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SHORT COMMUNICATION

Co-infection with *Enterobius vermicularis* and *Taenia saginata* mimicking acute appendicitis

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Summary In this report, we describe an unusual case of verminous appendicitis due to *Enterobius vermicularis* and *Taenia saginata* in a 29-year-old woman from Iran. The histopathological examinations and parasitological descriptions of both worms found in the appendix lumen are discussed. The removed appendix exhibited the macroscopic and microscopic features of acute appendicitis. Antihelminthic therapy was initiated with single doses of praziquantel for the taeniasis and mebendazole for the enterobiasis, and the patient was discharged.

Introduction

In tropical countries in which intestinal parasitic infections are quite common, such as Iran, verminous appendicitis remains common [1]. Several parasitic infections involving the appendix have been reported as the etiologies of appendicitis in humans. Among these infections, helminthes (verminuos) infections caused by *Enterobius vermicularis*, *Taenia* sp., *Ascaris* sp., *Schistosoma* sp., and *Trichuris trichiura* are most frequently reported [2—8].

Human enterobiasis caused by *Enterobius vermicularis* (*E. vermicularis*) infection is usually

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asymptomatic. The most common symptom is pruritus in the perianal region, but infestation may also present with ileocolitis, urinary tract infection, vulvovaginitis and appendicitis [9]. The presence of pinworms in the appendix has been demonstrated to mimicking appendicitis and/or appendiceal colic [10], but there is frequently no histological evidence of acute inflammation [9,11—13]. However, *E. vermicularis* is the most common worm found in the appendix, particularly in children and/or adolescents. Moreover, in our pervious study in the Mazandaran Province of northern Iran, verminous appendicitis was found to be more prevalent in the age group below 10 years old [14]. Additionally, the mean prevalence of *E. vermicularis* infection in the province has been reported to be approximately 4% [15]. Human taeniasis (due to *Taenia saginata* and *Taenia solium*) is a zoonotic tapeworm infection that is characterized by the presence of the adult form of the helminth in the human small intestine. Infection frequently occurs in individuals who eat poorly cooked and or unfrozen beef or pork containing the cysticerci.

Case report

In July 2012, a 29-year-old woman from the Mazandaran Province (53°6′E, 36°23′N), which is south of the Caspian Sea in northern Iran and has subtropical climate conditions, was referred to our emergency department due to acute abdominal pain in her right lower quadrant (RLQ) with a one-day history of colic pain, anorexia, vomiting and nausea. A physical examination revealed right iliac fossa tenderness and a mild fever. A laboratory examination revealed an elevated white blood cell (WBC) count of 10,600/μL with marked neutrophilia (67% neutrophils). No marked eosinophilia was observed (2% eosinophils). The removed appendix exhibited the macroscopic and microscopic features of acute appendicitis. Microscopic slides revealed mucosal ulceration and luminal exudates accompanied by an elongated and flattened segment of the helminth. A large number of round eggs with remarkable embryophores (an appearance of thick radial striations) were within the parasite uteri (known as gravid proglottids) and also freely floating in the lumina (Fig. 1). These characteristics confirmed that the helminth belonged to the genus *Taenia* sp. However, the eggs of both *Taenia* spp. are morphologically identical, but based on the history of the patient, which included no consumption of pork, the species was putatively identified as *T. saginata*. The patient was from the Mazandaran Province in which taeniasis caused by *T. saginata* is endemic, and the prevalence of the taeniasis in this province is estimated to be approximately 1—2% [16]. In contrast, because Iran is a Muslim country, no pork is eaten; accordingly, all human taeniasis occurs following the consumption of undercooked beef. Human infections with *T. saginata* have been observed in various regions of the country, particularly the Mazandaran Province in northern Iran where our patient lived.

Moreover, many transverse cross-section of *E. vermicularis* pinworms displaying the characteristic cuticular ridge (known as an alae) on both sides were identified (Fig. 2). Antihelminthic therapy was initiated with single doses of praziquantel for the taeniasis and mebendazole for the enterobiasis, and the patient was discharged.

Discussion

There is only one report of taeniasis/enterobiasis co-infection, which occurred in a 12-year-old boy

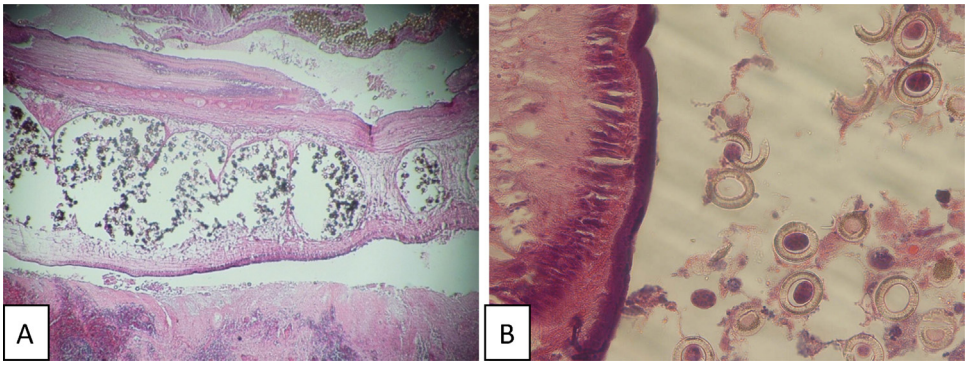

Figure 1 (A) Cross-section of *Taenia saginata* in the appendiceal lumen showing proglottid segment containing the numerous eggs; the mucosa shows an acute inflammation. (B) Note the characteristic emberyphore (radial striation) of *Taenia* eggs inside the proglottid. Hematoxylin and eosin stain (100× and 400× magnification for A and B, respectively).