

The surface epithelium shows partial ulceration. The lumen filled with *Enterobius Vermicularis* ova (Figure 1A and B).

Postoperative stool analysis in two cases showed *Entamoeba histolytica* infection. The patients were placed on antihelminthic treatment on the 2nd postoperative days, oral dose of mebendazole repeated 1-2 weeks, also, on IV metronidazole/12 h due to suppurative appendicitis and for *Entamoeba histolytica* infection in the combination of gram +ve and gram -ve antibiotics (Figure 2).

The patient discharged on the 3rd postoperative days after removal of a pelvic drain.

The families were advised that all members should be treated with antihelminthic drugs and other close contacts.

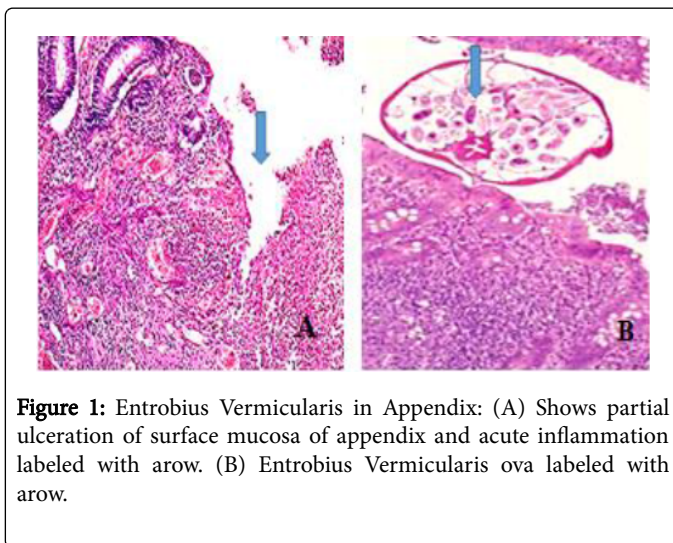


Figure 1: *Enterobius Vermicularis* in Appendix: (A) Shows partial ulceration of surface mucosa of appendix and acute inflammation labeled with arrow. (B) *Enterobius Vermicularis* ova labeled with arrow.

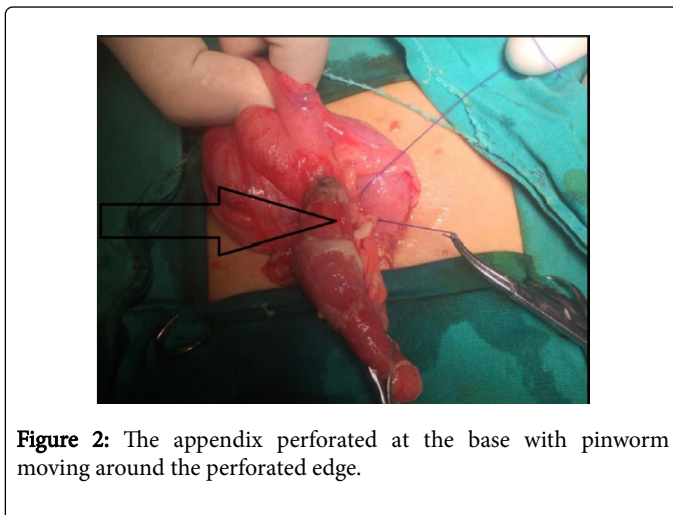


Figure 2: The appendix perforated at the base with pinworm moving around the perforated edge.

Discussion

Pinworm of pediatric appendicitis continued to be a rare surgical presentation it is frequency 1.52% [12]. Pinworm was associated with different pathologic changes ranging from lymphoid hyperplasia, acute appendicitis, and suppurative appendicitis to a normal appendix [7].

It is wrangled whether pinworm can cause appendicitis or if they are an incidental finding during an appendectomy [8]. In the few cases

reported synchronous acute inflammation and intraluminal *Enterobius vermicularis* infestation, it is unclear whether pinworm obstructing the lumen caused appendicitis, the pinworm induced a hypersensitivity reaction inducing appendiceal inflammation, or if the inflammation was from another cause [8]. Studies support the hypothesis that appendiceal lumen obstruction by pinworm infestation gives rise to symptoms ambiguous from suppurative appendicitis [13]. Ova release from female parasites may be a trait of appendiceal obstruction, which consequently is followed by bacterial overgrowth and finally ending to acute appendicitis. The reversibility of these processes may be questioned [14]. As the appendix is a residual organ, it can be easily infiltrated by numerous intestinal contents such as vegetable fibers, faecolith, worms and their eggs. These foreign particles can lead to the obstruction of the appendiceal lumen. If the lumen is obstructed, the persistent mucosal secretion, generation of bacteria and/or the presence of worms may cause an increase in the intraluminal pressure. Increased pressure hinders the blood supply of the appendix wall and mucosal damage may cause bacterial transgression, inflammation, sepsis and finally necrosis [15]. Recent study reviewing 2267 cases of appendicitis showed that there was a highly significant difference in the incidence of pinworm infestation in normal and in inflamed appendices, which may indicate that the presence of pinworm in the appendix can cause symptoms of acute appendicitis [16].

In rare cases, intraperitoneal pinworm contamination may present in some patients due to infection of the peritoneum via the fallopian tube or in patients with appendiceal or intestinal rupture. In these patients, the immune system reacts by creating granulation tissue around the pinworm. Symptoms related to extraintestinal pinworm infestation may include mesenteric abscess formation, omentitis, enterocutaneous fistula, urinary tract infection, salpingitis, fallopian tube infiltration, salpingoophoritis, and tubo-ovarian abscess [17-19].

Laboratory findings of these patients show extreme discrepancy including high to normal values [14]. It is important that these patients use antihelminthic treatment after operative intervention because the appendectomy treats only a sequel but not the root of the disease. An oral dose of mebendazole is the treatment of choice to *E. vermicularis* infestation, which is repeated in 1-2 weeks. Reinfection may be predictable because humans do not promote a preventative immunity against pinworm [14]. Finally, we believe that the pinworm may cause perforating suppurative appendicitis due to different pathological changes ranging from obstruction of the lumen to hypersensitivity reaction, further studies are necessary to deduce the relationship between *Enterobius vermicularis* and acute suppurative perforating appendicitis.

Conclusion

Pinworm is an uncommon cause of acute suppurative perforating appendicitis in Upper Egyptian children. Early diagnosis of pinworm infection and proper treatment might prevent probable further complications that may necessitate surgical intervention. The awareness of pinworm and its preventive measures should be included in all health education programs and should be delivered to schoolchildren and their mothers to overcome the risk of infection and its dangerous drawback. Future researches on the relation of pinworm and acute suppurative perforation appendicitis are important with a special recommendation to the significance of the appendix specimens investigation by both histopathological and faecolith examinations to detect the correct incidence of pinworm causing appendicitis in Egypt.

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Conflict of Interests

No conflict of interest.

Sources of Funding

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Ethical Approval

No ethical approval has been applied for this case series study, only the written and oral consent by the relatives of the patients.

Consent

A written consent has been obtained from the patients' relatives for operative intervention and for the publication of this case series.

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