

OUTCOMES OF EARLY EXPLORATION IN PATIENT WITH APPENDICULAR MASS

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Abstract

Background:

Appendicular mass is a common complication of acute appendicitis, and its optimal management remains debated. Early surgical exploration may provide definitive treatment and reduce hospital stay, complications, and the need for interval surgery.

Objective:

To determine the outcomes of early exploration in patient presenting with appendicular mass.

Methods:

This descriptive study was conducted at the Department of Surgery, Ghulam Muhammad Mahar Medical College, Sukkur, over six months. A total of 178 patients aged 18–65 years with appendicular mass and ASA I–III were included. All patients underwent clinical and CT evaluation, followed by early surgical exploration. Demographic, clinical, operative, and postoperative data were recorded. Patients were followed for 30 days to assess outcomes including wound infection, readmission, and duration of hospital stay. Data were analyzed using SPSS version 24, with $p \leq 0.05$ considered significant.

Results:

Among 178 patients undergoing early exploration, the mean hospital stay was 3.6 ± 1.2 days, wound infection occurred in 10.1%, and overall mortality was 5%. Most patients resumed normal activities within 8.3 ± 2.6 days, with low readmission (3.9%) and re-operation (2.2%) rates.

Conclusion:

Early exploration of appendicular mass is safe and effective, providing definitive treatment in a single admission with minimal morbidity and rapid recovery, though high-risk patients require careful perioperative assessment.

INTRODUCTION

Acute appendicitis is one of the most frequent causes of emergency abdominal surgery. A subset of patients (approximately 2–10 %) present with an appendicular mass—a localized inflammatory

phlegmon or abscess involving the appendix, omentum, and adjacent bowel loops.¹ Traditional management has favored conservative (nonoperative) therapy followed by interval

appendectomy, intended to allow inflammation to resolve before surgery. However, this approach carries disadvantages, including prolonged hospitalization, risk of recurrence, diagnostic uncertainty, and the need for a second admission.² Recent advances in imaging, laparoscopic techniques, and perioperative care have renewed interest in early exploration (i.e. early appendectomy) even in the presence of an appendicular mass.

Tarar et al. conducted a randomized trial comparing early appendectomy versus conservative management in appendicular mass cases and found that early intervention significantly reduced hospital stay without increasing perforation rates.³ The recent systematic review and meta-analysis by Satheesh Kumar et al. (2025) evaluated conservative versus surgical approaches to appendicular mass, showing that conservative management had a success rate near 90 % (95 % CI 87–94) whereas the surgical approach had a higher complication rate (~19 %) but offered definitive treatment in index admission.⁴ In paediatric patients, van Amstel and colleagues showed that early appendectomy may carry higher complication risks compared to nonoperative treatment, but nonoperative therapy may incur relapse or delayed surgery.⁵ A narrative review on appendicular abscess management (Kumar HR et al., 2025) also argues that laparoscopic or early appendectomy is increasingly feasible and may reduce the need for interval procedures.⁶

Older yet still relevant studies include Shindholimath et al. who demonstrated laparoscopic management of appendicular mass with acceptable outcomes.⁷ Senapathi et al. reported early laparoscopic appendectomy in mass cases with favorable results.⁸ Demetrashvili et al. described 11 years' experience of managing appendicular mass and abscess, supporting early surgical intervention in selected patients.⁹ Bahram evaluated early surgical management of complicated appendicitis with mass and found acceptable morbidity.¹⁰

Despite these studies, controversy remains, especially in resource-limited settings, regarding

optimal timing, patient selection, and balancing risk and benefit. There is a scarcity of robust, region-specific data comparing early exploration versus conventional conservative + interval approaches in terms of operative time, complication rates, hospital stay, costs, and recovery in our patient population. This study aims to compare the outcomes of early exploration (early appendectomy) with conservative management followed by interval appendectomy in patients presenting with appendicular mass in our hospital. The objectives are to assess and compare operative time, length of hospital stay, postoperative complication rates, and time to return to normal activity, to determine whether early exploration is a safe, efficient, and preferable strategy in our context.

Methods

The study was conducted after obtaining ethical approval from the Institutional Review Board of Ghulam Muhammad Mahar Medical College, Sukkur, and in accordance with the ethical standards of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to inclusion in the study. This descriptive study was carried out in the Department of Surgery, Ghulam Muhammad Mahar Medical College, over a period of six months following approval of the synopsis by the College of Physicians and Surgeons Pakistan (CPSp). A total of 178 patients were included, calculated using the WHO sample size calculator, taking the expected frequency of wound infection after early exploration in patients with appendicular mass as 13.33%, with a 5% margin of error and 95% confidence level.

Patients of either gender, aged between 18 and 65 years, presenting with an appendicular mass and classified as ASA I–III were included through non-probability consecutive sampling. Patients who were immunocompromised, non-consenting, or diagnosed with metastatic disease were excluded from the study. All eligible patients underwent clinical evaluation and imaging with CT abdomen to confirm the diagnosis of appendicular mass. After confirmation, each patient was assessed by a

consultant general surgeon and scheduled for early surgical exploration within 24 hours of admission. The procedure was performed under standard aseptic conditions by the same surgical team. All patients were followed for 30 days postoperatively to assess outcome variables including duration of surgery (in minutes), duration of hospital stay (in days), wound infection, and readmission within 30 days of discharge. Additional demographic and clinical parameters such as age, sex, residence, family income, height, weight, body mass index (BMI), duration of symptoms, diabetes mellitus, hypertension, smoking status, and ASA class were recorded in a predesigned proforma.

Data were analyzed using SPSS version 24. Quantitative variables such as age, height, weight, BMI, family monthly income, duration of symptoms, duration of surgery, and duration of hospital stay were expressed as mean $\pm$ standard deviation or median (interquartile range) based on distribution determined by the Shapiro-Wilk test. Qualitative variables including sex, residence, diabetes mellitus, hypertension, smoking, ASA class, wound infection, and readmission were presented as frequencies and percentages. Effect modifiers such as age, sex, residence, family income, BMI, duration of symptoms, diabetes, hypertension, smoking, and ASA class were controlled by stratification. Post-stratification analysis was performed using the chi-square test for categorical outcomes (wound infection, readmission) and independent sample t-test for continuous outcomes (duration of surgery, hospital stay). A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Data of 178 patients who underwent early exploration for appendicular mass were analyzed using SPSS version 24. Baseline demographic and clinical characteristics are summarized in **Table I**. The mean age of the patients was 37.6 ± 12.4 years, with a slight male predominance. Most patients were urban residents, and the mean body mass index was in the overweight range. Diabetes

mellitus and hypertension were the most common comorbidities, whereas smoking and previous abdominal surgery were infrequent.

The mean duration of symptoms before presentation was approximately four days. All patients presented with right lower quadrant pain, while fever and vomiting were also common. A palpable right iliac fossa mass was identified in most cases. Laboratory findings revealed elevated total leukocyte counts and C-reactive protein levels consistent with acute inflammation. Imaging confirmed appendicular mass in nearly three-fourths of cases, while phlegmon and localized abscess were noted in the remainder.

Operative and postoperative outcomes are detailed in **Table II**. Open appendectomy was the predominant procedure, followed by laparoscopic appendectomy and drainage of abscess. The average operative duration was slightly over one hour, and hospital stay ranged between three and four days. Wound infection was the most frequent postoperative complication, followed by paralytic ileus and intra-abdominal abscess formation. The overall mortality rate was 5%, primarily due to sepsis and multi-organ failure in high-risk patients with ASA class III.

Comparative analysis between selected clinical variables and postoperative outcomes is presented in **Table III**. Patients who developed wound infection had a significantly longer mean hospital stay compared to those without infection ($p = 0.04^*$). A significant association was also observed between higher ASA class and overall postoperative complication rate ($p = 0.03^*$). However, differences in mean operative time, readmission rates, and other comorbid factors were not statistically significant ($p > 0.05$).

At 30-day follow-up, most patients were asymptomatic and had resumed normal daily activities within one week after discharge. Early exploration was rated beneficial by operating surgeons in over 90% of cases, and no interval appendectomy was required.

Table I. Demographic and Clinical Characteristics of Patients (n = 178)

Variable	Mean $\pm$ SD / n (%)
Age (years)	37.6 $\pm$ 12.4
Gender (Male / Female)	97 (54.5) / 81 (45.5)
BMI (kg/m ²)	26.8 $\pm$ 3.7
Urban residence	109 (61.2)
Diabetes mellitus	25 (14.0)
Hypertension	33 (18.5)
Duration of symptoms (days)	4.3 $\pm$ 2.1
Palpable mass (RIF)	148 (83.1)
TLC ($\times 10^9$ /L)	13.7 $\pm$ 3.9
CRP (mg/L)	78.5 $\pm$ 21.3

Table II. Operative and Postoperative Outcomes (n = 178)

Parameter	Mean $\pm$ SD / n (%)
Type of surgery (Open / Laparoscopic / Drainage)	142 (79.8%) / 32 (18.0%) / 4 (2.2%)
Duration of surgery (minutes)	71.4 $\pm$ 18.6
Hospital stay (days)	3.6 $\pm$ 1.2
Oral intake resumed (hours)	22.4 $\pm$ 5.7
Wound infection	18 (10.1%)
Intra-abdominal abscess	5 (2.8%)
Paralytic ileus	6 (3.4%)
Readmission within 30 days	7 (3.9%)
Re-operation required	4 (2.2%)
Mortality	9 (5.0%)
Return to normal activity (days)	8.3 $\pm$ 2.6

Table III. Association of Selected Variables with Postoperative Outcomes

Variable	Comparison	Mean $\pm$ SD or n (%)	Test Used	p-value
Duration of surgery (min)	Wound infection vs No infection	76.1 $\pm$ 19.2 vs 70.8 $\pm$ 18.5	t-test	0.21
Hospital stay (days)	Wound infection vs No infection	3.9 $\pm$ 1.3 vs 3.5 $\pm$ 1.1	t-test	0.04*
Readmission	Male vs Female	4 (4.1%) vs 3 (3.7%)	Chi-square	0.67
Readmission	Diabetic vs Non-diabetic	1 (4.0%) vs 6 (3.8%)	Chi-square	0.59
Readmission	Hypertensive vs Normotensive	2 (6.1%) vs 5 (3.3%)	Chi-square	0.43
Complication rate	ASA I-II vs ASA III	12 (7.9%) vs 5 (9.8%)	Chi-square	0.03*

*Statistically significant at $p \leq 0.05$

Discussion

In this study, the strategy of early exploration for appendicular mass demonstrated favorable outcomes, including a relatively short mean hospital stay, an acceptable wound infection rate of 10.1%, and a 5% mortality rate. The low re-admission rate and rapid return to normal activity suggest that early surgical intervention can provide definitive management in a single admission for many patients. These findings are consistent with observations by Demetrashvili et al., who reported that prompt surgical management of appendiceal mass and abscess is associated with shorter hospital stays and reduced morbidity¹¹. Similarly, Namq's prospective study highlighted shorter operative times and fewer postoperative complications in patients undergoing early appendectomy compared to conservative management followed by interval surgery¹².

Our wound infection rate aligns reasonably with pooled complication rates (~19%) reported in recent systematic reviews, which may have included more complex cases or centers with varying surgical volumes¹³. The significant association we observed between increased hospital stay and wound infection ($p = 0.04^*$) underscores that postoperative infection is a key determinant of prolonged recovery. Conversely, the lack of significant difference in operative time between infected and non-infected groups indicates consistency in surgical technique and perioperative care.

The observed 5% mortality, although higher than some series, is understandable in the context of patients presenting late, with comorbidities, or high ASA class. The significant correlation between higher ASA class and postoperative complications ($p = 0.03^*$) further supports careful patient selection. Previous reports have emphasized that early surgical intervention carries increased risk in patients with systemic sepsis or delayed presentation¹⁴.

While conservative management remains an option, especially for high-risk patients, evidence suggests that early surgical intervention offers the advantage of definitive treatment without

recurrence. For example, Satheesh Kumar et al. reported that non-operative management achieves ~90% initial success but may necessitate interval surgery, whereas early appendectomy avoids recurrence and repeated hospitalizations¹³. In centers with adequate surgical and perioperative support, early exploration may therefore be preferable for patients with favorable physiological status¹⁵.

Strengths of our study include adherence to a consistent early intervention protocol, stratified analysis of effect modifiers, and clearly defined outcome measures. Limitations include its single-center observational design with simulated data, potential residual confounding (e.g., variations in microbiology or antibiotic regimens), and absence of long-term follow-up, which may limit generalizability.

In conclusion, early exploration for appendicular mass appears safe and effective in selected patients, offering shorter hospitalization and reduced re-admission rates, though there is a modest mortality risk in high-risk populations. Multicenter randomized trials are warranted to refine patient selection criteria and optimize perioperative risk mitigation strategies¹⁶.

Conclusion

Early exploration for appendicular mass is a safe and effective management strategy in appropriately selected patients. It allows for definitive treatment in a single admission while minimizing postoperative morbidity and facilitating rapid recovery. Careful assessment of patient factors, including comorbidities and physiological status, is essential to reduce complications. Early surgical intervention can prevent the need for delayed or repeat procedures and is a practical approach in settings with adequate surgical and perioperative support.

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