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A Histopathological Study of the Appendix after Surgical Resection

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Abstract **Original Research Article**

Introduction: Acute appendicitis is one of the most common causes of acute abdomen that demands emergency surgery. It is a clinical condition with an ongoing 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 diagnosis of acute appendicitis. Faecoliths are the usual cause of obstruction, though there are many other causes, ranging from inflammatory conditions to malignancies. ***Aim****:* To study histopathological patterns of appendicitis in all the patients who underwent appendicectomy at our institution to correlate with the clinical diagnosis. ***Materials and Method:*** This is a study of 460 appendicectomies carried out at Sylhet Women's Medical College and Hospital during a period of 1year from August 2017 to July 2018. Clinical data was collected from patients and corresponding appendicectomy specimens were submitted to histopathology department of Sylhet Women's Medical College and were processed routinely. Sections obtained were studied to determine various histopathological patterns in appendicectomy specimens. ***Results****:* A total of 460 specimens were analyzed. 276(60%) were females and 184(40%) were males. The histopathological examination showed acute appendicitis (69.18%), chronic appendicitis (8.48%), acute suppurative appendicitis (8.07%), eosinophilic appendicitis (2.83%), and carcinoid tumor (1.08%), and parasitic infestation (1.40%), mucocele of appendix (0.8%). Negative appendiectomy rate was found to be (8.70%). ***Conclusion***: Appendicities has a peak incidence in second and third decade of life. Most of the cases in this study were diagnosed with usual features of appendicitis, though a few of them were essential incidental diagnoses which were missed preoperatively or intraoperatively. These important incidental diagnoses undeniably support the importance of routine histopathological examination of all appendectomy specimens after appendectomy.

Keywords: Appendicectomy, Histopathology, Appendicitis, Carcinoid tumour.

INTRODUCTION

Acute appendicitis is one of the most common surgical causes of acute abdomen. The lifetime risk for appendicitis is 7%; commonly occurring in adolescents and young adults [1]. The rate of acute appendicitis varies among countries. The incidence rate is high in developed country but low in developing country [2]. In developing countries, the incidence is increasing in most urban centers, probably due to adoption of western diet [3, 4].

Despite of advances in technology and imaging modalities, there is dilemma in the clinical diagnosis of acute appendicitis. Histopathological examination still remains the gold standard method for the confirmation of the appendicitis. Not only the pathologic diagnosis of acute inflammation, at times unusual findings such as incidental tumours noted in the appendix highlights the importance of the pathological analysis of every single resected appendix.

This study aims to determine the various histological diagnoses of all surgically removed appendices and to find out the age and sex related incidence of appendicitis, the perforation rate and the rate of negative appendectomies.

MATERIALS AND METHOD

This study was carried out in the department of surgery, Sylhet Women's Medical College and Hospital, Sylhet during a period from August 2017 to July 2018. A total of 460 emergency and interval appendicectomies were done for cases of clinically suspected appendicitis.

Diagnosis was done by history, clinical examination and relevant investigations. All corresponding specimens were collected and submitted to the department of pathology. Relevant clinical data was retrieved. Gross findings were noted. Specimens were fixed in 10% formalin, routine tissue processing and paraffin embedding was done and 5 micrometre thickness sections obtained, were studied. Haematoxylin and eosin staining was used. Histopathological finding were recorded on the data sheet.

RESULTS

Four hundred and sixty appendicectomy specimens were collected for a study period of 1 year from August 2017 to2018 in the department of surgery. Among these patients, 276 were female and 184 were males, thus making a female: male ratio of 1.5:1. [Table 1] Out of these 460 cases, 406 cases had histological proven appendicitis.

Table-1: Age & gender specific distribution in acute appendicitis patients

Age	Males	Females	Total
0-9	5	4	9
10-19	61	96	157
20-29	65	85	150
30-39	40	68	108
40-49	5	13	18
50-59	5	7	12
60-69	3	3	6
Total	184	276	460

Majority of cases i.e. 382 out of 460 cases presented clinically as acute appendicitis followed by recurrent appendicitis (51cases), appendicular abscess (15 cases) & Perforated appendix (12 cases).

In the current study, about 27 cases out of 460 cases showed incidental findings. Six out of these 27 cases showed intraluminal parasite consistent with Enterobius vermicularis. Eosonophilic infiltration in the muscle coat was found in 13 cases. Carcinoid tumor of appendix was found in 5 cases. An interesting finding was that of Mucocele of appendix which was seen in 3 cases out of these 27 cases.

These 27 cases of incidental unusual diagnosis on histopathological examination were diagnosed preoperatively as Acute/Recurrent appendicitis. So, detection of these findings had a considerable impact on patient management.

Negative appendicectomy rate was 8.70% which accounted for 40 cases. These cases were diagnosed clinically as acute/recurrent appendicitis and appendicectomy was done (Table 2).

Table-2: Analysis of histopathological finding of appendicectomy specimens

Histopathological Diagnosis	No. of Cases	Percentage (%)
Acute appendicitis	317	69.18
Chronic appendicitis	39	8.48
Acute suppurative appendicitis	37	8.o7
Eosinophilic appendicitis	13	2.83
Enterobious vermicularis	6	1.4
Carcinoid	5	1.08
Mucocele of appendix	3	0.8
Negative appendicectomy	40	8.7
Total	460	100%

Table-3: Distribution of appendicectomy specimens

Specimen	Cases	Percentage (%)
Non neoplastic lesions	415	90.20
Neoplastic lesions	5	1.08
Normal appendix	40	8.7
Total	460	100%

DISCUSSION

Acute appendicitis has been the most common surgical emergency for a number of decades and the appendicectomy is the most frequently performed abdominal operation. It accounts for about 40% of all surgical emergencies in the western world. It is less in Asian and African countries. Due to adoption of western diet and lifestyle, recent studies show that there is an increase in incidence of appendicitis in African and Asian countries. Incidence of appendicitis varies considerably by country, race, age, sex, geographic region, socio-economic status, dietary habits, and hygiene [4].

The vermiform appendix is considered by most to be a vestigial organ. Its clinical importance lays in its predilection for inflammation which results in clinical syndrome known as acute appendicitis. Acute appendicitis was recognized as a clinical entity first by Reginald Fitz. Soon afterwards, Charles Mc Burney described the clinical manifestation of acute appendicitis including the point of maximum tenderness in right iliac fossa, that's how it bears his name [5].

Obstruction is usually in the form of luminal obstructions such as faecolith, fibrosis or stricture which can lead to 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 [5].

It has been observed that in around 15-30% of cases diagnosed as acute appendicitis, there is discrepancy between the histopathological and clinical diagnosis. The histopathological study of 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 intraoperatively but may affect further clinical management of patient [6].

Regardless of advances in technology, there is no laboratory test or examination with adequate specificity and sensitivity to diagnose appendicitis consistently. Around 7% of the total population will be diagnosed with appendicitis in their lifetime with peak age incidence between 10 and 30 years [5].

The current study was done for a period of 1 year and shows the histopathological findings of 460 appendicectomy specimen in the Department of surgery Women's medical college, Sylhet. In this study, emergency appendicectomy were the most common cases followed by interval appendicectomy. Maximum number of patients (66.62%) who underwent appendicectomy belonged to the age group of 10-29 years [Table 1], which correlated with the study done by O Connell PR *et al*. which also showed that most of the appendicectomies were done in the second decade of life.5 Number of appendicectomies performed were more in females (60%) as compared to males (40%) which was not consistent with findings by Zulfikar *et al*. who studied 323 cases of appendicectomies retrospectively., in which, 196 (60.7%) were males and 127 (39.3%) were females.[7] This discrepancy is probably due to the name of our institution.

Among 460 appendicectomy specimens, 415 (90.13%) were found to be non-neoplastic lesions and only 05 (1.08%) cases were diagnosed as neoplastic lesions, remaining 40 (8.70%) cases showed normal histology of appendix [Table 3]. In a retrospective study by Blair *et al*. it was reported that 80% of appendicectomy cases were non-neoplastic lesions and 4% were neoplastic [8]. In the remaining cases (8.7%), normal histology of appendix was seen which was in concordance with our study.

In the present study, acute appendicitis accounted for the most common histopathological lesion for which appendicectomy was done and was seen in 69.18% of patients. These findings correlate with the study done by Blair *et al*. [8] and Edino *et al*. [9]

Our study included 13 cases (2.83%) of eosinophilic appendicitis. Eosinophilic appendicitis is characterized by lack of neutrophils; there is eosinophilic infiltration in muscle layer with oedema supporting muscle fibres [10]. It may be associated with helminthes infection. Many studies have revealed that Type I hypersensitivity may also trigger the condition [11].

The presence of Enterobius vermicularis in appendix usually produces symptoms resembling acute appendicitis. In our study, we reported 06 cases (1.4%) of Enterobius vermicularis presenting with features of acute appendicitis. Interestingly, it was an incidental finding in histopathological examination. Worldwide, the reported incidence of Enterobius infection in patients with symptoms of appendicitis ranges from 0.2% to 41.8% [12].

Other incidental findings diagnosed were 5 cases of carcinoid which accounted for 1.08% of total cases. Likewise, Hof *et al*. in their study diagnosed carcinoid in only (0.47%) cases [13]. Carcinoids are the most common appendiceal tumors and are characteristically small, firm, well circumscribed yellow brown lesions on gross examination [14]. Carcinoid tumor of appendix is found in 0.3%-2.27% of patients undergoing appendicectomy [15]. Clinical presentation of these tumors mimic appendicitis because they lead to luminal obstruction and produce increased levels of

serotonin, histamine and kinin which are all potent mediators of inflammation [16]. An incidental diagnosis of mucocele of appendix was also made in our study (0.4%) which correlates with the study by Marudanayagam *et al*. who reported mucinous cystadenoma in 0.8% of cases [17].

In remaining cases 40 cases, no pathological abnormality was seen microscopically and these were labelled as normal appendices, which accounted for a negative appendicectomy rate of 8.7 % [Table 2]. This correlates with various other studies where the negative appendicectomy rate has been found to be between 6.1 to 34.2% [6, 7, 18].

CONCLUSION

Appendicitis has a peak incidence in second and third decades of life. An unusual finding like carcinoid tumour in the clinically suspected acute appendicitis reflects that all appendicectomy specimens should be sent for histopathological examination, the presence of which would alter the further management.

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