

A Clinical Audit of Emergency Appendectomies in a Tertiary Care Centre: Negative Appendectomy Rate, Complications and Outcomes

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ABSTRACT

Introduction: Acute appendicitis is a common surgical emergency. Despite advances in imaging and diagnostics, negative appendectomy and postoperative complications remain clinical concerns. This audit was conducted to measure the diagnostic precision and surgical outcomes of emergency appendectomies at a tertiary care center against international benchmarks, identifying specific areas for protocol standardisation and quality improvement

Methods: A retrospective audit was conducted on 147 patients who underwent emergency appendectomy for suspected acute appendicitis at a tertiary care hospital between September 2024 and March 2025. Practice was audited against World Society of Emergency Surgery (WSES) Jerusalem guidelines. Demographics, clinical presentation, preoperative imaging utilisation, surgical approach, histopathological reports, and postoperative complications were assessed. The primary audit endpoints were the negative appendectomy rate (NAR) and post-operative morbidity, which were compared with established national and international benchmarks. This audit followed the SQUIRE 2.0 reporting guidelines for quality improvement

Results: Laparoscopic appendectomy was the primary surgical approach in 69% (n=101) of cases, with a conversion to open done in 4%. Histopathological analysis confirmed acute appendicitis in most patients yielding a NAR of 6.8%. Complicated appendicitis was noted in 26.5% of the cases. The overall postoperative complication rate was 21%, with wound infections (9.5%) and intra-abdominal collections (4.7%) being the most common. No mortality was reported.

Conclusion: With a NAR of 6.8%, institutional practices successfully meet international benchmarks. Favourable outcomes are attributed to routine preoperative imaging and laparoscopic surgery. To further optimise care, we recommend standardising clinical scoring systems and refining infection control protocols, with a planned re-audit to close quality improvement cycle.

Keywords: Negative appendectomy, emergency surgery, laparoscopic appendectomy, clinical audit, postoperative complications, quality improvement

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INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies worldwide. Despite advances in diagnostics, clinical diagnosis remains challenging because of overlapping symptoms with other abdominal conditions. Historically, to avoid the missing true cases, negative appendectomy rates (NAR)—defined as the removal of a histologically normal appendix—were as high as 20–25% [1]. The use of ultrasonography, computed tomography (CT), and clinical scoring systems has significantly reduced NAR in many settings [2,3]. However, variability persists depending on the institutional protocols and access to imaging.

Even negative or uncomplicated appendectomies are not without risk, with studies reporting notable rates of wound infections, abscesses, and readmissions [4]. Complicated appendicitis, such as cases with perforation or abscess, further increases morbidity. In paediatric patients, surgeons often proceed with surgery despite uncertain findings to avoid missed diagnoses [5].

Clinical audits are a critical tool for evaluating surgical practices, identifying diagnostic gaps, and improving outcomes. This study was undertaken to audit emergency appendectomies performed at a tertiary care centre, with a specific focus on the negative appendectomy rate, diagnostic accuracy, complication rates, and the effectiveness of preoperative assessment strategies. By measuring performance against established international guidelines, this study aims to provide insight into institutional performance and contribute to evidence-based improvements in appendicitis management.

AIMS AND OBJECTIVES

The primary aim of this clinical audit was to evaluate the diagnostic accuracy and surgical outcomes of emergency appendectomies at a tertiary care center by measuring performance against the World Society of Emergency Surgery (WSES) Jerusalem guidelines. Specific objectives included determining the negative appendectomy rate (NAR) via histopathological confirmation and assessing the efficacy of preoperative imaging in meeting international benchmark.

PATIENTS AND METHODS

A retrospective clinical audit evaluated 147 patients who underwent emergency appendectomy for suspected acute appendicitis at SRM Medical College Hospital and Research centre between September 2024 and March 2025. Clinical practice was audited against WSES Jerusalem guidelines, with a primary benchmark of a NAR less than 10%. Data was systematically extracted from patient records, including demographics, clinical presentation, preoperative imaging (ultrasound or CT), and

surgical approach (laparoscopic vs open). Postoperative complications were assessed over a 30-day period. The NAR was determined through histopathological confirmation of excised specimens. Descriptive analysis was utilised to calculate complication rates and diagnostic accuracy, comparing outcomes with international surgical benchmarks to identify areas for standardised quality improvement. This clinical audit was designed and reported in accordance with the SQUIRE 2.0 (Standards for Quality Improvement Reporting Excellence) guidelines for quality improvement in healthcare.

RESULTS

The study population consisted of 147 patients with diverse age and gender. Typical presenting symptoms were abdominal pain (97%), anorexia (72%), vomiting (56%), and fever (37.6%). Physical examination revealed right iliac fossa tenderness in 100% of the audited cases. Preoperative imaging (ultrasound or CT) was used in most cases to diagnose acute appendicitis. Laparoscopic appendectomy was the primary surgical approach for 69% (n=101) with a conversion to open rate of 4% (n=6) due to adhesions and anatomical complexity (Fig.1). Complicated appendicitis was identified in 26.5% (n=39) of the cohort. Histopathological analysis confirmed acute appendicitis in majority of the cases, resulting in NAR of 6.8% (non-inflammatory or incidental pathologies) (Fig.2). Overall postoperative morbidity rate was 21% (n=31), characterised primarily by wound infection comprising about 9.5 % (n=14) of patients followed by intra-abdominal collections in 4.7% (n=7). Other complications included paralytic ileus, ARDS, ICU admission, and iatrogenic injury (Table.1). No mortality was reported during the study period.

DISCUSSION

Clinical auditing serves as the cornerstone of surgical quality improvement, providing an evidence-based mechanism to evaluate institutional performance against global standards.

In our study, the NAR was 6.8%, which is favourable when compared to historical values that accepted rates as high as 20–25% to avoid the risk of missing a true appendicitis case [6]. Furthermore, our findings outperform the results of the multicentre UK RIFT study, which documented a 20% NAR, suggesting that our diagnostic pathway is highly effective in preventing unnecessary surgical intervention [7]. In contrast, Noureldin et al. reported a lower NAR of 10.2% in a study conducted in a district general hospital setting in the UK [8]. Additionally, compared to other Indian cohorts, our NAR is notably lower than 9.7% and 17.2% reported by Talreja et al. and Joshi et al. respectively [9,10]. The lowest

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NAR was observed in Al-Batanony et al., at 3.6%, which likely reflects stringent imaging criteria and routine histopathological correlation [11]

The precision observed in this audit is largely attributable to the standard utilisation of preoperative imaging, specifically abdominal ultrasound and CT scans, characterised by high sensitivity (94%) and specificity (95%), has been a transformative factor in surgical decision making, as noted in a meta-analysis[12]. Our results align with the findings of Krajewski et al., where the integration of CT protocols reduced the NAR from 21.5% to 7.5%, validating the high-reliance imaging strategy employed at our institution [13].

A defining trend in this audit was the preference for the laparoscopic approach (69%). This shift reflects the modern surgical paradigms where minimally invasive techniques are favoured due to reduced post operative pain, accelerated recovery and reduced wound infections [14]. Noureldin et al. reported laparoscopic appendectomy in 93% of cases with a 4.6% conversion rate [8]. This is consistent with our conversion rate of 4% indicating high technical proficiency in managing anatomical complexity. However, complicated appendicitis-including perforation and abscess- was identified in 26.5% of cases. This incidence aligns with data from Khan et al. (28%) emphasising that delayed presentation remains a significant factor in surgical morbidity[15].

Regarding safety metrics, the overall postoperative complication rate in our cohort was 21% , with wound infections (9.5%) and intra-abdominal collections (4.7%) being the most common. This is comparable to the findings of Sakashita et al., who documented a 16% complication rate, including 12% wound infections and rare but severe complications such as enterocutaneous fistula and bowel resection [16]. A systematic review by Anderson and Petros also reported a 20% morbidity rate in patients with complicated appendicitis, reinforcing that complication rates vary depending on disease severity at presentation [17]. While no mortality was recorded, the occurrence of respiratory distress requiring ventilation (2.6%) and iatrogenic injury(2%) necessitates vigilant peri operative monitoring. Histopathological examination remains crucial in validating the diagnosis of appendicitis.[18]

In accordance with WSES Jerusalem guidelines, which serve as the gold standard for this audit, our results confirm that institutional performance at our centre successfully meets the international benchmark for diagnostic precision in acute appendicitis with NAR significantly less than 10%. Despite these strong outcomes, the audit identified a lack of standardised clinical scoring systems, such as Alvarado or AIR score, within the diagnostic pathway. Moving forward, the introduction of emerging trends, such as AI-powered medical imaging, may assist in early diagnosis and further reduce morbidity. [19] High postoperative morbidity with wound infection indicates a need to review preoperative

antibiotic timing, skin preparation techniques or sterilisation protocols. To fulfil the requirements of a complete clinical audit cycle, a follow up reaudit is planned in 2026 to evaluate impact of these standardised protocols on surgical outcomes and patient safety.

CONCLUSION

This clinical audit confirms that emergency appendectomy practices at our centre successfully meet the WSES Jerusalem guidelines benchmark with NAR standard <10%. The high diagnostic accuracy and favourable outcomes are attributed to the routine use of preoperative imaging and minimally invasive surgery. However, the observed 21% morbidity rate highlights a need for standardised clinical scoring systems, to further optimise triage. A planned re-audit for late 2026 will complete the quality improvement cycle and ensure continuous enhancement of surgical patient safety.

Drawbacks

This single-center audit may not be generalizable to other institutions with varying resources and protocols. No standardized use of scoring systems (e.g., Alvarado or AIR score) was documented in this study, which could have strengthened the diagnostic accuracy analysis. Exploration of AI-assisted diagnostics and cost-effectiveness analyses may further refine appendicitis management protocols.

Declarations

Ethical Approval and Consent to participate

Approval was granted by the Institutional Ethics Committee of SRM Medical College Hospital and Research Centre. Informed consent was obtained from all individual participants included in the study.

Clinical trial number: not applicable.

Consent for publication

Informed consent for the publication of anonymized clinical data and findings was obtained from all individual participants included in the study.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AR performed data collection, analysis, and drafted the manuscript. SK assisted in data acquisition. VP provided clinical oversight and critically revised the manuscript. All authors read and approved the final manuscript.

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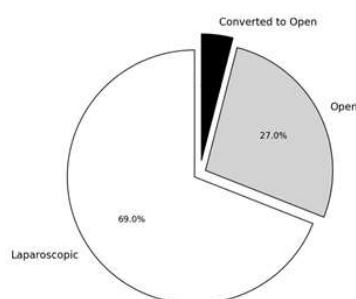


Fig.1. Percentage comparison of method of surgery

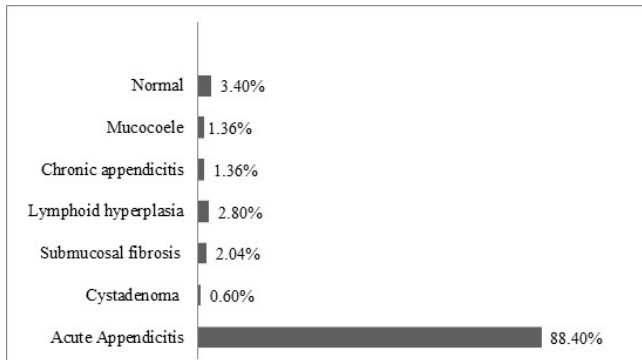


Fig.2. Histopathology reports of appendectomy specimens

Table 1. Post-operative morbidity and complications

Morbidity rate	21%
Wound infection	9.5%
Post-operative collections- Pelvic abscess, Interloop abscess	4.7%
Paralytic ileus	1.3%
ARDS, SICU for Ventillation	2.6%
Iatrogenic Injury	2%
UTI, Readmissions	2.6%