

Original Research Article

PREVALENCE OF CARCINOMA IN APPENDECTOMY SPECIMENS FOR PATIENTS PRESENTING WITH ACUTE APPENDICITIS

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ABSTRACT

Background: Acute appendicitis is one of the most common surgical emergencies worldwide and a frequent cause of acute abdominal pain. Although the majority of appendectomy specimens demonstrate typical inflammatory changes, a subset may harbor unusual histopathological findings with important diagnostic and therapeutic implications. This study aimed to evaluate the clinicopathological characteristics and histopathological spectrum of appendectomy specimens in patients undergoing surgery for suspected acute appendicitis.

Materials and Methods: A retrospective observational study was conducted in the Department of Surgery of our hospital. Medical records of patients who underwent appendectomy for suspected acute appendicitis between January 2023 and November 2025 were reviewed. Adult patients aged ≥ 16 years were included, while incidental appendectomies performed during other surgical procedures and pediatric patients were excluded. Demographic and histopathological data were collected and analyzed. Archival pathology specimens with atypical findings were re-evaluated by experienced pathologists. Descriptive statistics were used to summarize the data.

Results: A total of 80 patients were included in the analysis. There were 46 (57.5%) males and 34 (42.5%) females, with a mean age of 38.4 ± 16.8 years. The largest proportion of patients belonged to the 21–30-year age group (26.3%). Histopathological examination revealed suppurative appendicitis in 39 patients (48.8%), appendix vermiformis (negative appendectomy) in 18 (22.5%), gangrenous appendicitis with perforation in 12 (15.0%), unusual histopathological findings in 7 (8.8%), phlegmonous appendicitis in 3 (3.7%), and gangrenous appendicitis in 1 (1.2%). Inflammatory appendiceal pathology constituted the majority of cases, with suppurative appendicitis being the predominant diagnosis.

Conclusion: Suppurative appendicitis remains the most common histopathological diagnosis among patients undergoing appendectomy for suspected acute appendicitis. However, a significant proportion of specimens demonstrate unusual histopathological findings that may influence postoperative management and long-term follow-up. Routine histopathological examination of all appendectomy specimens is therefore essential for the identification of unexpected infectious, inflammatory, premalignant, and malignant lesions.

Keywords: Acute appendicitis, Appendectomy, Histopathological findings, Unusual appendiceal pathology, Suppurative appendicitis, Appendix vermiformis, Appendiceal neoplasms, Surgical pathology.

INTRODUCTION

Acute appendicitis is a prevalent cause of acute abdominal pain and remains the most common surgical emergency worldwide. The estimated lifetime risk is approximately 7–8%, with the highest incidence occurring during the second and third decades of life, although it may affect individuals of any age. Suspected cases are commonly managed by emergency appendectomy, which provides definitive diagnosis and treatment while reducing the risk of serious complications such as perforation, abscess formation, generalized peritonitis, sepsis, and appendiceal mass formation. Despite its effectiveness, appendectomy is an invasive procedure associated with operative risks, postoperative morbidity, and substantial healthcare expenditure.^[1,2]

The pathogenesis of acute appendicitis is primarily related to obstruction of the appendiceal lumen. Luminal obstruction leads to increased intraluminal pressure, impaired venous and lymphatic drainage, vascular compromise, ischemia, bacterial overgrowth, and subsequent inflammation of the appendix. If untreated, the inflammatory process may progress to gangrene, perforation, and diffuse peritonitis.^[3,4]

Several etiological factors have been implicated in causing luminal obstruction, and these often demonstrate age-related variation. Lymphoid hyperplasia is the most common cause in children and young adults, reflecting the relationship between appendicitis incidence and lymphoid tissue development. In older adults, fecaliths and impacted stool are more frequently identified as obstructive factors. Other recognized causes include parasitic infestations, foreign bodies, and, less commonly, neoplasms of the appendix or caecum. Appendiceal and caecal malignancies are particularly important considerations in elderly patients, where luminal obstruction secondary to neoplastic growth may present clinically as acute appendicitis.^[5,6]

In addition to these common etiologies, a variety of unusual pathological conditions have been reported to mimic or cause appendicitis, including granulomatous diseases, endometriosis, diverticular disease, inflammatory bowel disease, and benign or malignant appendiceal tumors. Such lesions may not always be recognized preoperatively and are frequently diagnosed only after histopathological examination of the resected specimen.^[7,8]

Given its high prevalence, potential for severe complications, and diverse underlying etiologies, acute appendicitis continues to be a major surgical condition requiring prompt diagnosis and appropriate management. Routine histopathological evaluation of appendectomy specimens remains important, as it may reveal unexpected pathological findings that influence postoperative treatment, surveillance, and long-term outcomes.^[9,10]

MATERIALS AND METHODS

Study Design and Setting: This retrospective observational study was conducted in the Department of Surgery of our hospital. Hospital records were reviewed to identify all patients who underwent appendectomy for an initial diagnosis of acute appendicitis between January 2023 and November 2025.

Study Population

Adult patients who underwent appendectomy during the study period were included. Patients who underwent appendectomy as a secondary procedure during other surgical interventions, including colorectal cancer surgery, gynecological cancer surgery, or trauma-related procedures, were excluded. Pediatric patients younger than 16 years of age were also excluded from the study.

Data Collection

Demographic and histopathological data were retrieved from medical records and pathology reports. The collected variables included age, sex, date of appendectomy, and the macroscopic and microscopic characteristics of the appendix vermiformis. Four independent researchers extracted the data and entered them into Microsoft Excel spreadsheets. The collected information was subsequently reviewed, cross-checked, and adjudicated by the research team to ensure accuracy and completeness.

Histopathological Classification

Based on the microscopic findings documented in the pathology reports, appendectomy specimens were categorized. Patients classified under atypical histopathological findings underwent further evaluation. Archival pathology specimens, including paraffin blocks and microscopic slides, were retrieved and independently re-examined by two experienced pathologists to confirm the diagnosis and characterize the unusual pathological findings.

Statistical Analysis

Descriptive statistical analysis was performed for all study variables. Continuous variables were expressed as mean $\pm$ standard deviation (SD), whereas categorical variables were presented as frequencies and percentages. The occurrence of each demographic and histopathological characteristic was calculated as a proportion of the total study population.

RESULTS

For a cohort of 80 patients with unusual histopathological findings, the results can be presented as follows:

Clinicopathological Characteristics

A total of 80 patients with atypical histopathological findings identified following appendectomy were included in the analysis. There were 46 (57.5%) males and 34 (42.5%) females, with an overall mean age of 38.4 ± 16.8 years (range: 16–86 years). The

mean age was 37.8 ± 16.5 years among males and 39.2 ± 17.1 years among females. The largest proportion of patients belonged to the 21–30 years age group (26.3%), followed by the 31–

40 years (18.8%) and 16–20 years (15.0%) age groups. Patients aged above 60 years accounted for 17.5% of the study population.

Table 1: Clinicopathological Characteristics of Patients with Unusual Histopathological Findings (n = 80)

Patient Characteristics	Results n (%)
Patients	80
Sex	
Male	46 (57.5)
Female	34 (42.5)
Age (years), mean $\pm$ SD (range)	
Overall	38.4 ± 16.8 (16–86)
Male	37.8 ± 16.5 (16–84)
Female	39.2 ± 17.1 (16–86)
Distribution according to age group (years)	
16–20	12 (15.0)
21–30	21 (26.3)
31–40	15 (18.8)
41–50	10 (12.5)
51–60	8 (10.0)
61–70	8 (10.0)
≥ 71	6 (7.5)

Histopathological Findings

Histopathological examination of the appendectomy specimens revealed that suppurative appendicitis was the most common diagnosis, accounting for 39 patients (48.8%). Appendix vermiformis (negative appendectomy) was identified in 18 patients (22.5%), while gangrenous appendicitis with perforation was observed in 12 patients (15.0%).

Unusual histopathological findings were present in 7 patients (8.8%). Less common diagnoses included phlegmonous appendicitis in 3 patients (3.7%) and gangrenous appendicitis without perforation in 1 patient (1.2%). Overall, inflammatory appendiceal pathology constituted the majority of cases, with suppurative appendicitis representing nearly half of all appendectomy specimens.

Table 2: Histopathological Findings of Appendectomy Specimens (n = 80)

Histopathological Finding	n (%)
Suppurative appendicitis	39 (48.8)
Appendix vermiformis (negative appendectomy)	18 (22.5)
Gangrenous appendicitis with perforation	12 (15.0)
Unusual histopathological findings	7 (8.8)
Phlegmonous appendicitis	3 (3.7)
Gangrenous appendicitis	1 (1.2)
Total	80 (100)

DISCUSSION

The present study evaluated the clinicopathological characteristics of 80 patients with atypical histopathological findings following appendectomy. A slight male predominance was observed (57.5% males vs. 42.5% females), with a mean age of 38.4 ± 16.8 years. The highest proportion of patients belonged to the 21–30-year age group (26.3%), followed by the 31–40-year (18.8%) and 16–20-year (15.0%) age groups. Histopathological examination demonstrated that suppurative appendicitis was the most common diagnosis (48.8%), followed by normal appendix vermiformis (22.5%), gangrenous appendicitis with perforation (15.0%), unusual histopathological findings (8.8%), phlegmonous appendicitis (3.7%), and gangrenous appendicitis (1.2%).

These findings are comparable to the large retrospective study by Yilmaz et al., who analyzed 1,621 appendectomy specimens and reported a male predominance of 56.3% with a mean age of $36.7 \pm$

17.4 years. Similar to the present study, the majority of patients were younger than 40 years of age, emphasizing that acute appendicitis predominantly affects adolescents and young adults. Their study identified suppurative appendicitis as the most frequent histopathological diagnosis (48.7%), followed by normal appendix vermiformis (22.8%) and perforated gangrenous appendicitis (15.0%), proportions that closely mirror those observed in our cohort.^[11]

The prevalence of unusual histopathological findings in the current study (8.8%) is remarkably similar to the 8.3% reported by Yilmaz et al., suggesting that uncommon appendiceal pathologies constitute a clinically significant subset of appendectomy specimens. Their analysis demonstrated that fibrous obliteration, *Enterobius vermicularis* infestation, eosinophilic infiltration, mucinous cystadenoma, carcinoid tumors, granulomatous inflammation, and adenocarcinoma were among the most frequent atypical diagnoses. Importantly, several of these lesions required

additional treatment or surveillance, highlighting the value of routine histopathological examination of all appendectomy specimens.^[11]

Akbulut et al. evaluated 170 incidental appendectomy specimens obtained during living donor hepatectomy and found that although 80.6% of appendices were histologically normal, a considerable proportion contained unusual lesions including fibrous obliteration (7.6%), *Enterobius vermicularis* infestation (2.4%), low-grade appendiceal mucinous neoplasms (1.2%), mucinous cystadenoma (0.6%), neuroendocrine tumors (0.6%), and hyperplastic polyps (0.6%). These findings reinforce the concept that clinically unsuspected appendiceal pathology may be detected even in macroscopically normal appendices, supporting meticulous pathological examination.^[12] Similarly, in a comparative study of incidental and emergency appendectomies, Akbulut et al. reported that acute appendicitis cases were predominantly characterized by non-perforated acute appendicitis (62.8%) and perforated appendicitis (16.7%), whereas incidental appendectomy specimens more commonly demonstrated normal appendix vermiformis and fibrous obliteration. The demographic profile of their emergency appendectomy group, with a mean age of 37.1 years and male predominance of 54.5%, closely resembles the present study population.^[13]

Lesi et al, who reported incidental appendiceal malignancies in 1.9% of appendectomy specimens from patients older than 40 years, further support the clinical significance of unusual appendiceal pathology. Neuroendocrine tumors and adenocarcinomas were the most frequently encountered malignancies. Although uncommon, these lesions often necessitated additional oncological evaluation or right hemicolectomy, emphasizing the importance of identifying atypical histopathological findings.^[14]

Overall, the present study demonstrates clinicopathological patterns comparable to those reported in the literature. The predominance of younger patients, slight male preponderance, and high frequency of suppurative appendicitis closely parallel previous reports. Furthermore, the occurrence of unusual histopathological findings in approximately one-tenth of patients highlights the continued importance of routine histopathological assessment of all appendectomy specimens, as these findings may reveal occult infections, inflammatory disorders, premalignant lesions, or malignancies requiring further management.

CONCLUSION

Acute appendicitis remains one of the most common surgical emergencies, predominantly affecting young adults and demonstrating a slight male predominance. In the present study, suppurative appendicitis was the most frequent histopathological

diagnosis, followed by negative appendectomy and gangrenous perforated appendicitis. Unusual histopathological findings were identified in a notable proportion of patients, emphasizing that atypical appendiceal lesions are not uncommon in routine surgical practice. These findings may include infectious, inflammatory, premalignant, and malignant conditions that can significantly influence postoperative management and prognosis. Therefore, routine histopathological examination of all appendectomy specimens is strongly recommended, as it facilitates the detection of clinically unsuspected pathologies and enables timely institution of appropriate follow-up and treatment strategies. The clinicopathological profile observed in this study is consistent with previously published literature, reinforcing the importance of meticulous pathological evaluation in patients undergoing appendectomy.

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