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Sonographic Diagnosis of Pinworm Infestation of the Appendix in an 18 Year Old Male Patient: A Case Report

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ABSTRACT

Enterobius vermicularis is one of the most common parasites in the world. It is also known as the pinworm, threadworm or the seatworm. A pinworm infection is one of the most common types of human intestinal helminthiasis. Patients with pinworm infestation are generally asymptomatic, but may present with pruritus ani. Pinworm infestation of the appendix may cause symptoms of appendicitis, with or without microscopic signs of acute inflammation. We present the case of an 18 year old male child, who was referred for sonographic evaluation of the abdomen, with complaints of pain in the right iliac fossa.

Keywords: appendix, ultrasound, helminthiasis, parasite, abdomen, abdominal pain, appendicitis **INTRODUCTION**

Enterobius vermicularis is the most common parasitic infection in developed countries of temperate and cool climates.^[1] It is an obligate parasite with humans being the only known natural host. Pinworm infestation is more common in the pediatric population. E. vermicularis is a common intestinal heliminth of humans, and has been implicated in various inflammatory conditions, such as, colitis^{[2],} perianal abscess or granulomas^[3] and chronic pelvic pain^[4]. It has also been associated with clinical features of acute appendicitis.^[5] Patients with E.vermicularis infestation of the appendix can present with clinical features of appendicitis, independent of the histological signs of acute inflammation.^[5,6] The presence of parasites in the appendix may result in appendiceal colic, even without eliciting an acute inflammation, by causing appendiceal lumenobstruction. The radiological imaging features of

parasitic infestation of the appendix have not been well described in the literature.

2. Case Presentation

An 18 year old male child was referred to our department for sonographic evaluation of the abdomen, with clinical suspicion of acute appendicitis. The patient complained of pain in the right iliac fossa, which was sudden in onset, progressive, localized and non-radiating. There were no complaints of any fever, vomiting, cough or rashes. The patient was afebrile, and systemic examination was normal. Laboratory investigations, including blood counts and urine examination, were unremarkable.

Sonographic evaluation of the patient was performed in the supine position, using curvilinear and highfrequency linear transducers.

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Sonographically, the appendix appeared to be slightly enlarged in caliber, measuring approx 8mm in maximum thickness. (Image 1) The wall thickness of the appendix was within normal limits, measuring approx 1.4mm. (Image 2) There was evidence of multiple, linear, tubular structures noted within the lumen of the appendix, showing haphazard movements. (Image 3) No evidence of any periappendiceal inflammation or fat-stranding was noted. No fluid collection was noted around the appendix. There was no evidence of any significant lymphadenopathy noted in the right iliac fossa. On applying graded probe compression, mild-tomoderate tenderness was elicited in the right iliac fossa. On color Doppler, no evidence of any significant vascularity was noted within the appendix and in the peri-appendiceal region. Rest of the abdominal and pelvic organs appeared normal in sonographic appearances.

Based on the sonographic findings, a diagnosis of parasitic infestation of the appendix was made.

A laparoscopic appendectomy was performed and the specimen was sent for histopathological evaluation, which confirmed the diagnosis of Enterobius vermicularis infestation of the appendix with no features of inflammation. (Image 4)



Image 1: Transverse and longitudinal sections taken through the appendix with a high-frequency linear transducer showing a slightly enlarged appendix.



Image 2: Longitudinal sections through the appendix showing normal wall thickness and no evidence of any peri-appendiceal inflammation.



Image 3: A longitudinal section through the appendix showing presence of multiple, linear, tubular, mobile hyperechoic structures within the lumen of the appendix.



Image 4: Post-operative excised surgical specimen of the appendix showing the presence of multiple pinworms within the appendix.

3. Discussion

Enterobius vermicularis, an obligate parasite, is one of the most common parasites in the world, infecting approximately 1000 million humans worldwide.^[7] E vermicularis is spread by fecal to oral route and is associated with close living, temperate and tropical climates, and poor hygiene.^[8] It is more frequently found in girls, with a peak age distribution of around 12 years old. While most intraluminal infections are asymptomatic, patients may present with pruritus ani that is worse at night. Other symptoms include abdominal pain, nausea, and vomiting.^[8] In literature, E. vermicularis infestation of the vermiform appendix has been reported in as far back as 1898.^[9] It remains controversial whether it actually causes inflammation of the appendix.^[10] Pinworm infestation of the appendix may cause symptoms of acute appendicitis, with or without microscopic signs of acute inflammation.^[11]

Some early reports show an association of E. vermicularis with inflammation of the appendix.^[12] However, the recent literature states that E. vermicularis infestation of the appendix can produce clinical features of appendicitis, without histological evidence of acute inflammation.^[13] There are several studies which suggest that the presence of pinworms may cause an appendicitis-syndrome identical to acute appendicitis without acute inflammation.^[7,11]

A high index of suspicion of the parasite involvement of appendix is required to reduce the rate of unnecessary appendicectomies. It is generally very difficult to differentiate appendiceal-syndrome due to parasite infection from acute appendicitis on the basis of physical examination alone. It is necessary to

understand the role of E. vermicularis in appendicitis to prevent any future morbidity of the patient.

4. Diagnosis

The diagnosis of E. vermicularis infection varies significantly, depending upon the patient presentation, extent of the infestation and the worm-load. Scotch-tape test is the most commonly used technique which involves pressing tape against the perianal skin early in the morning and examining under the microscope for eggs. Stool examination is of limited value as the parasitic worms and eggs are not generally passed in the stool, however, in patients with a high worm load, ovum or worms may be present in the stool.^[14]

It is generally very difficult to differentiate appendiceal-syndrome due to parasite infection from acute appendicitis on the basis of physical examination alone. A high index of suspicion of the parasitic involvement of the appendix is required to reduce the rate of unnecessary appendicectomies and to allow the surgeon to make small adjustments to prevent peritoneal contamination during surgical intervention.

Radiological imaging techniques are of limited value in making an accurate diagnosis. Ultrasonography remains the imaging modality of choice as if permits real-time visualization of the appendix and the periappendiceal region. Direct visualization of the parasitic worms within the appendiceal lumen on sonography is sufficient to make the correct diagnosis.

5. Management

Appendectomy, open or laparoscopic, remains the treatment of choice in cases mimicking acute appendicitis, however, the surgeon needs to proceed with caution if the appendix is observed not to be inflamed intra-operatively. The application of laparoscopic appendectomy technique in patients with parasitic infestation requires some technical considerations.^[15]

Post-operatively, it is imperative that the patient receives antihelminthic treatment to prevent any recurrent infection as well as to treat any other foci of infection in the body.

6. Conclusion

A high index of suspicion of the parasitic infestation must be included in the differential diagnosis of appendicitis, especially when the appendix appears non- inflamed on sonographic examination. An accurate radiological diagnosis with a high index of clinical suspicion of parasitic involvement may reduce the rate of unnecessary appendicectomies significantly. An accurate pre-operative diagnosis also allows the surgeons to take additional necessary precautions to minimize any chance of peritoneal contamination during surgical intervention.

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