

## A Case of Gastric and Duodenal Strongyloidiasis

\*Dhuha M A Al-Sajee and Aisha Al-Hamdani

### داء الأسطوانيات في المعدة والاثني عشر

ضحى محمود علوان الساجي، عائشة الحمداية

**الملخص:** تعتبر الدودة الأسطوانية البرازية من الممسودات (الديدان المدوّرة) التي تسبب حالات مزمنة من العدوى في الأمعاء دون ظهور أعراض مرضية. أما عند المرضى الذين يعانون ضعفا في المناعة فيمكن أن تسبب تلك الديدان تهديدا للحياة مع وجود أمراض أخرى. يصعب تشخيص حالة العدوى بالديدان عن طريق الفحص المجهرى لعينة برازية بالكشف عن يرقات الديدان تحت المجهر لأن اليرقات تكون قليلة جدا. نستعرض هنا حالة لشخص عمره 52 عاما من مدينة صلالة بمحافظة ظفار، يشكو من داء السكري (النوع الثاني) لمدة 15 عاما، وقد تم تشخيص إصابته بمرض ابيضاض الدم ذي الخلية المشعرة حديثا. يشكو المريض من الغثيان وأوجاع في البطن وفقدان الشهية مع نقص الوزن. بعد إجراء ناظور المريء والمعدة والأمعاء وأخذ الخزعات للفحص النسيجي المرضي، تم تشخيص الحالة بالإصابة بداء الاسطوانيات. الملخص: الدودة الأسطوانية البرازية، عدوى الأمعاء، تقرير حالة، عمان.

**ABSTRACT:** *Strongyloides stercoralis* is a nematode parasite which causes a protracted asymptomatic intestinal infection. It is considered a life threatening condition in immunocompromised patients when hyperinfection is associated with disseminated disease. The diagnosis by routine stool examination is very limited since the larval output in stools is very low. We present the case of a 52 year-old Omani man from Salalah, in the southern region of Oman, with a 15-year history of type 2 diabetes mellitus and recently discovered to have hairy cell leukaemia, who complained of nausea, abdominal pain, loss of appetite and loss of weight. An oesophagogastroduodenoscopic biopsy was obtained and histopathologic examination revealed gastrointestinal strongyloidiasis.

**Keywords:** *Strongyloides stercoralis*; intestinal infection; Case report; Oman.

**S**TRONGYLOIDIASIS IS CAUSED BY AN infection with *Strongyloides stercoralis*.<sup>1</sup> The diagnosis of strongyloidiasis is often difficult since stool examination is negative in up to 50–70% of the cases.<sup>2</sup> The role of the histopathological examination of the surgical and cytology specimens is important in the diagnosis and exclusion of a wide range of infectious diseases.

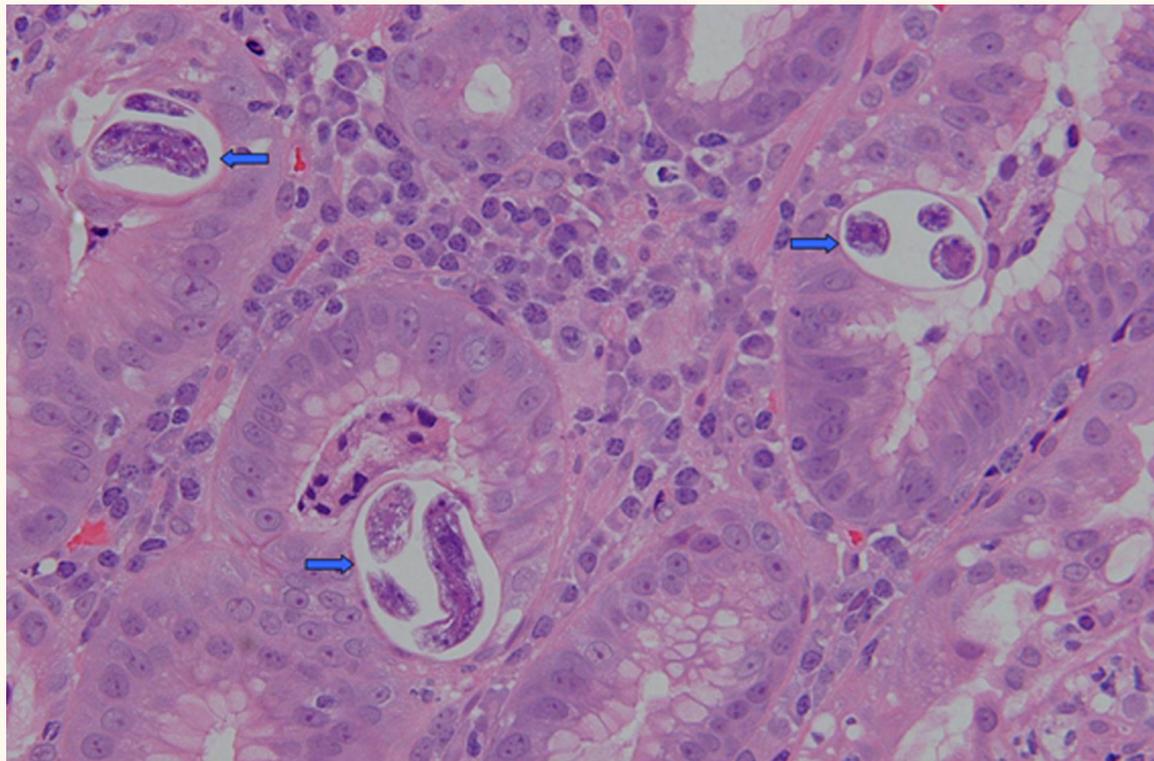
### Case Report

A 52 year-old man from Salalah region was referred to Sultan Qaboos University Hospital, Oman, complaining of pyrexia of unknown origin of 6 weeks duration. Upon admission, he was diagnosed to have hairy cell leukemia on both blood film and bone marrow aspirate. The patient was a known case of type 2 diabetes mellitus of 15 years duration and had a previous history of treatment for *Helicobacter pylori* induced chronic gastritis.

The patient also complained of epigastric pain with nausea and loss of appetite as well as loss of weight; however, no skin manifestations, indicative of cutaneous infestations, were present. The peripheral blood oesinophilic count was normal. A repeated routine stool examination was negative for parasites. A serology test for detection of *Strongyloides* infection was not done.

An oesophageogastroduodenoscopy was performed and the findings showed gastritis with multiple duodenal ulcers and hypertrophied mucosa. Gastric and duodenal biopsies (2 and 3 mm across respectively) were taken and separately submitted for histopathological examination. On gross examination, the fragments were received fixed in formalin and separately labelled as gastric and duodenal biopsies. The specimens were routinely processed and stained with haematoxylin and eosin staining.

Microscopic examination of the samples



**Figure 1:** Haematoxylin and eosin (H&E) stain, gastric mucosa x 40 showing cross-sections of *Strongyloides stercoralis* (arrows)

obtained by the gastric biopsy showed gastric antral mucosa [Figure 1] with cross-sections of many parasitic worms, morphologically consistent with *Strongyloides stercoralis*, seen within the crypts, in the glandular epithelium and within the lamina propria with associated chronic inflammatory cell infiltration in the lamina propria. There was no intestinal metaplasia, malignancy or *H. pylori* organisms

Sections from the duodenal biopsy showed small bowel mucosa [Figure 2] with numerous cross as well as longitudinal sections of *Strongyloides stercoralis*. The lamina propria showed active chronic inflammatory cell infiltrate consisting of eosinophils, plasma cells and lymphocytes.

The patient was treated with albendazole 400 mg orally twice daily for ten days and he was found to be completely cured of strongyloidiasis when the gastric and duodenal biopsies were repeated.

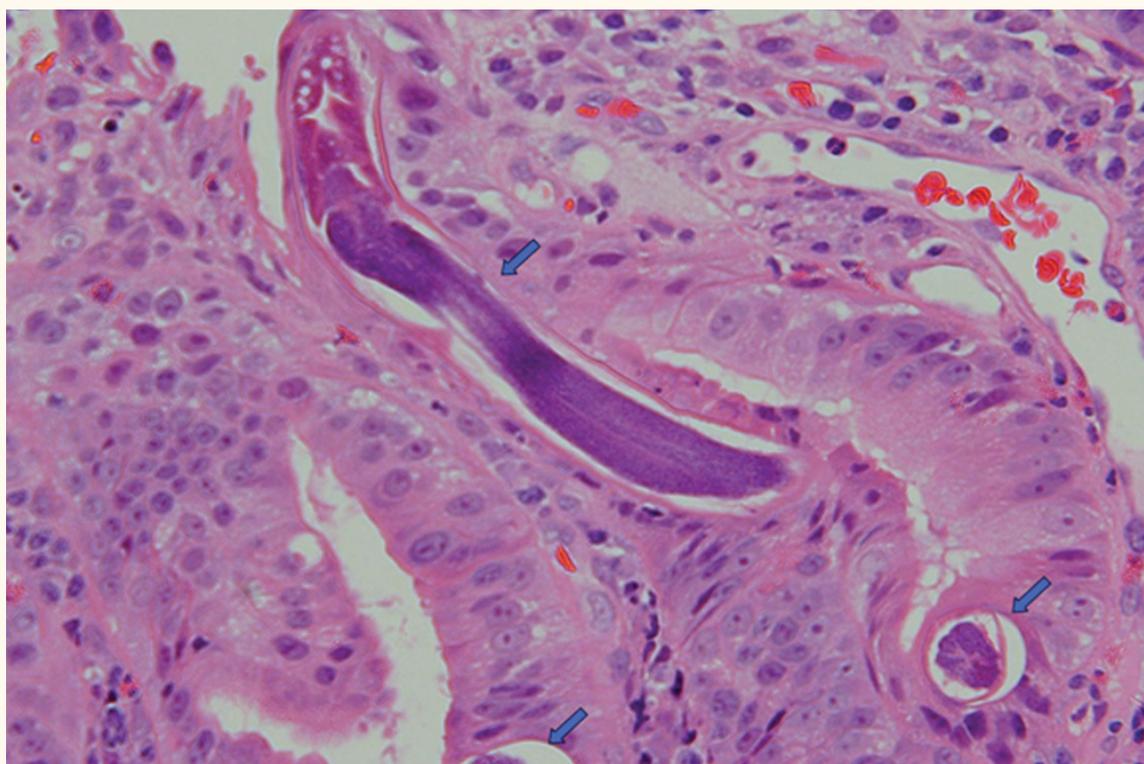
## Discussion

Infection with *Strongyloides stercoralis* is known as strongyloidiasis or threadworm infection. The global prevalence is 30–100 million with the highest prevalence in the developing countries of Asia,

Africa and Latin America.<sup>2</sup> It is endemic in tropical and sub-tropical areas of the world.<sup>2,3</sup> In Oman, the weather is predominantly hot and dry in most of the areas except in the Salalah region, where it is relatively cool and rainy, thus encouraging parasitic intestinal helminthiasis; nonetheless, strongyloidiasis is considered to be of low prevalence in Oman.<sup>4,5</sup>

*Strongyloides stercoralis* can alternate between parasitic and free-living life cycles. In the free-living cycle, the rhabditiform larvae are shed in the stool into the soil where they grow into adult worms that produce eggs which will hatch to larvae. These larvae can either grow to adult worms or penetrate the human skin to start the parasitic life cycle. In humans, the larvae are transported to the lungs through the blood stream and then through the alveoli and bronchi they reach the pharynx where they are swallowed into the stomach and the small intestine. In the small intestine, the larvae grow into adult female worms. By parthenogenesis, the female worms produce eggs that hatch to larvae and cause autoinfection.<sup>6</sup>

The diagnosis of strongyloidiasis by routine stool examination is very limited since the output of the parasite in the stool is low and thus 50–70% of a single



**Figure 2:** Haematoxylin and eosin (H&E) stain, duodenal mucosa x 60 showing cross and longitudinal sections of *Strongyloides stercoralis* (arrows)

general stool examination is unrewarding.<sup>2,4,5</sup> It is also worth mentioning that the eosinophilic count is not a reliable indicator of parasitic infection.<sup>6</sup>

Although the serological test enzyme-linked immunosorbent assay (ELISA) for diagnosing strongyloidiasis is highly sensitive (reaching up to 90%), the test is not always available, does not discriminate recent from old infections, and shows cross-reaction with other helminth infections. Thus the pathological examination of tissue sections and aspirate material gives the definitive diagnosis.<sup>6</sup>

Nonetheless, in order to reach a correct diagnosis of a specific helminthic infection, the pathologist needs to have a wide knowledge of the types of helminthes that localise within body tissues and fluids together with the stages of development and the morphological features to avoid misdiagnosing them as an arthropod or artifacts.

A definite diagnosis is made by finding one or more stages of the parasites in faeces, an intestinal aspirate, peritoneal fluid, peripheral blood or in tissue sections. The haematoxylin and eosin (H&E) stained section plays two roles in tissue diagnosis of parasitic infections. First, it allows detection of most parasites or their eggs. Second, for those which are

not readily visualised, the pattern of inflammation, in conjunction with the clinical history, may provide a clue to their presence and thus initiate a more careful search and further evaluation using special stains.<sup>7</sup> For the diagnosis of strongyloidiasis no special stains are required. However, difficulties in the diagnosis of strongyloidiasis may arise in mixed infections with Gram-negative bacteria.<sup>7</sup>

Early diagnosis is very important especially in immunocompromised patients or patients on steroids and chemotherapy in order to lower the fatality due to hyperinfection.<sup>4</sup>

In our case, the patient had a long history of gastrointestinal symptoms consisting of abdominal pain, nausea and loss of appetite which were relieved following the treatment of strongyloidiasis. The risk of hyperinfection in this case is high because of his associated medical illnesses and hairy cell leukaemia.

## Conclusion

Although *Strongyloides stercoralis* infection is usually asymptomatic and routine stool examination may be negative, histopathological identification of

the parasite in tissue sections provides the definite diagnosis. Early diagnosis of such parasitic infection in immunocompromised patients is life saving and avoids fatality caused by hyperinfection or systemic dissemination. We therefore recommend that strongyloidiasis should be on the top of the differential diagnosis list for any patient who is immunocompromised and complaining of gastrointestinal symptoms in order to avoid the dramatic complication of hyperinfection.

#### ACKNOWLEDGEMENT

We authors wish to thank the doctors in the Department of Medicine of Sultan Qaboos University Hospital for the concurrent medical management of this case.

## References

1. Marty AM, Andersen EM. Helminthology in tropical pathology. In: Doerr W, Seifert G, Uehlinger E, Eds. 2nd Ed. Berlin: Springer-Verlag, 1995. pp. 801–982.
2. Davila PM, Fortun J, Velez RL, Norman F, Montes de Oca M, Zamarron P, et al. Transmission of tropical and geographically restricted infections during solid-organ transplantation. *Clin Microbiol Rev* 2008; 21:60–96.
3. Hotez PJ, Brindley PJ, Bethony JM, King ChH, Pearce EJ, Jacobson J. Helminth infections: the great neglected tropical diseases. *J Clin Invest* 2008; 118:1311–21.
4. Patel PK, Khandekar R. Intestinal parasitic infections among school children of Dhahira Region of Oman. *Saudi Med J* 2006; 27:627–32.
5. Scrimgeour EM, Mehta FR, Suleiman AMJ. Infectious and tropical diseases in Oman: a review. *Am J Trop Med Hyg* 1999; 61:920–5.
6. Agrawal V, Agarwal T, Ghoshal UC. Intestinal strongyloidiasis: a diagnosis frequently missed in the tropics. *Trans R Soc Trop Med Hyg* 2009; 103:242–6.
7. Woods GL, Walked DH. Detection of infection and infectious agents by use of cytologic and histologic stains. *Clin Microbiol Rev* 1996; 9:382–404.