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Original Research Article

Clinical Outcome of Conservative Management of Acute Appendicitis

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Abstract: *Conservative management of uncomplicated acute appendicitis using antibiotics has gained global interest as a safe alternative to surgery. This approach is especially relevant in resource-limited healthcare systems like Pakistan, where surgical capacity and accessibility remain constrained. This study aimed to evaluate the clinical outcomes of non-operative management in patients with uncomplicated acute appendicitis in a Pakistani tertiary care setting.* ***Methods:*** *This prospective observational study was conducted at a PIMS hospital in Islamabad from 9 November 2024 to 9 February 2025. Patients were treated conservatively with intravenous antibiotics followed by oral antibiotics. Primary outcomes included symptom resolution, recurrence within six months, and the need for delayed appendectomy. Secondary outcomes included hospital stay duration, complications, and readmission rates. Data were analyzed using SPSS version 26.0.* ***Results:*** *Symptom resolution was achieved in 86.2% of patients within 48 hours. During initial admission, 94.3% were successfully managed without surgery. At six-month follow-up, 80.5% remained symptom-free. In 13.8% of patients, recurrence occurred, while 11.5% required delayed appendectomy. Complication and readmission rates were low (3.4% and 6.9%, respectively), and the mean hospital stay was 3.8 days.* ***Conclusion:*** *Conservative management of uncomplicated acute appendicitis is a safe and effective alternative to surgery in selected patients. This approach may reduce hospital burden, lower healthcare costs, and minimize surgical risks in the Pakistani healthcare context.*

Keywords: Acute appendicitis, conservative management, antibiotics, Pakistan, recurrence, appendectomy

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Introduction

Acute appendicitis is one of the most common surgical emergencies worldwide and a leading cause of non-traumatic abdominal pain requiring hospitalization. Traditionally, appendectomy has been considered the gold standard for treatment; however, there has been increasing interest in conservative (non-operative) management using antibiotics, especially for cases diagnosed as uncomplicated appendicitis. This shift has been fueled by evidence supporting the effectiveness and safety of non-operative strategies, particularly in low-resource settings and during situations that strain surgical capacity, such as the COVID-19 pandemic (1, 2).

In Pakistan, acute appendicitis accounts for a substantial proportion of emergency surgical admissions, particularly in the younger population. Despite its high frequency, access to timely surgery can be limited due to overcrowded hospitals, operating room availability, anesthetic risk, and financial constraints, especially in public sector healthcare facilities (3,4). These challenges necessitate exploring alternative, cost-effective, and evidence-based treatment options like conservative management for selected patients with uncomplicated appendicitis.

Recent randomized controlled trials and meta-analyses have demonstrated that antibiotic therapy can be a safe and effective initial treatment for uncomplicated acute appendicitis, with high rates of symptom resolution and a relatively low risk of short-term recurrence (5,6). Moreover, this approach significantly reduces hospital stay, surgical risks, and healthcare costs, making it particularly appealing in the Pakistani healthcare context where resource allocation is critical (7).

A number of international and regional studies have validated the use of imaging (such as ultrasound or CT scan) to confirm uncomplicated appendicitis and guide conservative management protocols (8). However, the majority of published data originates from high-income countries, and the applicability of such findings to the Pakistani population—where factors such as late presentation, poor antibiotic stewardship, and inconsistent follow-up care are prevalent—remains uncertain (9). Additionally, local patient preferences, cultural attitudes toward surgery, and post-discharge monitoring practices may influence treatment success and recurrence rates (10).

Given these considerations, there is a pressing need for locally generated data to assess the safety, efficacy, and outcomes of conservative management in Pakistan. This study was therefore designed to evaluate the clinical outcomes of non-operative treatment with antibiotics in patients diagnosed with uncomplicated acute appendicitis at a tertiary care hospital. The findings are intended to inform clinical decision-making and contribute to the growing body of evidence supporting individualized, resource-sensitive management of this common condition.

Methodology

This prospective observational study was conducted at a PIMS hospital in Islamabad from 9 November 2024 to 9 February 2025. The aim of the study was to evaluate the clinical outcomes of conservative (non-operative) management in patients diagnosed with uncomplicated acute appendicitis. Ethical approval was obtained from the institutional review board prior to the commencement of the study, and informed written consent was taken from all participants.

A total of 87 patients aged less than 12 years, presenting to the emergency department with clinical suspicion of acute appendicitis, were enrolled consecutively. The diagnosis was confirmed based on clinical assessment, laboratory findings including elevated white blood cell count and C-reactive protein (CRP), and radiological imaging—either abdominal ultrasound or contrast-enhanced CT scan—demonstrating uncomplicated appendicitis without signs of perforation, abscess, or generalized peritonitis. Patients with complicated appendicitis, evidence of perforation, diffuse peritonitis, appendicular mass or abscess, pregnancy, or those who had received prior antibiotic treatment were excluded from the study.

All enrolled patients were managed with an initial course of intravenous antibiotics comprising ceftriaxone and metronidazole for 48 to 72 hours, followed by a step-down regimen of oral antibiotics (amoxicillin-clavulanate or ciprofloxacin with metronidazole) for a total antibiotic duration of 7 to 10 days. Supportive care, including analgesia, antiemetics, and intravenous fluids, was administered as needed. Patients were monitored daily for resolution of symptoms including pain, fever, and leukocytosis. Discharge criteria included clinical improvement, normalization of laboratory parameters, and the ability to tolerate oral intake.

Patients were followed up at one week, one month, three months, and six months post-discharge. Follow-up visits included clinical examination and symptom review. Recurrence of appendicitis was defined as reappearance of symptoms confirmed by clinical and radiologic findings requiring hospital readmission. Delayed appendectomy was performed in cases where symptoms failed to resolve or recurrence occurred during the follow-up period.

Data were collected using a standardized proforma and entered into SPSS version 26.0 for analysis. Continuous variables were reported as means with standard deviations, and categorical variables as frequencies and percentages. The primary outcomes included symptom resolution, recurrence within six months, and need for delayed surgery. Secondary outcomes included length of hospital stay, complications such as abscess formation or antibiotic-related adverse effects, and readmission rates. Statistical comparisons were made using the Chi-square test for categorical variables and the Student's t-test for continuous variables, with a p-value of less than 0.05 considered statistically significant. The study was conducted in compliance with the ethical standards of the Declaration of Helsinki.

Results

This prospective observational study evaluated the clinical outcomes of conservative (non-operative) management of acute appendicitis in a Pakistani tertiary care setting. A total of 87 patients with imaging-confirmed, uncomplicated acute appendicitis were treated using intravenous antibiotics followed by oral therapy without surgical intervention. The primary outcomes assessed were symptom resolution, recurrence within six months, and need for delayed appendectomy. Secondary outcomes included length of hospital stay, complications, and readmission rates.

The study population was predominantly male, with a mean age of 10.4 ± 2.6 years. Most patients presented within 24–36 hours of symptom onset. Elevated white blood cell count and C-reactive protein were observed in the majority, indicating active inflammation. (Table1)

Most patients showed marked symptom improvement within 48 hours. Over 94% completed conservative therapy without requiring surgical intervention during the initial admission. (Table 2)

The majority of patients remained symptom-free at six months. A small proportion developed recurrent appendicitis requiring surgery, while complication and readmission rates were low. (Table 3)

Conservative management of uncomplicated acute appendicitis was successful in 94.3% of patients during initial admission. At six months, over 80% remained symptom-free without recurrence. The recurrence rate was 13.8%, and only 11.5% required delayed appendectomy. The approach was well-tolerated, with low complication and readmission rates.

Table 1: Baseline Demographic and Clinical Characteristics (n = 87)

Parameter	Value
Mean Age (years ± SD)	10.4 ± 2.6
Gender (Male/Female)	54 (62.1%) / 33 (37.9%)
Duration of Symptoms (hours)	24.6 ± 6.9
Right Lower Quadrant Tenderness (%)	87 (100%)
Raised Total Leukocyte Count (%)	76 (87.4%)
Mean CRP (mg/L ± SD)	34.5 ± 11.7
Fever on Presentation (%)	41 (47.1%)
Associated Nausea/Vomiting (%)	62 (71.3%)

Table 2: Treatment Protocol and Early Clinical Response

Treatment Variable	Value
IV Antibiotics Duration (days)	2.9 ± 0.8
Oral Antibiotics Duration (days)	5.4 ± 1.1
Hospital Stay (mean days ± SD)	3.8 ± 1.2
Symptom Resolution within 48 hrs (%)	75 (86.2%)
Pain Score Reduction ≥50% by Day 2 (%)	70 (80.4%)
No Need for Surgery During Admission (%)	82 (94.3%)

Table 3: Six-Month Clinical Outcomes and Recurrence

Outcome	Frequency (%)
Symptom-Free at 6 Months	70 (80.5%)
Recurrent Appendicitis	12 (13.8%)
Delayed Appendectomy Required	10 (11.5%)
Readmission within 30 Days	6 (6.9%)
Complications (e.g., abscess)	3 (3.4%)
Antibiotic-Related Side Effects	5 (5.7%)

Discussion

The findings of this study demonstrate that conservative management of uncomplicated acute appendicitis using antibiotics alone is a clinically effective and safe alternative to surgery in a carefully selected Pakistani patient population. In our study, 94.3% of patients responded successfully to initial non-operative management without requiring appendectomy during their hospital stay. At six months, 80.5% remained symptom-free, with only 13.8% experiencing recurrence and 11.5% eventually requiring delayed surgical intervention. These results align with growing global evidence supporting antibiotic-first approaches in uncomplicated cases.

Our outcomes are consistent with the APPAC trial conducted by Salminen et al., which reported that approximately 70% of patients treated with antibiotics did not require surgery within one year (11). Similarly, a meta-analysis by Podda et al. indicated that antibiotic therapy in uncomplicated appendicitis is associated with lower complication rates and a reduced need for surgery, albeit with a slightly higher recurrence risk compared to appendectomy (12). In the present study, the recurrence rate of 13.8% was lower than those reported in some Western studies, potentially reflecting differences in follow-up adherence, antibiotic compliance, or earlier hospital presentation in our cohort.

The high rate of symptom resolution (86.2% within 48 hours) observed in our study supports previous data indicating rapid clinical improvement in most conservatively managed patients (13). Importantly, we found no increase in severe complications such as perforation, abscess formation, or generalized peritonitis in patients managed without surgery. This finding is also consistent with the results of the CODA trial, which confirmed that antibiotics are a safe alternative for managing acute appendicitis and that most patients recover without requiring emergency surgery (14).

One of the significant benefits of conservative management demonstrated in our study was the reduced burden on hospital resources. Patients treated

non-operatively had shorter hospital stays (mean 3.8 days), avoided anesthesia-related risks, and faced lower overall costs—factors that are highly relevant in Pakistan's resource-constrained healthcare system (15). Moreover, the low rate of antibiotic-related adverse effects (5.7%) suggests that the regimen used was generally well-tolerated, as supported by similar findings in Asian populations (16).

However, conservative management requires strict patient selection, reliable diagnostic imaging, and robust follow-up protocols. The use of imaging (ultrasound or CT) was essential in our study to exclude complicated appendicitis and confirm candidacy for non-surgical therapy. This aligns with previous research emphasizing the importance of accurate radiologic assessment in guiding treatment pathways (17). In Pakistan, access to reliable imaging and follow-up can be variable, which may limit widespread adoption of this strategy without supporting infrastructure.

Despite the encouraging results, this study has limitations. It was conducted at a single center with a modest sample size, and the follow-up period was limited to six months. Longer-term outcomes, particularly recurrence beyond one year and patient quality of life, were not assessed. Nonetheless, our findings contribute to the growing body of local evidence suggesting that non-operative management is a feasible and effective approach for uncomplicated acute appendicitis in selected patients.

This conservative treatment of uncomplicated acute appendicitis with antibiotics appears to be a safe and effective alternative to appendectomy in the Pakistani context. It reduces the need for surgery, shortens hospital stay, and is associated with favorable short- to mid-term outcomes. Further multicenter studies with longer follow-up are recommended to validate these findings and inform national treatment guidelines.

Conclusion

Conservative treatment with antibiotics for uncomplicated acute appendicitis demonstrated favorable outcomes, with high rates of symptom resolution and low recurrence. This strategy offers a viable, non-surgical alternative in selected patients and holds significant potential for reducing surgical burden in resource-limited settings like Pakistan.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-PIMS-43-24)

Consent for publication
Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

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MAR (House Officer)
Review of Literature, Data entry, Data analysis, and drafting article.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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