

Unusual Histopathological Findings of Appendectomy Specimens

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ABSTRACT

Background: Appendicitis is a very common surgical clinical condition and appendectomy is a frequently performed procedure worldwide. Although obstruction caused by fecoliths or lymphoid aggregation is a common reason for appendicitis, unusual histopathological findings can be a cause too. Unusual findings can range from benign conditions like worm infestation and cysts to malignant conditions like carcinoid tumors and adenocarcinomas. Enterobius vermicularis infection, tuberculosis, ascaris lumbricoides infestation, carcinoid tumors and cystadenomas are some of the commonly appearing unusual findings.

Objective: To document the number of rare histopathological findings of appendectomy specimens.

Methods: A 7 year retrospective study was conducted at Ziauddin University Hospital from March 2005 to December 2012. From accumulated information for 2157 appendectomies, 138 appendectomy specimens had rare histopathological findings. Incidental and negative appendectomies were excluded from this study.

Results: 58% of the patients with unusual histopathological findings were males (n=80) and 42% were females (n=58). Most common findings included: Enterobius vermicularis 48.5% (n=67), Tuberculosis 13% (n=18), Carcinoid tumors 9% (n=13) and cystadenomas 8% (n=11). Other findings include: peri appendicular abscess, adenocarcinoma of colonic origin, necrotizing lymphadenitis, ascaris lumbricoides, Meckel's diverticulum, taenia saginata, pheochromocytoma and mucocele.

Conclusion: Appendectomy specimens should be routinely sent for histopathological examinations as this practice can help in diagnosing rare tumors and conditions.

KEY WORDS: Appendicitis, Histopathological Findings, Appendectomies, Enterobius Vermicularis, Tuberculosis infestation, Carcinoid tumors, Cystadenomas.

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INTRODUCTION

Appendicitis is a very common clinical condition and appendectomy is one of the most frequently performed surgical procedures worldwide. The incidence of appendicitis is different due to regional and racial differences.¹ United States has seen an increase in the number of appendicitis cases from 7.6% to 9.3², with peak number of cases presenting in the late teens.³ However, the data required for epidemiology of appendicitis in Pakistan is scarce.²⁹ Obstruction is the most common cause for appendicitis with fecoliths or lymphoid aggregations being the usual causes.⁴ However, rare causes of obstruction can also cause appendicitis. Some of these frequently appearing rare causes include: Enterobius vermicularis^{5,6,7}, tuberculosis⁸, carcinoid Tumors⁹, parasitic infections like ascaris lumbricoides¹⁰ and cystadenomas.¹¹ Rarer findings include adenocarcinoma, mucocoele and eosinophilic infiltration.¹²

Most of the research performed on this topic is done in the western developed countries, since data for developing countries like Pakistan is insufficient comments cannot be made if parasitic infection findings in appendectomies are higher in the developing countries as compared to the developed ones.²⁹

This topic needs more research especially in Pakistan. The research will help in determining the common rare findings while emphasizing on the importance of routine histopathological examination after appendectomies. It will also help in discovering new research opportunities especially regarding this topic.

METHODOLOGY

This was a retrospective descriptive study conducted at Ziauddin University Hospital, Nazimabad over a period of seven years, histopathological data from March 2005 to December 2012 was chosen. The sample was selected at CI of 95% and precision value of 0.05. 2157 cases were taken out of which 138 cases with rare histopathological findings were assessed. Majority of the cases were diagnosed clinically, with supportive investigations of CBC, CRP and ultrasound and a CT scan. Incidental and negative appendectomies were excluded

from the study. The data was analyzed using Microsoft excel v.2010. T test was used to calculate the significance (P value) of the data.

RESULTS

Out of 138 cases 58% of the patients with rare findings were males (n=80) and 42% were females (n=58). The ages ranged from 11 years to 69 years (mean age=24 years). Enterobius vermicularis had the highest frequency of 48.5% (n=67) (P value= 0.018), Tuberculosis 13% (n=18) (P value= 0.037), carcinoid tumors 9% (n=13) (P value =0.049) and cystadenomas 8% (n=11) (Figure 1).

Figure 1: Most common unusual causes

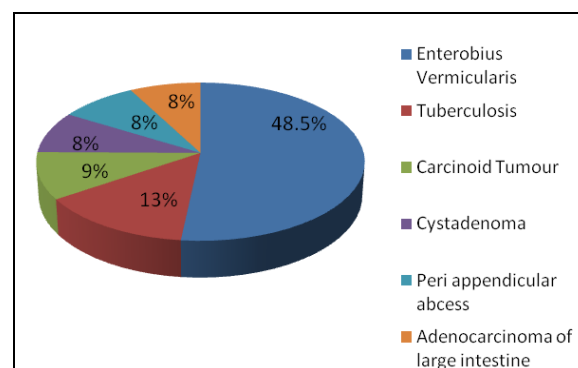
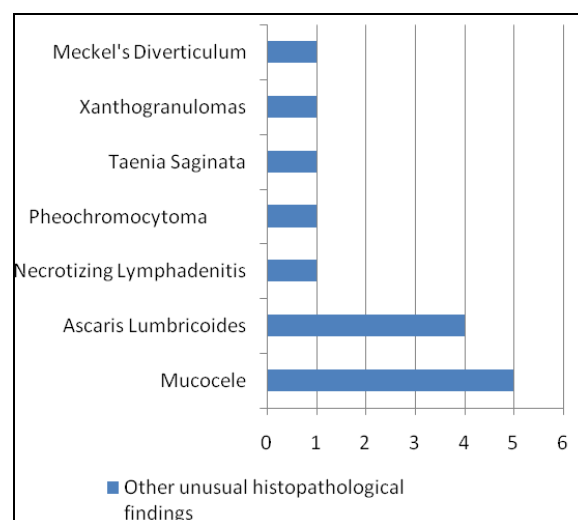


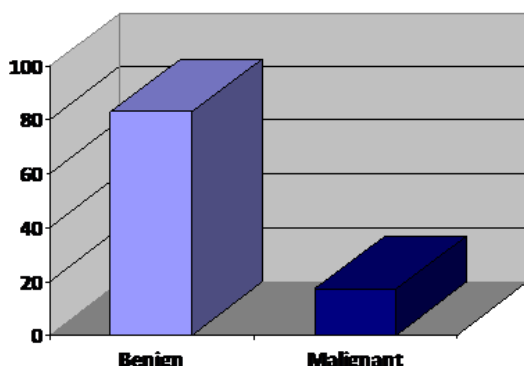
Figure 2: Other unusual histopathological findings



Other causes include adenocarcinoma from large intestine 8% (n=11), peri appendicular abscess 8% (n=11), mucocoele (n=5), ascaris

lumbricoides (n=4), amoebic infestation (n=8), necrotizing lymphadenitis (n=1), taenia saginata (n=1), xanthogranulomas (n=1), pheochromocytoma (n=1) (Figure 2). 17% of the findings were malignant causes while 83% of the conditions were benign (Figure 3). The ratio of male: female is 1.38: 1. 5 cases with *Enterobius vermicularis* and 2 cases of tuberculosis also presented with peri appendicular abscess. 1 case of appendicitis presented with Meckel's Diverticulum.

Figure 3: Ratio and nature of causes



DISCUSSION

Vermiform appendix is an organ with immunological function in the abdominal cavity which is variable in position and length. It is important in different disease processes, such as appendicitis, carcinoma and diverticulitis.³⁰

According to the result out of 2157 cases, 137 appendectomies (6.35%) showed rare histopathological findings, which is a higher percentage as compared to a literature review by Sami et al which had 1% of unusual appendectomy findings.¹³ *Enterobius Vermicularis* was dominant in the findings with 48.5% of the cases. *Enterobius Vermicularis* reproduces in the proximal part of ascending colon, cecum, appendix and terminal ileum¹⁴; it is transmitted by poor hand washing practices and poor hygiene.¹⁵ While it stays asymptomatic in children and adults it can present with appendicitis and life threatening complications. The presentation of appendicitis with *Enterobius Vermicularis* can range from lymphoid hyperplasia to gangrenous appendicitis with perforation.¹⁵ *Ascaris Lumbricoides* (2.89%) *Taenia saginata* (0.8%) were found to be rarer causes of appendicitis in other studies too.^{16,17,18}

Tuberculosis is known to be a disease of the developing countries; stronger strains of tuberculosis with extreme multi drug resistance have emerged making its eradication hard especially in Pakistan.¹⁹ Tuberculous appendicitis is a very rare finding and is usually diagnosed after histopathological examination; our study had 13% of diagnosed tuberculous appendicitis as compared to Chong VH, et al review of clinical presentation of tuberculous appendicitis which had 0.2% appendectomies diagnosed with tuberculosis.²⁰ Cystadenomas and mucocele of appendix accounted for 11% of the rare findings; Mucocele is the dilatation of appendiceal lumen due to obstruction²¹ and cystadenomas are rare tumors that are associated with cystic dilatation²² with an incidence of 0.2-0.3%.¹³ Carcinoid tumors are the most common malignant tumors of the appendix accounting for 60% of all malignant tumors of appendix with an incidence of 0.3-2.7% worldwide.^{13,23} The risk for its metastasis depends on the size of the tumor.²⁴ Most of the tumors are less than 1 cm in size which has near to 0% risk for metastasis. An appendectomy is sufficient for this size of the tumor.²⁵ For carcinoid tumor of size more than 2 cm the risk of metastasis goes up to 85% which needs to be managed with right hemicolectomy.²⁶ Adenocarcinomas of the appendix are extremely rare tumors accounting for 0.01%²⁷ which were found to be 0.7% in our study, however 7.3% adenocarcinomas in this study originated from the large intestine; oncologic resection with hemicolectomy needs to be done in such cases. Peri appendicular abscess may occur in 2%-7% of the cases with acute appendicitis³¹, clinically, peri appendicular abscess and acute appendicitis may give similar symptoms but their management is completely different. Acute appendicitis is treated immediately with appendectomy whereas peri appendicular abscess is treated with percutaneous abscess drainage and interval appendectomy.³¹

Meckel's Diverticulum was among the rarer findings in appendectomies, only one case presented with Meckel's diverticulum. Meckel's diverticulum is a rare congenital abnormality arising due to the persistence of the vitelline duct in 1-3% of the population. Diverticulitis can be mistaken for appendicitis and proper investigations should be done for proper diagnosis.²⁸ In comparison with the references, the data collected has shown higher frequencies

of rare appendiceal findings which show the dire need of research and intervention in this subject.¹³

CONCLUSION

Even though appendicitis commonly presents with fecoliths and lymphoid obstruction, routine

histopathological examination needs to be done to observe rare causes of appendicitis. The epidemiology of these rare findings need to be researched upon, a comparison of epidemiological patterns will help us in taking better approach to the case and will help in finding accurate causes for such conditions.

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