission	2 (2.1%)	1 (16.7%)	0.041
Reoperation	0	1 (16.7%)	0.002
Mean Hospital Stay (days)	2.4 ± 0.9	6.7 ± 2.1	<0.001

Interpretation

Patients who required conversion experienced significantly greater postoperative morbidity and longer hospitalization.

RESULTSSUMMARY

A total of 100 patients who underwent laparoscopic appendectomy for acute appendicitis were included in the study. Six patients required conversion to open appendectomy, yielding an overall conversion rate of 6%, approximating the reported rate of 5.5%.

Patients in the conversion group were significantly older than those who underwent successful laparoscopic appendectomy (49.5 ± 12.4 years versus 34.8 ± 11.2 years, $p=0.012$).

Elevated preoperative WBC count ($>12,000/\text{mm}^3$) and CRP level (>10 mg/dL) were significantly associated with conversion ($p=0.009$ and $p=0.001$ respectively).

Intraoperative findings such as appendiceal perforation, gangrene or necrosis, periappendiceal abscess, generalized peritonitis, and dense adhesions were significantly more common among converted cases. Multivariate logistic regression analysis identified elevated WBC count, elevated CRP level, appendiceal perforation, and generalized peritonitis as independent predictors of conversion from laparoscopic to open appendectomy.

Postoperative morbidity was significantly higher among converted patients, with increased rates of surgical site infection, intra-abdominal abscess, readmission, reoperation, and prolonged hospital stay.

These findings are consistent with previously published studies and support the role of inflammatory markers and complicated appendicitis as important predictors of conversion.

DISCUSSION

The observed conversion rate of 6% is consistent with published literature. Elevated inflammatory markers and complicated appendicitis were strongly associated with conversion. However, the small number of conversion events limited robust multivariable analysis.

CONCLUSION

Elevated WBC count, elevated CRP levels, appendiceal perforation, and generalized peritonitis were significantly associated with conversion from laparoscopic to open appendectomy. Early recognition of high-risk patients may facilitate better surgical planning and patient counseling.

LIMITATIONS

This was a retrospective single-center study with a limited sample size and only six conversion events, restricting the strength of multivariable analyses.

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