

Histopathological Spectrum of Appendicectomy Specimen**Vishwa Manishkumar Patel^{1*}, Meena Rajiv Daveshwar², Hiral Samir Shah³**¹*Third year resident Doctor, Department of Pathology, S.S.G hospital and Medical college, Baroda, India*²*Associate Professor S.S.G Hospital and Medical college, Baroda, India*³*Tutor, S.S.G Hospital and Medical college, Baroda, India***Received: 20-08-2020 / Revised: 23-09-2020 / Accepted: 14-10-2020****Abstract**

Background : Appendicitis is by far the most common abdominal emergency. Histopathological examination of the appendix after appendicectomy is recommended to identify unexpected findings. **Objective :** The purpose of the present study is to evaluate the various histopathological diagnosis in appendicectomy specimen. **Material and method:** Present study consist of 300 appendicectomy specimen (either open or laparoscopic) which were studied for histopathological examination for the period of one year. The clinical and imaging details were reviewed from histopathology requisition form. **Results :** In present study, total 300 appendicectomy cases were studied among which 298 (99.34%) cases were non neoplastic and 2 cases were neoplastic (0.66%). Maximum number of the patients were 11 to 20 year age group. Male were affected more being 194 (65%) and female constitute 106 (35.3%) with M:F ratio of 1.8:1. There were maximum number of cases of acute appendicitis of 132 cases (44%) followed by second commonest was acute on chronic appendicitis (21.66%). **Conclusion :** Routine histopathological examination yields important clinical information to diagnose inflammatory and neoplastic (benign and malignant) conditions. The study concludes that all appendicectomy specimen should be sent for routine histopathological examination which is gold standard for diagnosis of various unexpected pathological lesions.

Keywords : Appendicitis, non-neoplastic, neoplastic, Appendicectomy, Histopathological diagnosis

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Introduction

Appendicitis accounts for the most common abdominal emergency and appendicectomy is routinely performed surgeries all over the world [1]. Appendicitis occurs most commonly in children and young adults with life timerisk of approximately 7% [2]. Incidence of appendicitis is increasing in India and other developing countries, mainly in urban cities due to increased acceptance towards western diet [3]. Despite of advances in technology and imaging modalities, there is dilemma in the clinical diagnosis of acute appendicitis with accuracy in only 60-80% of cases [4]. Therefore, histopathological examination stays the gold standard method of choice for pathological analysis of every single resected appendix.

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Appendicitis can be obstructive or non-obstructive type. Luminal obstruction is the main factor in acute appendicitis although fecoliths and lymphoid hyperplasia are the usual cause of obstructions, however some unusual factors could also be involved which includes parasitic infestations like enterobiasis, ascariasis, bacterial infections like tuberculosis or a tumour as carcinoid, primary/secondary adenocarcinoma, lymphoma, gastrointestinal stromal tumour [5,6].

The present study was undertaken with the following aims and objectives-

1. To study the patterns of lesions (non-neoplastic and neoplastic) in the appendicectomy specimens.
2. To study the detailed morphological features of the different non-neoplastic and neoplastic lesion i.e both benign and malignant.

Material and method

The present retrospective study was carried out at Department of Pathology, S.S.G. Hospital and Medical

College, Baroda. The study included surgically removed either open or laparoscopic appendectomy specimen for evaluation of pathological lesions of the appendix over a period of one year from May 2018-April 2019. The appendix resected along with other organs like hysterectomy and colectomy were excluded from the study. The clinical details of the patient were reviewed from histopathology requisition forms like age, gender, signs and symptoms, duration of complaints, previous or present significant clinical history, radiological findings and provisional clinical diagnosis. Detailed gross examination of the appendectomy specimens was carried out (figure

1). The specimen was fixed in 10% neutral buffered formalin for 24 hours. Specimen was divided into two by cutting a cross section 2 cm from tip then one longitudinal section from distal one third (tip area) and one cross section from proximal part submitted for microscopic examination. Tissue processing was done and paraffin embedded tissue blocks were prepared. By microtomy, sections of 4-5 micrometers thickness were cut and processed. All the tissues were stained with haematoxylin and eosin stain. Statistical analysis: Statistical analysis was done by Microsoft Excel worksheet. The data of cases were evaluated by mean, range and percentage parameters.

Results

Table 1: Distribution of number of cases of neoplastic and non-neoplastic lesions.

Specimen	Number of cases	Percentage
Non-neoplastic lesions	298	99.34%
Neoplastic lesions	02	0.66%

Table 2: Age and gender specific distribution in appendicitis patients

Age	Males	Females	Total cases
0-10	18	07	25
11-20	83	43	126
21-30	51	28	79
31-40	22	13	35
41-50	09	13	22
51-60	05	01	06
61-70	04	01	05
71-80	01	00	01
81-90	01	00	01
Total	194	106	300

Table 3: Distribution of various lesions of appendix based on incidence

Serial No.	Histopathological Changes	Total Number of cases	Total %
Normal histology			
1.	Normal	01	0.33%
Inflammatory appendix disorders			
2.	Acute appendicitis	132	44%
3.	Necrotizing appendicitis	01	0.33%
4.	Acute on chronic appendicitis	65	21.66%
5.	Chronic appendicitis	04	1.33%

Periappendicitis			
6.	Obliterative appendicitis with peri appendicular abscess	01	0.33%
7.	Acute appendicitis with peri appendicular inflammation	04	1.33%
8.	Acute appendicitis with peri appendicular abscess	28	9.33%
9.	Acute appendicitis with serositis	04	1.33%
Total cases of periappendicitis		37	12.3%
Miscellaneous			
10.	Lymphoid hyperplasia	58	19.33%
Neoplastic			
11.	Low grade appendiceal mucinous neoplasm (LAMN)	01	0.33%
12.	Mucinous adenocarcinoma	01	0.33%
Total number of cases		300	

In present study, total 300 appendicectomy cases were studied among which 298 (99.34%) cases were nonneoplastic and 2 cases were neoplastic (0.66%) (Table 1). Maximum number of the patients were 11 to 20 year age group. (Table 2) The youngest patient was of 5 months old infant and oldest patient was 81 year old. Male were affected more being 194 (65%) and female constitute 106 (35.3%) with M:F ratio of 1.8:1. There were maximum number of cases of acute appendicitis of 132 cases (44%) followed by second commonest was acute on chronic appendicitis (21.66%). Among two neoplastic lesions, each case of Low grade appendiceal mucinous neoplasm (LAMN) (Figure 2) and Mucinous adenocarcinoma (Figure 3) were identified.



Fig 1: On gross examination of Appendicectomy specimen mucosal congestion and changes of serositis seen on external surface

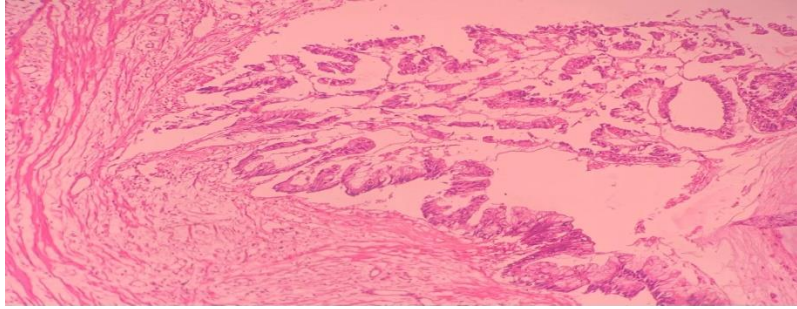


Fig 2: Dysplastic mucinous epithelium arranged in complex branching configuration diagnosed as Low Grade Appendiceal Mucinous Neoplasm (LAMN) 20XH&E

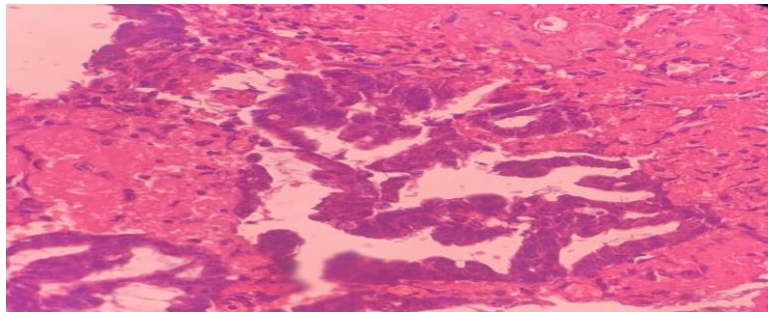


Fig 3: Mucinous adenocarcinoma 40X H&E: Invasion of wall of appendix by malignant glands diagnosed as mucinous adenocarcinoma.

Discussion

The histopathological examination of appendix serves two purposes. First it allows the diagnosis of pathological lesions of appendix; second, histopathological examination may disclose additional pathologies that may not be evident intraoperatively which may impact patient's management. Acute appendicitis is defined as an inflammation of the inner lining of the appendix which then spreads to other parts of the organ. Luminal obstruction is considered one of the most critical consequences, as it triggers the inflammatory process[7]. When lumen obstruction occurs, intraluminal pressure surpasses in the appendiceal veins, causing venous outflow obstruction. Finally, ischemia develops in the appendiceal wall, which weakens the epithelial integrity and increases the organ's risk of bacterial invasion. Although lymphoid hyperplasia and fecoliths are the most common causative factors of luminal obstruction, other less frequent factors have been associated with the

condition[8]. The diagnosis of acute appendicitis relies on an evaluation of the patient's history, laboratory and radiologic findings, as well as the surgeon's subjective judgment based on experience. However, the reported rates of histology-proven negative cases following appendectomy have ranged between 9.2% and 35.0%[9]. However present study showed one case of unremarkable appendix (0.33%) diagnosed after multiple sections of appendix. Recurrent infections of appendix can cause acute or chronic appendicitis. Patient usually have history of chronic abdominal pain and histologic findings of chronic appendicitis with suppurative change. Most commonly encountered underlying condition of acute appendicitis in the first two decades of life is lymphoid hyperplasia, while in elderly patients it is fecal obstruction[10]. Periappendicitis is defined as appendiceal serosal inflammation without mucosal involvement. Periappendicitis can be classified into two types, juvenile and secondary. In the juvenile form, the inflammation reaches the submucosa with an increasing

gradient of inflammation as it approaches serosa. It is believed to result from previous episodes of appendicitis with resolution of mucosal inflammation. Secondary periappendicitis complicates concurrent intra-abdominal infections or other inflammatory conditions. O'Neil et al concluded that the incidence of periappendicitis is 5.4% and it does not represent a process that requires special management[11]. Acute inflammation with periappendicitis was also very common nonneoplastic lesion of appendix which showed histopathologic finding of inflammation, abscess formation and changes of serositis in present study, which comprises of total 12.3% of cases. Low grade appendiceal mucinous neoplasm (LAMN) is neoplastic lesion of appendix with low grade epithelial features in the absence of infiltrative growth. It is a rare malignancy accounting for 1% of gastrointestinal neoplasms and is found in less than 0.3% of appendectomy specimens. LAMNs are associated with diverticula, herniations, dissections, and rupture[12]. The most feared complication is seeding of mucin into the adjacent peritoneum, leading to pseudomyxoma peritonei (PMP), associated with a high rate of mortality. Seeding into the peritoneum occurs in the late stages of the disease[13]. Primary tumors of appendix are unusual.

Primary appendiceal adenocarcinomas (PAAs) are very rare malignant neoplasm accounting for 0.05-0.2% of all appendectomies and only 6% of all malignant tumors of appendix [14]. Primary adenocarcinoma of appendix constitutes <0.5% of all gastrointestinal neoplasm. Most of mucinous type Primary mucinous Adenocarcinoma of appendix is well differentiated slowly growing pushing rather than infiltrating margin. Its importance lies in the treatment consideration and tendency to produce condition such as pseudomyxoma peritonei[15]. Most of malignant appendix tumors present with acute appendicitis or palpable abdominal mass and are diagnosed incidentally at histopathological examination of the surgically excised specimens or an incidental finding during exploration for another disease. Appendix malignancies may also be asymptomatic and be found incidentally. When symptoms are present, the disease process is often advanced in symptomatic cases. Therefore, even when appendectomy specimens show normal macroscopic features, histopathologic analyses may provide clinically useful insights into the patient's condition and help to improve patient outcome by revealing a previously unrecognized disease[16].

Conclusion

The present study showed that incidence of appendicitis is high in the second and third decades of life and slightly higher in males. Histopathological examination of the appendix yield important clinical information in addition to the operative findings and it should be undertaken in all cases of acute appendicitis. An unusual finding such as mucinous adenocarcinoma and low grade appendiceal mucinous neoplasm in clinically suspected acute appendicitis reflects the value of histological examination of every resected appendix, the presence of which would alter the further management. We conclude that histopathology remains the gold standard for the diagnosis of acute appendicitis.

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