CASE REPORT

Endoscopic (video) demonstration of hookworm infestation of the stomach

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SUMMARY

Hookworm infestation is common in southern India. The adult worms normally reside in the duodenum, graze the intestinal mucosa with their large buccal cavities and ingest the intestinal epithelial cells and blood. Depending on the number of worms the infection may be either asymptomatic or can cause iron deficiency anaemia due to chronic blood loss. Adult worms live in the small intestine and are not usually seen in the stomach. There are only very few case reports in the literature reporting hookworm infestation of the stomach. In this case report we present an endoscopic (video) demonstration of hookworm infestation of the stomach in a woman who presented with chronic anaemia.

CASE PRESENTATION

A 55-year-old woman presented with generalised weakness and exertional dyspnoea of 2 months duration. On examination she had pallor, and systemic examination was normal. Investigation revealed hypochromic microcytic anaemia (haemoglobin of 9 g/dL). Stool for ova, cyst and occult blood was negative. Gastroscopy was performed to evaluate the cause of anaemia, which revealed a few hookworms in the duodenum and a single hookworm in the antrum (figures 1 and 2). Initially we thought that the worm seen in the stomach entered due to the jejunoduodenogastric reflux secondary to retching during the endoscopic procedure, but on careful examination it was found that the worm was grazing the stomach mucosa and even on forceful flushing with water the worm could not be flushed (video 1). The gastric mucosa

Figure 2 Endoscopy picture showing hookworm in the antrum.

around the worm where it was grazing was oedematous though there were no erosions. The worm along with a mucosal bit was removed with biopsy forceps. After biopsy, the hookworm got separated from the gastric mucosal bit. Histopathology section revealed a hookworm with ingested gastric epithelial cells and red blood cells inside the lumen of the worm (figure 3). Since electron microscopy is required to exactly identify the species of the hookworm it was not carried out in our patient. The histopathology from the gastric mucosal bit revealed focal atrophy and focal cryptitis with infiltration of lamina propria by lymphoplasmacytic infiltration and a few scattered haemorrhages. A colonoscopy was also carried out which was normal. She was treated with albendazole and was started on haematinics.

OUTCOME AND FOLLOW-UP

The patient's haemoglobin is improving (haemoglobin of 13.5 g/dL) and she has been asymptomatic for the past 2 months.

DISCUSSION

Hookworm infestation is common worldwide and is one of the commonest parasitic infections seen in India. It is seen more commonly in rural areas where people work in the field without footwears since it is usually acquired by penetration of the intact skin by the third stage larvae (infective stage of the parasite) present in the soil. After penetration of the skin they enter the blood stream and reach the lungs, where they penetrate the alveoli and reach the airspaces and ascend through the

Figure 1 Endoscopy picture showing a hookworm in the first part of the duodenum.

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Video 1 Endoscopic video demonstrating the grazing of the antral mucosa of the stomach by the hookworm.

respiratory tree and are then swallowed into the gastrointestinal tract. They reach the small intestine and mature into adult worms which usually measure around 1 cm in length and each worm can live for 14 years. The male and female worms mate and the females lay around 10 000–20 000 eggs/day which are excreted in the stools. The eggs then become rhabditiform larvae in the soil and they infect a new host when they come in contact with the skin.

The common types of hookworms which infect humans are *Ancylostoma duodenale* and *Necator americanus*. The adult

worms develop large buccal cavities and they graze the intestinal mucosa and suck the blood of the host. Each adult worm can suck blood of about 0.01–0.04 mL/day in case of *N americanus* and 0.05–0.3 mL/day in case of *A duodenale*.¹ Hence depending on the load of infection they can cause either asymptomatic infection if it is mild or anaemia if it is moderate or more. Diagnosis is usually made by demonstration of the eggs in the stool sample and the treatment is a single dose of albendazole.

The swallowed larvae of the hookworm develop into adult worms only in the small intestine and they attach to the small intestinal mucosa and thrive on the host's blood. They are not usually seen in the stomach. So far in the literature only a few reports of hookworm infestation of the stomach are available.^{2 3} The proposed mechanism by which the adult worm reaches the stomach might be the jejuno duodenogastric reflux. In general parasitic infection of the stomach is extremely rare. Some of the other rare parasitic infections of the stomach that have been reported are strongyloidiasis, cryptosporidiosis, anisakiasis and ascariasis. The major reason for the rarity of gastric infections might be the acidic environment present in the stomach due to gastric acid secretion. Ever since the introduction of proton pump inhibitors (PPI) many people worldwide with acid peptic disease, gastro-oesophageal reflux disease, people on non-steroidal anti-inflammatory drugs, to mention a few, are on prolonged intake of this drug. Hence this group of population who are on prolonged PPI may not have the normal acidic environment in the stomach and this might be a factor facilitating colonisation of these parasites in the stomach; however, studies are required to confirm this hypothesis. Our patient was on prolonged PPI intake for acid peptic disease prescribed by her primary care physician. To the best of our knowledge, this is the first video demonstration of the grazing of stomach mucosa by a hookworm (video 1). In our patient the cause of anaemia was most probably hookworm infestation of the small intestine. In addition, she also had hookworm infestation of the stomach. The fact that there were haemorrhages noted in the gastric biopsy specimens suggests that the worm in the stomach was sucking blood from there.

Learning points

- ▶ Adult hookworms may rarely be seen in the stomach.
- ▶ Hookworms can graze the stomach mucosa as well and can suck blood and ingest the epithelial cells from the stomach like they usually do in the small intestine.
- ▶ The treatment is the same for hookworm infestation of the stomach as with hookworm infestation of the small intestine.

Contributors VB was the endoscopist and was involved in the conception and designing of the manuscript. PB was involved in literature research and data analysis and its interpretation. MDP and RG'BV helped in preparation of the pathology pictures and also helped in editing the manuscript.

Competing interests None.

Patient consent Obtained.

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Figure 3 Histopathology picture showing the cut section of the hookworm.

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