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## Histopathological Study of Appendectomy Specimens in a Rural Tertiary Care Hospital in Bangladesh

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### Abstract

**Background:** Appendicitis is one of the most common causes of the acute abdomen that demands emergency surgical intervention. It is a clinical condition that is frequently encountered as a diagnostic challenge. Sometimes grossly normal-appearing appendix, removed from patients with suspected acute appendicitis, on histopathological examination may reveal a more serious underlying pathology. Hence, histopathological studies form the gold standard for the diagnosis of appendicitis. **Aim:** To study the histopathological patterns of appendicitis in patients who underwent appendectomy. **Methods:** This study was carried out in the department of Pathology, Jahurul Islam Medical College, Bajitpur, Kishoreganj from January 2020 to December 2020. All the appendectomy specimens were received in 10% formalin as fixative. Sections obtained were studied to determine various histopathological patterns in appendectomy specimens. **Results:** A total of 252 specimens were undertaken for histopathological examination. There were 154 (61.1%) males and 98 (38.1%) females with male to female ratio of 1.6:1. The most common lesion observed was acute appendicitis (51.98%) followed by recurrent appendicitis (28.17%), acute suppurative appendicitis (07.15%), gangrenous appendicitis (06.36%), eosinophilic appendicitis (02.38%), follicular lymphoid hyperplasia (02.38%), mucinous adenoma (0.40%) and mucinous adenocarcinoma (02.38%). **Conclusion:** Most of the cases in this study were diagnosed with the usual features of appendicitis, though a few of them were incidental diagnoses that were missed clinically. These important incidental diagnoses undisputedly support the notion that every appendectomy specimen must be sent routinely for histopathological examination.

**Keywords:** Appendectomy specimen, Histopathology, Appendicitis.

### Introduction

Appendicitis is a sufficiently common abdominal emergency and appendectomy is one of the most routinely performed surgeries in the world. Hence, the appendix is a frequent surgical

specimen in most histopathology laboratories. Diagnosis of acute appendicitis is based on history and physical examination along with laboratory and as well as radiological findings.<sup>1</sup> However, the histopathological study is the gold

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standard for the diagnosis of acute appendicitis.<sup>2</sup> For the significant implications on the treatment, prognosis and outcome of the patient, the histopathological examination must be needed.<sup>3</sup> Appendicitis occurs commonly in children and young adults with a lifetime risk of 7%.<sup>4</sup> In spite of all the recent advancements, clinical diagnosis of acute appendicitis is accurate in 60-80% of cases only.<sup>5</sup>

Appendicitis can be of obstructive or non-obstructive type. Luminal obstruction is the main factor in acute appendicitis and some other common obstructive lesions are fecolith, lymphoid hyperplasia and foreign bodies. However, some unusual factors could also be the cause which includes parasitic infestations like ascariasis, and enterobiasis, bacterial infections such as tuberculosis or a neoplasm like a carcinoid, gastrointestinal stromal tumor and lymphoma.<sup>6</sup>

As there is little data available, the study aims to evaluate the various histopathological diagnosis of appendectomy specimens to find out unusual factors for appendicitis and compare them.

### Materials and methods

The present study was conducted in the department of Pathology at Jahurul Islam Medical College and Hospital, Kishoreganj. A total of 252 appendectomy specimens were received in the histopathology section of the department of Pathology during a period of 12 months from January 2020 to December 2020.

All appendectomy specimens were received in 10% formalin as fixative. Gross features of these appendectomy specimens were recorded and sections were taken for histopathological examination. A minimum of three sections were taken from each specimen; one longitudinal section from the distal tip of the appendix, one cross-section each from the middle, and one from the base of the appendix. Sections of 3-5 micrometer thickness were cut on a rotary microtome and stained with Hematoxylin and Eosin (H&E) and a histopathological diagnosis was done and reported by a pathologist.

### Results

A total of 252 appendectomy specimens were received in the department of Pathology for a study period of 12 months from January 2020 to December 2020. Among these patients, 154 were males and 98 were females, thus making a male-female ratio of 1.6:1 (Table 01). Out of 252, the majority were diagnosed as acute appendicitis (131 cases) followed by recurrent appendicitis (71 cases), acute suppurative appendicitis (18 cases), and gangrenous appendicitis (16 cases). The other histopathological diagnoses were follicular lymphoid hyperplasia (06 cases), eosinophilic appendicitis (06 cases), *Enterobius vermicularis* (02 cases), mucinous adenoma (01 case), and mucinous adenocarcinoma (01 case) [Table 02]. Also, 249 (98.8%) cases were found as non-neoplastic lesions and 03 (1.2%) cases were diagnosed as neoplastic lesions (Table 03).

**Table 01: Age & gender-specific distribution of appendectomy specimens**

Age (years)	Male	Female	Total
0-9	02	02	04
10-19	34	23	57
20-29	74	42	116
30-39	26	22	48
40-49	09	06	15
50-59	07	02	09
60-69	02	01	03
Total	154 (61.1%)	98 (38.9%)	252

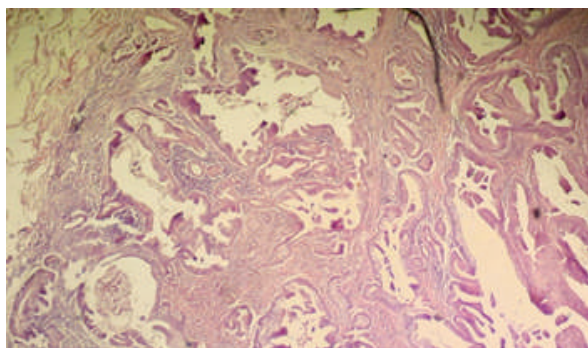
**Table 02: Histopathological findings of appendectomy specimens**

Histopathological Diagnosis	No. of Cases	Percentage (%)
Acute appendicitis	131	51.98
Recurrent appendicitis	71	28.17
Acute suppurative appendicitis	18	7.15
Gangrenous appendicitis	16	6.36

Follicular lymphoid hyperplasia	06	2.38
Eosinophilic appendicitis	06	2.38
Enterobius vermicularis	02	0.79
Mucinous adenoma	02	0.79
Mucinous adenocarcinoma	01	0.40
Total	252	100

**Table 03: Distribution of appendectomy specimens**

Specimens	Cases	Percentage (%)
Non-neoplastic lesions	249	98.8
Neoplastic lesions	03	1.2
Total	252	100



**Figure 01: Photomicrograph showing Mucinous adenocarcinoma of the appendix (Hematoxyline & Eosin stain x100)**

### Discussion

Acute appendicitis has been the most common surgical emergency. It accounts for about 40% of all surgical emergencies in the western world. It is less in Asian and African countries. Due to the adoption of the western diet and lifestyle, recent studies show that there is an increase in the incidence of appendicitis in African and Asian countries. The incidence of appendicitis varies considerably by country, race, age, sex,

socioeconomic status, geographic region, dietary habits, and hygiene.<sup>7</sup>

The vermiform appendix is considered by most to be a vestigial organ and its inflammation is known as acute appendicitis. Acute appendicitis was recognized as a clinical entity first by Reginald Fitz. Subsequently, Charles McBurney described the clinical manifestation of acute appendicitis including the point of maximum tenderness in the right iliac fossa, that is how it bears his name.<sup>6</sup>

Luminal obstructions caused by fecolith, fibrosis, or stricture can lead to the proliferation of aerobic and anaerobic bacteria. Lymphoid hyperplasia can also narrow the lumen leading to luminal obstruction. Once obstruction occurs, there is continued mucus secretion and inflammatory exudation which leads to increased intraluminal pressure resulting in obstruction of lymphatic drainage.<sup>6</sup>

The histopathological study of the appendix has the advantage that it confirms the diagnosis of acute appendicitis. Also, it reveals other important pathological findings that may not be obvious on gross examination intra-operatively but may affect further clinical management of patients.<sup>8</sup>

There is no definitive laboratory investigation with adequate specificity and sensitivity to diagnose appendicitis consistently, regardless of advances in technology. Around 7% of the total population will be diagnosed with appendicitis in their lifetime with peak age incidence between 10 and 30 years.<sup>6</sup> The current study was done for 12 months and shows the histopathological findings of 252 appendectomy specimens in the department of Pathology at Jahurul Islam Medical College and Hospital, Kishoreganj. In this study, emergency appendectomy was the most common scenario followed by interval appendectomy. The maximum number of patients [116 cases (46.03%)] who underwent appendectomy belonged to the age group of 20-29 years (Table 01), which correlated with the study done by Marudanayagam et al. which also showed that most of the appendectomies were done in the

second decade of life.<sup>9</sup> Number of appendectomies performed was more in males (61.1%) as compared to females (38.9%) which were consistent with findings by Zulfikar et al. who studied 323 cases of appendectomies retrospectively, in which, 196 (60.7%) were males and 127 (39.3%) were females.<sup>10</sup>

Among 252 appendectomy specimens, 249 (98.8%) were found with non-neoplastic lesions and 03 (1.2%) cases were diagnosed as neoplastic lesions (Table 03). In a retrospective study by Blair et al., it was reported that 80% of appendectomy cases were non-neoplastic and 4% were neoplastic<sup>11</sup> which was in concordance with our study.

In the present study, acute appendicitis accounted for the most common histopathological lesion for which appendectomy was done and was seen in 51.98% of patients. These findings correlate with the study done by Blair et al.<sup>11</sup> and Edino et al.<sup>12</sup>

The present study reported 7.15% cases of acute suppurative appendicitis which is similar to the study by Sujatha R et al., which reported 6.5%.<sup>15</sup> However, the study by Edino ST et al. reported 14.1% cases.<sup>12</sup>

In this study gangrenous appendicitis was reported in 16 cases (6.36%). These findings indicate the delay by patients in seeking timely treatment. Fecoliths are reported in 40% of acute appendicitis, 65% of gangrenous appendicitis without rupture, and nearly 90% of gangrenous appendicitis cases with rupture.<sup>16</sup>

Our study included 06 cases (2.38%) of eosinophilic appendicitis. Eosinophilic appendicitis is characterized by a lack of neutrophils, there is eosinophil infiltration in the muscle layer with edema.<sup>13</sup> It may be associated with helminthic infestation. Many studies have revealed that Type I hypersensitivity may also trigger the condition.<sup>13</sup>

The presence of *Enterobius vermicularis* in the appendix usually produces symptoms resembling acute appendicitis. In our study, we reported 02

cases (0.79%) of *Enterobius vermicularis* presenting with features of acute appendicitis. Worldwide, the reported incidence of *Enterobius* infection in patients with symptoms of appendicitis ranges from 0.2% to 41.8%.<sup>14</sup>

An incidental diagnosis of mucinous adenoma of the appendix was also made in our study in 1 case (0.4%) which correlates with the study by Marudanayagam et al. who reported mucinous adenoma in 0.8% of cases.<sup>9</sup>

Mucinous adenocarcinoma of the appendix was the only malignant lesion encountered in the present study seen in a single case. Similarly, Jones and Paterson reported that adenocarcinoma was found in only 0.1% of all appendectomies.<sup>17</sup>

### Limitations

The clinical and laboratory data were not available, for this reason, the present study did not include a clinical scoring system like the Alvarado score. Immunohistochemistry was not done for neoplastic cases due to the unavailability of required facilities.

### Conclusion

Maximum cases were found in the age group of 20-29 years with male predominance. Acute appendicitis is the most common morphology followed by recurrent appendicitis. In the present study, histopathological examination provided clues for the diagnosis of many important incidental lesions. Hence, every appendectomy specimen must be sent routinely for histopathological examination and studied meticulously, as some unusual findings bearing implications on treatment and prognosis may be seen, regardless of the reason for which the appendectomy is performed.

### References

1. Norman J, Leslie H. Appendix. In: Weidner N, Cote R, Suster S, Weiss LM editors. *Modern surgical pathology*. 2nd ed. Saunders Elsevier. 2009; 1:837-852.

2. Russel MG, Dorant E, Brummer RJM et al. Appendectomy and the risk of ulcerative colitis, *Gastroenterology*. 1997; 113(2):377-82.
3. Lally KP, Cox CS, Andrassy RJ. Appendix. In: Townsend CM, Beachamp RD, Evers BM, Mattox KL, editors. *Sabiston text book of surgery*. 16th ed. New Delhi: Harcourt (India) Pvt. Ltd. 2002, p. 917-28.
4. Turner JR. The Gastrointestinal tract, In: Kumar, Abbas, Fausto(eds). *Robins [3] and Cotran Pathologic basis of disease*. 9th edn. Saunders: Philadelphia 2010. Pp. 816.
5. Fergusson JAE, Hitos K, Simpson E. Utility of white cell count and ultrasound in the diagnosis of acute appendicitis. *ANZ J Surg*. 2002;72(11):781-83.
6. O'Connell PR. The vermiform appendix. In: Russell RC, Williams NS, Bulstrode CJ. editors. *Bailey and Love's Short Practice of Surgery*. 26th ed. London: Arnold Hodder. 2010. Pp 1203-1218.
7. Oguntola AS, Adeoti ML, Oyemolade TA. Appendicitis: Trends in incidence, age, sex, and seasonal variations in South-Western Nigeria. *Ann Afr Med*. 2010; 9:213-7.
8. Duzgun AP, Moran M, Uzun S, Ozmen MM, Ozer VM, Seckin S, et al. Unusual findings in appendectomy specimens: Evaluation of 2458 cases and review of the literature. *Indian J Surg*. 2004;66(4):221-26.
9. Marudanayagam R, Williams GT, Rees BI; Review of the pathological results of 2660 appendectomy specimens *Gastro*. 2006;41(8):745-749.
10. Zulfikar I, Khanzada TW, Sushel C, Samad A; Review of the pathologic diagnoses of appendectomy specimens. *Annals of King Edward Medical University*. 2009; 15(4):168-170.
11. Blair NP, Bugis SP, Turner LJ, Macleod MM; Review of pathological diagnosis of 2216 appendectomy specimens. *Am J Surg*.1993;165(5):618-620.
12. Edino ST, Mohammed AZ, Ochicha O, Anumah M; Appendicitis in Kano, Nigeria: A 5year review of pattern, morbidity and mortality. *Annals of African Medicine*, 2004; 3(1):38-41.
13. Aravindan KP, Deepthy Vijayaraghavan, Marie Therese Manipadan. Significance of eosinophils-edema lesion. *Indian J Pathol Microbiol*. 2010;53:258-261.
14. Aydin O. Incidental parasitic infestations in surgically removed appendices: A retrospective analysis. *Diagn Pathol*. 2007; 2:16.
15. Sujatha R, Anushree CN, Neha Singh. Histopathological spectrum of appendectomy specimens- A prospective study. *Indian Journal of Pathology and Oncology*. 2017;4(4):638-42.
16. Sinha RT, Dey A. A retrospective study of histopathological features of appendectomy specimens- What all can expect? *J Med Sci Health*. 2016;2(2):06-12.
17. Jones MW and Paterson AG; The correlation between gross appearance of the appendix at appendectomy and histopathological examination. *Ann R Coll Surg Engl.*, 1988; 70(2):93-94