

## Acute Eosinophilic Appendicitis: A prospective study in consecutive 400 appendectomy cases.

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**Abstract:** Introduction: Acute eosinophilic appendicitis (AEA) is a rare type of appendicitis where the inflamed appendix infiltrates by eosinophil rather than neutrophil in the muscularis propria accompanied by edema. Acute eosinophilic appendicitis similar to the classical appendicitis in symptoms. The diagnosis of AEA cannot be made before surgery and the histopathological examination remains the gold standard for diagnosis.

Purpose: To find out the incidence of AEA in reported cases.

Materials and Methods: This prospective study was carried over a period of 12 months from January 2016 to December 2016 to find out the incidence of AEA in appendectomy specimens received in the department of Pathology, S.P. Medical College, Bikaner, Rajasthan.

Results: A total of 400 appendix specimens were received during the period January 2016 to December 2016. 10 out of 400 appendectomy patients (2.5%) aged between 5 years to 60 years showed AEA.

Conclusion: From the study it was concluded that there is a need for complete workout of patient by clinician, to exclude other organ involvement and associated syndrome. Furthermore, there is a need to understand the pathogenesis of AEA.

**Keywords:** Eosinophilic appendicitis, edematous, histopathological examination

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### I. Introduction

Acute eosinophilic appendicitis (AEA) is an uncommon inflammatory condition of appendix. Acute eosinophilic appendicitis was first proposed by Aravindan in 1997<sup>2</sup> and defined by Aravindan et al. The pathogenesis and etiology of AEA, which still remains unknown. The clinical presentation is similar to that of acute appendicitis and grossly inflamed appendix.

The histological hallmark of AEA is eosinophilic infiltration of the muscularis propria with accompanying oedema separating muscle fibre<sup>1</sup>. Histopathological examination of resected appendix remains the gold standard for diagnosis of AEA.

Eosinophilic appendicitis is less well understood disease entity which needs detailed further study and clear cut defining criteria. The aim of our study to find the incidence of AEA in our region.

### II. Materials And Methods:

This was prospective study carried out over a period of 12 months from January 2016 to December 2016 in the department of Pathology Sardar Patel Medical Collage Bikaner Rajasthan.

Appendectomy specimens received were fixed in 10% neutral buffered formalin and embedded in paraffin. The length and circumference at the point of maximum thickness were measured. Three cross sections were taken representing base, middle and tip. Additional sections were taken from any grossly abnormal area if present. Sections were then stained with H and E stain and examined microscopically.

### III. Results

A total of 400 appendix specimens were received during the period January 2016 to December 2016. 10 out of 400 appendectomy patients (2.5%) aged between 5 years to 60 years showed AEA.

The patients with AEA comprised 6 adult male (60%), 2 Male children (20%) and two females (20%) with median age 26.7 years.

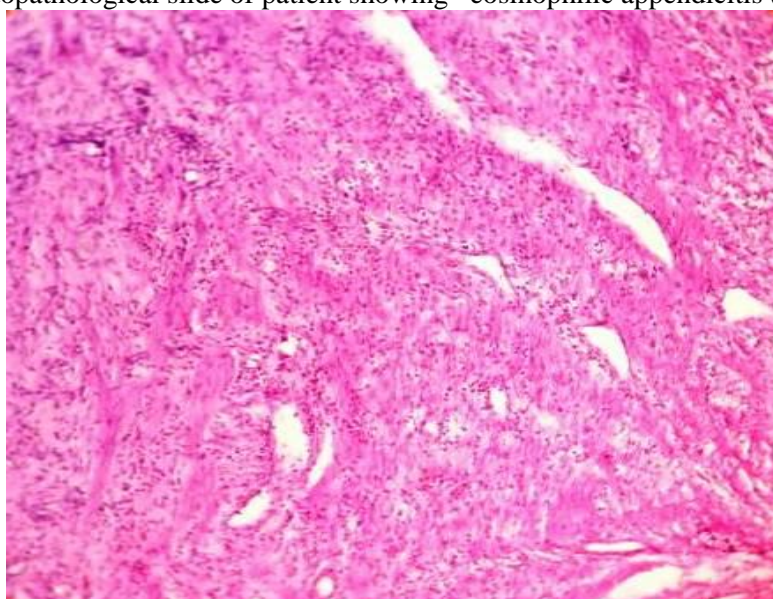
In our study there was no H/O allergy, no peripheral eosinophilia and there was no history of parasitic infestation. The chief complaint in all cases was pain abdomen while in few cases nausea and vomiting were also present.

**Figures and Tables (11 Bold)**

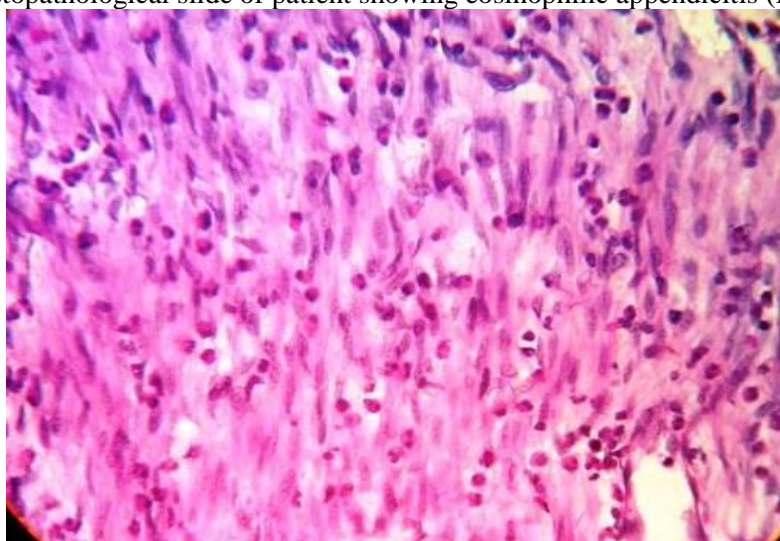
**FEATURES OF REPORTED CASES OF EOSINOPHILIC APPENDICITIS**

Cases	Age/sex	Clinical diagnosis	H/O allergy	P.S Eosinophilia	Stool Examination	Gross findings
1	40Y/M	Acute appendicitis	Absent	Absent	negative	Inflamed & congested
2	24Y/M	Acute appendicitis	absent	Absent	negative	Inflamed
3	7Y/Mch	Subacute appendicitis	absent	Absent	Negative	Congested
4	26Y/M	Acute appendicitis	absent	Absent	Negative	Inflamed
5	25Y/F	Acute appendicitis	absent	Absent	Negative	Inflamed
6	28Y/F	Acute appendicitis	absent	Absent	Negative	Inflamed & congested
7	35Y/M	Acute appendicitis	absent	Absent	Negative	Inflamed
8	22Y/M	Acute appendicitis	absent	Absent	Negative	Inflamed
9	52Y/M	Intestinal obstruction	absent	Absent	Negative	Inflamed
10	8Y/Mch	Acute appendicitis	absent	Absent	Negative	Inflamed

**Figure 1:** Histopathological slide of patient showing eosinophilic appendicitis (H and E, ×100)



**Figure 2:** Histopathological slide of patient showing eosinophilic appendicitis (H and E, ×400)



#### IV. DISCUSSION

Acute eosinophilic appendicitis was first proposed by Aravindan in 1997 and defined by Aravindan et al. in 2010. Accordingly, the development of acute appendicitis is triggered by type I hypersensitivity and primarily pathological changes which is characterized by eosinophilic-edematous lesion occur in appendix. If the lesion becomes infected by bacteria, acute suppurative appendicitis occurs and if there is no infection, AEA occurs. The blood eosinophil count first increases and then decreases over time in cases with acute suppurative and eosinophilic appendicitis. On the contrary, eosinophilia persists and does not resolve over time in eosinophilic gastroenteritis cases. Thus, AEA should be evaluated as a variant of acute appendicitis rather than an extension of eosinophilic gastroenteritis. In early times, eosinophilic appendicitis was characterised by *Strongyloides stercoralis* infestation, granulomas and associated tissue infiltration by eosinophilic leukocytes<sup>3</sup>. However, we did not find such evidence of worms or granulomas in any of our cases.

Carr NJ<sup>4</sup> suggests that an eosinophil count in excess of 10 per cmm (25 per 10 HPF) could be abnormal and labelled as eosinophilic appendicitis. He also states differential diagnosis for this eosinophilic infiltrate as eosinophilic enteritis and infestation by parasites. Our case fulfilled these criteria. In our case, eosinophils were present in all the layers including muscularis propria (25-30per HPF) .

Gaurav jain et al<sup>5</sup> reviewed 268 appendectomy cases, among these, five cases were found to have eosinophilic appendicitis. these cases were studied for clinical and pathological findings. Incidence found 5/268 (1.9%). There was a male preponderance noted.

Rajeshwari K et al<sup>6</sup> reviewed 159 appendectomy cases, three cases were found to have eosinophilic appendicitis (EA) and these cases were studied for clinical and pathological findings. Incidence of 1.8% (3/159) with male preponderance was found.

G. Santhosh et<sup>7</sup> al done study to measure the eosinophil degranulation resulting in a rise in the serum of eosinophil granule proteins that would be expected in such cases. In cases of acute appendicitis, there is an inverse relationship between duration of symptoms and serum ECP. However, this was not statistically significant. Significant local eosinophil activation and degranulation occurs in acute appendicitis, enough to cause a rise in serum levels of eosinophil chemotactic protein.

Usha Rani Singh et al<sup>8</sup> done a study which aim was to study the eosinophils, mast cells, nerves and ganglions in normal and inflamed appendices. A total of 329 appendices including 192 case of acute appendicitis (group A), 94 cases of clinically acute but histologically normal appendices (group B), 13 cases of complementary/elective appendicectomies (group C) and 30 normal controls from medico-legal autopsies(group D), were studied for the presence of eosinophils, mast cells, nerves and ganglia in mucosa, submucosa and muscularis propria. The mean eosinophil and mast cell counts were significantly higher in mucosa, submucosa and muscularis propria in Group A and B, when compared to group C+D. The number of nerves and ganglion cells were significantly higher in group A when compared to groups B and C+D. The correlation between eosinophil and mast cell count was not found to be statistically significant. A significant increase in Eosinophils, mast cells, nerves and ganglion cells was seen in acute appendicitis. Increase in eosinophils and mast cells may explain the pain in histologically normal but clinically suspected acute appendicitis.

Talley NJ et al<sup>9</sup> The aim of this study was to evaluate the clinicopathological spectrum of eosinophilic gastroenteritis and identify possible difficulties in establishing the diagnosis. All patients with a diagnosis of eosinophilic gastroenteritis, defined by the presence of gastrointestinal symptoms and eosinophilic infiltration of the gut, or a radiological diagnosis with peripheral eosinophilia, were identified from the Mayo Clinic records; in none was there evidence of extraintestinal disease. Eosinophilic gastroenteritis should be considered in the differential diagnosis of unexplained gastrointestinal symptoms even in the absence of peripheral eosinophilia.

Marc E. Rothenberg et al<sup>10</sup> done study in which Primary eosinophilic gastrointestinal disorders are defined as disorders that selectively affect the gastrointestinal tract with eosinophil-rich inflammation in the absence of known causes for eosinophilia (eg, drug reactions, parasitic infections, and malignancy). These disorders include eosinophilic esophagitis, eosinophilic gastritis, eosinophilic gastroenteritis, eosinophilic enteritis, and eosinophilic colitis and are occurring with increasing frequency. Significant progress has been made in elucidating that eosinophils are integral members of the gastrointestinal mucosal immune system and that eosinophilic gastrointestinal disorders are primarily polygenic allergic disorders that involve mechanisms that fall between pure IgE-mediated and delayed TH2-type responses.

Shivraj N Kanthikar<sup>11</sup> et al reported a primary eosinophilic appendicitis is a rare condition of unknown etiology having vague and unexplained symptoms. Histopathological hallmark of this entity is eosinophilic infiltration of the muscularis propria with accompanying edema separating the muscle fibers, and absence of neutrophilic infiltration. Preoperative correct diagnosis of this entity is not possible in view of lack of specific imaging technology. Histopathological examination is the gold standard for the diagnosis.

In our study there was 400 appendectomy cases taken. 10 out of 400 were found AEA. Incidence is 10/400 (2.5%). There was also male preponderance found.

## V. CONCLUSION

Acute eosinophilic appendicitis is a rare event and less well understood entity and an early marker of acute appendicitis. Hence if patient undergoes laprotomy for various etiologies and if appendix found congested should be removed. Adopting such therapeutic modality can prevent future occurrence of acute appendicitis and hence need for appendectomy later in life. It is important to conduct further studies about AEA, for better diagnostic approach and management, as well as understanding the pathogenesis of this entity.

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