



HISTOPATHOLOGICAL STUDY OF APPENDICECTOMY SPECIMEN: A 7 YEARS STUDY

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ABSTRACT Vermiform appendix is a vestigial organ. Its pathological importance is due to its propensity for inflammation. Inflammation of appendix may cause morbidity and mortality. Acute appendicitis is the most common cause of 'acute abdomen', a surgical emergency. A 7 years study was performed to determine various lesions of appendix (non-neoplastic and neoplastic) and to study their detailed morphological features. A retrospective study for a period of 7 years was conducted in the department of Pathology, Regional Institute of Medical Sciences (RIMS), a tertiary hospital. Histopathological reports of appendicectomy specimen that were received in the department were collected and reviewed. A total of 1671 cases of appendicectomy specimens were studied. 1160 were found to be non-neoplastic lesions and 11 cases were found to be neoplastic. Among the non- neoplastic lesions, the most common histopathological diagnosis made was recurrent appendicitis (41 %) followed by acute appendicitis (35%). Other non – neoplastic lesions found were appendix with submucosal fibrosis and lymphoid hyperplasia, xanthogranulomatous appendicitis, tubercular appendicitis and 2 cases of Enterobius vermicularis. Neoplastic lesions found were low- grade appendiceal mucinous neoplasm (LAMN) and appendiceal neuroendocrine neoplasms, 1 case of mucinous adenocarcinoma and 1 case of Burkitt Lymphoma. The present study provides an understanding into the histological patterns of various possible lesions that can occur in appendix. Diagnosis of acute appendicitis and other lesions can be established by a good clinical acumen but there is controversy over its accuracy. This is when histopathological examination gratifies the confirmation of diagnosis. Histological examination thus is the gold standard of diagnosis of appendiceal lesion in appendicectomy specimen.

KEYWORDS : appendix, histopathology, appendicitis

INTRODUCTION

Vermiform appendix is a vestigial organ present in human being, apes and wombat (a nocturnal Australian marsupial). It was noted for the first time during the Egyptian civilization as early as 3000 BC. It is named as such due to its worm – like appearance.^[1]

Appendix is a tubular extension of the cecum originating from its posteromedial aspect, 2.5 cm below the ileocecal junction. The length of normal appendix varies remarkably ranging from 2 to 20 cm, with an average length of 7 to 10 cm in adults. Normal luminal diameter is 1 to 3 cm. Appendix is supplied by appendicular artery, an end- artery branch of ileocecal artery.^[1]

Histologically, the appendix has 4 layers – mucosa, submucosa, muscularis propria and serosa.

The study was conducted to determine the histological features of various appendiceal lesions and to establish a clinicopathological correlation in appendicectomy specimens.

MATERIALS AND METHODS

The present study was conducted in the department of Pathology, RIMS Imphal over a period of 7 years from January 2018 to July 2024. All appendicectomy specimen received were included in the present study. Specimens were fixed in 10% neutral buffered formalin. Gross examination of each appendix a specimen was carried out to see for the presence of obstruction, dilation and perforation. For each specimen, 2 sections were taken – one transverse and one longitudinal. Following the grossing, tissue processing was done in Leica automatic tissue processor followed by staining with hematoxylin and eosin (H and E) staining procedure. Special staining procedures such as PAS (Periodic acid Schiff) was carried out whenever required. The slides were examined under light microscope and diagnosis were made while correlating with the clinical parameters.

RESULTS

A total of 1671 cases were studied. Maximum number of appendicectomies were performed in a wide range of age group ranging from (4 days to 97 years) as depicted in figure 1. The frequency of distribution of lesions of appendix is depicted in table 1.

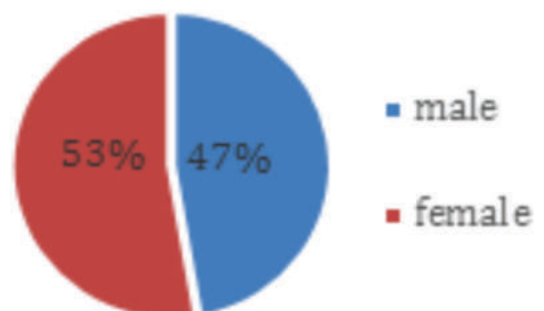
SEX-WISE DISTRIBUTION

Figure 1: Sex-wise distribution of appendiceal lesions

Table 1: Distribution Of Appendiceal Lesions

Sl. No.	Diagnosis	No. of cases	Percentage of cases (%)
I	NON- NEOPLASTIC LESIONS		
	1. Recurrent appendicitis	700	41
	2. Acute appendicitis	586	35
	3. Acute appendicitis with peri-appendicitis	292	17
	4. Acute Necrotising	49	2.9
	5. Submucosal fibrosis with lymphoid hyperplasia	26	1.6

6. Enterobius vermicularis	02	0.12
7. Normal appendix	02	0.12
8. Tubercular Appendicitis	01	0.05
9. Appendicular lump	01	0.05
10. Xanthogranulomatous appendicitis	01	
II NEOPLASTIC LESIONS		
1. LAMN	06	0.35
2. NEN	03	0.18
3. Mucinous adenocarcinoma	01	0.05
4. Burkitt Lymphoma	01	0.05

Recurrent Appendicitis

700 (41%) cases of recurrent appendicitis were seen. Grossly, these lesions showed congestion of the mucosal surface. Microscopy showed hyperplastic lymphoid follicles with chronic inflammatory cells infiltrate composed predominantly of lymphocytes and plasma cells in the appendiceal wall.

Acute Appendicitis

Acute appendicitis was encountered in 586 (35%) cases. Most of these cases of acute appendicitis were seen in the age group years with slightly male predominance. On gross examination, most of the specimen were swollen and congested.

On microscopic examination, mucosal linings were ulcerated with dense inflammatory cells infiltration of the appendiceal wall by polymorphs. Some of the cases showed extensive acute inflammatory cell infiltration reaching even upto the serosa which were classified as acute appendicitis with peri-appendicitis. Acute appendicitis with peri-appendicitis accounted to 292 (17%).

Xanthogranulomatous Appendicitis

Only one case of xanthogranulomatous appendicitis was diagnosed. Appendix was firm and yellowish - brown. Microscopy showed diffuse infiltration of the appendiceal wall by polymorphs along with many foamy histiocytes.

Enterobius Vermicularis

2 cases of Enterobius vermicularis were seen. Microscopy showed appendiceal wall invaded by oxyuriasis morphologically resembling Enterobius Vermicularis

Tubercular Appendicitis

Interestingly 1 case of Tubercular appendicitis was also diagnosed. Gross examination showed congestion of the appendiceal mucosal surface.

Microscopy showed well – formed granuloma with focal caseating necrosis of the wall with non- specific mixed inflammatory cells throughout the wall. Ziehl Neelsen stain for AFB showed positivity for bacilli. (Figure 1)

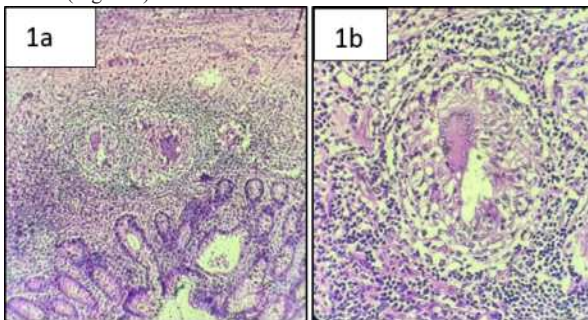


Fig 1: a: Photomicrograph of granulomatous appendicitis with well-formed granuloma in the appendiceal wall. (H and E, 10X) b: high power view of appendiceal tuberculosis showing well – formed epithelioid granuloma and Langhans type of giant cells. (H and E, 40X)

Low Grade Appendiceal Mucinous Neoplasm (LAMN)

06 cases of LAMN were diagnosed. Appendix in LAMN showed congested mucosal surface with its lumen filed with mucoid material. Microscopic examination showed appendiceal wall lined by dysplastic mucinous epithelium with individual lining cells having elongated hyperchromatic nuclei, inconspicuous nucleoli and apical mucin. Acellular mucin was also observed which was seen dissecting the

muscularis propria reaching upto serosa. (Figure 2)

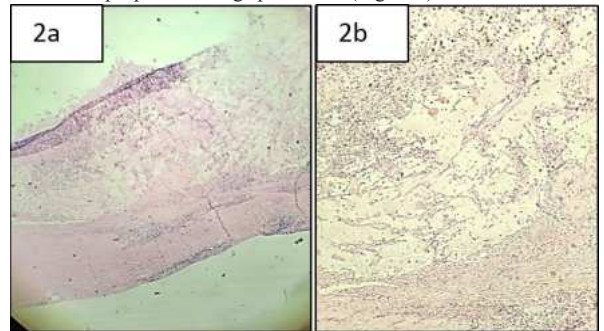


Fig 2: a: Photomicrograph of Low Grade Appendiceal Mucinous Neoplasm (H and E, 10X) b : high power showing pools of acellular mucin dissecting the appendiceal mucin (H and E, 40X)

Neuroendocrine Neoplasm

3 cases of NEN were diagnosed. Gross examination showed congestion with solid yellowish mass in the tip of the appendix. Microscopic examination showed tumor arranged in insular and trabecular pattern composed of monomorphic cells having round to ovoid nuclei and salt and pepper chromatin and moderate amount of eosinophilic cytoplasm. (Figure 3)

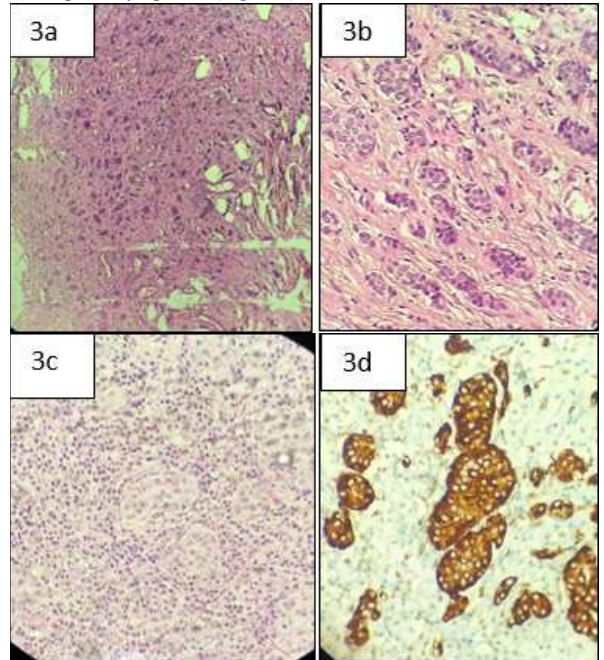


Fig 3: a: Photomicrograph of appendiceal neuroendocrine neoplasm (H and E, 10X) b: high power view showing nests and trabeculae of tumor cells. (H and E, 40X) c: high power view showing nests of tumor cells with salt and pepper nuclear chromatin (H and E, 40X) d: Immunohistochemical stain showed positivity for neuroendocrine cell marker, Chromogranin in the tumor cells

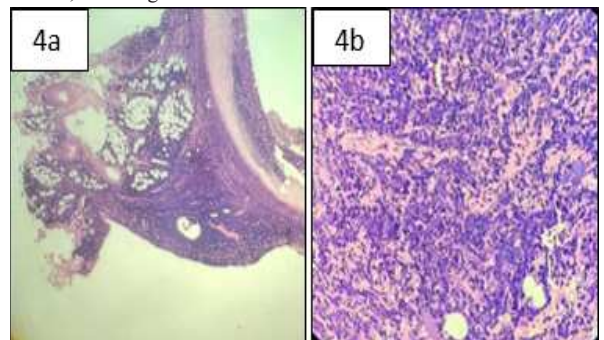


Fig 4: a: Photomicrograph of Burkitt's Lymphoma (H and E, 10X) b: high power view of appendiceal Burkitt's lymphoma showing monotonous population of tumor cells infiltrating the appendiceal wall. (H and E, 40X)

Burkitt Lymphoma

1 case of Burkitt Lymphoma was diagnosed.

Gross examination of the case of Burkitt Lymphoma showed appendix with smooth congested surface and lumen obliterated with brownish material.

Microscopy showed a focus of tumor composed of monomorphous population of lymphoid cells infiltrating the mucosa, submucosa, muscularis propria and serosa. The individual tumor cells were medium sized with round to ovoid nuclei, coarse nuclear chromatin, scant cytoplasm and squaring-off of the cytoplasmic border. Numerous apoptotic cells and mitotic figures were also seen. (Figure 4)

DISCUSSION

The current study is a 7 years study conducted on appendectomy specimens received in the department of Pathology, RIMS. Histopathological examination allows the diagnosis of appendiceal lesions and also help in disclosing additional pathological features that may not be evident intra-operatively which may impact in patient management. Maximum number of patients who underwent appendectomy were in the age group of years. Males (47%) showed a greater percentage of appendectomy as compared to females (53%) (Figure 1).

NON- NEOPLASTIC LESIONS

(99.3 %) of the appendectomy specimen were found to be involved by non- neoplastic lesions. Neoplastic lesions were seen in 11 cases (0.7 %). These findings were in agreement with study conducted by Blair et al.^[2] Recurrent appendicitis was the most common appendiceal lesion for which appendectomy was performed constituting 41% of cases. This finding was in concordance with those of Momin YA et al^[3] and Kulkarni MP et al^[4].

The diagnosis of recurrent appendicitis was made in those appendiceal lesions with chronic inflammatory cells composed predominantly of lymphocytes and plasma cells in the muscularis propria and serosa and evidence of subserosal fibrosis.

Acute appendicitis constituted the second most common lesion (35%). This was in concordance with studies conducted by Makaju R et al^[5], Mehmood N et al^[6], Nikumbh DB et al^[7] and Patel MM et al^[8].

Xanthogranulomatous inflammation (XGI) is a rare non- neoplastic lesion of the appendix. On gross examination, XGI typically presents as bright-yellow or golden-yellow mass-like lesions associated with abscess. On microscopic examination, XGI has a characteristic high number of foamy histiocytes in appendiceal wall admixed with lymphocytes and plasma cells. Only one case of XGI was encountered in our study.

NEOPLASTIC LESIONS

Neoplastic lesions constituted 0.7% of all cases. Among neoplastic lesions, low grade appendiceal mucinous neoplasm (LAMN) accounted to about 0.35 %. Mucin seeding leading to pseudomyxoma peritonei is the most feared complication.

Diagnosis of Neuroendocrine Carcinoma was made in 03 cases. 1 case of mucinous carcinoma of appendix was also encountered.

CONCLUSION

It is an interesting fact that appendix though being a small vestigial organ can be a mighty mouse. Lesions affecting appendix if not diagnosed and treated early may lead to fatal complications. A good clinical acumen may to some extent help in diagnosis of appendiceal lesions but histopathological examination remains the gold standard method for the confirmation of clinical diagnosis. Our current study has covered an entire gamut of pathological lesions that may involve appendix. An attempt to establish a clinicopathological correlation in appendectomy has thus been accomplished.

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