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Clinicopathological Correlation of Appendiceal Biopsy Findings in Patients at a Tertiary Healthcare Facility

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Abstract

Background: acute appendicitis is a common abdominal disease often resolved through surgical removal of the appendix (appendectomy). Post-surgical tissue analysis (histopathology) of the appendix frequently identifies microscopic abnormalities, even when the appendix appears normal to the naked eye (macroscopically). This suggests that underlying pathological processes, such as unexpected tumor growth or parasitic infections, can be present in appendices without visible signs of disease. ***Methods:*** A retrospective, descriptive, cross-sectional study analyzed all appendectomy specimens submitted for histopathological evaluation at SCB Medical College and Hospital, Cuttack, spanning the period from January 2024 to December 2024. The investigation encompassed the complete set of available histopathology reports for all appendix biopsies performed on patients within this defined one-year interval. ***Results:*** the analyzed cohort of 182 appendectomy specimens revealed a predominance of acute appendicitis, representing 57.7% (n=105) of the histopathological diagnoses. The demographic profile of the biopsied individuals showed a higher representation of males (n=109, 59%) relative to females (n=73, 40%). Stratification by age indicated the 11-20 year demographic as having the largest proportion of appendectomy cases (24%). Furthermore, while acute pathologies constituted the numerical majority, proportional analysis across age strata demonstrated a relative increase in chronic appendicitis diagnoses within the 21-30 year age group compared to younger cohorts. ***Conclusions:*** Post-appendectomy, detailed microscopic analysis of the removed appendix is crucial to confirm its identity, precisely diagnose any existing disease (like inflammation or infection), and importantly, to exclude the presence of hidden cancerous growths. This thorough histopathological examination is a fundamental step for accurate diagnosis and the detection of any unexpected malignancies.

Keywords: ***Appendix biopsies, Histopathology, Cancer, Appendicitis.***

Introduction

Appendicitis represents a prevalent abdominal pathology, with acute presentations typically managed via appendectomy [1]. Beyond therapeutic intervention, appendectomy specimens are crucial for definitive diagnosis and mitigating the risk of complications such as sepsis, perforation, and plastron formation [2]. While laparoscopy aids in the visual assessment of the abdominal and pelvic cavities, macroscopic normality of the appendix does not preclude underlying pathological conditions detectable through histopathological analysis. Occult appendiceal neoplasms or parasitic infestations may be present in macroscopically unremarkable appendices, often necessitating prophylactic appendectomy for comprehensive evaluation [3]. Intraoperative identification occurs in approximately half of appendiceal tumors. Furthermore, appendectomy specimens facilitate the histological evaluation of endometriosis and inflammatory bowel disease [4]. Notably, some macroscopically normal appendices exhibit inflammatory pathological changes discernible only at the molecular level [5]. Consequently, histopathological examination of appendectomy specimens is indispensable for confirming acute appendicitis, particularly in equivocal cases, and for revealing unanticipated pathologies, including infections, granulomatous inflammation, and benign or malignant neoplasms [6,7]. This study aimed to characterize the spectrum of histopathological findings in appendix biopsies at a tertiary care center.

Methods

A retrospective, descriptive, cross-sectional analysis was conducted on all appendix biopsies processed at SCB Medical College and Hospital, Cuttack, between January 2022 and December 2024. Utilizing a duration-based retrospective design, all patients with available appendix biopsy samples within this three-year period were included. The study encompassed histopathology reports of these appendix biopsies exclusively; patients with biopsies from other sites were excluded. Histopathological data, including diagnoses, and demographic information (age, gender) along with the year of biopsy, were retrieved from the pathology laboratory registers of SCB Medical College and Hospital, Cuttack. The collected data underwent statistical analysis to characterize the histopathological spectrum of appendiceal specimens.

Results

Out of the total 182 cases of appendix biopsies, 105 (57.7%) cases of acute appendix were found to be the most common. This was followed by 69 (37.9%) cases of chronic, 7 (3.8%) cases of acute on chronic and 1 (0.5%) cases of cancer. Males accounted for 109 (59%) cases of appendix biopsies which are in majority in comparison to 73 (40%) cases of female appendix biopsies. The male to female ratio is 1.4:1 (**Table 1**).

Table 1: Classification of appendix biopsies based on diagnosis.

Diagnosis	Total	%	Male	%	Female	%
Acute	105	57.7	66	60.6	39	53.4
Chronic	69	37.9	40	36.7	29	39.7
Acute on chronic	7	3.8	3	2.8	4	5.5
Cancer	1	0.5	0	0	1	1.4
Total	182	100.0	109	100	73	100.0

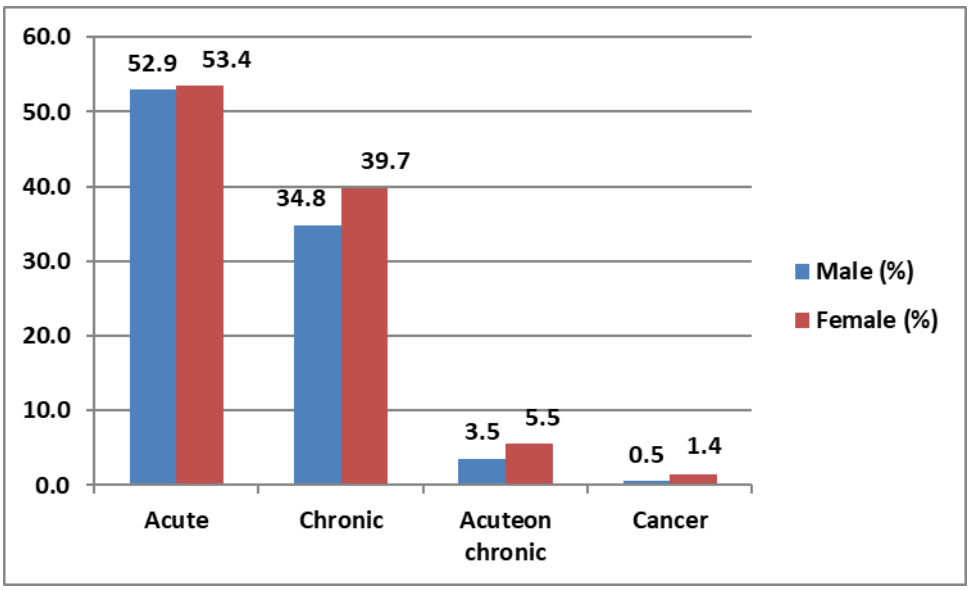

Figure 1: Sex wise distribution of appendix biopsies based on diagnosis.

Based on age grouping, the age group of 11-20 showed 45 (24%) cases of appendix biopsies out of the total 182 cases. The majority of cases of appendix biopsies observed in age group 11-20 (24%) were acute (14.48%). In 70 and above age groups, there was no prevalence of appendix biopsies observed. Only 1 (0.5%) case of cancer was observed in the age group 51-60 (**Table 2**).

While acute conditions have the highest absolute numbers, the percentage distribution reveals variations across age groups. For instance, the percentage of chronic conditions seems to increase in the 21-30 age group compared to younger groups.

Table 2: Classification of appendix biopsies based on age groups.

Age groups	Total	%	Acute	%	Chronic	%	Acute on chronic	%	Cancer	%
≤10	24	13.1	15	14.2	8	11.5	1	14.2	0	0
1l-20	45	24.7	26	24.7	18	26	1	14.2	0	0
21-30	38	20.8	21	20	15	21.7	2	28.5	0	0
31-40	28	15.8	16	15.2	11	15.9	1	14.2	0	0
41-50	25	13.7	14	13.3	10	14.4	1	14.2	0	0
51-60	13	7.14	9	8.5	3	4.3	0	0	1	100
61-70	8	4.3	3	2.8	4	5.7	1	14.2	0	0
71-80	1	0.5	1	0.9	0	0	0	0	0	0
>/=81	0	0	0	0	0	0	0	0	0	0
Total	182	100	105	100	69	100	7	100	1	100

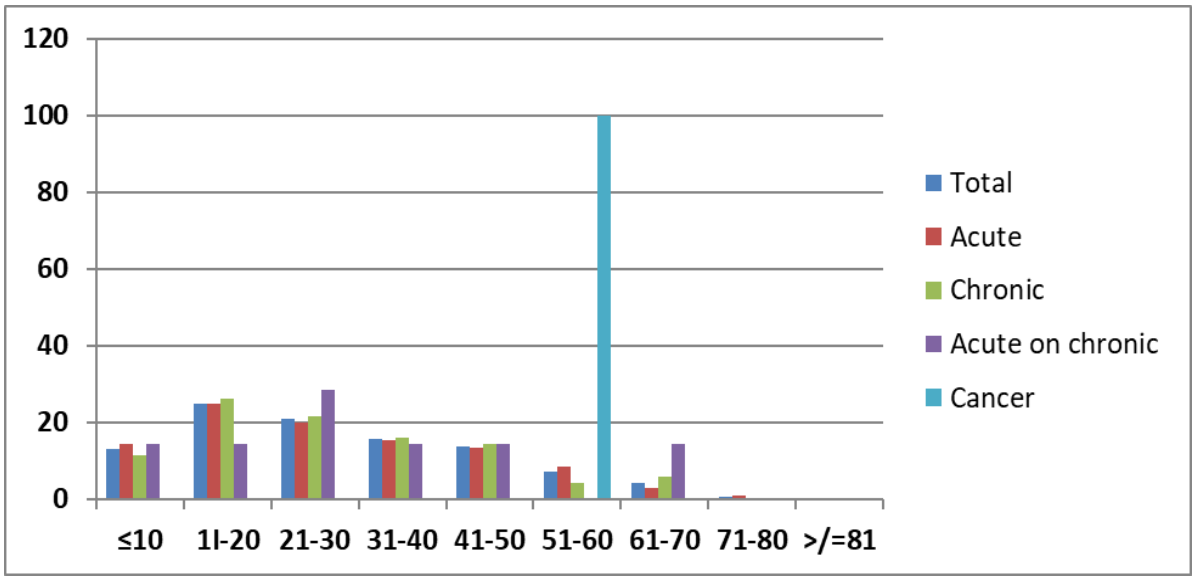

Figure 2: Classification of appendix biopsies based on age groups.

Discussion

The provided text indicates that appendectomy is a common emergent surgical procedure. Histopathology serves as a crucial diagnostic modality for characterizing appendiceal lesions and identifying their etiological bases [8]. Notably, even appendices appearing normal upon gross examination frequently undergo histopathological assessment to identify potential microscopic inflammation or other concealed pathological entities [9]. Epidemiological data from Western populations suggests that acute appendicitis constitutes a significant proportion (approximately 40%) of emergency surgical interventions. While historically less prevalent in African and Asian regions, recent evidence points towards a rising incidence of appendicitis in these populations, potentially linked to the adoption of Western dietary and lifestyle patterns [10].

The analysis of appendiceal biopsies in this study cohort demonstrates a statistically significant gender disparity, with males comprising 60.17% and females 39.83% of the patient population, thus exhibiting a male-biased representation. The age-specific incidence of appendectomy peaked within the 11-20 year interval, with a closely secondary peak in the 21-30 year interval. This observed age distribution corroborates existing epidemiological data10 that identifies the 11-30 year age stratum as having the highest susceptibility to appendiceal diseases. The calculated male-to-female ratio of 1.5:1 in this investigation is consistent with previously reported ratios in the literature [8,10,11]. Furthermore, the diagnostic pathway for chronic appendicitis, unlike its acute counterpart characterized by distinct clinical manifestations, necessitates surgical intervention (appendectomy) followed by histopathological examination for definitive confirmation [12].

Our investigation determined a chronic appendicitis prevalence of 38.2% within our analyzed cohort of appendiceal biopsies. This observed proportion is statistically significantly elevated when compared to the chronic appendicitis frequencies documented in prior studies by Punnoose *et al.*[12] (10.06%), Rehman *et al.*[13] (7.9%), Elfaedy *et al.*[14] (5.2%), Dincel *et al.*[15] (0.2%), and Shreshtha *et al.*[16] (2.6%). Conversely, acute appendicitis represented approximately 58.2% of the appendiceal biopsies in our study, a finding that demonstrates statistical consistency with the prevalence reported by Qasmi *et al.*[17] (82%), Ojo *et al.*[18] (69.9%), and Kumar *et al.*[19] (46.2%). However, the incidence of acute appendicitis in our cohort contrasts sharply with the substantially lower rate of 8.3% reported by other [20]. In our study, the observed incidence of appendiceal carcinoma was 0.3%, a value that is statistically comparable to the low prevalence of carcinoid tumors reported by Jones *et al.* [20] (1.05%) and Ojo *et al.*[18] (0.95%).

The primary limitations of this study were its single-center design and its retrospective nature, relying on the analysis of existing patient records.

Declarations

Ethical Approval and Consent to participate

Not applicable as retrospective nature of study. Consent for publication: Not applicable as retrospective nature of study.

Availability of supporting data

Upon request to the corresponding author.

Competing interests

Nil

Funding Statement

None

Authors contributions

All authors made substantial contributions to the reported work, including in the areas of conception, study design, execution, data collection, analysis, and interpretation. They participated in drafting, revising, and critically reviewing the article, gave final approval for the version to be published, agreed on the journal for submission, and accepted responsibility for all aspects of the work.

References

[1] Akbulut S, Tas M, Sogutcu N, Arikanoglu Z, Basbug M, Ulku A, *et al.* Unusual histopathological findings in appendectomy specimens: A retrospective analysis and literature review. World J Gastroenterol. 2011;17(15):1961.

[2] Unver N, Coban G, Arıcı DS, Buyukpınarbasılı N, Gucin Z, Malya FÜ, *et al.* Unusual Histopathological Findings in Appendectomy Specimens: A Retrospective Analysis of 2047 Cases. Int J Surg Pathol. 2019;27(2):142-6.

[3] Hussain A, Mahmood H, Singhal T, Balakrishnan S, El-Hasani S. What is positive appendicitis? A new answer to

an old question. Clinical, macroscopical and microscopical findings in 200 consecutive appendectomies. Singapore Med J. 2009;50(12):1145-9.

[4] Connor SJ, Hanna GB, Frizelle FA. Appendiceal tumors: retrospective clinicopathologic analysis of appendiceal tumors from 7,970 appendectomies. Dis Colon Rectum. 1998;41(1):75-80.

[5] Polat DA, Münevver M, Selçuk U, MahirM O, VasfiM O, Selda S, *et al.* Unusual findings in appendectomy specimens: Evaluation of 2458 cases and review of the literature. Indian J Surg. 2004;66(4):221-6.

[6] Charfi S, Sellami A, Affes A, Yaïch K, Mzali R, Boudawara TS. Histopathological findings in appendectomy specimens: a study of 24,697 cases. Int J Colorectal Dis. 2014;29(8):1009-12.

[7] Swank HA, Eshuis EJ, Ubbink DT, Bemelman WA. Is routine histopathological examination of appendectomy specimens useful? A systematic review of the literature. Colorectal Dis. 2011;13(11):1214-21.

[8] Marudanayagam R, Williams GT, Rees BI. Review of the pathological results of 2660 appendicectomy specimens. J Gastroenterol. 2006;41(8):745-9.

[9] Edino ST, Mohammed AZ, Ochicha O, Anumah M. Appendicitis in Kano, Nigeria: A 5-year review of pattern, morbidity and mortality. Ann Afr Med. 2004;3(1).

[10] Oguntola A, Adeoti M, Oyemolade T. Appendicitis: Trends in incidence, age, sex, and seasonal variations in South-Western Nigeria. Ann Afr Med. 2010;9(4):213.

[11] Ma KW, Chia NH, Yeung HW, Cheung MT. If not appendicitis, then what else can it be? A retrospective review of 1492 appendectomies. Hong Kong Med J. 2010;16(1):12-7.

[12] Dincel O, Göksu M, Türk BA, Pehlivanoğlu B, İşler S. Incidental Findings in Routine Histopathological Examination of Appendectomy Specimens; Retrospective Analysis of 1970 Patients. Indian J Surg. 2018;80(1):48-53.

[13] Punnoose AP, Joseph E, Joseph D, Thomas BM, Thomas SV, Ivan RA. Histopathological Evaluation of Lesions of Appendix - A Cross Sectional Study. J Evid Based Med Healthc. 2021;8(34):3187-92.

[14] Rehman S, Khan AI, Ansari HA, Alam F, Vasenwala SM, Alam K, *et al.* Retrospective analysis of appendicectomy specimens: A tertiary care center-based study. Saudi Surg J. 2017;5(2):71-5.

[15] Elfaedy O, Benkhadoura M, Elshaikhy A, Elgazwi K. Impact of routine histopathological examination of appendectomy specimens on patient management: a study of 4012 appendectomy specimens. Turkish J Surg. 2019;35(3):196-201.

[16] Shrestha R, Ranabhat S, Tiwari M. Histopathologic analysis of appendectomy specimens. J Pathol Nepal. 1970;2(3):215-9.

[17] Qasmi SA, Bugti S, Qamar N, Ghani A, Saldera K. Histopathological analysis of biopsy cases processsed at diagnostic centers of paf faisal and masroor hospaital. A prospective study. IntArch BioMed Clin Res. 2022;8(1):PA1-4.

[18] Ojo OS, Udeh SC, Odesanmi WO. Review of the histopathological findings in appendices removed for acute appendicitis in Nigerians. J Royal Coll Surg Edinburgh. 1991;36(4):245-8.

[19] Kumar A, Altamash S, Kumar A, Singhal P, Bijalwan A. A retrospective study of histopathological exam reports of appendix in appendectomies performed at a teaching hospital in Dehradun. Int Surg J. 2020;7(6):1990-3.

[20] Yilmaz M, Akbulut S, Kutluturk K, Sahin N, Arabaci E, Ara C, Yilmaz S. Unusual histopathological findings in appendectomy specimens from patients with suspected acute appendicitis. World J Gastroenterol. 2013 Jul 7;19(25):4015-22.

[21] Jones AE, Phillips AW, Jarvis JR, Sargen K. The value of routine histopathological examination of appendicectomy specimens. BMC Surg. 2007;7(1).