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## APPENDICITIS IN THE ELDERLY – A MICROANATOMICAL PERSPECTIVE

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### ABSTRACT

**Background of the study:** The appendix lies in the junction between small and large intestine. It is highly vascular and rich in lymphoid follicles and forms a part of Gut Associated Lymphoid Tissue (GALT). With advancing age, the diameter of the lumen & lymphoid follicles supposedly get reduced. Therefore appendicitis is less common in the elderly population and more common in the young and adolescents. **Aim and Objective:** To study the micro anatomical features of appendix in terms of presence of luminal diameter and lymphoid tissue in the walls of human vermiform appendix.

**Methodology:** 54 post appendectomy specimens belonging to the age group of 40 – 80 years were utilized for the present study. The specimens were subject to routine histological study

**Results and Conclusion:** The entire specimen (100%) showed histological evidence of presence of lumen and lymphoid tissue contrary to the conventional teaching.

**Keywords:** appendix, lymphoid tissue, appendicitis

### INTRODUCTION

The inflammation of the Human vermiform appendix always poses a challenge to the surgeon in spite of numerous technological and surgical advancements in the field of gastrointestinal surgery. The Human vermiform appendix is regarded as a specialized structure rather than as a vestigial organ<sup>1</sup>. Many factors contribute to the causative aspect of acute appendicitis; however the obstruction to the lumen by a facecloth is cited to be the commonest cause<sup>2</sup>.

In later decades of life the lumen is partially or wholly obliterated whereas it is widely patent in early childhood<sup>3</sup>. More so as age advances the lymphoid follicles in the walls of the vermiform

appendix also undergo degeneration and is replaced by scar tissue.

Since in the elderly the lumen of the appendix is either partially or fully obliterated and there is a reduction in the distribution of lymphoid tissue in the appendicular walls, logically there should be no inflammation of the organ in the older age group. The life expectancy has increased when compared to the previous century. Therefore the incidence of appendicitis in the elderly age group is on the rise<sup>4</sup>. Undiagnosed appendicitis can lead to rupture of appendix which in turn will give rise to perforation and peritonitis.

To our knowledge review of literature showed a dearth of histological studies proving the luminal obliteration and decrease of lymphoid follicles in the older age group. Therefore the present study is undertaken to introspect the state of lumen and

lymphoid tissue in the elderly population from a micro anatomical point of view and its possible role in the pathogenesis of acute appendicitis.

### MATERIALS AND METHODS

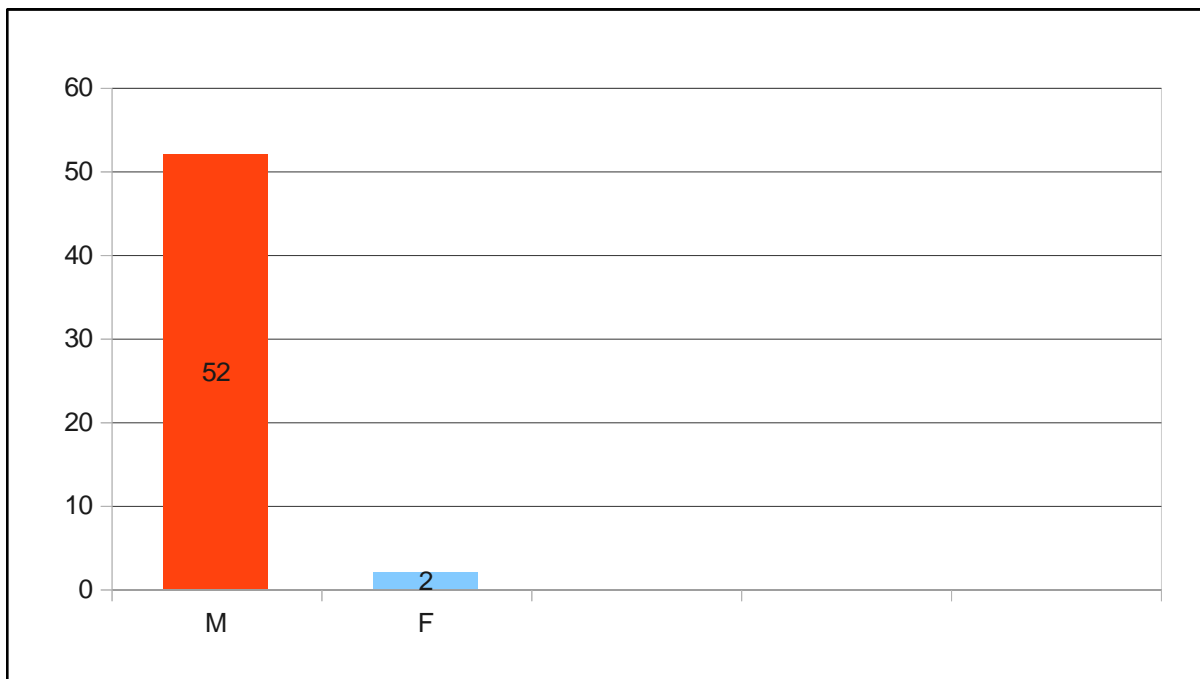
Specimen tissues of vermiform appendix was collected from patients undergone appendicectomy between the age group ranging from 44 years to 79 years over a period of three years after due clearance from the Institutional ethical committee and informed consent from the patient. The patients were elaborated about the reason for surgery and the procedure of surgery. They were explained about the significance of appendix and its functions. The process of histological sectioning

was explained in common language. The significance of the study was also explained to them. They were assured of confidentiality and non-disclosure of identity.

The total number of cases of elderly persons in the series was 54. Out of this 2 specimens belonged to female patients and 52 belonged to male patients. Persons undergoing negative appendicectomy and cases of gangrenous appendicitis were excluded from the purpose of study. The obtained specimen tissues were processed and stained with hematoxylin and eosin and were observed under microscope for the presence of appendicular lumen and aggregations of lymphoid follicles.

### RESULTS

a) Diagrammatic representation of Sex wise distribution



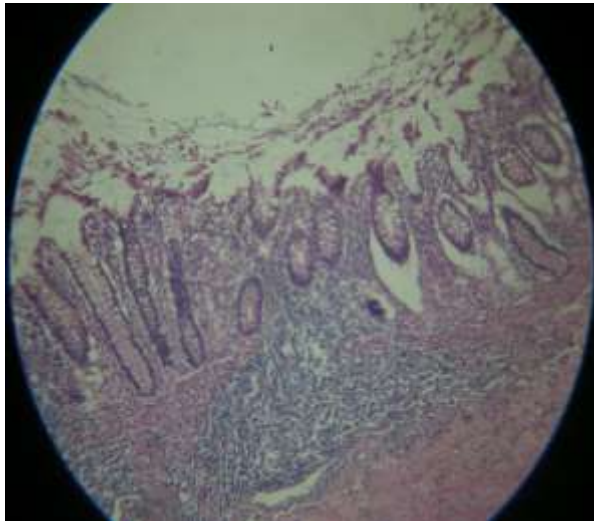
Total number of patients = 54

Males = 52

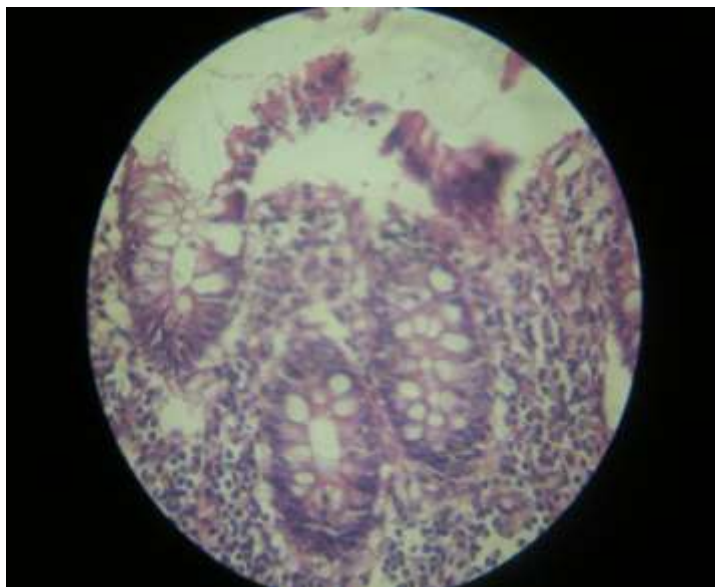
Females = 2

b) All the specimens showed presence of lumen, aggregation of lymphoid tissue and signs of inflammation (Fig. A, B, C & D). Few specimens showed evidence of faecoliths.

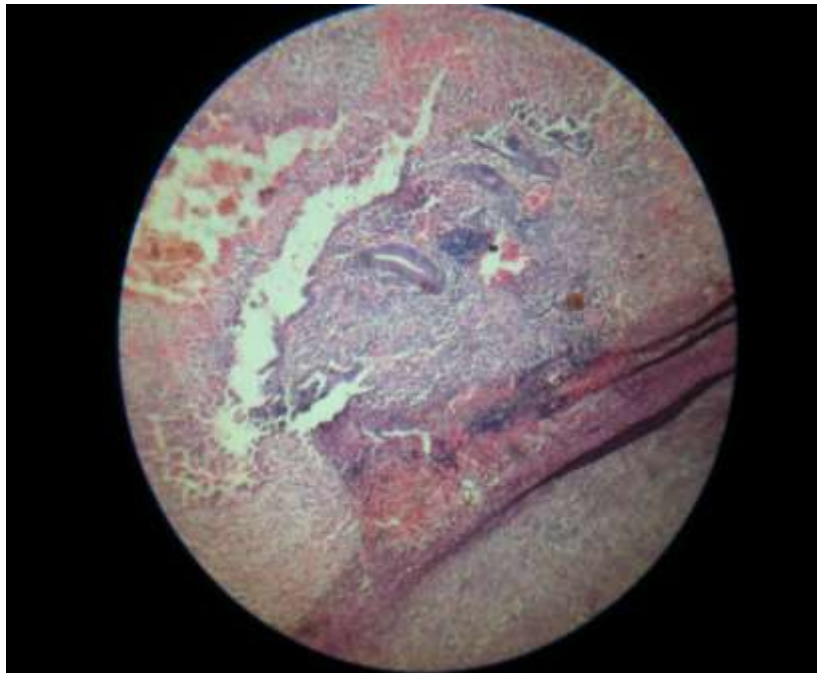
**Picture A: Histological feature of normal appendix (10 X view)**



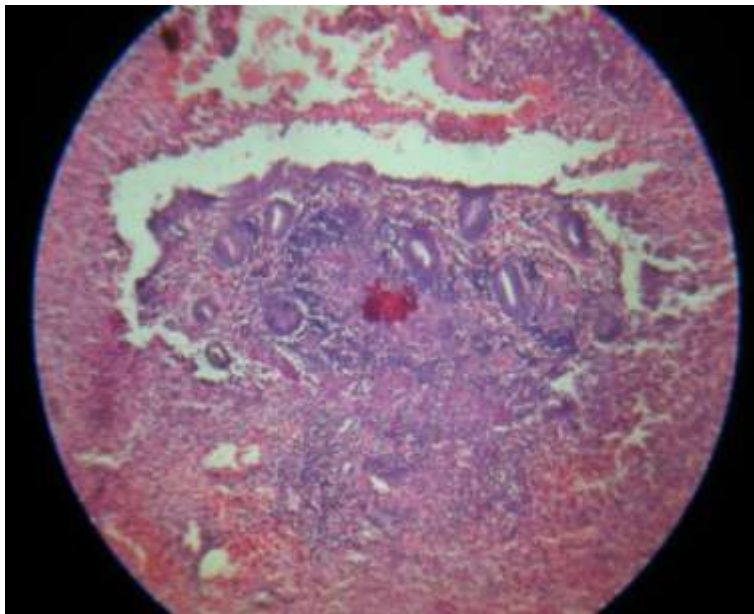
**Picture – B: Normal appendix (40 X view)**



**Picture – C: Presence of slit like lumen with inflammatory tissue**



**Picture – D: Reduced lymphocyte aggregation with lumen**



## DISCUSSION

The incidence of acute appendicitis in adolescents is 20%<sup>5</sup>. Few other authors have reported that the life time risk of acute appendicitis is 7%<sup>2</sup>. Acute appendicitis is more common in adolescents and young adults<sup>5</sup>

The pathogenesis of appendicitis is associated with obstruction (due to a faecolith) in majority of cases (50 to 80%)<sup>2</sup>. Other causes include impaction due to a gall stone, tumor or ball of worms. This is usually the outcome of increased intraluminal pressure and retention of contents which allows acute suppuration to occur<sup>3</sup>. However less commonly, in some number of cases the inflammation is not associated with luminal obstruction and the pathogenesis of the inflammation is not known. When inflammation of the appendix exceeds its confines there is a significant increase in the rate of mortality<sup>5</sup>

This has been attributed to the atypical presentation of appendicitis due to physiological changes and disease manifestation in the elderly population<sup>1</sup>

According to conventional teaching and prescribed standard texts, the lumen of the human vermiform appendix is either partially or fully obliterated in old age. In a study on Bangladeshi people, Rahman MM (2008)<sup>6</sup> reported a progressive decrease in the weight of the appendix with age. The maximum luminal diameter was observed in the age group of 21-35 years and the minimum luminal diameter was noted in the elderly age group (56-70 years)<sup>6,7</sup>. The presence of lymphoid follicles in the walls undergo a significant reduction in the elderly which invariably leads to a delayed or decreased immune response<sup>2,8</sup>. All these factors, reduced luminal diameter, decreased lymphatic follicle and its replacement by fibrous tissue have been attributed to a reduction in the incidence of acute appendicitis in the elderly. Therefore the diagnosis of appendicitis in the elderly age group is difficult to make and it carries a significantly increased risk of mortality and complications<sup>9</sup>

In the present study the samples were collected from patients aged above 40 years. All the

specimens (n= 54) showed presence of appendicular lumen and aggregation of lymphoid follicles in the walls irrespective of the age distribution (44yrs – 79 years, the mean age being 64 yrs). The presence of the lumen and aggregation of lymphoid follicles in all the cases (100%) is contrary to the conventional and established teaching.

## CONCLUSION

In summary, in the present series the authors did not observe any case with obliteration of appendicular lumen, reduction or absence of lymphoid aggregations in the walls of the appendix in elderly age group. These findings in the present study indicate that the human vermiform appendix still is an enigma and cannot be taken lightly by surgeons with regards to its age. In elderly persons with pain abdomen the appendicitis should be also included as a probable cause since, the morbidity and mortality associated with this condition at this age is significantly higher. However the authors recommend future studies with a larger sample size to establish our findings.

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