



HISTOMORPHOLOGICAL SPECTRUM OF APPENDICULAR LESIONS

Histopathology

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ABSTRACT

Introduction: The appendix, which is a vestigial organ in humans, is attached to caecum. The disease appendicitis is one of the commonest causes of acute abdomen. It is also the commonest reason of the emergency surgery that can lead to significant morbidity and mortality. Usually when appendectomy is done early, it relieves all the symptoms. The misdiagnosis related to the disease often leads to removal of uninflamed appendix.⁽¹⁾ The précised aetiology of appendicitis is uncertain, although the most common hypothesis is the obstruction of appendiceal lumen with secondary infection. The luminal and intraluminal pressure and due to the constant pressure, the thrombosis of appendicular vasculature and venous obstruction occurs resulting in ischemia. The bacteria enter the damaged mucosa and the pus forms inside the appendix eventually causing the infarction and perforation.⁽²⁾ **Aim:** We aimed at determining the spectrum, histopathology and prevalence of lesions in appendix in our tertiary care hospital. **Material And Methods:** This is a retrospective study conducted in the department of pathology in tertiary care hospital, Mumbai over a period of 18 months. 300 specimens of appendicular lesions received during the study period. The specimens were fixed in 10% formalin and stained with Haematoxylin and Eosin stain. The lesions were classified based on their histomorphological findings. **Results:** This study included total of 300 specimens of resected appendix. In the present study, the total sample number received during study period was 7840, Out of which total number of appendicectomy specimens were 300 (3.82%), present study, the age group from the paediatric to geriatric age group were considered. Majority of patients 99(33%) belong to 21-30 years age group. During the study period, a total number of 300 patients had appendectomy out of which, the number of males was higher than females, with 60% of the cases being male, 40 % being female. In the present study, the non-neoplastic lesions were found in majority. Out of 300 cases, the non- neoplastic lesions accounted for 295 cases (98.4%) and neoplastic lesions contributes 5 cases (1.66%). **Conclusions:** According to the current study, men are slightly more likely than women to develop appendicitis with predominancy in second and third decades of life. In all cases of acute appendicitis, a histopathological examination of the appendix should be done since it provides crucial clinical information in addition to the operational results. The importance of histological investigation of every resected appendix is demonstrated by uncommon discoveries such as low grade appendiceal mucinous neoplasia and adenocarcinoma in clinically suspected acute appendicitis, the presence of which alters the subsequent therapy. Thus, we draw the conclusion that the histological analysis is still the best method for identifying appendiceal lesions.

KEYWORDS

Appendix, Histomorphology, Non-neoplastic, Neoplastic

INTRODUCTION

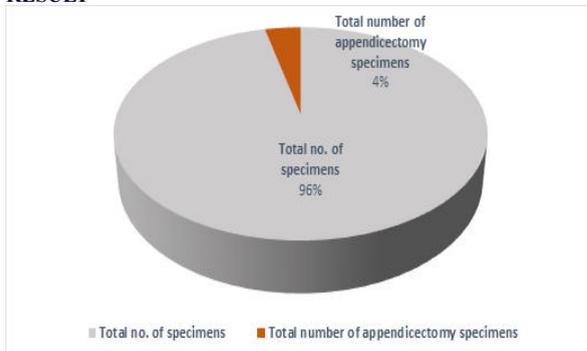
AIM

The aim of this study is to determine the spectrum, histopathology and prevalence of lesions in appendix in our tertiary care hospital.

MATERIAL AND METHODS

It is a retrospective study performed in the department of pathology in a tertiary care hospital over a period of eighteen months. During this period, a total of 300 appendicectomy specimens were received by the Department of Pathology. The standard Formalin Fixed Paraffin Embedding tissue processing protocols were followed and "3- 4" µm thick sections were cut and stained with Haematoxylin and Eosin stains for histopathological analysis. The gross appearance of specimens and the histopathological reports were recorded as per proforma. The clinical data is obtained from the hospital records and tissue specimens received in the department.

RESULT



(Table/Figure 1)

In the period of eighteen months, Total 7840 specimens were received in the department out of which total 300 specimens of appendicectomy were observed. In the present study, the total specimens received were of both male and female gender. Out of the 300 specimens studied, 98.4% (295 cases) belonged to non-neoplastic lesions whereas 05 cases (1.66%) were of neoplastic lesions. [fig 1]. The age of the patients ranged from less than one year to 70 years. Overall, majority of the cases that are 99 cases, belonged to the age-group of 21-30 years followed by age group of 11-20 years with 79 cases. The deviation of the lesions was more towards the male gender that is of 180 cases (60%).

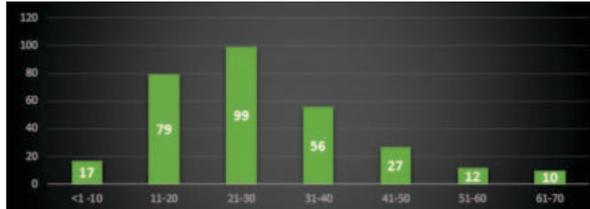
In the present study, Total 300 specimens of appendicectomy specimens were analysed and the histopathological features were reported as non-neoplastic and neoplastic lesions.

According to several population-based studies conducted across the country, the peak age group for appendectomy is 10-30 years. Age incidence of appendicular lesions was higher in second and third decade. The majority of patients in our study 99 cases (33%) are in the 21-30 year old age group, followed by the 11-20-year-old age group 79 cases (26.3%), 18.6% cases were seen in 31-40-year-old age group. 27 cases (9%) are found in age group of 41-50 years and 17 cases (5.6%) in less than 10 years of age group. The mean age of the patients was 27.9 year. The youngest patient was five years old and the oldest was 68 years old.

Age (Years)	Frequency	Total (%)
<1 -10	17	5.68
11-20	79	26.36
21-30	99	33.0
31-40	56	18.66
41-50	27	9.0
51-60	12	4.0

61-70	10	3.3
Total	300	100

Table/Figure 2. Age Wise Distribution Of Non Neoplastic And Neoplastic Appendicular Lesions



(Table/Figure 3). Graphical Representation Showing Age Distribution Of Subjects

The age and sex distribution of the cases enrolled in this study are depicted in the above table and the graph showing that the maximum number of cases came from the years (adult) age group, followed by paediatric cases and minors with least cases from the geriatric age group.

During the study period, a total number of 300 patients had appendectomy out of which, the number of males was higher than females, with 60% of the cases being male, 40 % being female.

Acute appendicitis most common in young adults and adolescents but may occur in any age group. The lifetime risk for appendicitis is 7%. Males are slightly more affected than females⁽³⁾

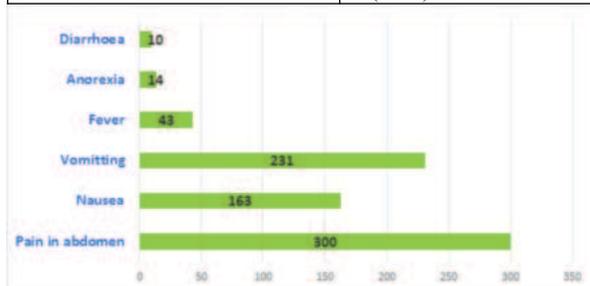


The Sex Wise Distribution Of Cases Is Graphically Depicted Below (Table/figure 4)

As per our data, (100%) 300 cases had pain in abdomen, being the most common presenting complaint, followed by vomiting (77%), nausea (54.3%), fever (14.3%), anorexia (4.6%) and diarrhoea (3.3%). Presenting complaints as described by the patients, have been tabulated as follows.

(Table/Figure 5)

Symptoms	Frequency
Pain in abdomen	300 (100%)
Nausea	163 (54.3%)
Vomiting	231 (77%)
Fever	43 (14.3%)
Anorexia	14 (4.6%)
Diarrhoea	10 (3.3%)



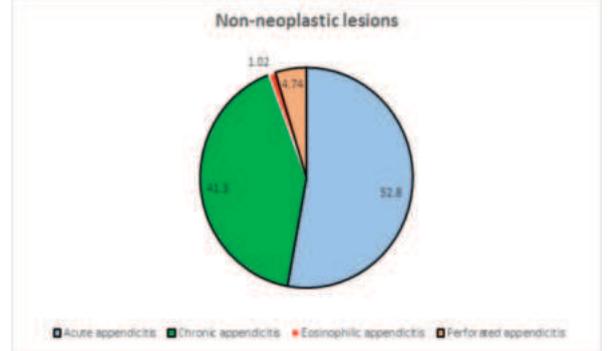
(Table/Figure 6). Graphical Representation Showing Presenting Complaints Of The Subjects

In the present study, The non-neoplastic lesions were found in majority. Out of 300 cases, The non-neoplastic lesions accounted for 295 cases (98.4%) and neoplastic lesions contributes 5 cases (1.66%). The findings at histology are depicted in below table. Majority of the cases were classified under acute appendicitis 156(52.8%). Chronic appendicitis accounted for 122(41.35%) cases. Remaining cases of eosinophilic appendicitis and perforated appendicitis contributed for

3(1%) and 14(4.1%) of cases.

(Table/Figure 7)

Inflammatory lesions/ Non neoplastic lesions (n=295)	Frequency	Percentage
Acute Appendicitis	156	52.80
Chronic Appendicitis	122	41.35
Eosinophilic Appendicitis	3	1.02
Perforated Appendicitis	14	4.74
TOTAL	295	100

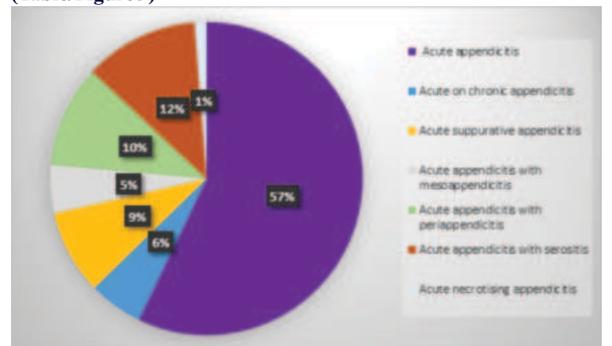


(Table/Figure 8)

Out of 295 Cases under acute appendicitis, majority of the cases that is, 92(58.9%) cases belonged to early acute appendicitis, followed by acute appendicitis with serositis(12.1%), acute appendicitis with peri appendicitis (10.9%) and acute on chronic appendicitis(8.9%). Acute appendicitis with meso-appendicitis comprises of 8 cases whereas 4 cases and 2 cases belonged to acute suppurative appendicitis and acute necrotising appendicitis. The term Acute eosinophilic appendicitis (AEA) is a rare variant and less understood entity of appendicitis which does not show neutrophils in the muscle layer, instead a marked eosinophilic infiltration is observed.⁽⁴⁾ In our study, we reported 3 cases (1.02%) of eosinophilic appendicitis.

Inflammatory lesions/ Non neoplastic lesions (n=295)	Frequency	Percent
Early Acute Appendicitis	92	58.97%
Acute on chronic appendicitis	14	8.97%
Acute Suppurative Appendicitis	04	2.56%
Acute appendicitis with meso-appendicitis	08	5.16%
Acute Appendicitis with serositis	19	12.17%
Acute Appendicitis with Peri appendicitis	17	10.89%
Acute Necrotising appendicitis	02	1.28%
TOTAL	156	100

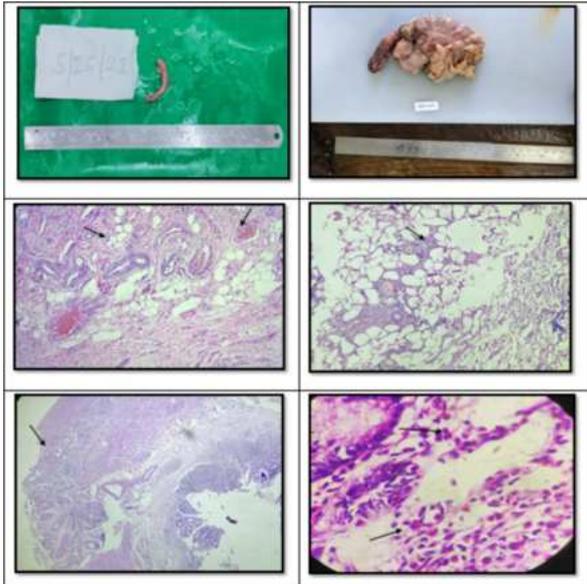
(Table/Figure 9)



(Table/Figure 10)

1. Gross picture of appendix measuring 7 cm in length, greyish white in color, soft to firm in consistency.
2. Gross picture of perforated appendix with blackish discoloration at the tip of the appendix.
3. 40X, H and E stain- Photomicrograph showing serosa containing many congested and dilated blood vessels along with mixed inflammatory cell infiltrates.
4. 10X, H and E stain- Photomicrograph showing serosa showing inflammatory cells along with dilated and congested vessels.
5. 10X, H and E stain- Photomicrograph showing ulcerated mucosa along with transmural acute inflammatory cell infiltrate.

6. 40X, H and E stain- Photomicrograph showing mucosa infiltrated with eosinophils.

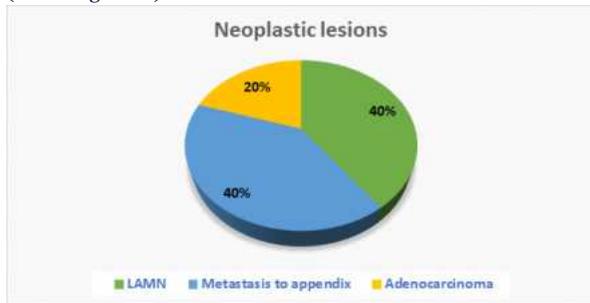


In the present study, the non-neoplastic lesions were found in majority. Out of 300 cases, the non- neoplastic lesions accounted for 295 cases (98.4%) and neoplastic lesions contributes 5 cases (1.66%). Out, of 5 neoplastic lesions, 2 cases (40%) are diagnosed as Low- grade appendiceal neoplasm, 2 cases (40%) are accounted for metastasis to appendix in a case of colon carcinoma and 1 case (20%) was diagnosed as adenocarcinoma of appendix.

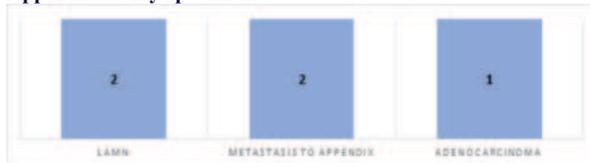
Frequency Distribution Of Study According To Neoplastic Lesions

Neoplastic lesions (n=5)	Frequency	Percentage (%)
Low Grade mucinous neoplasm of appendix (LAMN)	02	40
Involvement of Appendix by GIT tumour of a different site	02	40
Adenocarcinoma	01	20
TOTAL	05	100

(Table/Figure 11)



(Table/Figure 12) Pie Chart Showing Neoplastic Lesions Of Appendectomy Specimens



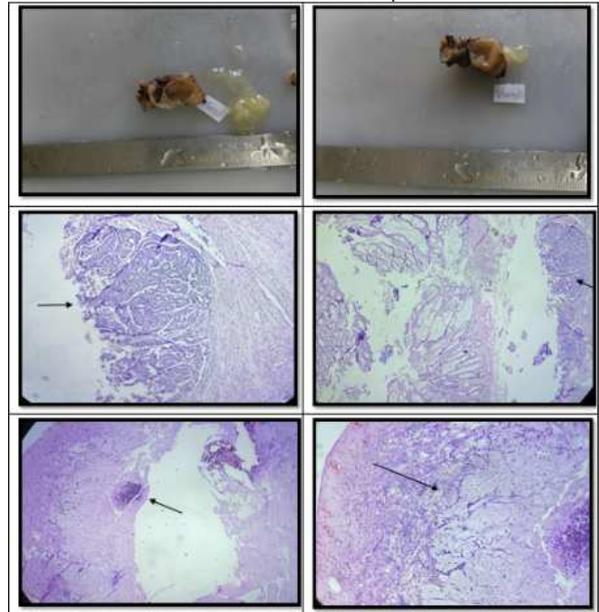
(Table/Figure 13) Graphical Representation Showing Neoplastic Lesions Of Appendix

1. Gross picture of cut open specimen of appendix containing cyst showing mucinous filed material.
2. Gross picture of cut open specimen of appendix containing cyst showing mucinous filed material.
3. 40X, H and E stain- Photomicrograph showing large tumour cells infiltrating the appendix.
4. 40X, H and E stain- Photomicrograph showing appendiceal mucosa

(on the left side) infiltrated by metastatic tumour cells (on the right side)

5. 40X, H and E stain- Photomicrograph showing and tall columnar epithelium with abundant apical mucin

6. 40X, H and E stain- Photomicrograph showing thickened muscularis mucosa with dissection of mucin up to serosal surface.



DISCUSSION

One of the most frequent general surgical illnesses to present in an emergency is appendicitis, and its diagnosis is typically dependent on how the patient presents clinically⁽⁵⁾. One of the most frequent surgical operations carried out globally is the appendectomy. Between the ages of 10 and 30, the incidence of appendicitis is generally correlated with the development of lymphoid tissue⁽⁶⁾. With a lifetime risk of about 7%, appendicitis typically affects young adults and adolescents, however the incidence rate varies globally⁽⁷⁾. This study was undertaken to evaluate the various histopathological lesions in appendectomy specimens. The majority of patients in our study 99 cases (33%) are in the 21-30 year old age group, followed by the 11-20-year-old age group 79 cases (26.3%), 18.6% cases were seen in 31-40-year-old age group. 27 cases (9%) are found in age group of 41-50 years and 17 cases (5.6%) in less than 10 years of age group. The youngest patient was five years old and the oldest was 68 years old. The study done by Suhailur Rehman et al,⁽⁸⁾ in which the majority of the patients were (45.5%) in the age group of 21- 30 years shows the similar results as our present study. Study done by Muller G et al⁽⁹⁾ is also in concordance with our study. In our study, male preponderance was established. There were 180 (60%) cases of males and 120(40%) cases of females. This correlates with the studies done by S.T. Edino et al⁽¹⁰⁾ and R.Sujatha et al⁽¹¹⁾ in which male preponderance was also noted in appendicular lesions. Our findings are in accordance with the above studies. In the present study, all of the patients presented with pain in abdomen 300(100%) followed by vomiting and nausea in 77% and 54.3% of cases followed by fever (14.3%) and diarrhoea (3.3%) of cases. Studies done by S.T. Edino et al⁽¹⁰⁾ and OC Osime et al⁽¹²⁾ also reported abdominal pain as the most common symptoms in all cases (100%) in their respective studies followed by vomiting and nausea followed by fever and diarrhoea. In the present study of 300 appendectomy specimens, 295 (98.4%) were found to be involved by non-neoplastic lesions and only 5(1.6%) were involved by neoplastic lesions thus showing predominancy of non-neoplastic lesions. Previous studies done by Vishwa et al⁽¹³⁾ and Shaveta Sharma et al⁽¹⁴⁾ also reported that 99.3% and 98.6% cases in their studies were involved by non-neoplastic lesions which is in majority of the cases in their study. Our study is comparable with Vishwa et al⁽¹³⁾ and Shaveta S et al⁽¹⁴⁾. In our study, we found 2 cases (1.74%) of eosinophilic appendicitis showing an intense eosinophilic infiltration which is close with the study done by Park et al.⁽¹⁵⁾. In the present study, we reported 5 (1.6%) neoplastic cases out of total 300 cases where we recorded 2 cases (0.67%) of LAMN (Low mucinous appendiceal neoplasm), 2 cases (0.67%) of Involvement of Appendix by GIT tumour of a different site and 1 case (0.3%) of adenocarcinoma. LAMN is neoplastic lesion of appendix with low grade epithelial features in the

absence of appendix in low grade epithelial growth. It is rare malignancy accounting for infiltrative growth. In our study, LAMN accounted for 2 cases (0.67%) encountered in the present study. Our study closely correlates with the study done by Ch. Geeta et al⁽¹⁵⁷⁾ which also reported 1 case of LAMN out of 10 mucinous lesions in their study.

CONCLUSION

According to the current study, men are slightly more likely than women to develop appendicitis with predominance in second and third decades of life. In all cases of acute appendicitis, a histopathological examination of the appendix should be done since it provides crucial clinical information in addition to the operational results. The importance of histological investigation of every resected appendix is demonstrated by uncommon discoveries such as low grade appendiceal mucinous neoplasia and adenocarcinoma in clinically suspected acute appendicitis, the presence of which alters the subsequent therapy. Thus, we draw the conclusion that the histological analysis is still the best method for identifying appendiceal lesions.

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