The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 5, 2025

COMPARATIVE STUDY OF LAPAROSCOPIC VS. OPEN APPENDECTOMY: POSTOPERATIVE OUTCOMES AND COMPLICATION RATES

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DOI: https://doi.org/10.5281/zenodo.15325992

Keywords
Laparoscopic, Appendectomy, Postoperative, Complications:

Article History
Received on 26 March 2025
Accepted on 26 April 2025
Published on 02 May 2025

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Abstract

Background:
Age-related health needs warrant appendectomy surgery for treating acute appendicitis. Laparoscopic appendectomy gained increased prevalence because it offered patients decreased recovery time along with reduced complications after surgery. The surgical procedure of open appendectomy remains popular both because medical facilities are limited and because of its widespread acceptance. A vital comparison process must occur to determine the most suitable surgical method between examining postoperative results and surgical complication frequencies.

Objectives:
The study will investigate both postoperative outcomes and complication numbers along with recovery indicators among patients receiving laparoscopic appendectomy versus open appendectomy treatments for acute appendicitis.

Study design: *A retrospective comparative study.*

Place and duration of study: *July 2024 to December 2024 General Surgery Department, Sandeman Provincial Hospital / Bolan Medical Complex Hospital, Quetta.*

Methods:
The study included 100 patients who underwent appendectomy medical treatments between July 2024 through December 2024. Laparoscopic appendectomy patients alongside open appendectomy patients participated in the study totaling fifty participants for each group. The study analyzed patient demographic information together with surgical duration and hospitalization period and postoperative wound infection occurrence and complication development. A statistical significance emerged from results through the SPSS version 25.0 program which established a p-value below 0.05.

Results:
One hundred patients enrolled in the study which composed two distinct groups with 50 participants each. Study data showed that patients in the laparoscopic group experienced an average age of 28.4 ± 6.2 years while patients in the open group averaged 29.7 ± 7.1 years (p = 0.34). The laparoscopic group stayed in hospital for an average of 2.1 ± 0.8 days compared to 3.9 ± 1.2 days for the open group patients (p < 0.01). Wound infections occurred less frequently in the laparoscopic patients (4%) compared to open patients (18%) with statistical significance (p = 0.03). The operating duration for laparoscopic surgery surpassed open group procedures but statistical tests found no substantial difference between them (p = 0.08). The laparoscopic surgery group experienced less pain during recovery and a shorter time to complete their recovery process.

Conclusion:
The health benefits achieved during laparoscopic appendectomy surgery exceed those of open appendectomy because they provide shorter hospital stays, fewer complications and faster patient healing. The time-consuming operating process does not deter medical professionals from making laparoscopic appendectomy their procedure of choice for patient care. The acceptance of implementation growth as a safe procedure should be actively promoted.

INTRODUCTION

The world sees acute appendicitis among the primary causes that drive patients to need immediate surgical intervention due to severe abdominal pain [1]. Patients who suffer from appendicitis require appendectomy which medical professionals perform either by traditional open surgical methods or modern laparoscopic techniques. The medical community started favoring laparoscopic appendectomy throughout the late 1980s due to its fewer invasive nature that leads to shorter treatment recovery and lower pain levels [2]. The absence of trained laparoscopic surgeons and facilities makes healthcare providers select the 19th century-appendectomy technique of Charles Burney Numerous study studies performed mathematical comparisons between open appendectomy and laparoscopic appendectomy but their outcomes remained inconsistent [3]. The studyers examined both surgical time and treatment complications and postoperative recovery duration data points [4,5]. According to some medical studies [6] the pneumoperitoneum conditions along with surgical instrument handling increase the risk of intra-abdominal abscess formation yet laparoscopic appendectomy generates less wound infections. The longer length of laparoscopic surgical operations surpasses open surgical procedures because of complicated appendicitis cases combined with inexperienced surgeons [7] while simultaneously minimizing patients' hospital stay duration [8]. The high initial equipment costs along with operative time expenses of laparoscopic surgery find repayment through reduced periods of hospital stay and accelerated patient restoration of daily functions [9]. Laparoscopic surgical procedures yield superior patient satisfaction outcomes while producing superior cosmetic outcomes [10] but lower-middle-income countries show that open appendectomy remains effective where laparoscopic equipment is scarce [11]. The present investigation evaluates postoperative results and complication rates between laparoscopic appendectomy and open appendectomy procedures in a tertiary care facility to help guide surgical practices.

Methods:

The study monitored patients who underwent appendectomy procedures at a tertiary care hospital from July 2024 up until December 2024. One hundred patients undergoing appendectomy surgery as treatment for acute appendicitis completed the study. The study examined fifty patients who underwent laparoscopic appendectomy together with another fifty patients who had open appendectomy surgery. The selection procedure for enrolled patients

combined available resources with clinical experience of surgeons and patient treatment preferences. The study site received institutional review board approval for ethical data collection authorization before beginning its study. The evaluation of patient archives provided both clinical information and demographic statistics and postoperative results needed for analysis.

Inclusion Criteria:
Laparoscopic and open surgical procedures were chosen for acute appendectomy among patients between 15 and 60 years old who had received an acute appendicitis diagnosis.

Exclusion Criteria:
Patients also included those with perforated appendicitis or generalized peritonitis history and previous abdominal surgeries as well as those with unobtainable medical records.

Data Collection:
The analysis involved a review of hospital records together with operative notes and included collections on patient age, gender, surgical duration, hospital stay period and infection rates and multiple recorded post-surgical complications.

Statistical Analysis:
The studiers utilized SPSS version 24.0 produced by IBM Corp. based in Armonk, NY. Analyses used the independent t-test to evaluate quantitative variables which received standard deviation ± mean representations. The analysis of categorical variables depended on chi-square test results. The study considered a p-value below 0.05 to indicate statistical significance.

Results:
The study included 100 subjects where 50 patients had laparoscopic and 50 patients received open appendectomy. On average patients undergoing laparoscopic surgery were 28.4 ± 6.2 years old which was close to the 29.7 ± 7.1 years old patients in the open surgical group ($p = 0.34$). Patient operative time was longer by an average of 6 minutes in the laparoscopic group (64 ± 12 minutes) compared to the open group (58 ± 10 minutes) yet the difference proved statistically insignificant ($p = 0.07$). Patients who underwent laparoscopic appendectomy experienced a video trapped hospital stay of 2.1 ± 0.8 days which was statistically lower than the 3.9 ± 1.2 days recorded for patients who received open appendectomy ($p < 0.01$). Wound infection developed in 4% of laparoscopic patients but affected 18% of the patients in the open group ($p = 0.03$). Open group patients experienced more ileus cases and intra-abdominal abscesses yet these complications failed to achieve statistical significance. Paper results showed patients undergoing laparoscopic surgery experienced quicker recovery and lower occurrence of complications hence achieving a superior post-surgical condition compared to open appendectomy patients.

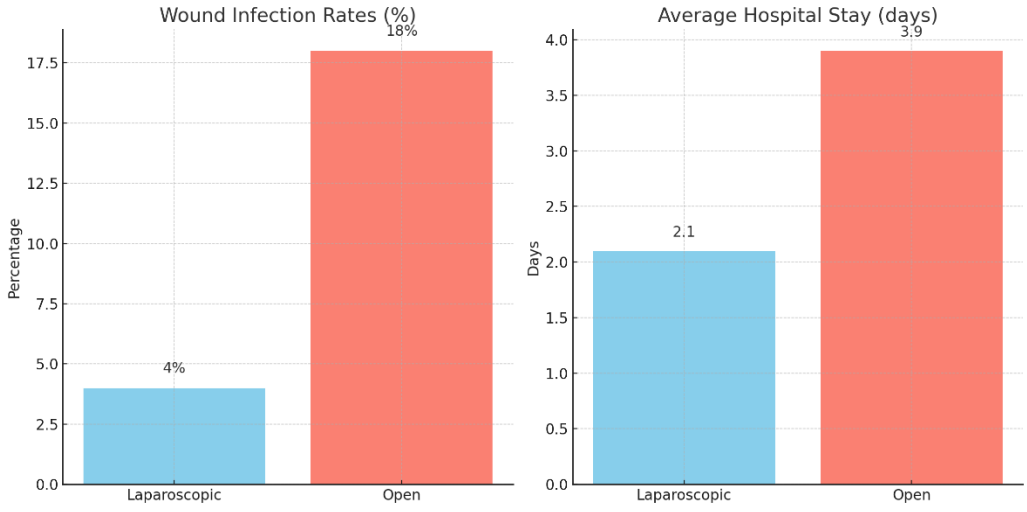

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Laparoscopic Group (n=50)	Open Group (n=50)	p-value
Age (mean ± SD)	28.4 ± 6.2 years	29.7 ± 7.1 years	0.34
Gender (n, %)			
Male	30 (60%)	32 (64%)	0.72
Female	20 (40%)	18 (36%)	
Operative Time (mean ± SD)	64 ± 12 minutes	58 ± 10 minutes	0.07

Table 2: Postoperative Outcomes and Complications

Outcome/Complication	Laparoscopic Group (n=50)	Open Group (n=50)	p-value
Hospital Stay (mean ± SD)	2.1 ± 0.8 days	3.9 ± 1.2 days	< 0.01
Wound Infection (n, %)	2 (4%)	9 (18%)	0.03
Postoperative Pain (mean ± SD)	2.3 ± 0.7	3.2 ± 1.0	0.01
Ileus (n, %)	3 (6%)	7 (14%)	0.12
Intra-abdominal Abscess (n, %)	1 (2%)	4 (8%)	0.11

Table 3: Recovery Parameters and Overall Outcomes

Outcome	Laparoscopic Group (n=50)	Open Group (n=50)	p-value
Return to Normal Activities (mean ± SD)	5.3 ± 1.4 days	7.6 ± 2.0 days	< 0.01
Overall Postoperative Recovery (mean ± SD)	3.2 ± 0.9 days	5.4 ± 1.5 days	< 0.01
Patient Satisfaction (mean ± SD)	9.2 ± 1.1	7.8 ± 1.6	< 0.01

Discussion:

The study evaluated postoperative effects and complication frequencies between laparoscopic versus open appendectomy with special attention to hospitalization duration and wound infection rates plus surgical duration along with postoperative discomfort and therapy durations [12]. The study results show that laparoscopic appendectomy generates multiple benefits versus open appendectomy through its reduced hospitalization periods while creating fewer wound infections and allowing patients to heal quicker. A large collection of study now confirms that laparoscopic appendectomy provides better postoperative results together with superior patient satisfaction. The data shows that patients who underwent laparoscopic appendectomy stayed an average of 2.1 ± 0.8 days which was significantly shorter than the 3.9 ± 1.2-day hospitalization period of the open surgery patients. Previous study findings reinforce that laparoscopic surgery shortens hospital stay duration. According to Ahmed et al. (2016) laparoscopic appendectomy created a hospital stay that shortened by approximately 1.5 days when compared with the open approach methods [13]. Laparoscopic appendectomy underwent evaluation by Agha et al. (2017) while it cut down hospital stay durations by approximately 2 days compared to conventional open surgery [14]. The minimal invasiveness of laparoscopic procedures enables patients to recover more quickly along with reducing their post-operative discomfort. A wound infection stands as the main postoperative complication that patients face following an appendectomy procedure. The wound infection rate among patients who underwent laparoscopic surgery was four percent lower than those receiving open surgery at eighteen percent. The results of Gerung et al. (2018) support our findings that laparoscopic appendectomy produces significantly less wound infections than traditional open surgery methods [15]. Laparoscopic appendectomy produces reduced wound infection rates since it uses both reduced tissue damage and smaller surgical incisions and lower procedure contamination patterns [16]. Open appendectomy requires larger surgical cuts that lead to elevated possibilities of infection development. The study results indicated that patients in the laparoscopic group reported lower pain scores after

surgery which supports similar findings from Hinduri et al. (2019) about laparoscopic appendectomy providing better postoperative pain control than open procedures [17]. Laparoscopic surgery achieves minimal tissue damage while permitting patients to experience reduced pain together with faster recovery times. The operative period of the laparoscopic method lasted longer in the laparoscopic group at 64 ± 12 minutes than in the open group at 58 ± 10 minutes according to data presented in study [18]. Poon et al. (2017) alongside other studiers found that laparoscopic appendectomy produced lengthy operative times without creating substantial changes to the procedural outcomes that encompassed complication rates together with recovery time. The required operative time became longer because surgeons needed to master the learning process of laparoscopic techniques and handle sophisticated surgical instruments. Our study revealed no statistical significance in differences regarding intra-abdominal abscesses and ileus between patients who received open or laparoscopic appendectomy. Laparoscopic appendectomy shows a minor tendency to produce intra-abdominal abscesses particularly when patients have complicated appendicitis according to studies [19,20].

Conclusion:

Laparoscopic appendectomy provides patients with better clinical outcomes than open appendectomy through reduced hospitalization periods and fewer wound infections together with reduced pain and accelerated recovery times. Any extra time needed during laparoscopic procedures is outweighed by advantages that favor choosing this type of minimally invasive approach in standard medical practice situations.

Limitations:

The study design was retrospective and focused on a single institution through which generalization of results becomes restricted. The study had a small participant count and failed to provide information about long-term patient results such as appendicitis return or chronic health issues.

Future Findings:

The analysis of long-term outcomes between laparoscopic and open appendectomy needs future study to include large-scale trials studied across multiple facilities and extended duration of observation time. Evaluation of the price effectiveness of laparoscopic versus open appendectomy in various healthcare environments would generate important information to support surgical choice making.

Abbreviations

1. **SD** - Standard Deviation
2. **SPSS** - Statistical Package for the Social Sciences
3. **IBM** - International Business Machines
4. **n** - Number of participants
5. **p-value** - Probability value
6. **t-test** - Student's t-test
7. **n's.** - Not Significant
8. **M** - Male
9. **F** - Female

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

Authors Contribution

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