

## Original Research Article

## Need of Histopathological Evaluation in Routine Appendectomy Specimens

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## Abstract

**Introduction:** The present Study was planned to determine the role of histopathological examination of all surgically resected appendix to rule out various incidental (neuroendocrine tumor, parasitic infection) and common findings like acute appendicitis, which were difficult to diagnose by any other modality of diagnosis. **Material and Methods:** Present study was done retrospectively in Pacific Institute of Medical Sciences, Udaipur from January 2018 to December 2018. 144 patients were diagnosed acute appendicitis or recurrent acute appendicitis, who underwent appendectomy, either laparoscopic or open, were included. These patients were reviewed with Gross, patients' age, sex, and histopathological reports. **Results:** A total of 144 specimens were analyzed 80 (55.56%) were males and 64 (44.44%) were females. M:F ratio 1.25:1. Histopathological examination showed healing appendicitis was the most common finding (44.46%) followed by acute appendicitis (35.42%), Recurrent appendicitis 6 (4.17%), Acute appendicitis with periappendicitis 5 (3.47%), Acute suppurative appendicitis 12 (8.33%), Enterobius vermicularis (Parasitic) 1 (0.69%), Tubercular pathology 1 (0.69%), Gangrenous appendicitis 2 (1.39%), Appendicular endometriosis 1 (0.69%). **Conclusion:** There is a higher incidence of appendicitis between 31 to 40 years. The necessity for histopathological evaluation is increase due to wide range of diagnosis and its mimics to various pelvic pathology clinically.

**Keywords:** Appendicitis; Histopathological examination; Incidental findings; Pelvic pathology.

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## Introduction

Acute Appendicitis is the most common intra abdominal condition which requires emergency surgery. Acute appendicitis is most common in

adolescent and young age group.<sup>1</sup> Despite the prevalence of acute appendicitis, the diagnosis is difficult to confirm preoperatively and may be confused with mesenteric lymphadenitis, acute salpingitis, ectopic pregnancy and meckel's diverticulitis.<sup>2</sup>



The peak incidence of appendicitis was found between second and third decades. Urgent appendectomy has markedly reduced the morbidity to avoid the complications like perforations but has increased the diagnostic error rate.<sup>1</sup>

Pain in right iliac fossa sometime create a diagnostic dilemma for clinicians and despite of all the clinical and radiological examination the unusual finding of the appendix has to confirmed by histopathological examinations<sup>1</sup>

The fact which highlights the importance of pathological analysis of each and every single resected appendix is tumors, worms, tuberculosis and appendiceal endometriosis.<sup>3</sup>

The aim of the study was to determine the various histological diagnosis of all surgically resected appendices along with age and sex incidence of appendicitis.

## Materials and Methods

The present study was done retrospectively in Pacific Institute of Medical Sciences, Udaipur from January 2018 to December 2018. The specimen were received in the Department of Pathology and gross finding were recorded. 144 cases of routine appendectomy specimens were selected for the study. The specimens were fixed in 10% formalin for 24 hrs and then four mm thick sections were cut from various representative areas and submitted for routine histopathological processing. Section was studied by light microscopy after Hematoxylin and Eosin staining. Periodic Acid Schiff (PAS) and Zeil Neelson Stains were done whenever required. Patients who underwent incidental appendectomy during other surgeries and negative appendectomies were excluded from the study.

## Statistical methods

The data entry and analysis was done by using excel sheet. (SPS Software -7)

## Results

During the period of study from January 2018 to December 2018, 144 patients from Hospital records were found who underwent appendectomy.

They were evaluated by physical examination and laboratory investigations. Among these patients, 80 (55.56%) were males and 64 (44.44%) were females with male to female ratio of 1.25:1.

Table 1 showed the histopathological diagnosis

of appendicitis among the study population. Out of 144 cases, 64 cases (44.46%) was diagnosed as healing appendix (Fig. 4) and 51 cases (35.42%) was diagnosed as acute appendicitis (Fig. 1 to 4), 5 cases of acute appendicitis also reported with periappendiceal inflammation. Two cases of gangrenous appendicitis were diagnosed with signs of perforation.

Twelve cases were defined as acute suppurative appendicitis and majority of them were seen between 30–40 years of age. Unusual pathological finding in appendix was found in four specimens.

Among the unusual finding of appendix, one case diagnosed with tubercular appendicitis (Fig. 7) seen in 35 years male patients presented with acute abdominal pain. In another case, 32 years female patient was reported Mc Burney's scar endometriosis with complaint of frequent pain (Fig. 5).

A case of carcinoid neuroendocrine tumour was also reported in eight year old female child who was clinically asymptomatic and grossly shows normal features (Fig. 9). In the present study, the peak incidence of appendicitis was found between 31 and 40 years. (Table 2)

**Table 1:** Distribution Pattern of histopathological diagnosis of appendicitis

Hp finding	No of cases
Acute appendicitis	51 (35.42%)
Acute appendicitis with periappendicitis	5 (3.47%)
Acute suppurative appendicitis	12 (8.33%)
Carcinoid appendix	1 (0.69%)
Healing appendicitis	64 (44.46%)
Recurrent appendicitis	6 (4.17%)
Enterobius vermicularis (Parasitic)	1 (0.69%)
Tubercular pathology	1 (0.69%)
Gangrenous appendicitis	2 (1.39%)
Appendicular endometriosis	1 (0.69%)

**Table 2:** Distribution of appendicitis according to age range

Age group (in years)	No of cases
0–10	5
11–20	11
21–30	21
31–40	48
41–50	43
51–60	11
61–70	04

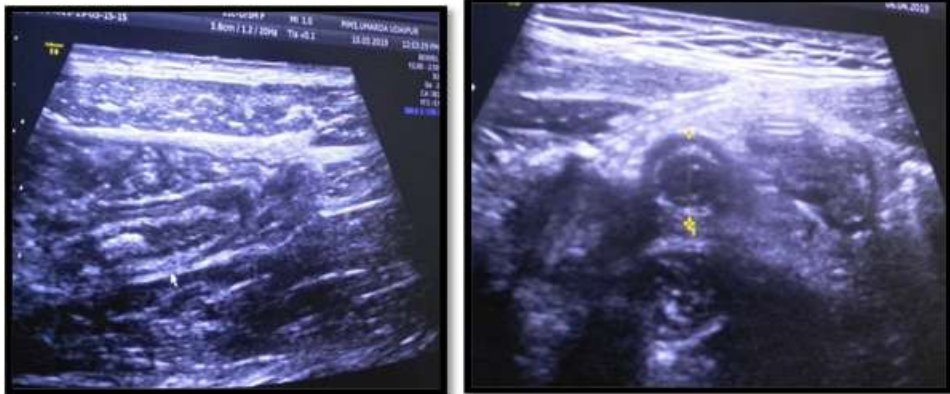


Fig. 1: USG Reveals Longitudinal view and Transverse view - Appendicitis



Fig. 2: USG Reveals fecolith in appendix

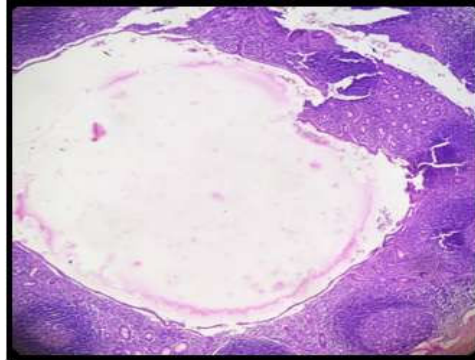


Fig. 3: 10x Appendicitis with Prominent Lymphoid Follicles

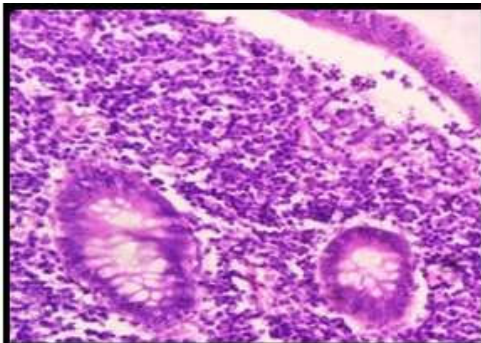
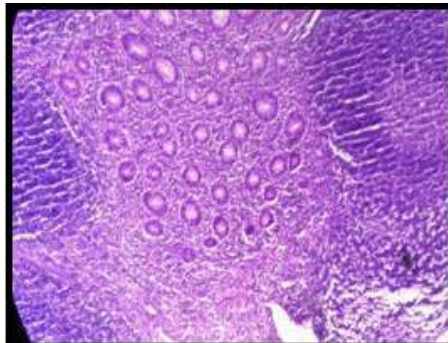


Fig. 4: (10x & 40x) Reveals Chronic Inflammatory Infiltrates - Chronic Healing Appendicitis

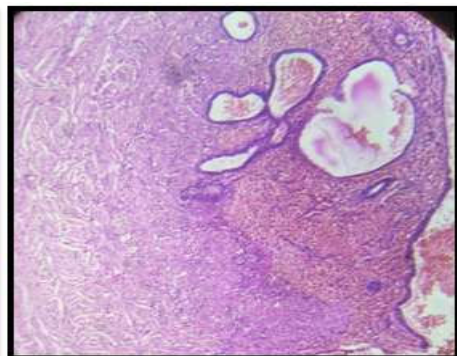


Fig. 5: (10x & 40x) Appendix with Endometrial Glands (Endometriosis)

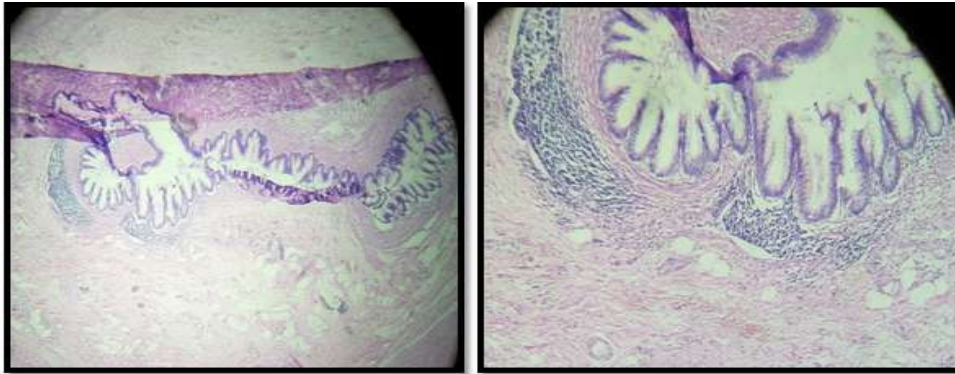


Fig. 6: (10x & 40x) Appendix with Mucocele

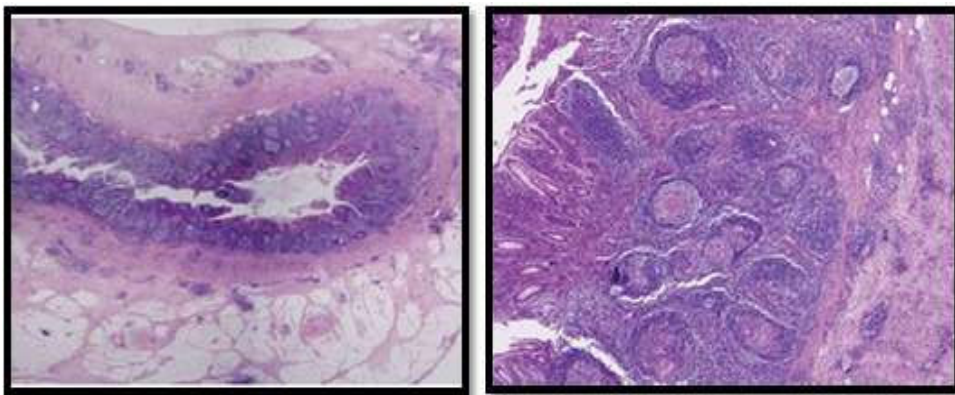


Fig. 7: H & E - (10x ) & (40x) Reveals Granuloma Formation Seen

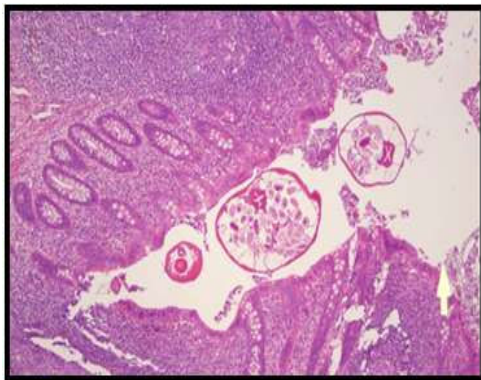


Fig. 8: H & E (40x) Section reveals Entrobiosis in Appendix

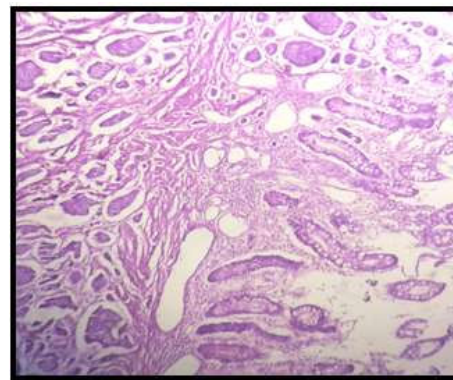


Fig. 9: H & E (40x) Section Revealed Carcinoid in Appendix

## Discussion

Among all abdominal operations, Appendectomy is the most frequent operation seen in India. Various causes of Appendectomy have been observed like faecoliths, lymphoid hyperplasia and some unusual factors etc. Histological examination of appendix helps us to diagnose unusual finding of appendix especially where it's not evident intraoperatively. Incidence of appendicitis varies substantially

by country, race, dietary habit, hygiene and socioeconomic status.<sup>4</sup>

Table 3: Comparison of Incidence of various appendicular pathology

	Subedi N <i>et al.</i>	Chawda HK <i>et al.</i> 2015	Present study
Acute appendicitis	91.9 %	57.38%	35.42%
Chronic appendicitis	3.5%	39.52%	44.46%
Granulomatous appendicitis	0	0.71%	0.69%
Tumour in appendix	0.6%	2.14%	0.69%

The Present study discloses a variety of histopathological lesions which showed peak incidence of acute appendicitis in males in age groups of 31–40 years. The present study also reveals that acute appendicitis (Fig 1 and 2 Radiological appearance, Fig. 3 Acute Appendicitis) was most commonly seen among male compare to females. Similar findings were observed by Sinha RT *et al.* and Kulkarni MP *et al.*<sup>4,5</sup> While study done by Vijayasree V *et al.* showed the female dominance for the acute appendicitis.<sup>6</sup>

Recurrent appendicitis was noted in six cases in present study. While three cases were found in another study done by Nikumbh DB *et al.* in Maharashtra.<sup>7</sup> The biopsy reveals that marked eosinophilic infiltration in muscularis mucosa layer of appendix along with eosinophilic oedema without any evidence of parasites. Similar finding were observed in the study done by Aravindan KP *et al.*<sup>8</sup> The chronic appendicitis (Fig 4) was higher (44.46%) in the present study compared to the study done by Chawda HK *et al.* and Subedi N *et al.*<sup>1,9</sup> (Table 3) Gangrenous appendicitis was found in two cases. Similar finding were observed in the study done by Kulkarni MP *et al.* and Chawda HK *et al.*<sup>5,1</sup>

One case of *E. vermicularis* infestation was noted which clinically diagnosed as appendicitis (Fig. 8). Another study done by Sinha RT *et al.* showed three cases of *E. Vermicularis* infestation.<sup>4</sup> Worldwide reported incidence of *Enterobius* infestation in patient with symptoms of appendicitis ranges from 0.2% to 41.8%.<sup>10</sup> The presence of *E. Vermicularis* is an important histological finding which will help patients to receive anti-helminthic treatment.

Unexpected finding of tubercular inflammation in appendix was found in one case (Fig. 7). Similar finding were found in Sinha RT *et al.* study.<sup>4</sup> In another study by Yilmaz M *et al.* showed granulomatous inflammation in only 0.3% cases.<sup>11</sup> The histological finding of tubercular granuloma in routinely resected appendix will help patients for early diagnosis and to receive ATT therapy even after the removal of appendix. Tuberculosis of appendix is rare accounting for 0.65% of all the surgically removed appendix.<sup>12</sup>

Carcinoid tumour is considered to be the most common type of appendiceal primary malignancy. The present study accounts for one cases (0.69%) Fig 9. Similar finding was observed in study done by Nikumbh DB *et al.* and Subedi N *et al.*<sup>7,9</sup>

The study done by Shrestha R *et al.* revealed carcinoid tumour ranging from 0.1% to 1.05% which is incidentally observed during microscopic examination.<sup>13</sup> Appendiceal tumour are unusual

accounting for 0.4% of all gastrointestinal tract malignancy.<sup>14</sup> The present study showed carcinoid tumour in tips of appendix and microscopically it is infiltrating upto the muscularis mucosa layer. The present study showed size of appendiceal carcinoids is less than 1 cm was similar with the Emre A *et al.* study.<sup>15</sup>

Appendiceal endometriosis considered to be the important differential diagnosis for a symptom with right iliac fossa pain. The present study showed one case (Fig. 5) with very unusual finding of appendiceal endometriosis. The cases which was clinically diagnosed as acute appendicitis can be rule out with rare possibility of endometrosis by histopathologically examination. Endometriosis of the caecum is rare condition which can mimic acute appendicitis and almost never diagnosed before surgery. Appendiceal endometriosis is an important leading cause for female infertility.<sup>3</sup>

## Conclusion

Obstruction of the lumen is a major cause of acute appendicitis. Obstructions may be due to unusual findings like parasitic manifestation, granulomatous inflammation, scar endometriosis or neoplasm of appendix, all can easily mimicking an attack of acute appendicitis. The true nature of the disease is always diagnosed only through histological examination.

Although clinical diagnosis and ultrasonography has a definite role to diagnose acute appendicitis but specially in female patients, sometimes it is difficult to rule out appendiceal endometriosis. As it mimicking other associated pelvic pathology.

With this study, we sought to determine the occurrence and type of unusual factor in acute appendicitis cases or in cases which mimic the clinical presentation of acute appendicitis.

The study finding help us to understand how much importance should be given to the topic of appendicitis clinically and what are the benefits of the patients or clinicians of histopathological examination of every appendectomy patients. Therefore this organ remain worthy for careful and systemic study both by clinician and pathologist.

**Ethical Clearance:** Study was conducted after getting ethical clearance from Institutional Human Ethics Committee (IHEC) of Pacific Institute of Medical Sciences, Umarda, Udaipur.

**Conflict of interest:** Nil

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