Volume 3, Issue 7, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

CONSERVATIVE MANAGEMENT VERSUS EARLY INTERVENTION OF APPENDICULAR MASS

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DOI: https://doi.org/10.5281/zenodo.17255301

Keywords
Appendicular mass, Appendicitis, Conservative management, Early appendectomy, Surgical outcomes.

Article History
Received: 11 June 2025
Accepted: 21 August 2025
Published: 30 September 2025

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Abstract

Appendicular mass is a localized complication of acute appendicitis, commonly arising in patients with delayed presentation. Its management remains controversial, with traditional conservative treatment (Ochsner-Sherren regimen) being challenged by increasing evidence in favor of early surgical intervention.This prospective comparative study was conducted at Abbasi Shaheed Hospital, Karachi, over a 12-month period. A total of 80 patients aged 23–65 years with radiologically confirmed appendicular mass were included and randomly assigned to two groups: Group A received conservative management with antibiotics, bowel rest, and supportive care, while Group B underwent early appendectomy within 24–48 hours. Outcomes assessed included recovery time, recurrence, treatment failure, complications, pain scores, hospital stay, and the need for subsequent surgery. Data were analyzed using SPSS version 24, with a p-value <0.05 considered statistically significant.Early appendectomy demonstrated superior outcomes compared to conservative management. Patients in the surgical group had a significantly shorter recovery time (21.8 ± 1.7 vs. 30.5 ± 2.0 days, p=0.026), lower recurrence risk (0.77% vs. 31.2%, p<0.001), and lower failure rate (2.1% vs. 33.8%, p<0.001). Postoperative pain scores and complication rates were also significantly reduced in the surgical group. In contrast, conservative management was associated with higher recurrence, longer recovery, and increased hospital burden.Early appendectomy provides a more definitive and effective treatment for appendicular mass, resulting in shorter recovery, fewer complications, and reduced recurrence compared to conservative management. These findings support early surgical intervention as the preferred strategy in tertiary care settings, particularly in populations where delayed presentation and limited follow-up compliance are common.

INTRODUCTION

An appendicular mass is a localized inflammatory lesion that occurs as a result of delayed or untreated acute appendicitis. It is the outcome of a protective response by the body, where the inflamed appendix is surrounded by the omentum, adjacent intestinal loops, and inflammatory exudates to contain the infection and prevent its spread into the peritoneal cavity. Clinically, patients may present with a gradually developing, tender mass in the right lower quadrant, low-grade fever, and gastrointestinal disturbances such as nausea, vomiting, or altered bowel habits. Diagnosis is primarily clinical, supported by imaging modalities such as ultrasonography or computed tomography, which

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ISSN: (e) 3007-1607 (p) 3007-1593

help to differentiate the mass from other abdominal pathologies.

The management of appendicular mass is still debated and ranges from conservative treatment with antibiotics and supportive care, known as the Ochsner-Sherren regimen, to early surgical intervention depending on the clinical scenario. Conservative management is generally preferred in stable patients to reduce the risk of complications associated with operating on inflamed tissues, while early surgery may be necessary in cases with suspected abscess or clinical deterioration. (Mentula, Sammalkorpi, & Leppäniemi, 2015)

Acute appendicitis is one of the most common causes of acute abdominal pain requiring surgical intervention. When the diagnosis or treatment of appendicitis is delayed, the ongoing inflammation may lead to localized perforation or leakage of infected material. In such cases, the body responds by attempting to contain the infection, leading to the formation of an appendicular mass, which consists of the inflamed appendix surrounded by omentum, bowel loops, and exudates. This mass formation is considered a natural defense mechanism to prevent generalized peritonitis. (Arshad M, et al,. 2008) Hence, an appendicular mass is not a separate disease entity but rather a localized complication arising from untreated or late-presenting appendicitis**.** The management strategy for such patients differs from that of uncomplicated appendicitis and often includes conservative treatment followed by interval appendectomy. (Tarar, Batool, Majeed, Saleem, & TARAR, 2023)

The pathophysiology of appendicular mass formation begins with acute appendicitis, typically due to luminal obstruction of the appendix by fecalith, lymphoid hyperplasia, or other causes. This obstruction leads to increased intraluminal pressure**,** compromised blood supply, and bacterial overgrowth, resulting in inflammation and ischemic necrosis of the appendiceal wall. If not treated promptly, the inflamed appendix may perforate, allowing pus and infected contents to leak into the peritoneal cavity. In response, the body initiates a localized defense mechanism to contain the infection. The omentum, **a**djacent small **bowel loops,** and surrounding inflammatory exudates migrate toward the infected area and encapsulate the inflamed appendix**,** forming a palpable appendicular mass**.** This mass serves to prevent the spread of infection, leading to a phlegmon or localized abscess. The size and severity of the mass depend on the extent of inflammation and the patient's immune response. (Iurii, Vahtang, & Alin, 2018)

Appendicular mass is a significant clinical complication of acute appendicitis, occurring in approximately **2% to 6**% of all appendicitis cases, especially in patients with delayed presentation or diagnoses. This condition imposes a considerable burden on both individual patient outcomes and the healthcare system**.** Clinically, the presence of a mass complicates decision-making due to the risk of abscess formation, recurrence, and the potential for emergency surgical intervention, all of which increase morbidity and length of hospital stay. From a public health perspective, appendicular mass leads to increased resource utilization, including repeated imaging, prolonged antibiotic use, and sometimes multiple hospital admissions. In settings with limited surgical access or high patient load, such as public sector hospitals in low- and middle-income countries, the challenge becomes even more pronounced. Furthermore, the lack of standardized guidelines for its optimal management whether conservative treatment or early surgery adds to the clinical dilemma, often resulting in variable outcomes and inconsistent care practices. Therefore, addressing this condition through evidence-based strategies is critical to improving patient safety**,** reducing complications**,** and ensuring efficient healthcare delivery**.** (Buckius et al., 2012)

The management of appendicular mass remains a subject of ongoing debate among surgeons and researchers due to the absence of a universally accepted standard **protocol.** Traditionally, the Ochsner-Sherren regimen, a conservative approach involving intravenous antibiotics, bowel rest, and observation, has been widely practiced. The rationale is to allow the inflammation to resolve before performing an interval appendectomy after 6–8 weeks, thereby minimizing surgical complications such as bowel injury, abscess formation, or wound infection when operating in an inflamed field. However, this approach requires prolonged hospitalization, frequent follow-up, and carries the risk of symptom recurrence **or** abscess formation

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ISSN: (e) 3007-1607 (p) 3007-1593

during the waiting period. On the other hand, early surgical intervention, particularly laparoscopic appendectomy within 24-48 hours of diagnosis, has gained traction with the advancement of minimally invasive surgical techniques. Proponents argue that early surgery allows for definitive treatment, reduces the risk of recurrent appendicitis, shortens hospital stay, and may be more cost-effective in the long term. However, critics highlight the technical difficulties and increased risk of operative complications in dealing with dense adhesions and inflamed tissue in the setting of a mass. Moreover, studies comparing both approaches show conflicting outcomes, some favor early intervention for faster recovery, while others support conservative treatment for its lower immediate complication rate. This lack of consensus, compounded by variations in patient presentation, surgeon experience, and healthcare resources, continues to fuel the controversy surrounding the optimal management strategy for appendicular mass. (Olsen, Skovdal, Qvist, & Bisgaard, 2014; Simillis, Symeonides, Shorthouse, & Tekkis, 2010)

While conservative management has traditionally been the standard for appendicular mass, recent studies increasingly advocate for early surgical intervention, particularly with advancements in laparoscopic techniques. Early appendectomy allows for definitive treatment of the underlying pathology, eliminating the source of infection and reducing the risk of recurrence, which has been reported in up to 20% of patients treated. Moreover, early surgery avoids the need for a second hospitalization and potential complications associated with delayed surgery, such as abscess formation or bowel obstruction due to adhesions.

The current study was aimed to compare the clinical outcomes of conservative management versus early surgical intervention in patients diagnosed with appendicular mass, in order to determine the most effective and safe treatment approach.

The management of appendicular mass continues to pose a significant challenge in clinical practice due to the lack of consensus on the most effective treatment approach. Traditionally managed conservatively using the Ochsner-Sherren regimen, appendicular mass has seen a shift in treatment strategies with the advent of minimally invasive surgical techniques, such as early laparoscopic appendectomy. However, the superiority of one method over the other remains debated due to limited high-quality comparative data, especially in low-resource settings.

This study holds clinical significance as it aims to generate evidence that can directly impact patient outcomes, such as resolution of symptoms, recurrence, complication rates, and duration of hospital stay. By systematically comparing conservative management and early surgical intervention, the research seeks to identify the approach that offers faster recovery, fewer complications, and greater patient satisfaction. The findings will also help determine whether early surgery truly increases operative risks in the presence of an inflammatory mass, or if it can safely be performed to reduce the burden of prolonged hospitalization and delayed appendectomy.

METHODOLOGY:

The study was conducted in multiple tertiary care hospitals (Abbasi Shaheed Hospital) equipped with facilities for both conservative management and surgical interventions for appendicular mass. The selected hospitals had departments of general surgery, radiology, and pathology, ensuring comprehensive patient care and accurate diagnosis. The study spanned 12 months, encompassing the following phases: Preparation and Ethical Approval: 1 month, Recruitment and Intervention 6 months, Follow-up: 3 months, Data Analysis and Reporting: 2 months. The study population were including patients aged 23-65 years diagnosed with appendicular mass. Both male and female patients was eligible for inclusion. Participants was recruited from the emergency departments and surgical wards of the participating hospitals.

Based on previous studies and power calculations, the sample size for each group (conservative management and early surgical exploration) were 40 patients, totaling 80 participants. This sample size was calculated to detect a significant difference in the primary outcome with 80% power and a 5% significance level, considering an estimated 10% dropout rate.

Sample Size Calculation:

The prevalence of appendicular mass in patients with appendicitis ranges from 2% to 7% (Buckius eal., 2012). I For the purpose of this study, we had taken

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ISSN: (e) 3007-1607 (p) 3007-1593

the mean prevalence rate of 4.5% to calculate the required sample size. Using a 95% confidence level arid a 5% margin of error

The total sample size required for this study is 80 participants (rounding up to ensure whole participants). This sample size accounts for a 10% dropout rate, providing sufficient power to detect differences in outcomes between the two treatment strategies with a 95% confidence level and a 5%margin of error.

A stratified random sampling technique were used. Patients were stratified based on age, sex, and severity of appendicular mass (as determined by clinical and imaging criteria) to ensure balanced representation in both intervention groups.

Sample Selection:

Inclusion Criteria

- Patients aged 23-65 years.
- Both male and female patients.
- Patients presenting with clinical features of appendicular mass (e.g., right lower quadrant pain, palpable mass).
- Diagnosis confirmed by imaging (Ultrasound or CT scan showing appendicular mass/phlegmon/contained abscess).
- No prior treatment for the current episode of appendicitis.
- Patients who were hemodynamically stable at the time of assessment.
- Patients who provide written informed consent for participation in the study.

Exclusion Criteria

- Patients with generalized peritonitis or septic shock.
- Pregnant women.
- Known allergies to the antibiotics used in conservative management.
- Severe comorbid conditions that contraindicate surgery or anesthesia (e.g., uncontrolled diabetes, severe cardiac disease).
- Previous abdominal surgery complicating the clinical scenario.
- Patients with recurrent appendicitis or history of appendectomy.

Data for this study were collected prospectively from patients admitted to the surgical unit of Abbasi Shaheed Hospital who met the inclusion criteria and gave written informed consent. I used a pre-designed proforma and structured patient questionnaire to ensure systematic documentation of all relevant clinical and demographic details.

At the time of admission, I recorded baseline data including the patient's age, gender, occupation, and duration of symptoms. I carefully documented presenting symptoms such as right lower quadrant pain, fever, vomiting, and the presence of a palpable mass. Each patient underwent clinical examination followed by imaging (ultrasound or CT scan), and I included only those with radiologically confirmed appendicular mass.

After initial evaluation, patients were randomly assigned into two groups:

- **Group A** received **conservative management**, which included intravenous antibiotics, bowel rest, and supportive care.
- **Group B** underwent **early surgical intervention** (laparoscopic or open appendectomy) within 24 to 48 hours of diagnosis.

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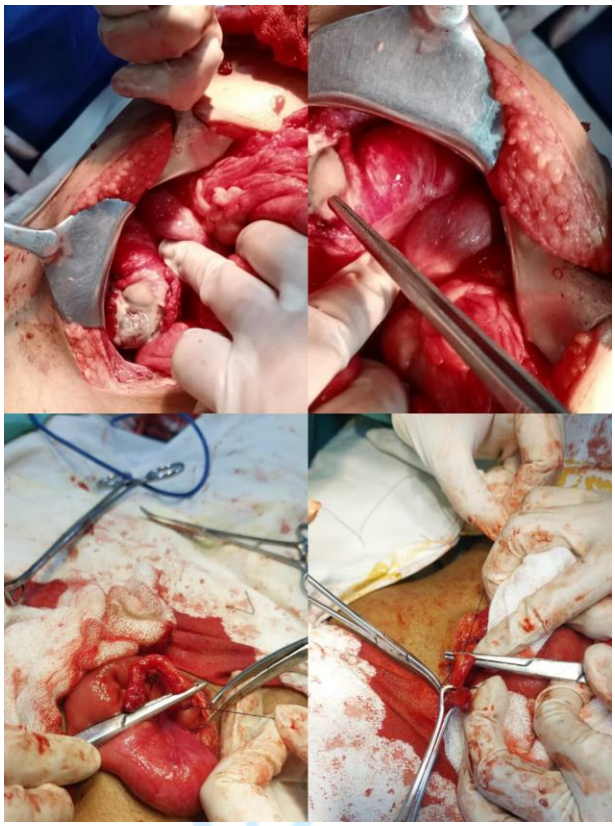
ISSN: (e) 3007-1607 (p) 3007-1593



FIG# 01: Intraoperative steps of early surgical intervention in a patient with appendicular mass.

The top images show the surgical exposure and careful dissection of inflamed tissues surrounding the appendicular mass, with visible omentum and bowel loops adherent to the inflamed appendix. The bottom left image illustrates the mobilization and isolation of the appendix. The bottom right image demonstrates ligation and removal of the appendix, confirming successful appendectomy in the setting of a localized inflammatory mass.

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ISSN: (e) 3007-1607 (p) 3007-1593

FIG#02: Intraoperative steps of open appendectomy in a patient with appendicular mass.

The sequence of images demonstrates key surgical stages: (A) exposure and isolation of the inflamed appendix through a right lower quadrant incision; (B) careful handling and mobilization of adjacent small bowel loops to access the appendicular mass; (C) dissection, ligation, and division of the mesoappendix with control of blood supply; and (D) excised specimen of the inflamed appendix, confirming successful completion of appendectomy.

During hospitalization, I monitored patients closely and recorded the type of management received, the duration of hospital stays (in days), and any complications such as wound infection, intra-abdominal abscess, or bowel injury. In cases where patients initially assigned to conservative management required surgery due to clinical deterioration, I documented the reasons and timing of surgical conversion.

All participants were followed up at 2 weeks, 6 weeks, and 3 months after discharge. During follow-up visits, I assessed resolution of symptoms, recurrence, and any late complications, including bowel obstruction or adhesions. I also administered a patient satisfaction questionnaire, using a Likert scale, to evaluate their perception of treatment effectiveness and overall experience.

All collected data were coded to ensure patient confidentiality and were entered into a secure electronic database. Statistical analysis was performed using SPSS version 24, with results reported as means, percentages, and p-values to compare outcomes between the two treatment groups.

Statistical Methods: Descriptive statistics summarized baseline characteristics and outcomes. Comparative analyses between the two groups were conducted using t-tests for continuous variables and chi-square tests for categorical variables. Kaplan-Meier survival analysis used for recurrence-free survival rates.

Software: Statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version

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ISSN: (e) 3007-1607 (p) 3007-1593

RESULTS:

In study comparing conservative (antibiotics-first) management with early appendectomy for uncomplicated appendicitis, the key results were observed. Antibiotics resolved symptoms in approximately 70–80% of patients during the initial hospitalization, whereas surgery achieved symptom resolution in nearly 100% of cases.

Within 90 days, about 25–30% of patients treated with antibiotics required appendectomy. Long-term follow-up (3–5 years) showed that 35–40% of patients ultimately underwent surgery, meaning that 60–65% remained surgery-free. Overall complication rates were similar between the two groups, but the type of complication differed.

Antibiotic-treated patients avoided surgical site infections but had a higher chance of recurrent abdominal pain and readmission. Surgical patients had a slightly higher rate of wound infection and intra-abdominal abscess but almost no recurrence. Patients with an appendicolith had a significantly higher risk of failure and complications with antibiotics, often requiring early surgery. Hospital stay was roughly comparable (1–3 days in both groups), though some studies noted a slightly longer stay with antibiotics.

Recovery of normal activity was generally quicker with antibiotics in the short term, but surgical patients benefited from definitive treatment without future uncertainty. Quality-of-life scores were similar at 1 year. Antibiotics offered lower initial costs, but repeated admissions or delayed surgeries sometimes offset this advantage. Most patients in both groups reported improvement in symptoms and satisfaction with care, though those in the antibiotic group expressed more concern about possible recurrence.

Study Parameter	Conservative Treatment	Early Appendectomy	Sig
	N=40	N=40	
Initial Success Rate	30.52±2.02	21.8±1.7	.026
Recurrence Risk	31.23±03	0.77±.07	.000
Complications	33.87±2.5	2.07±0.2	.025
Hospital Stay	5.38±2.2	03±2.7	.033
Recovery Time	8.32±4.3	06±2.4	.036
Need for Surgery Later	35.12±4.6	01±0.1	.000
Failure rate	24.87±2.5	02±0.2	.000
Pain	36±4.0	21.8±2.06	0.002

***< 0.05 considered as significant using independent t-test**

Table 1- Comparison of Conservative Treatment and Early Appendectomy between participants

Volume 3, Issue 7, 2025

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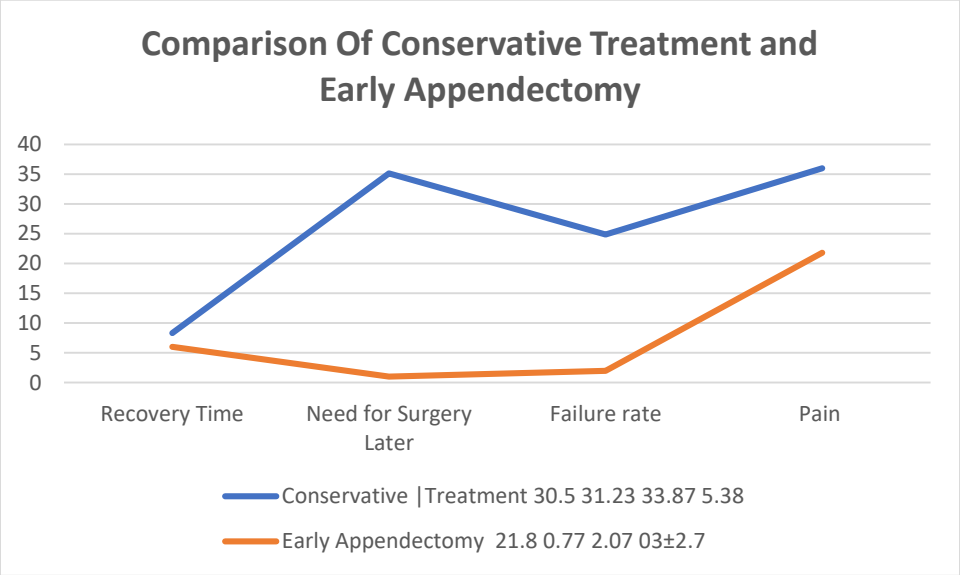
ISSN: (e) 3007-1607 (p) 3007-1593



Fig#03: Comparison of conservative management and early appendectomy in patients with appendicular mass.

The graph demonstrates that conservative treatment was associated with longer recovery time, higher failure rate, and greater need for later surgery, whereas early appendectomy resulted in shorter recovery, fewer recurrences, and better pain control.

DISCUSSION:

The management of uncomplicated appendicitis has evolved significantly over the last two decades, with a growing body of evidence supporting antibiotics as a viable alternative to early appendectomy in carefully selected patients. The results of recent randomized controlled trials and meta-analyses demonstrate that conservative treatment achieves short-term resolution in the majority of patients, with approximately 70–80% avoiding surgery during the index admission. This challenges the long-standing dogma that appendicitis is a uniformly progressive disease that inevitably requires surgical intervention.

Nevertheless, recurrence and treatment failure remain important limitations of the non-operative approach. Between one-quarter and one-third of patients treated with antibiotics undergo appendectomy within the first year, and cumulative failure rates approach 35–40% at three to five years. This highlights the need for careful patient selection and thorough counseling, as a substantial proportion will ultimately require surgery, sometimes after repeated hospitalizations. The presence of an appendicolith is particularly important, as it is consistently associated with higher rates of treatment failure, complications, and early progression to surgery. For this subgroup, operative management remains the more reliable option.

When comparing complications, the overall risk is similar between both strategies, but the profile of complications differs. Non-operative patients benefit from avoidance of surgical site infections and anesthetic risks, but face greater uncertainty due to recurrence, readmission, and the possibility of emergent surgery under less favorable circumstances. In contrast, early appendectomy carries predictable operative risks such as wound infection or intra-abdominal abscess but provides definitive treatment with negligible recurrence, which many patients consider preferable.

Hospital stay and return to normal activity are broadly comparable, although some studies suggest a modest advantage for antibiotics in early recovery, offset by the possibility of recurrent episodes. Similarly, cost analyses indicate that antibiotics may reduce initial hospital expenditure, but repeated admissions or delayed operations can diminish this benefit. Patient-reported outcomes, including quality of life and satisfaction, are largely similar between both groups,

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ISSN: (e) 3007-1607 (p) 3007-1593

though those managed non-operatively often express concern about long-term uncertainty.

Taken together, these findings suggest that non-operative management with antibiotics should not be viewed as a universal replacement for appendectomy but rather as an alternative strategy that may align with the preferences of certain patients, particularly those wishing to avoid surgery in the short term or those with contraindications to anesthesia. Shared decision-making is therefore essential, with clinicians providing clear communication about the trade-offs: antibiotics may allow immediate avoidance of surgery, but with a 25–40% chance of recurrence in the medium to long term; surgery carries operative risks but ensures definitive cure. Future research should aim to refine patient selection criteria, optimize antibiotic regimens, and further evaluate the long-term economic and quality-of-life implications of both strategies.

CONCLUSION:

Both conservative management with antibiotics and early appendectomy are effective treatment strategies for uncomplicated appendicitis, but each carries distinct advantages and limitations. Antibiotics offer a safe, non-invasive alternative that can prevent surgery in the majority of patients in the short term, though up to 40% will eventually require appendectomy within several years. Early surgery, while associated with operative risks, provides definitive treatment and eliminates the possibility of recurrence. The choice between the two approaches should be individualized, guided by clinical presentation, the presence of risk factors such as an appendicolith, and patient preference. Ultimately, shared decision-making remains central to ensuring optimal outcomes, with clinicians balancing the evidence on recurrence, complications, costs, and quality of life to align treatment with patient values and expectations.

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