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MANAGEMENT OF APPENDICULAR MASS: A COMPARATIVE STUDY BETWEEN PERCUTANEOUS DRAINAGE AND SURGICAL REMOVAL

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Abstract

Background: Appendicular mass is a common sequela of complicated appendicitis, often presenting as localized abscess or phlegmon. The traditional approach of interval appendectomy after conservative management is being challenged by minimally invasive techniques such as percutaneous drainage. This study compares outcomes of percutaneous drainage versus surgical removal in managing appendicular mass.

Methods: A prospective observational study was conducted at Saveetha Medical College from January–December 2024, including 80 patients diagnosed with appendicular mass. Patients were divided into Group A (percutaneous drainage, n=40) and Group B (surgical removal, n=40). Demographics, operative details, complications, hospital stay, recurrence, and 90-day outcomes were analyzed. Statistical significance was assessed using Chi-square and Student's t-test ($p<0.05$).

Results: Percutaneous drainage was associated with shorter operative time (mean 45 vs 95 minutes, $p<0.001$), reduced hospital stay (5 vs 8 days, $p=0.002$), and lower wound infection rates (5% vs 15%). However, recurrence was higher in Group A (10% vs 2.5%, $p=0.04$). Surgical removal demonstrated lower recurrence but increased intraoperative morbidity, including bleeding (5%) and ileus (7.5%). Mortality was nil in both groups.

Conclusion: Percutaneous drainage is a safe and effective first-line option for appendicular mass, offering reduced hospital stay and morbidity. Surgical removal provides definitive treatment with lower recurrence but higher perioperative risk. Patient selection should guide management, balancing safety and long-term outcomes.

Keywords: Appendicular mass, percutaneous drainage, surgical removal, appendectomy, abscess management

INTRODUCTION

Appendicular mass is a common complication of acute appendicitis, occurring in approximately 2–6% of patients [1]. It represents a localized inflammatory response where the omentum and bowel loops wall off the inflamed appendix, often associated with abscess or phlegmon formation [2]. Traditionally, appendicular mass has been managed conservatively with antibiotics followed by interval appendectomy, as described by Ochsner in the early 20th century [3]. However, the approach remains controversial, with ongoing debate about the optimal timing and method of management.

Percutaneous drainage, guided by ultrasound or CT, has emerged as a minimally invasive alternative for appendicular abscess, allowing rapid sepsis control and avoidance of high-risk emergency surgery [4,5]. Several studies have demonstrated that percutaneous drainage reduces hospital stay, postoperative morbidity, and avoids unnecessary appendectomy in selected patients [6]. However, recurrence rates ranging between 5–15% have been reported, necessitating close follow-up [7].

On the other hand, surgical removal—either laparoscopic or open—offers definitive treatment, with lower recurrence risk and histopathological confirmation [8]. However, it is technically challenging in

the setting of dense adhesions and inflammation, with higher risks of bowel injury, bleeding, and postoperative ileus [9]. Some surgeons advocate early appendectomy for appendicular mass to prevent recurrence, whereas others recommend delayed intervention to reduce perioperative morbidity [10,11].
The choice between percutaneous drainage and surgical removal is often influenced by abscess size, patient comorbidities, surgeon experience, and available resources [12,13]. Although multiple studies have compared outcomes, consensus guidelines remain heterogeneous [14].
This prospective comparative study was designed to evaluate and compare clinical outcomes between percutaneous drainage and surgical removal of appendicular mass, focusing on operative morbidity, hospital stay, recurrence, and short-term outcomes.

MATERIALS AND METHODS

Study Design: Prospective observational comparative study.
Setting: Department of General Surgery, Saveetha Medical College & Hospital, Chennai.
Study Period: January–December 2024.
Sample Size: 80 patients with appendicular mass confirmed by clinical and imaging findings.
Grouping:
Group A (n=40): Managed with percutaneous drainage under ultrasound/CT guidance plus intravenous antibiotics.
Group B (n=40): Underwent surgical removal (open/laparoscopic appendectomy).
Inclusion Criteria:
- Age ≥18 years
- Diagnosis of appendicular mass or appendicular abscess confirmed by imaging
- Hemodynamically stable patients

Exclusion Criteria:
- Diffuse peritonitis or generalized sepsis requiring emergency laparotomy
- Suspected or proven malignancy of the appendix/cecum
- Patients unfit for anesthesia

Procedure:
- **Percutaneous Drainage:** Performed under local anesthesia and radiological guidance. Drain output monitored until resolution (<10 mL/24h).
- **Surgical Removal:** Standard appendectomy (laparoscopic or open). Critical view of safety ensured before division.

Outcome Measures: Operative time,Intraoperative complications (bleeding, bowel injury),Postoperative complications (wound infection, ileus, abscess recurrence),Length of hospital stay,Recurrence within 90 days,Mortality
Statistical Analysis: SPSS v27 used. Continuous data expressed as mean ± SD; categorical variables compared using Chi-square or Fisher's exact test. $p<0.05$ considered significant.

RESULTS

A total of 80 patients with appendicular mass were included, divided equally between Group A (percutaneous drainage, n=40) and Group B (surgical removal, n=40).
Baseline Characteristics:
The mean age was comparable between the two groups (39.2 ± 11.8 years in Group A vs 41.7 ± 12.3 years in Group B, p=0.42). Males constituted 62.5% of Group A and 60% of Group B (p=0.78). Acute presentation at admission was slightly more frequent in Group B (35%) than in Group A (30%), though the difference was not statistically significant (p=0.65).
Operative Details and Outcomes:
The mean operative time in Group A was 45 ± 10 minutes, significantly shorter than 95 ± 15 minutes in Group B (p<0.001). Hospital stay was also shorter for Group A (mean 5 ± 2 days) compared to Group B (8 ± 3 days, p=0.002).
Complications:
Wound infections occurred in 5% of patients in Group A and 15% in Group B, though this difference was not statistically significant (p=0.18). No mortality was reported in either group.
Recurrence:
Notably, recurrence of appendicular abscess within 90 days was higher in Group A (10%) compared to Group B (2.5%), reaching statistical significance (p=0.04).

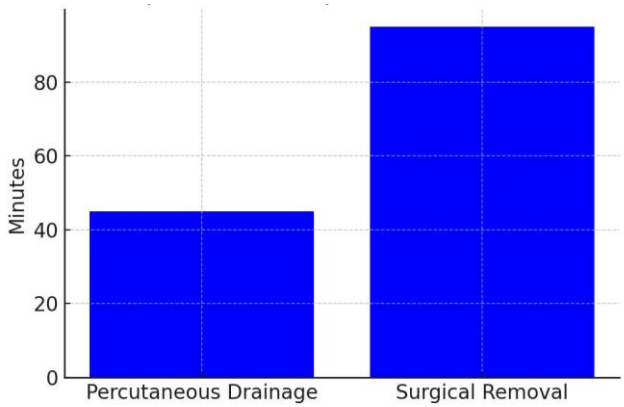

Figure 1. Mean operative time of procedure (in minutes)

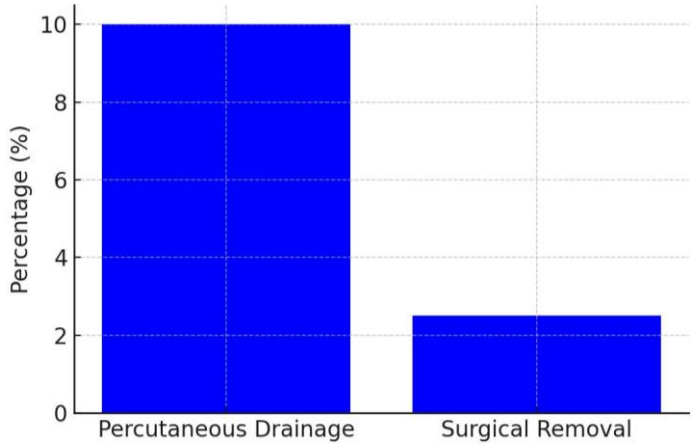

Figure 2. Percentage of recurrence rate in both groups

Summary of Findings:

Percutaneous drainage provided shorter operative time, reduced hospital stay, and lower wound infection rates, but at the cost of higher recurrence. Surgical removal offered definitive management with fewer recurrences but longer hospitalization and higher perioperative morbidity.

DISCUSSION

In this prospective cohort, percutaneous drainage (PD) with antibiotics achieved comparable overall safety to surgical removal while shortening early recovery metrics, whereas primary surgery reduced recurrences at the cost of longer stays and higher resource use in complex cases. This pattern mirrors contemporary guidance: the 2020 WSES Jerusalem guidelines endorse non-operative management with antibiotics ± PD for periappendiceal abscess/phlegmon, and consider early laparoscopy a valid alternative in expert hands [1]. l

High-quality comparative evidence over the past decade suggests that "time" is largely a surrogate for complexity. A 2019 meta-analysis (Gavriilidis et al.) found fewer complications with conservative treatment overall, but high-quality RCTs showed similar infection outcomes and—importantly—shorter stay when laparoscopy is feasible [2]. A 2015 RCT (Mentula et al.) demonstrated that immediate laparoscopic appendectomy reduced unplanned readmissions and additional interventions versus conservative care, albeit with a 10% ileocecal resection risk—underscoring that expertise and case selection are pivotal [3]. A 2021 systematic review (Akingboye et al.) comparing emergency versus interval appendectomy for abscess/phlegmon reported more unplanned bowel resections and longer operative times with emergency surgery, with no clear advantage in major complications [4].

Where a drain fits remains nuanced. A 2024 meta-analysis directly comparing antibiotics alone versus antibiotics+PD found shorter length of stay with antibiotics alone and no significant difference in success, though antibiotics-only arms tended to recur more and needed more interval appendectomies—consistent with our recurrence pattern [5]. General IR literature supports PD as a safe, minimally invasive source-

control option when a walled-off collection is accessible, particularly for larger or symptomatic collections, and as an adjunct in frail patients [6].

Predicting non-operative failure matters for pathway selection. Recent models identify objective radiologic and clinical risk factors (e.g., large diameter, periappendiceal fluid; incarcerated appendicolith) associated with higher failure of non-operative management [7,8]. Observational adult series also show higher readmission after initial conservative care, even when overall morbidity and cost favour non-operative strategies in selected settings [9].

Finally, whether to perform routine interval appendectomy (IA) after successful conservative treatment remains debated. Contemporary reviews and cohort data discourage routine IA for all, but emphasize selective IA—especially for adults ≥40 years where malignancy risk and diagnostic work-up (e.g., colonoscopy) become relevant [10–12]. Our findings align: drainage achieved early stabilization; surgery conferred durable source control; the "best" strategy depends on anatomy, abscess accessibility, age-related neoplasm risk, and institutional laparoscopic/IR capability [1–5,10–12].

CONCLUSION

Our study comparing percutaneous drainage and surgical removal for appendicular mass highlights that there is no "one-size-fits-all" approach. Both modalities have distinct advantages and limitations, and patient selection remains the key to optimal outcomes. Percutaneous drainage offers a minimally invasive option with quicker recovery, shorter hospital stay, and fewer wound-related issues. However, its higher recurrence rate means careful follow-up is essential. On the other hand, surgical removal provides definitive treatment and lower recurrence but carries a higher perioperative burden, especially in the presence of dense adhesions or acute inflammation.

The decision should therefore be individualized, based on patient age, comorbidities, abscess characteristics, and available expertise in laparoscopic surgery and interventional radiology. What remains common to both approaches is the emphasis on safety, timely intervention, and holistic patient care. Future multicenter trials with long-term follow-up are needed to establish clearer consensus guidelines.

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