Small bowel parasitosis as cause of obscure gastrointestinal bleeding diagnosed by capsule endoscopy

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INTRODUCTION
Hookworm infection represents a major burden of disease in the developing world, with many cases of iron deficient anemia being caused by this type of parasitosis. In this report we present the case of a young man originating from South-East Asia, whose hookworm infection was diagnosed by capsule endoscopy, providing high-quality images of the disease processes taking place inside the patients’ gut.

CASE REPORT
A 24-year old Pakistani man who immigrated to Greece one year ago was referred to our hospital for small bowel capsule endoscopy. The patient was initially admitted to another hospital complaining for worsening fatigue. On his admission severe anemia was diagnosed [Hct: 15.6% (normal 41%-53%), Hb: 2.3 mmol/L (8.4-10.9 mmol/L) MCV: 62.9 fl (78-100 fl)] along with marked eosinophilia [Eosinophils: 22.4% (0%-8%), WBC: 7.02 × 10^9/L].

Abstract
Hookworm infection is a relatively common cause of anemia in endemic areas. However, it is rarely encountered in Europe. In this report we describe the case of a 24-year old patient originating from an endemic area who was admitted due to severe anemia, with an Hct of 15.6% and eosinophilia (Eosinophils: 22.4%). While both esophagogastroduodenoscopy and colonoscopy were non-diagnostic, capsule endoscopy revealed a large number of hookworms infesting his small bowel and withdrawing blood. The patient was successfully treated with Albendazole. Capsule endoscopy was proven an important tool in diagnosing intestinal parasitosis.

Key words: Ancylostoma duodenale; Parasitosis; Capsule endoscopy; Obscure gastrointestinal bleeding; Anemia

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(4.5-11 × 10^9/L)]. Physical examination was unremarkable apart from signs of anemia. He was assessed by EGD, colonoscopy, along with transabdominal ultrasound and numerous blood tests. The results were normal, apart from the aforementioned anemia and eosinophilia. Stool test showed no ova or parasites.

The capsule endoscopy performed in our department (Pillcam SB capsule, Given Imaging, Yoqneam, Israel) revealed a large number of hookworms infesting the patient's small bowel (Figure 1A) from the duodenum to the proximal ileum. The parasites were attached to the mucosal surface of the intestine withdrawing blood, whereas mucosal bleeding was seen in areas previously attacked by the parasites (Figure 1B, C).

The patient was treated with a single dose of 400 mg of albendazole[1] and oral iron supplementation. His hemoglobin and hematocrit substantially improved in the following 2 wk and were normal in a follow up visit 4 mo later.

DISCUSSION

Hookworm infection in human subjects is caused by the helminth nematodes Necator americanus and Ancylostoma duodenale, both of which are strictly human parasites[2]. An estimated 576-740 million people are infected, especially in poor, rural areas in the tropics and subtropics, making hookworm infection one of the most common chronic infections worldwide[3]. N. americanus is found in the Americas, the Caribbean and has recently been reported in Africa, Asia and the Pacific. A. duodenale infections are common in sub-Saharan Africa, Asia and the Pacific[4]. Both types of hookworms parasitise the proximal part of the small intestine in their adult form. The daily output of eggs per female worm is around 10000 for N. americanus and can be as high as 30000 for A. duodenale. Eggs hatch in soil. The larvae molt twice to become infective third-stage larvae, which penetrate the host’s skin, travel through the circulation, reach the alveolar capillaries, enter the lungs, pass over the epiglottis and are swallowed into the gastrointestinal tract. A. duodenale can also be infective when ingested as third-stage larvae[5]. Our patient originated from South-East Asia, an area where A. duodenale is endemic. However, the identification of the exact type of hookworm is not easy by just viewing the capsule endoscopy images.

Iron deficient anemia is the main adverse outcome of hookworm infection. Blood loss occurs when the parasites attach themselves onto the mucosal surfaces using their cutting apparatus and contract their muscular esophagi to create negative pressure, which allows the withdrawing of blood. In addition, adult hookworms also release anticoagulants to ensure blood flow[6,7]. The hookworms ingest a portion of the extravasated blood and red cells undergo lysis releasing hemoglobin, which is digested by enzymes that line the parasites’ gut[8]. All these processes can be visualized in the images presented. Areas of bleeding can be seen in previously attacked areas of the mucosa, while the parasites’ gut containing blood can be readily visualized. The patient presented, had severe anemia. The presence of more than 40 adult hookworms has been reported to be adequate to cause a host hemoglobin level of less than 6.82 mmol/L, especially if the initial iron stores of the host were not adequate[9].

Eosinophilia can also be detected in 30% to 60% of cases[10] and its peak usually coincides with the development of adult hookworms in the intestine, which in turn occurs 5 to 9 wk after the onset of the infection[10]. Our patient immigrated to Greece almost a year ago and it seems unlikely that his eosinophilia represents the stage of adult hookworm formation. Rather, it probably reflects the state of chronic eosinophilia of the parasitic infection.

The diagnosis of hookworm infestation is normally based on the microscopical examination of feces to detect hookworm eggs[11]. However in this case, stool microscopy failed to identify any eggs. This was also the case in some other instances of hookworm infections diagnosed by capsule endoscopy[11-14]. It seems however that this is the first such endoscopically proven case reported in Europe. Capsule endoscopy provided us with a better insight into the processes taking place in this disease entity. In addition, this case underscores the importance of parasites as the cause of disease, even in non endemic areas.
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