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Acute eosinophilic appendicitis caused by *Taenia saginata*: A case report

Meysam Sharifdini [a], Khadijeh Nematdoost [a], Reza Shafiei [b], Aref Teimouri [c,*]

[a] Department of Medical Parasitology and Mycology, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran
[b] Department of Pathobiology and Laboratory Sciences, North Khorasan University of Medical Sciences, Bojnurd, Iran
[c] Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

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ABSTRACT

Introduction: The role of parasites in the pathogenesis of appendicitis has been debated for a long time. To date, several gastrointestinal parasites have been reported as the causes of appendicitis in humans. *Taenia* infestation of the appendix is uncommon and few cases have been reported in the literature.

Presentation of case: We reported a case of acute eosinophilic appendicitis (AEA) in a 42-year-old woman caused by *T. saginata* in northern Iran. The patient was admitted to the emergency department with a 2-day history of acute abdominal pain in her lower right quadrant. Abdominal ultrasonography showed intra-abdominal bleeding and endometrium cysts. Routine hematological tests showed increases in white blood cell (WBC) count of 19.8×10^3 per mcL with 3% eosinophilia. During abdominal laparotomy, peritoneal fluid was bulked with abdominal bleeding due to rupture of the uterine cyst. After investigation of inflammation in the appendix region, patient underwent appendectomy. Histopathological findings showed acute inflammation with eosinophils and a large number of round eggs with flattened segments of the genus *Taenia*. It is impossible to distinguish between *T. saginata* and *T. solium* based solely on egg morphology in the specimens. Therefore, based on history of the patient, which included no consumption of pork, the species was identified as *T. saginata*. At the three months follow-up, the patient was in good health.

Conclusion: In the current study, a case of AEA by *T. saginata* was reported. However, this was not the first case of acute appendicitis by *T. saginata*. Further studies are necessary to show roles of parasites in pathogenesis of AEA.

1. Introduction

Helminth and protozoan infections of the gastrointestinal tract remain an important public health problem in tropical areas and developing countries. The role of parasites in the pathogenesis of appendicitis has been debated for a long time. To date, several gastrointestinal parasites have been reported as the causes of appendicitis in humans. *Enterobius vermicularis*, *Taenia* sp., *Ascaris* sp., *Schistosoma* sp., and *Trichuris trichiura* are reported to be associated to human appendicitis [1–7]. Human taeniasis, due to *Taenia saginata* (beef tapeworm) and/or *T. solium* (pork tapeworm), is a zoonotic cestode infection that is characterized by the presence of the adult worm in the human small intestine. Humans become infected with *T. saginata* or *T. solium* when they consume infected raw/undercooked beef or pork, respectively [5]. *T. saginata* is distributed globally, and more frequent in developing countries where raw/undercooked meat with cysticercus bovis (larval stage) is consumed as part of traditional food cultures [5]. The clinical signs of the infection include irritation in the intestine, abdominal pain constipation, diarrhea, dizziness, nausea, weight loss, irritation of the intestine and stomach ache, which rarely occurs with mild eosinophilia and fever [5]. The most common symptom of the infection is the active passing of proglottids segment in feces or felt as it passes through the anus [8]. In a few cases, the worm can cause intestinal obstruction [5,8], colonic anastomotic leakage [9] as well as obstruction of the appendiceal lumen by migrate the proglottids into the appendix [3–5,10]. *Taenia* infestation of the appendix is uncommon and few cases have been reported in the literature [4,5,11]. This case report aims to consider parasitic agents as one of the possible causes of appendicitis, especially in endemic areas. In the current study, we reported a case of acute eosinophilic appendicitis (AEA) caused by *T. saginata* in northern Iran.

1.1. Presentation of case

A woman aged 42 years old was referred to the emergency

* Corresponding author.
E-mail addresses: sharifdini5@gmail.com (M. Sharifdini), kh.nematdoost@gmail.com (K. Nematdoost), reza_shafi@yahoo.com (R. Shafiei), aref_teimouri@yahoo.com, aref_teimouri@sums.ac.ir (A. Teimouri).

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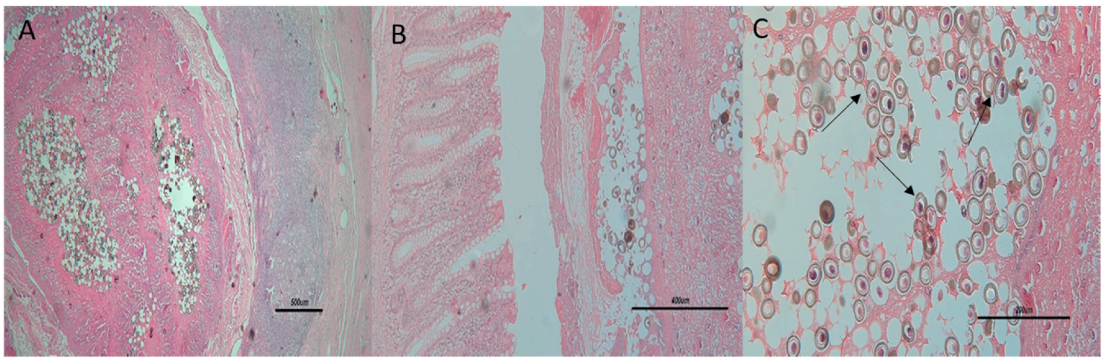

Fig. 1. A) *Taenia* uterus in the appendix lumen containing numerous eggs; B) Acute inflammation in the appendix wall with eosinophils and neutrophils; and C) The black arrow indicate *Taenia* eggs inside the proglottid (40, 100× and 200 × magnifications for A, B and C respectively (hematoxylin & eosin staining).

department of Imam Khomeini hospital in Someh Sara, Guilan, Iran with a 2-day history of acute abdominal pain in her lower right quadrant. A physical examination showed no fever but generalized abdominal tenderness was reported. Abdominal ultrasonography showed intra-abdominal bleeding and endometrium cysts. Routine hematological tests showed increases in white blood cell (WBC) count of 19.8×10^3 per microliter (normal ranges of 3.5×10^3 to 10.8×10^3 cells/mcL) with 3% eosinophilia. During abdominal laparotomy, peritoneal fluid containing blood was bulked in abdomen and pelvic with abdominal bleeding due to rupture of the uterine cyst. After drainage and washing of the peritoneum, the endometrium cyst was removed. After investigation of inflammation in the appendix region, patient underwent appendectomy. Removed appendix demonstrated macroscopic and microscopic characteristics of acute appendicitis. Microscopic studies illustrated a large number of round eggs with significant embryophores (appearance of thick radial striations) within the parasite uteri (gravid proglottids) (Fig. 1 A, B, C). Histopathological findings showed acute inflammation with eosinophils and flattened segments of the genus *Taenia*. Furthermore, wall of the appendix was filtrated by numerous eosinophils (Fig. 1 A, B). Histopathological diagnosis included AEA. No evidences of malignancy were seen in the specimen. The patient was treated with single doses of praziquantel (10 mg/kg) and was discharged. The patient was followed up at one month and three months following surgery. On this visit, a clinical examination was performed and at three months follow-up, the patient was in good health. This work has been reported in line with the SCARE 2020 criteria [12].

2. Discussion

Acute appendicitis, characterized by inflammation of the appendix, is a common cause of abdominal pain and one of the most common cause of emergency gastrointestinal surgery in people. The exact causes of acute appendicitis are unknown and possibly multifactorial including: genetic factors, foreign bodies, fecal material, abdominal trauma, bacterial infection, lymphadenitis and obstruction of the appendix lumen [13]. A rare cases may be due to intestinal helminthic parasites [14]. Some types of parasites, particularly helminths, can enter the appendix accidentally. How parasites enter the appendix has not been identified yet. Most probably, the parasite attaches to the intestinal wall and migrates to various adjacent tissues, where it develops for a long time. When the parasite reaches the appendix, it can develop and creating an inflammatory reaction [5]. *E. vermicularis* is a cosmopolitan parasite located predominantly in the cecum, appendix and colon and is the most common parasite associated with acute appendicitis [8,10,15]. *T. saginata* is one of the most common zoonotic tapeworm that is mainly located in the human gastrointestinal tract [4]. Adult worms live primarily in the proximal part of the small intestine without causing any severe symptoms [11]. In heavy infections, proglottids of the parasite may become lodged in the pancreatic ducts, liver and less commonly into the appendiceal lumen [1]. However, the number of cases of appendicitis due to *Taenia* has been increasing over the past decade [2,3,11,15].

Although, association between *Taenia* and acute appendicitis has already been described in the literature and may occur as a result of the worm proglottids (ova) and/or the adult worm entering the appendix, the clear mechanism of *Taenia* entry in to appendix remains an unresolved issue [5,16,17]. In a study by Çalli et al. [3] a case of appendicitis was presented in which *E. vermicularis* was only the worm detected in the appendectomy specimen. However, *Taenia* eggs and the adult worm were determined in the stool of the patient. In the current study a case of AEA by *T. saginata* was reported. It is impossible to distinguish between *T. saginata* and *T. solium* based solely on egg morphology in the specimens. Therefore, based on history of the patient, which included no consumption of pork, the species was identified as *T. saginata* [5]. However, this was not the first case of acute appendicitis by *T. saginata*.

3. Conclusion

In the current study we presented a case of AEA caused by *T. saginata*. A broad range of clinical symptoms in gastrointestinal parasitic infections and various anatomical positions of the appendix make an accurate diagnosis more difficult. Hence, it is important to consider parasitic agents as one of the possible causes of appendicitis, especially in endemic areas. Further studies are necessary to show roles of parasites in pathogenesis of AEA.

Declaration of competing interest

The authors declared no potential conflicts of interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.102241.

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Ethical approval

The study was approved by the Ethics Committee of Guilan

University of Medical Sciences, Iran with ethics number of IR.GUMS. REC.1399.565.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal on request.

Patient perspective

The procedure of surgery was explained to the patient with all advantages and possible complications. She had given informed consent for this operation.

Provenance and peer review

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Author's contribution

Meysam Sharifdini: Conducted the staining procedures and has made the color photos.

Khadijeh Nematdoost: contributed for diagnose and the process of original draft preparation.

Reza Shafiei: Edited the rough draft into the final manuscript.

Aref Teimouri: Writing, review and editing of the manuscript.

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Dr. Aref Teimouri, Department of Parasitology and Mycology, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran. Email: aref_teimouri@yahoo.com

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