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Concomitant Infection of Appendix with *Taenia* and *Enterobius vermicularis*

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Appendicitis is one of the most common causes of acute surgical disease in children and young adult. There are many reports in the world, concerning the infectivity of appendix with different parasites. However, concomitant infection of appendix with *Taenia* and *Enterobius vermicularis* is a rare case. A twelve years old boy, living in Islam-shahr, Iran, admitted to a hospital, presenting symptoms suggestive of appendicitis. Following surgically resection of the appendix, histopathological examination was performed on H&E stained sections. In the lumen of the appendix, section of *E. vermicularis* adult female and eggs of *Taenia* were visible.

Key words: Appendicitis, *Taenia, Enterobius vermicularis*

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INTRODUCTION

Appendicitis is one of the most common surgical diseases of children and young adults. Parasites, however, are one of the uncommon etiologies. The importance of intestinal parasites as the exciting cause of appendicitis was first emphasized in 1901 by Metchnikoff who reported three cases of this disease due to *Ascaris lumbricoides*[1]. However, among parasites the most common agent which is associated with appendix, as reported in the literature, is *Enterobius vermicularis*[2]. *E. vermicularis*, commonly known as pinworm, is an intestinal nematode that usually affects children between the ages of 5 to 15 years old, but may infest individuals at any age or socioeconomic group. It is the most common intestinal worm in the world with an estimated more than 1000 million people throughout the world infected[2,3]. It lives only in humans and is not generally a serious condition. Infection is via the oro-faecal route, occurring in children, due primarily to the hands carrying the eggs from the perianal area to the mouth, and in adults, due to eating infected vegetables (contamination of the soil with human faeces). Furthermore, the eggs, on account their peculiar adhesive properties of the shell, adhere to underwear and are carried by dust, in the various living areas[4]. Pinworm attaches itself with the lips to the caecal mucosa, to the appendix and proximal areas of the ileum and colon. Pinworm infection can be asymptomatic, having the characteristic anal pruritus, or can be associated with abdominal pain and sometimes with appendicular pain when the worms are in the appendix.

One of the other intestinal parasites which is sometimes reported to be lodged in the appendix is *Taenia*. *Taenia saginata* and *Taenia solium* are cyclophyllidean tapeworms which spend their adult stages in human intestines. Cattles and pigs are intermediate hosts for *T. saginata* and *T. solium*, respectively. Human acquires taeniasis following ingestion of raw or undercooked meat of intermediate hosts containing cysticercus larva. The gravid proglottides of the strobila, which are filled by *Taenia* eggs, become detached and excreted in the human faeces. If gravid proglottides or their eggs lodge in the appendiceal lumen, they may initiate appendicitis[2]. In this study, concomitant infection of an appendix with *Taenia* and *E. vermicularis* is reported from a 12 years old boy.

MATERIALS AND METHODS

In late 2004, a 12 years old boy was admitted to a hospital in Islam-Shahr, Central Iran, presenting symptoms suggestive of appendicitis. The patient was confined to bed for appendix surgery. After removal of the appendix, macroscopical and microscopical examinations were performed on the resection and pathological findings was recorded. The specimen was first preserved in 10% formalin and following tissue processing by conventional histological methods; 5 μm sections were prepared and stained by hematoxylin and eosin (H&E).

RESULTS

In macroscopical observation of the appendix, the specimen consisted of an appendix vermicularis measuring 7×1×1 cm with gray glistening serosa. Cut sections revealed a filliform white structure in the middle part of the lumen. The latter was patent and contained scant fecaloid material. Microscopical findings revealed the histology of appendix with

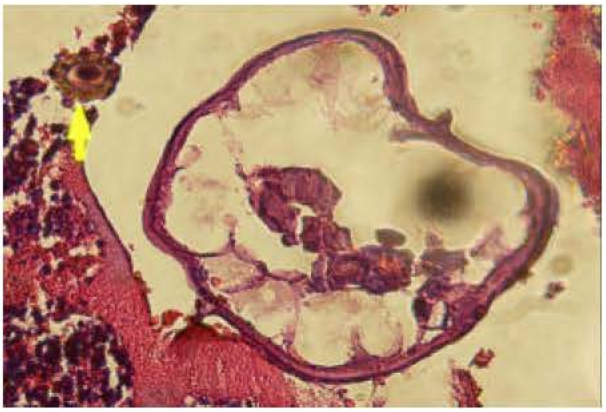

Fig. 1: Adult *E. vermicularis* in the appendix lumen (magnification × 10)

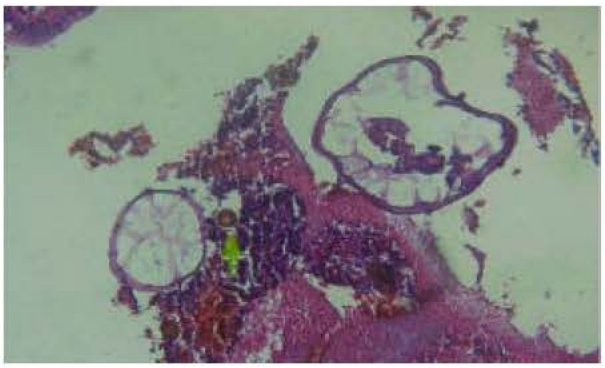

Fig. 2: Section of the appendix showing the existence of adult female *Enterobius vermicularis* and eggs of *Taenia* (arrow) . (magnification × 40)

preserved mucosa showing mixed inflammatory cells infiltration, predominated by lymphoplasma cells along with numerous eosinophils. The muscularis propria and serosa lack inflammatory cell infiltration but showed mild congestion. In the lumen, a section of *E. vermicularis* adult female was observed with thick eosinophilic walls showing two projecting lateral alae (Fig. 1). The central lumen of the worm was full of eggs. In addition to adult *E. vermicularis*, in the lumen of the appendix some *Taenia* eggs with thick brownish golden reflective walls, showing fine radiations, were present (Fig. 2).

DISCUSSION

To the best of our knowledge this is the first report of concomitant infectivity of an appendix with *E. vermicularis* and *Taenia*. A review of the literature shows that, the relationship of *Enterobius* infection to acute appendicitis has not been clearly demonstrated, although *Enterobius* has been found in many patients with symptoms of appendicitis and where no other cause has been found[2]. Sometimes eosinophilic granolomas are found but most studies have not supported an association between *E. vermicularis* or any other helminth and appendicitis[5-7]. Possibly *E. vermicularis* is the cause of appendicitis-like symptoms (pseudo appendicitis) or, on the other hand, worms may leave an appendix that is inflamed[2,7].

The terminal gravid proglottides of *Taenia* separate from the strobila and sporadically can cause acute appendicitis or cholangitis[2]. Although subacute appendicular taeniasis is uncommon, but in most cases is associated with pathological disorders[8]. Lejbkowicz *et al.*[8] reported two cases of *Taenia* infestation in the appendix which both showed acute phlegmonous inflammation. Jain *et al.*[9] described an unusual association of malakoplakia of the appendix with eggs of *Taenia* species. Kia *et al.*[10] reported two cases of *Taenia* infestation in the appendix which, in one of them both eggs and proglottide were presented in the lumen of an perforated appendix and the tissue reaction was acute gangrenous appendicitis and the other case was an appendix with normal reactive follicular hyperplasia. The current report which represent a rare case of concomitant infection of appendix with *E. vermicularis* and *Taenia* is confirmative to the role of parasites as etiological agents of appendicitis.

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