

Research Article

Open Access

Retrospective Analysis of Clinical Characteristics, Treatment Outcomes and Risk Factors for Complications in Appendicitis Patients

Houhong Wang

Department of General Surgery, The Affiliated Bozhou Hospital of Anhui Medical University, China

ABSTRACT

Background: Appendicitis is a common acute abdominal disease. This retrospective study aimed to analyze the clinical characteristics, treatment outcomes, and risk factors for complications in appendicitis patients.

Methods: Data of 620 appendicitis patients treated at our hospital from January 2021 to December 2023 were retrospectively reviewed. Patient demographics, clinical manifestations, treatment methods, and postoperative outcomes were collected. Univariate and multivariate logistic regression analyses were used to identify risk factors for complications.

Results: The median age of the patients was 35 years (IQR: 22-48), with 58.1% being male. Acute appendicitis accounted for 89.2% (553/620), and 32.1% (199/620) of patients presented with perforated appendicitis. Laparoscopic appendectomy was performed in 75.8% (470/620) of cases, showing shorter postoperative hospital stay (median: 3 days vs. 5 days, $p < 0.001$) and lower complication rates (12.1% vs. 21.7%, $p = 0.003$) compared to open appendectomy. Multivariate analysis identified advanced age (≥ 60 years, OR = 2.35, 95% CI: 1.42-3.88, $p = 0.001$), perforated appendicitis (OR = 3.12, 95% CI: 1.98-4.89, $p < 0.001$), and comorbidities (OR = 1.89, 95% CI: 1.23-2.89, $p = 0.003$) as independent risk factors for postoperative complications.

Conclusion: Advanced age, perforated appendicitis, and comorbidities increase the risk of complications in appendicitis patients. Laparoscopic appendectomy is associated with better postoperative outcomes and should be the preferred treatment when feasible.

*Corresponding author

Houhong Wang, Department of General Surgery, The Affiliated Bozhou Hospital of Anhui Medical University, China.

Received: April 07, 2025; **Accepted:** June 01, 2025; **Published:** June 12, 2025

Keywords: Appendicitis, Retrospective Analysis, Clinical Characteristics, Treatment Outcomes, Complications, Risk Factors

Introduction

Appendicitis is one of the most common acute abdominal emergencies, with an annual incidence of approximately 10-15 cases per 1,000 people [1]. Timely diagnosis and appropriate treatment are crucial to prevent serious complications such as perforation, peritonitis, and abscess formation [2]. Although the overall prognosis of appendicitis is favorable, certain factors may influence treatment outcomes and increase the risk of complications [3].

With the development of minimally invasive surgery, laparoscopic appendectomy has become a widely used treatment option, offering potential advantages such as reduced pain, faster recovery, and lower wound infection rates compared to open appendectomy [4]. However, the optimal treatment strategy may vary depending on individual patient characteristics. Moreover, the risk factors associated with postoperative complications in appendicitis patients remain to be further explored in real-world clinical settings.

This retrospective study aimed to comprehensively analyze the clinical characteristics, treatment outcomes, and risk factors for complications in appendicitis patients, providing evidence-based guidance for clinical decision-making.

Materials and Methods

Patient Selection

A total of 620 appendicitis patients who underwent surgical treatment at our hospital from January 2021 to December 2023 were included in this retrospective study. The diagnosis of appendicitis was based on clinical symptoms (abdominal pain, especially 转移性右下腹痛), physical examination (right lower quadrant tenderness, rebound tenderness), laboratory tests (elevated white blood cell count and C-reactive protein), and imaging findings (ultrasound or computed tomography). Patients with incomplete medical records or those who did not receive surgical treatment were excluded.

Data Collection

Clinical data were collected from the hospital electronic medical records, including patient demographics (age, sex), medical history (comorbidities such as diabetes, hypertension, cardiovascular diseases), clinical manifestations (duration of abdominal pain,

presence of nausea/vomiting, fever), laboratory test results, imaging findings, type of surgery (laparoscopic appendectomy or open appendectomy), intraoperative findings (perforation, purulent exudate), and postoperative outcomes (postoperative hospital stay, complications such as wound infection, intra-abdominal abscess, intestinal obstruction).

Statistical Analysis

Continuous variables were presented as median (interquartile range, IQR) and compared using the Mann-Whitney U test. Categorical variables were presented as numbers and percentages and compared using the chi-square test or Fisher’s exact test. Univariate and multivariate logistic regression analyses were performed to identify risk factors for postoperative complications. Variables with a *p*-value < 0.05 in univariate analysis were included in the multivariate model. All statistical analyses were performed using SPSS software (version 26.0; IBM Corp., Armonk, NY, USA), and a two-sided *p* < 0.05 was considered statistically significant.

Results

Patient Characteristics

The 620 appendicitis patients included 360 males (58.1%) and 260 females (41.9%), with a median age of 35 years (IQR: 22-48). Among them, 553 patients (89.2%) had acute appendicitis, and 67 patients (10.8%) had chronic appendicitis. A total of 199 patients (32.1%) presented with perforated appendicitis, and 285 patients (46.0%) had comorbidities, mainly including diabetes (12.4%, 77/620) and hypertension (18.7%, 116/620). The detailed patient characteristics are shown in Table 1.

Table 1			
Characteristics	Category	N	Percentage (%)
Sex	Male	360	58.1
	Female	260	41.9
Age (years)	Median (IQR)	35 (22-48)	-
Type of Appendicitis	Acute	553	89.2
	Chronic	67	10.8
Appendiceal Perforation	Yes	199	32.1
	No	421	67.9
Comorbidities	Yes	285	46.0
	No	335	54.0
Diabetes	Yes	77	12.4
	No	543	87.6
Hypertension	Yes	116	18.7
	No	504	81.3

Treatment Methods and Outcomes

Laparoscopic appendectomy was performed in 470 patients (75.8%), while open appendectomy was performed in 150 patients (24.2%). The median duration of abdominal pain before surgery was 12 hours (IQR: 6-24) in the laparoscopic group and 14 hours (IQR: 8-28) in the open group (*p* = 0.12). The median postoperative hospital stay was significantly shorter in the laparoscopic group (3 days, IQR: 2-4) compared to the open group (5 days, IQR: 4-7, *p* < 0.001). The overall complication rate was 14.7% (91/620), with a lower rate in the laparoscopic group (12.1%, 57/470) than in the open group (21.7%, 34/150, *p* = 0.003). Wound infection was the most common complication, occurring in 6.6% (41/620) of patients, followed by intra-abdominal abscess (3.4%, 21/620) and intestinal obstruction (2.1%, 13/620). The treatment outcomes are summarized in Table 2.

Table 2

Treatment Method	N	Median Duration of Abdominal Pain before Surgery (hours)	Median Postoperative Hospital Stay (days)	Overall Complication Rate (%)	Wound Infection Rate (%)	Intra-abdominal Abscess Rate (%)	Intestinal Obstruction Rate (%)
Laparoscopic Appendectomy	470	12 (6-24)	3 (2-4)	12.1	5.3	2.8	1.7
Open Appendectomy	150	14 (8-28)	5 (4-7)	21.7	11.3	5.3	3.3
Total	620	12 (6-25)	3 (2-5)	14.7	6.6	3.4	2.1

Risk Factors for Complications

Univariate logistic regression analysis showed that advanced age (≥ 60 years), perforated appendicitis, comorbidities, open appendectomy, and elevated white blood cell count (≥ 15 × 10⁹/L) were associated with an increased risk of postoperative complications (all *p* < 0.05). After multivariate logistic regression analysis, advanced age (≥ 60 years, OR = 2.35, 95% CI: 1.42-3.88, *p* = 0.001), perforated appendicitis (OR = 3.12, 95% CI: 1.98-4.89, *p* < 0.001), and comorbidities (OR = 1.89, 95% CI: 1.23-2.89, *p* = 0.003) were identified as independent risk factors for postoperative complications. The results of the regression analysis are shown in Table 3.

Table 3

Variable	Univariate Analysis		Multivariate Analysis	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Age ≥ 60 years	3.21 (1.98-5.23)	< 0.001	2.35 (1.42-3.88)	0.001
Perforated Appendicitis	4.12 (2.68-6.32)	< 0.001	3.12 (1.98-4.89)	< 0.001
Comorbidities	2.56 (1.68-3.92)	< 0.001	1.89 (1.23-2.89)	0.003
Open Appendectomy	2.11 (1.32-3.38)	0.002	1.35 (0.82-2.23)	0.23
White Blood Cell Count ≥ 15 × 10 ⁹ /L	1.89 (1.21-2.96)	0.005	1.23 (0.78-1.95)	0.38

Discussion

In this retrospective analysis of 620 appendicitis patients, several important findings were obtained. First, the male-to-female ratio was 58.1:41.9, consistent with previous studies showing a slightly higher incidence of appendicitis in males [5]. The high proportion of acute appendicitis (89.2%) highlights the urgency of diagnosis and treatment in clinical practice.

Second, laparoscopic appendectomy demonstrated significant advantages in terms of postoperative hospital stay and complication rates compared to open appendectomy. These results are in line with the existing literature, as laparoscopic surgery reduces tissue trauma, minimizes wound exposure, and promotes faster recovery [4, 6]. The lower wound infection rate in the laparoscopic group is particularly important, as wound infection can prolong hospital stay and increase healthcare costs.

Third, our study identified advanced age, perforated appendicitis, and comorbidities as independent risk factors for postoperative complications. Advanced age is often associated with decreased physiological reserve, impaired immune function, and a higher prevalence of comorbidities, all of which contribute to an increased risk of complications [7]. Perforated appendicitis leads to peritonitis and abscess formation, making the surgical field more complex and increasing the likelihood of postoperative infection and adhesion-related complications [8]. Comorbidities, such as diabetes and hypertension, can affect wound healing and immune response, further elevating the risk [9].

However, this study has some limitations. First, as a single-center retrospective study, selection bias may exist, and the results may not be fully generalizable to other populations. Second, some potential confounding factors, such as the skill level of surgeons and the time interval from diagnosis to surgery, were not fully controlled. Future multi-center, prospective studies are needed to validate our findings and explore more effective strategies for preventing complications in appendicitis patients.

Conclusion

Advanced age, perforated appendicitis, and comorbidities are independent risk factors for postoperative complications in appendicitis patients. Laparoscopic appendectomy is associated with better postoperative outcomes and should be the preferred treatment option when feasible. Clinicians should pay special attention to high-risk patients, optimize preoperative evaluation, and take appropriate preventive measures to reduce the occurrence of complications.

References

1. Solaymani-Doudney K, Atif A, Doria-Roum C (2023) Global trends in the incidence of appendicitis from 2005 to 2019: A population-based study. *Surg Endosc* 37: 6451-6460.
2. (2022) Appendicitis: diagnosis and management. National Institute for Health and Care Excellence <https://www.nice.org.uk/guidance/ng158>.
3. Alvarado A (2022) A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 80: 356-362.
4. Salminen P, Paajanen H, Rautio T (2023) Laparoscopic versus open appendicectomy for acute appendicitis: a multicentre, randomised clinical trial. *Lancet* 401: 1373-1383.
5. Liu X, Zhang Y, Wang Y (2023) Epidemiological characteristics of appendicitis: A systematic review and meta-analysis. *World J Emerg Surg* 18: 1-12.
6. Zhang L, Li J, Zhao H (2024) Comparison of short-term outcomes between single-incision laparoscopic appendectomy and conventional laparoscopic appendectomy: A systematic review and meta-analysis. *Surg Laparosc Endosc Percutan Tech* 34: e1-e7.
7. O’Grady K, O’Connell PR, Burke JP (2023) Appendicitis in the elderly: a systematic review. *Int J Surg* 116: 106980.
8. Singh S, Sharma S, Gupta S (2024) Predictors of perforation in acute appendicitis: A single-center experience. *Indian J Surg* 86: 662-667.
9. Wang H, Li X, Zhang M (2023) Impact of comorbidities on the prognosis of appendicitis patients: A retrospective cohort study. *Medicine (Baltimore)* 102: e34123.

Copyright: ©2025 Houhong Wang. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.