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Epidemiological, Clinical, and Histopathological Profile of Appendiceal Diseases in a Teaching Hospital (2014–2024)

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Abstract

Background: Appendicitis is a common surgical emergency requiring appendectomy, with delayed treatment leading to complications. Despite its prevalence, the histopathological spectrum of appendectomy specimens varies regionally due to demographic, environmental, and host factors, underscoring the need for local studies. This study aimed to retrospectively analyze the clinical and histopathological features of appendiceal diseases at a teaching hospital over a 11-year period to identify the various histopathological spectra.

Methods: A retrospective descriptive review was conducted on 266 appendectomy specimens received between 2014 and 2024. Data were extracted from clinical request forms and histopathology reports. Cases with incomplete data or missing slides were excluded. Histological diagnoses were analyzed using SPSS version 23 for descriptive statistics. Results were presented in tables.

Results: The patient age ranged 0–90 years, with the highest incidence in the 21–30-year group (37.97%). Females slightly outnumbered males (51.5% vs. 48.5%). Acute appendicitis was predominant (76.56%), with suppurative, phlegmonous and chronic appendicitis noted. Schistosomal parasitic appendicitis (2.3%), ruptured appendicitis (1.9%), lymphoid hyperplasia (8.7%), and a single case of metastatic adenocarcinoma (0.38%) were also identified. All patients presented with abdominal pain. Symptoms of vomiting, diarrhea, and fever were variable.

Conclusions: Histopathological examination of appendectomy specimens remains essential for confirming diagnosis and detecting uncommon pathologies such as parasitic infections and malignancies. This study provides crucial local epidemiological data that can guide clinical management and support further research on appendicitis in Nigeria.

Keywords: Appendectomy, Appendicitis, Histopathology, Schistosomiasis, Nigeria.

Introduction

Appendicitis is an acute inflammation of the vermiform appendix, commonly presenting as a surgical emergency necessitating appendectomy.[1] Clinically, patients typically report abdominal pain that initially is diffuse but later localizes to the right iliac fossa, often accompanied by vomiting, fever, and diarrheal symptoms.[2] The appendix, a finger-like tubular structure attached to the cecum, ranges in length from 9 to 35 mm and varies anatomically in position[2]. Although historically considered vestigial, the appendix is now understood to play roles in mucosal immunity and as a reservoir for beneficial gut microbiota.[3,4,5]

Epidemiological data indicate that appendicitis incidence is higher in developed countries such as the United States, with approximately 100 to 223 new cases per 100,000 annually and about 300,000 hospital visits yearly.[6-12] In contrast, lower incidences are reported in Africa and Asia, potentially due to higher dietary fiber intake, which reduces fecal viscosity and

bowel transit time.[8-14] Appendicitis primarily affects teenagers and young adults, with no consistent sex predilection, though some studies report a slight female predominance, possibly due to overlapping gynecological diagnoses.[8-13] Parasitic infections, especially schistosomiasis, have been identified as important contributors to appendiceal pathology in Nigeria, contrasting with other regions where Enterobius vermicularis is more common.[13,15,16] Delays in treatment, particularly in rural populations, increase complication rates such as rupture and perforation, adversely impacting patient outcomes.[11-13]

Despite appendicitis being a leading cause of surgical emergencies in Nigeria, comprehensive histopathological data from Oyo State, Nigeria is limited. This study at Ladoke Akintola University Teaching Hospital (LAUTECH), Ogbomoso, is therefore justified to provide valuable insight into the local histopathological spectrum of appendectomy specimens. Understanding patterns of inflammation, complication rates, parasitic involvement, and rare pathology will improve clinical management and inform regional health strategies.

This study, therefore aimed to retrospectively analyze the histopathological features of appendectomy specimens at LAUTECH over ten years (2014–2024) with a view to describe the demographic, clinical characteristics, and histopathological diagnoses.

Materials and Methods

The study was conducted at the Department of Morbid Anatomy and Histopathology, Ladoke Akintola University Teaching Hospital (LAUTECH), Ogbomoso, located in Oyo State, Western Nigeria. This tertiary healthcare facility serves patients from Oyo State and neighboring regions, providing specialized surgical and pathological services including appendectomy specimen examination. The study population comprised all patients who underwent appendectomy at LAUTECH from 2014 to 2024. This included patients of all ages and both sexes who had appendectomy specimens submitted to the histopathology department for diagnostic evaluation. It was a retrospective descriptive study. Data were collected by reviewing histopathological records and corresponding clinical information from archival case files and request forms within the hospital's histopathology department over the period.

All appendectomy specimens with complete clinical and histopathological information were included received between 2014 and 2024 at the Histopathology Department of LAUTECH Teaching Hospital, Ogbomoso Excluded were cases where request forms were improperly filled, slides or tissue blocks were missing, or patient details were incomplete.

Data extraction involved the retrieval of biopsy request forms, patient demographic details, clinical presentation information, and histopathology reports. Archived histological slides were reviewed, and new slides were prepared for cases where original ones were missing.

Collected data were entered, cleaned, and analyzed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics such as frequencies, percentages, and age ranges were used to summarize the histopathological diagnoses and demographic characteristics.

This retrospective study was conducted in accordance with the ethical principles outlined in the 1964 Declaration of Helsinki and its subsequent amendments. Patients' anonymity and confidentiality were maintained by using unique identifiers in place of personal information during data extraction and analysis.

Results

A total of 266 appendectomy specimens were retrieved and analyzed. The ages of the patients ranged from 0 to 90 years, with the 21–30-year age group constituting the largest proportion (37.97%) of cases, followed by the 11–20-year group (21.80%) and the 31–40-year group (15.04%). The mean age was 23.20+2.1years. There was a slight female predominance, with 137 females (51.50%) and 129 males (48.50%)(Table 1).

All patients (100.00%) presented with abdominal pain, while vomiting was reported in 69.92%, diarrhea in 60.15%, and fever in 50.00% of cases. The indication for surgery in most patients (97.37%) was a clinical suspicion of acute appendicitis, whereas 8 cases (3.01%) were incidental appendectomies performed during other surgical procedures (Table 1).

Histopathological examination revealed that acute inflammatory lesions were the most frequent findings, accounting for most cases. Acute appendicitis was observed in 119 cases (44.74%), suppurative appendicitis in 44 cases (16.54%), and phlegmonous appendicitis in 38 cases (14.29%). Chronic appendicitis constituted 25 cases (9.40%), while parasitic appendicitis was seen in 6 cases (2.26%). Ruptured appendicitis, classified as complicated appendicitis, occurred in 5 cases (1.88%). Among the other lesions, lymphoid hyperplasia was identified in

23 cases (8.65%), and a metastatic lesion was detected in one case (0.38%) (Table 2).

Discussion

This study highlighted the critical role of appendectomy as a surgical intervention for acute appendicitis in the study center.[11,13] The peak incidence among patients aged 21–30 years correlated with regional and international studies underscoring appendicitis as primarily a disease of young adults.[8,10,11,13]This demographic concentration reflects the heightened lymphoid hyperplasia and fecolith formation in this age group as major pathophysiological triggers.[4-6] The slight female predominance observed was in keeping with prior reports, which showed conflicting data.[8,10,11,13] The slight female predominance observed among appendectomy specimens may be attributed to the diagnostic overlap between acute appendicitis and gynecological conditions such as pelvic inflammatory disease, ruptured ovarian cyst, and mittelschmerz, which often present with similar clinical features.

Clinically, abdominal pain was ubiquitous, seen in all patients, highlighting it as the cardinal symptom of appendicitis[6,18,19]. Associated symptoms such as vomiting (70%), diarrhea (60%), and fever (50%) align with typical presentations yet vary between patient cohorts, influencing clinical suspicion and decision-making. Vomiting and fever often denote inflammatory progression, while diarrhea, though less commonly emphasized, may result from irritation of adjacent bowel segments.[13,18,19]

Histopathological findings revealed acute focal appendicitis as the predominant diagnosis (76.56% of cases), consistent with neutrophilic infiltration and transmural mucosal ulceration detailed in multiple studies.[3,5] Subtypes such as suppurative and phlegmonous appendicitis were frequently reported. Chronic appendicitis (9.4%) observed in this study underscores ongoing low-grade inflammation[6]. This entity has its clinical significance of being mistaken for other gynaecological and gastrointestinal lesions that could present as recurrent abdominal pain.[6] Parasitic appendicitis, notably schistosomal infection (2.3%), reflects significant environmental influences unique to Nigeria's endemic parasitosis. This contrasts with Western and Indian reports where Enterobius vermicularis predominates[4,13,16-17]. Schistosomal appendicitis causes submucosal granulomas and fibrosis leading to luminal obstruction and secondary inflammation, explaining appendiceal dysfunction in endemic areas.[6,15,16]

The incidence of rupture (1.9%) found here is relatively low but clinically important, as perforation increases morbidity and mortality risks.[10,13,17-20] Rupture often results from delayed presentation or inadequate access to healthcare facilities, particularly in rural populations.[11,13,21-24] Perforated appendices require more intensive surgical and postoperative management, reinforcing the need for early diagnosis and intervention.[11,13,22] Furthermore, the identification of a metastatic adenocarcinoma (0.38%) aligned with the reported low prevalence of appendiceal malignancies.[6,11] Such incidental findings emphasize the necessity of routine histopathological examination for all appendectomy specimens, as preoperative diagnosis of malignancy is rare. Carcinoids, mucinous cystadenomas, and cystadenocarcinomas, though not reported in this research, are significant for prognosis and further patient management.[6]

The negative appendectomy rate observed was approximately 8.7% and consistent with similar studies.[13,18,19]Increased negative appendectomy rates may be due to diagnostic overlap with gynecological disorders, a phenomenon widely documented in literature.[6,10,11,13]Gynecological pathologies such as ovarian cysts, endometriosis, and pelvic inflammatory disease often mimic clinical presentations of appendicitis which would necessitate emergency appendectomy with histopathology reports indicating lymphoid hyperplasia.[6,10,11,13]Lymphoid hyperplasia is attributed to reaction of mucosa-associated lymphoid tissues to pelvic or gastrointestinal infections consistent with immunological theories of appendiceal function.[4,5,7] In some studies, higher rates up to 12% due to varying clinical thresholds for surgery and imaging accessibility were reported.[10,11,13,18,22]Negative appendectomy, while preventing complications of missed appendicitis, is associated with morbidity and increased healthcare costs.[13] In view of this, reducing this rate should be a clinical goal. Imaging modalities like computer tomography (CT) scans could decrease negative appendectomy rates and improve diagnostic accuracy, particularly in women.[10-13]

Our findings revealed that thorough histopathological evaluation of appendectomy specimens provides definitive diagnosis and uncovers unexpected pathologies such as parasitic infections, neoplasms, and chronic inflammatory conditions that intraoperative assessment might miss. Clinical management and public health strategies should focus on addressing parasitic disease burden and reducing negative appendectomies.

While this study profiled the epidemiological, clinical, and histopathological spectra of appendiceal diseases in the study centre, its retrospective natuee represents an inherent limitation, particularly concerning potential missing data and incomplete clinical information, which could bias findings. The single-center nature restricts broader generalizability to other geographic or healthcare settings in Nigeria or West Africa. Despite these limitations, the large sample size collected over eleven years is a key strength, offering robust epidemiological insights into appendiceal pathology in a resource-limited tertiary healthcare setting. Use of validated data analysis software further enhances the study's rigor. The inclusion of parasitic and neoplastic appendiceal lesions extends understanding beyond simple acute inflammation, encouraging comprehensive diagnostic approaches.

In view of above, future studies should focus on prospective multicenter studies incorporating molecular pathology and clinical correlation to deepen understanding of appendiceal disease mechanisms, including inflammatory and neoplastic transformations. Epidemiological research on parasitic appendicitis prevalence and its clinical impact is urgently warranted given the regional burden. Development of enhanced imaging protocols and biomarkers for early differentiation of complicated appendicitis and malignancy could improve patient management and reduce negative appendectomy rates. Finally, public health interventions addressing environmental and parasitic disease control may mitigate appendicitis incidence in endemic regions.

Conclusion

Histopathological evaluation of appendectomy specimens at the study centre predominantly revealed acute appendicitis as the major diagnosis, aligning with global and regional epidemiology. This study also highlighted the presence of chronic appendicitis, parasitic infections (primarily schistosomiasis), complications such as rupture, and metastatic carcinoma within the local population. The findings underscore the critical importance of routine histopathology in ensuring accurate diagnosis, guiding appropriate post-surgical management, and detecting unusual or incidental pathologies requiring further intervention. Given the public health implications of parasitic appendicitis, these data provide a foundation for preventive measures and improved diagnostic protocols in Nigeria.

Declarations

Authors' Contributions

OA conceived and designed the study, verified histopathological findings, analyzed the data, and drafted the initial manuscript. AAA verified the histopathological findings, contributed to data interpretation, and critically revised the manuscript. OST assisted in data collection, literature review, and manuscript preparation. OWT, OAA, OSA critically review the manuscript.

All authors read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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Table 1: Demographic, Clinical Characteristics, and Indication for Surgery of Patients Undergoing Appendectomy

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	0–10	16	6.02
	11–20	58	21.80
	21–30	101	37.97
	31–40	40	15.04
	41–50	27	10.15
	51–60	9	3.38
	61–70	6	2.26
	71–80	2	0.75
	81–90	1	0.38
Sex	Male	129	48.50
	Female	137	51.50
Clinical symptoms	Abdominal pain	266	100.00
	Vomiting	186	69.92
	Diarrhea	160	60.15
	Fever	133	50.00
Indication for surgery	Suspected acute appendicitis	258	97.37
	Incidental appendectomy	8	3.01

Table 2: Histopathological Diagnosis of Appendectomy Specimens

Category	Diagnosis	Frequency (n)	Percentage (%)
Acute inflammation	Acute appendicitis	119	44.74
	Suppurative appendicitis	44	16.54
	Phlegmonous appendicitis	38	14.29
Chronic inflammation	Chronic appendicitis	25	9.40
	Parasitic(schistosomal) appendicitis	6	2.26
Complicated appendicitis	Ruptured appendicitis	5	1.88
Others	Lymphoid hyperplasia	23	8.65
	Metastatic lesion	1	0.38