

Histopathological Spectrum of Appendiceal Lesions with Associated Unusual Findings in Appendicectomy Specimens

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Abstract

Background: Acute appendicitis is the one of the most common surgical emergencies in world wide. Gold standards method for diagnosis of acute appendicitis is histopathological examination of appendectomy specimen. Appendiceal lumen obstruction caused by faecolith mainly and unusual factors rarely. Spectrums of appendiceal lesions consist of inflammatory lesions to malignant lesions. *Methods:* The present retrospective study included 159 appendicectomy specimens received in the department of pathology, Narayana Medical College & Hospital, Nellore, Andhra Pradesh, India, during the period of January 2016 to December 2016. Appendicectomy specimens were fixed in 10% formalin and then stained with Haematoxylin and Eosin staining technique. *Results:* Among the 159 appendicectomy specimens, Acute appendicitis account for 72 (45.28%) with peak occurrence in the age group 11-20 years (27.67%) and 21-30 years (25.79%) with male predominance (1.74:1). Unusual findings were noted in 21(13.21%) cases on histopathology. Most common unusual findings included chronic obliterative appendicitis (61.90%), followed by acute eosinophilic appendicitis (14.29%) and Carcinoid appendix (9.52%). Other unusual findings include Granulomatous appendicitis, Enterobius vermicularis parasitic infestation and primary adenocarcinoma of appendix. *Conclusion:* The gross examination of appendix during surgery cannot detect the unusual findings particularly malignancies. Histopathological examination of appendix is essential to avoid the malignancies missed and gives clinician a clear idea regarding treatment strategy.

Keywords: Appendicitis; Carcinoid; Primary Adenocarcinoma; Enterobius Vermicularis.

Introduction

According to global statistics appendicectomy is one of the most commonly performed operations in acute surgical emergency like acute appendicitis [1]. In adolescent and young adults life time risk of acute appendicitis is 7%. According to Indian statistics, the incidence of acute appendicitis is increasing in urban areas due to usage of western food habits [2]. Gold standard method for confirmation of acute appendicitis is histopathological examination of appendicectomy specimen [2]. Most common cause of obstruction in acute appendicitis are fecolith and

lymphoid hyperplasia. Unusual causes of obstruction in acute appendicitis are Enterobiasis, Tuberculosis, Carcinoids and primary or secondary adenocarcinomas [3].

The aim of the present study is to determine the histopathological spectrum of appendiceal lesions and to find the unusual causes for appendicitis and compare them with other studies.

Material and Methods

The present study was conducted in department of pathology, Narayana Medical College & Hospital, Nellore, Andhra Pradesh, India, during the period of one year from January 2016 to December 2016. Total number of 159 appendicectomy specimens were analyzed. Appendicectomy specimens were fixed in

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(Received on 10.06.2017, Accepted on 19.06.2017)

10% formalin and then stained with Haematoxylin and Eosin staining technique. Spectrum of appendiceal lesions were analyzed according to diagnosis and unusual findings were noted and data was compared with other studies.

Results

Among the 159 cases of appendiceal lesion, 44 cases (27.67%) are noted in 11-20 years age group, 41 cases (25.79%) are noted in 21-30 years age group, 27 cases (16.98%) are noted in 31-40 years age group, 21 cases (13.21%) are noted in 41-50 years age group, 11 cases (6.92%) are noted in 51-60 years age group, 7 cases (4.40%) are noted in 61-70 years age group & 7 cases (4.40%) are noted in less than 10 years age group. One case (0.63%) is noted in 71-80 years age group. In our study most of the appendiceal lesions noted in 11-30 years age group, and least number of cases noted in 71-80 years age group. The peak age incidence of appendicitis was found in the age group of 11-20 years with 27.67%. In our study, youngest age of appendiceal lesions were noted in male child 8 years and elderly age of appendiceal lesions were noted in male 79 years. In our study mean age of appendiceal lesions was 30.69 years

Among the 159 cases of appendiceal lesions, 101(63.52%) cases were males and 58(36.48%) were

females. Male to Female ratio is 1.74:1.

Among the 159 cases of appendiceal lesions, 72 cases (45.28%) were Acute nonspecific appendicitis, 38 cases (23.90%) were chronic nonspecific appendicitis, 21 cases (13.21%) were unusual findings in appendicitis, 10 cases (6.29%) were Acute suppurative/necrotizing appendicitis, 8 cases (5.03%) were recurrent/follicular appendicitis, 7 cases (4.40%) were Acute perforative/obliterative appendicitis and 3 cases (1.89%) were Gangrenous appendicitis. In our study, majority of cases were acute appendicitis [72 cases (45.28%)] and unusual findings were noted in 21 cases (13.21%) (Table 1).

Among the 21 cases of unusual appendicitis, 13 cases (61.90%) were chronic obliterative appendicitis, 3 cases (14.29%) were Acute eosinophilic appendicitis, 2 cases (9.52%) were carcinoids, one case (4.76%) were Granulomatous appendicitis, one case (4.76%) were Enterobiasis (Figure 1) and one case (4.76%) were Primary adenocarcinoma of appendix (Figure 2). In our study, majority of cases were chronic obliterative appendicitis 13 cases (61.90%) followed by Acute eosinophilic appendicitis 3 cases (14.29%) and Carcinoid appendix 2 cases (9.52%) (Figure 3). In our study rare unusual histopathological findings were found in one case of Granulomatous appendicitis, Enterobius vermicularis and Primary adenocarcinoma (4.76%) respectively (Table 2).

Table 1: Histopathological spectrum of appendicitis

S. No	Histopathological Diagnosis	No. of Cases	Percentage
1.	Acute non specific appendicitis	72	45.28%
2.	Acute perforative /obliterative appendicitis	7	4.40%
3.	Acute suppurative /necrotizing appendicitis	10	6.29%
4.	Recurrent/follicular appendicitis	8	5.03%
5.	Chronic non specific appendicitis	38	23.90%
6.	Gangrenous appendicitis	3	1.89%
7.	Unusual findings	21	13.21%
	Total	159	100%

Table 2: Spectrum of unusual finding on Histopathology

S. No	Unusual/Rare Finding	No. of Cases	Percentage
1.	Chronic obliterative appendicitis	13	61.90%
2.	Acute eosinophilic appendicitis	3	14.29%
3.	Granulomatous appendicitis	1	4.76%
4.	Diverticulum appendicitis	-	-
5.	Mucocele appendix	-	-
6.	Carcinoid appendix	2	9.52%
7.	Primary adenocarcinoma	1	4.76%
8.	Enterobius vermicularis	1	4.76%
9.	NHL	-	-
10.	Leiomyoma of appendix	-	-
	Total	21	100%

Table 3: Comparison of unusual Histopathological examination findings

S. No	Authors (Year)	Duration of study (years)	No. of cases	Unusual finding on HPE	Percentage
1.	DuzgunAP et al ^[15] (2004) study	6	2458	19	0.70%
2.	Abdul rehman salem Al Mulhim (2011) [7] study	3	1324	67	5.10%
3.	Akbulut S et al (2011) [9] study	4.8	5262	54	1.02%
4.	Emre A et al (2013) [17] study	4	1255	88	7.00%
5.	Menon I et al (2014) [16] study	7	2157	138	6.40%
6.	Nikumbh et al (2015) [18] study	4	790	44	5.60%
7.	Present study (2016) study	1	159	21	13.21%

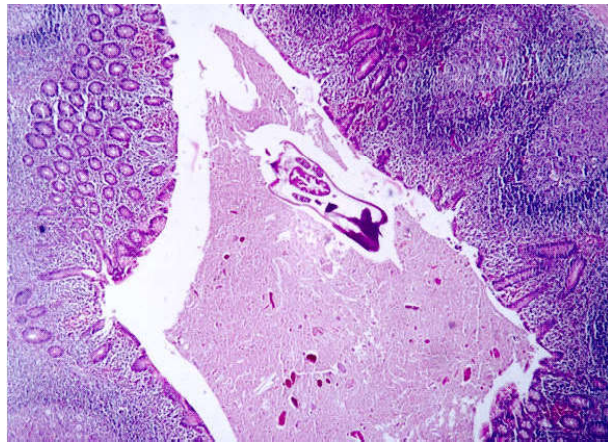


Fig. 1:

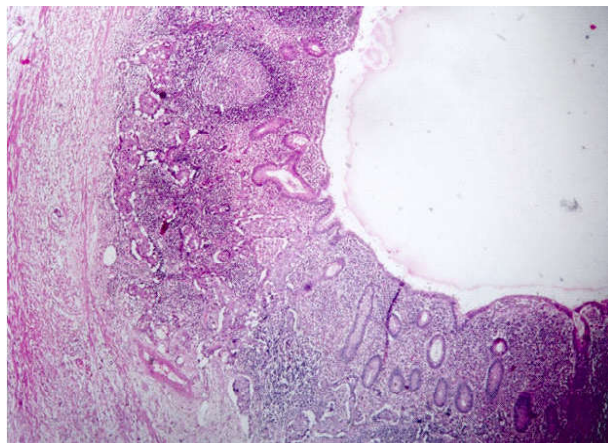


Fig. 2:

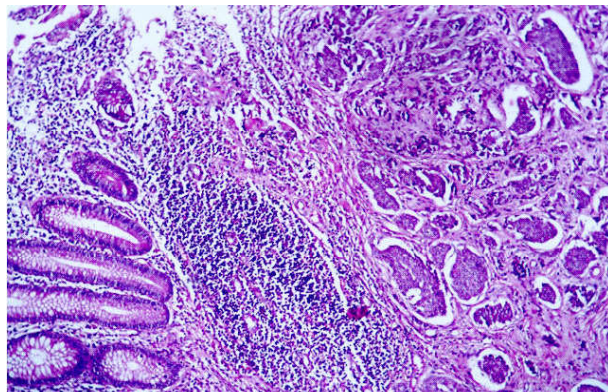


Fig. 3:

Discussion

Acute appendicitis is most common surgical emergency for a number of decades. Obstruction of the lumen of appendix seems to be the essential for developing an appendiceal infection. Faecoliths and lymphoid hyperplasia are the most common causes of the obstruction. Some unusual factors could also be involved. Surgical exploration for acute appendicitis is one of the most common surgical emergencies in young population worldwide. Acute appendicitis can occur at any age from infants to extreme old age and the peak incidences of appendicitis occur during the second and third decades of life. In our study, the peak incidence of appendicitis was in age group of 11 to 30 years which is similar to other studies particularly Chua et al [4] 1990 study, Anderson et al [5] 1992 study, Lee et al [6] 1993 study and Abdul rehman Salem Al Mulhimi 2011 [7] studies.

According to Primatesta P et al [8] 1994 study and Abdul rehman Salem Al Mulhimi 2011 [7] study, sex difference for appendicitis with males being more predominant than females. In our study, sex difference for appendicitis with males being more predominant than females. In our study, sex difference for appendicitis is 101 (63.52%) cases were males and 58 (36.48%) cases were females, with a ratio 1.74:1 which is similar to above two studies.

The histopathological criterion for the diagnosis of acute appendicitis is neutrophilic infiltration of the muscularis mucosa. The incidence of chronic appendicitis as a pathologic or clinical entity has been greatly disputed. Much more a frequently recurrent acute attack may be inappropriately referred to as chronic appendicitis. Extensive fibrosis of the appendiceal architecture implies a chronic inflammatory reaction within the wall, supports the diagnosis of chronic obliterative appendicitis. Recurrent appendicitis especially in children occurs due to hyperplasia of lymphoid follicles in the wall, some other causes in the adults are due to excess mucin production. The diagnosis of chronic and recurrent is

clinically important due to its different causes. Recurrent right iliac fossa pain in mainly females may be due to many other gynecology causes including chronic appendicitis. Acute eosinophilic appendicitis may be presented as obliterative appendicitis due to fibrosis. Granulomatous appendicitis due to tuberculosis is known to be a disease of developing country.

The gastrointestinal system is ranked sixth among all extra pulmonary involvements [9]. The appendix may be affected secondary to ileocecal tuberculosis but appendiceal tuberculosis may occur in an even rarer primary form without any evidence of the disease elsewhere [9]. The reported incidence of appendiceal Tuberculosis varies from 0.1 to 3% among all appendectomy performed [9]. An accurate diagnosis is usually established after histopathological examination of specimen. Histopathologically, submucosal caseating granuloma and langhans giant cells suggesting Tuberculosis of the appendix. *Enterobius vermicularis* was identified in ranges from 0.18 to 4.1% of patients with clinical appendicitis and was most commonly seen in appendix with chronic inflammation or where the appendix was normal on histology [10,11-13] *Enterobius vermicularis* was rarely associated with histopathological changes of acute appendicitis [11].

Mucocele is an obstructive dilatation of appendix resulting from intraluminal accumulation of mucoid material. The incidence of mucocele in appendicectomy specimens has been described as retention cyst, mucosal hyperplasia, mucinous cystadenoma and cystadenocarcinoma. We had not found such cases in our study. An appendiceal carcinoid tumor is considered the most common type of appendiceal primary malignant lesion and account for almost 60% of all appendiceal tumors [14]. An appendiceal carcinoid tumor is found in 0.3-2.27% of the patients undergoing an appendectomy [17]. It is rare for carcinoids to be diagnosed preoperatively, they are usually found incidentally during appendectomy [9,14]. In 70-85% of cases, the carcinoid tumors are less than 1cm and are located at the tip of an appendix [9]. The majority of appendiceal carcinoids are benign and metastasis rare. Histologically comprises of nest of uniform monotonous cells with salt and pepper chromatin. Neoplasms of the appendix are very uncommon and usually diagnosed at operation of autopsy. Benign tumors of the appendix consist of leiomyomas, neuromas and lipomas. Malignant tumors of the appendix include carcinoids, mucoceles and adenocarcinomas.

Primary adenocarcinoma of the appendix is an extra ordinarily rare tumor, with fewer than 300 of these

lesions described in the world literature. This tumor is most common in person aged between 50-55 years. Adenocarcinomas behave aggressively and in a fashion similar to that of colonic adenocarcinomas, so they must also be treated with right hemicolectomy procedure. In our study one (4.76%) case of female patient with 38 years was found.

According to Nikumbh et al [18] 2015 study, histopathological spectrum of appendiceal lesions are, acute nonspecific appendicitis incidence is 38.2%. In our study incidence is 45.28% which is slightly higher than Nikumbh et al [18] 2015 study. Acute perforative/obliterative appendicitis incidence is 9.9%. In our study incidence is 4.40% which is lower than Nikumbh et al [18] 2015 study. Acute suppurative/necrotizing appendicitis incidence is 7.9%. In our study incidence is 6.29% which is slightly lower than Nikumbh et al 2015 [18] study. Recurrent/follicular appendicitis incidence is 9.5%. In our study incidence is 5.03% which is lower than Nikumbh et al 2015 [18] study. Chronic nonspecific appendicitis incidence is 28.5%. In our study incidence is 23.90% which is slightly lower than Nikumbh et al 2015 [18] study. Gangrenous appendicitis incidence is 0.4%. In our study incidence is 1.89% which is slightly lower than Nikumbh et al 2015 [18] study. Unusual appendicitis incidence is 5.6%. In our study incidence is 13.21% which is slightly higher than Nikumbh et al [18] 2015 study.

In our study unusual appendicitis incidence is 13.21%, which is higher than Duzgun AP et al [15] 2004 study, Abdul rehman Salem Al Mulhim et al [7] 2011 study, Akbulut S et al [9] 2011 study, Emre A et al [17] 2013 study, Menon I et al [16] 2014 study and Nikumbh et al 2015 [18] study (Table 3).

According to Nikumbh et al [18] 2015 study, histopathological spectrum of unusual appendicitis are, chronic obliterative appendicitis incidence is 77.3%. In our study incidence is 61.90% which is slightly lower than Nikumbh et al [18] 2015 study. Acute eosinophilic appendicitis incidence is 6.8%. In our study incidence is 14.29% which is slightly higher than Nikumbh et al [18] 2015 study. Carcinoid appendix incidence 2.3%. In our study incidence is 9.52% which is slightly higher than Nikumbh et al [18] 2015 study. Granulomatous appendicitis incidence is 4.5%. In our study incidence is 4.76% which is similar to Nikumbh et al [18] 2015 study. No case of *Enterobius vermicularis* are noted in Nikumbh et al [18] 2015 study. In our study incidence of *Enterobius vermicularis* is 4.76%. Two cases of Signet ring adenocarcinomas in appendix noted in Nikumbh et al [18] 2015 study. In our study, incidence of primary adenocarcinoma in appendix is 4.76% which is similar to Nikumbh et al [18] 2015 study.

Conclusion

Macroscopic examination of appendix at the time of surgery cannot detect the unusual findings particularly carcinoid appendix, primary adenocarcinoma of appendix and metastatic carcinomatous deposit. Histopathological examination of appendix is essential to avoid the missing of unusual findings during gross examination and gives clinician a clear idea regarding treatment strategy.

Acknowledgement

The authors are thankful to the Miss. D. PADMAJA B.Tech and all the faculty of department of pathology, Narayana Medical College and Hospital, Nellore.

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