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Case Series

Enterobiasis Masquerading as Acute Appendicitis: A Case Series from a Remote Indian Island

Ashwinkumar K Barsagade[1], Sivaganesh Alias Porko[2], Chandan Chowdhuri[2], Avnika Jasuja[2*.]

Department of Pathology, [1]Jawaharlal Nehru Medical College, DMIMS, Sawangi Meghe, Wardha, Maharashtra, [2]Andaman & Nicobar Islands Institute of Medical Sciences, Port Blair

* Correspondence: Dr Avnika Jasuja (avnikajasuja@gmail.com)

ABSTRACT

Enterobius vermicularis is a common parasitic infection and is rarely seen as an incidental finding in appendectomy specimens. Enterobius vermicularis often presents with symptoms similar to acute appendicitis. We present six cases with clinical features of acute appendicitis. Appendectomies were done for all the cases and the histopathological examination showed Enterobius vermicularis in the lumen of appendix in all six cases. Four cases showed lymphoid hyperplasia without acute inflammation, one case showed evidence of acute inflammation (acute appendicitis) and one case showed normal histology with no evidence of acute inflammation. Enterobius vermicularis infestation is quite common in India but these six cases belong to the remote Indian Islands of Andaman & Nicobar. Enterobiasis may rarely present as acute appendicitis and careful histopathological examination needs to be done for initiation of post-operative antiparasitic medications. Preoperative diagnosis of these patients is important to avoid unnecessary surgery unless presenting as a surgical emergency.

Keywords: appendectomy, appendicitis, enterobiasis

INTRODUCTION

Appendicitis is the most common acute surgical condition of the abdomen occurring in 7–12% of the general population.[1] The most common presenting feature is appendiceal colic. There is significant association between parasitic infestation and acute appendicitis ranging from 0.2 to 41% .[2]

However, previous research has questioned the role of Enterobius vermicularis in acute appendicitis, with some studies suggesting that infection serves as a precursor to appendiceal inflammation and other studies disputing this theory and demonstrating that

Enterobius vermicularis is more frequently associated with non-inflamed appendices.[3-6] In the literature, there has been mention of worms imitating the symptoms of acute appendicitis, which is referred to as the phenomenon of 'appendiceal colic'.[6] The reason behind appendiceal colic is explained by the hypothesis of appendiceal lumen obstruction.[7] Appendiceal colic may be caused by the presence of parasites in the appendix [8,9] that might not elicit an acute inflammation.[3,10,11] Enterobius vermicularis infection has a worldwide distribution and is one of the most common childhood helminthic infections in the developed world.[2] Its mode of transmission is feco-oral route. Cecum is the major site for Enterobius.[1,2] We describe here six cases presented with clinical features of acute appendicitis and histopathological examination showed Enterobius vermicularis infestation without any evidence of inflammation in most of the cases.

CASE SERIES

The study is a retrospective study conducted at the Department of Pathology of a Tertiary care hospital. Out of 166 appendectomy specimens received in the department of Pathology from January 2021 to December 2022, six cases showed presence of Enterobius vermicularis infection. Gross examination of five of the cases showed unremarkable external surface while one case showed congested surface [Figure-1]. Microscopic examination of all the cases showed presence of adult worms with a thick cuticle, lateral alae and visible organs consistent with Enterobius vermicularis within the lumen [Figure-2], [Figure-3]. Four cases showed Lymphoid Hyperplasia in the subepithelial layer of the appendicular wall [Figure-4].

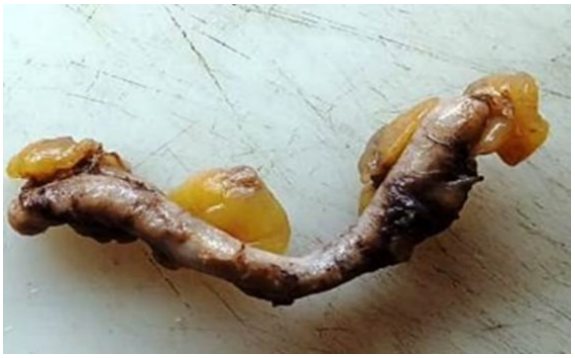

Figure-1: The external surface of appendix is congested.

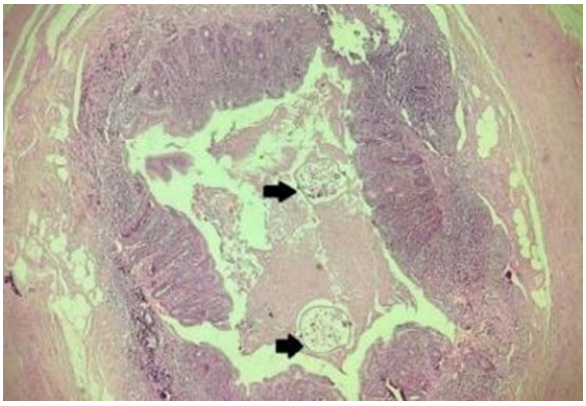

Figure-2: Lumen of Appendix with Enterobius vermicularis (Arrow) (4X, H & E Stain)

Case 1

A 23-year-old female presented initially with right sided lower quadrant acute abdominal pain associated with fever and vomiting for two days. The patient's abdominal pain increased in intensity for one day. Laboratory findings include a mildly elevated ESR and mild neutrophilic leukocytosis. Abdominal ultrasound examination showed no abnormality. Based on clinical findings a provisional diagnosis of acute appendicitis was made and laparoscopic appendectomy was done.

Gross examination showed an appendix of 8.5 cm in length with 7mm in diameter. On sectioning the lumen was found to be filled with brownish material, possibly faecolith.

Histopathological examination revealed lymphoid hyperplasia in the sub-epithelium. The lumen showed adult worms with a thick cuticle, lateral alae and visible organs. There was no evidence of acute inflammation in the wall of the appendix. Histopathological diagnosis of Appendix showing lymphoid hyperplasia with Enterobius vermicularis was reported.

Case 2

A 60-year-old female presented with sudden right sided lower quadrant acute abdominal pain. She had a dull aching pain around umbilicus for one week. This pain was accompanied with mild fever. Her laboratory findings revealed a mild elevated total white blood count of 12886/mm^3. Abdominal ultrasound examination was not done and based on clinical signs and symptoms a diagnosis of Acute appendicitis was made and an emergency laparoscopic appendectomy was performed.

Gross examination showed an appendix of 5 cm in length with 8mm in diameter. On sectioning the lumen was filled with brownish material.

Histopathological examination of the appendix revealed adult worms with a thick cuticle, lateral alae and visible organs consistent with Enterobius vermicularis within the lumen. The sub-epithelium showed lymphoid hyperplasia with germinal centers. There was no evidence of acute inflammation in the wall of the appendix. Histopathological diagnosis of Appendix showing lymphoid hyperplasia with Enterobius vermicularis was reported.

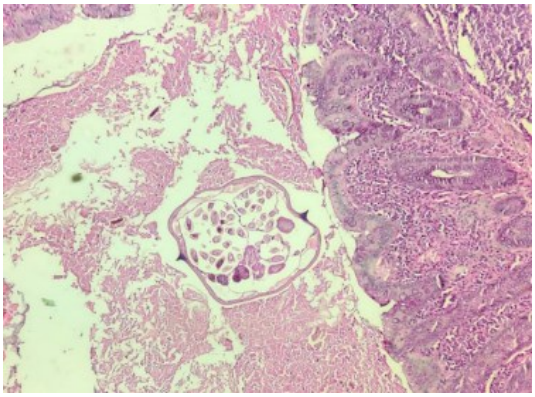

Figure-3: Adult worms with a thick cuticle, lateral alae and visible organs in appendiceal lumen (10X, H & E Stain)

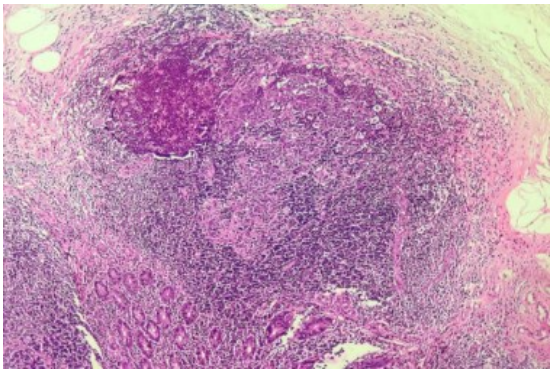

Figure-4: Lymphoid hyperplasia in appendix (40X, H & E stain)

Case 3

A 14-year male presented with acute pain in the right lower quadrant of the abdomen along with fever and vomiting. Physical examination revealed right iliac fossa tenderness. Abdominal ultrasonography was not done due to the long waiting period in emergency ultrasonography in a limited resource setup. A clinical diagnosis of Acute Abdomen was made and the patient was posted for Laparoscopic appendectomy.

Gross examination showed an appendix of length of 8 cm and distal half dilated with maximum diameter of 15mm. External surface was congested. Lumen was filled with soft brownish material.

Histopathological examination showed features of Acute Appendicitis with peri-appendicitis with Enterobius vermicularis within lumen. Eosinophils were seen increased in muscle layer and serosa.

Case 4

A 9-year-old male presented with acute pain in the right lower quadrant of the abdomen for one day. Patient had history of recurrent dull pain in the right lower quadrant for two months. Complete blood count was within normal limits. USG abdomen showed normal findings and a provisional clinical diagnosis of Acute Appendicitis was made and patient was posted for Laparoscopic appendectomy.

Gross examination showed an appendix of length of 6 cm with maximum diameter of 5 mm. External surface was unremarkable. Lumen was filled with soft brownish material.

Histopathological examination showed appendix with lymphoid hyperplasia and Enterobius vermicularis within the lumen.

Case 5

A 21-year-old female presented with pain in the periumbilical region for two days which characteristically shifted to the right iliac fossa of the abdomen. Radiological investigation was not done in this case and a clinical diagnosis of Acute Appendicitis was made and the patient was posted for Laparoscopic appendectomy.

Gross examination showed an appendix of length of 9 cm and distal half dilated with maximum diameter of 5 mm. External surface was unremarkable. Lumen was patent.

Histopathological examination showed an appendix with unremarkable histology and Enterobius vermicularis within lumen.

Case 6

A 4-year female child presented with acute pain in the right lower quadrant. Abdominal ultrasonography and complete blood count were within normal limits. A provisional clinical diagnosis of appendicitis was made and laparoscopic Appendectomy was done.

Gross examination showed an appendix of length of 5 cm and with maximum diameter of 4 mm. External surface was unremarkable. Lumen was patent.

Histopathological examination showed appendix with lymphoid hyperplasia in the sub-epithelium and Enterobius vermicularis within the lumen.

DISCUSSION

Enterobius Vermicularis infection is one of the most common childhood helminthic infections in the developed world.[2] The mode of transmission is the feco-oral route. Cecum is the major site for Enterobius followed by appendix.[1,2] Enterobius vermicularis infection is generally asymptomatic and may present with pruritus ani and restless sleeping. This infection is prevalent in all socioeconomic groups.[11] Geographical variation of this infection is well documented. This infection is more common in tropical and underdeveloped countries.[1] While often considered tropical, parasitic diseases are now seen more frequently in developed countries because of immigration and increased world travel. Aydin O et al. reported four cases of Enterobius vermicularis among 190 appendectomies (3.15%) in a retrospective analysis of the Turkish population.[7]. In present study Enterobius vermicularis was reported in six cases among 166 appendectomy specimens received (3.61%).

The association between parasitic infection of the appendix and acute appendicitis has been widely investigated.[12] The reason behind appendiceal colic is explained by the hypothesis of appendiceal lumen obstruction. Lumen of the appendix can get blocked due to fecal stasis, faecoliths or lymphoid hyperplasia. Other etiologies include undigested vegetable residues, fruit seeds, tumors and intestinal parasites.[13] Various studies provide evidence suggesting that the clinical symptoms of appendicitis may stem from luminal obstruction caused by adult parasites, rather than true inflammation of the appendiceal wall .[7]

This blockage of the appendix presents as appendicitis and is the most common reason for emergency appendectomy.[14] The majority of these resected appendiceal specimens lacked any signs of histological inflammation.[5,15] In the present study, the majority of cases did not show the presence of acute inflammation.

Enterobiasis infection can present as changes ranging from reactive lymphoid hyperplasia to acute suppurative inflammation.[16] Infection with Enterobius vermicularis can result in a range of pathological changes, including lymphoid hyperplasia, acute and suppurative appendicitis, or even a seemingly normal appendix. However, symptoms can arise when the lumen of the appendix becomes obstructed by the presence of worms.[17]

A study in Denmark by Wiebe BM et al. concluded that presence of this parasite in the appendix can present with the symptoms of acute appendicitis.[18] Various studies confirmed the association between inflammation and parasites.[19] In our study there was no evidence of inflammation and lymphoid hyperplasia was noted in four of the cases and one case showed features of acute appendicitis while one case showed normal histology of appendix.

During intraoperative diagnosis of E. vermicularis infection, treatment should involve thermal ablation or endoscopic suctioning to control pinworms, removal of the appendix using a specimen bag, and meticulous examination of port sites, abdominal cavity, and pelvis to prevent intraperitoneal contamination and associated complications like omentitis, pelvic inflammatory disease, and pelvic peritoneal granulomas.[6]

These patients should receive postoperative anti-helminthic treatment for the complete eradication of Enterobius vermicularis infestation and the close family members should also be treated with anti-helminthic to eradicate the asymptomatic reservoirs.[20]

Prior to appendectomy, patients can benefit from fecal sampling and night-time application of cellophane tape (Scotch tape test) in the perianal area for detecting the parasite as well as empirical anti-helminthic therapy.[5] Once Enterobius is confirmed, close contacts such as family members should also be treated.

Table 1: Summary of clinicopathological characteristics of six cases

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Age (years)	23	60	14	9	21	4
Sex	F	F	M	M	F	F
Presenting features	Right lower abdominal pain	Right lower abdominal pain	Right lower abdominal pain	Recurrent abdominal pain	Right lower abdominal pain	Right lower abdominal pain
Radiology	WNL	WNL	Not Done	WNL	Not Done	WNL
Procedure	Laparoscopic Appendectomy	Laparoscopic Appendectomy	Laparoscopic Appendectomy	Laparoscopic Appendectomy	Laparoscopic Appendectomy	Laparoscopic Appendectomy
Gross						
Length of appendix	8.5 cm	5 cm	8 cm	6 cm	9 cm	8 cm
Largest diameter of appendix	7 mm	8 mm	15 mm	5 mm	12 mm	10 mm
Congestion	-	-	+	-	-	-
Status of appendiceal lumen	Fecolith +	Fecolith +	Soft Brownish material	open	open	open
Histopathology						
Acute Appendicitis	-		+	-	-	-
Gangrene	-	-	-	-	-	-
Perforation	-	-	-	-	-	-
Negative Appendicitis	+	+	-	+	+	+
Lymphoid Hyperplasia	+	+	_	-	+	+

CONCLUSIONS

We conclude that presence of Enterobius vermicularis usually accounts for appendiceal related pain unrelated to histological inflammation. High index of suspicion and considering parasitic origin in the differential diagnosis of abdominal pain will help prevent unnecessary surgeries unless there is a surgical emergency. A thorough histopathological examination of appendectomy specimens by pathologists for search of parasites helps in initiating appropriate anti-helminthic treatment of patients and their close family members.

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