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Stool examination for occult blood in severe hookworm infection in our study compared with other studies

Govindarajalu Ganesan

Associate professor, Dept. of General surgery, Indira Gandhi Medical College and Research Institute, Puducherry India

Abstract

Objective: Stool examination for occult blood in patients with severe hookworm infection in our study was compared with other studies.

Methods: A study of 1100 patients who had undergone upper gastro-intestinal endoscopy for a period of four and half years from May 2009 to October 2013 was carried out. In all the patients found to have hookworms in duodenum, investigations were done to know about the presence of anaemia. In patients with severe anaemia [haemoglobin <7g/dl or g%] due to severe hookworm infection stool examination was done to look for the presence or absence of occult blood. The results were found as given below.

Results: Out of these 1100 patients, 14 patients found to have hookworms in duodenum were taken into consideration for our study. Out of these14 patients, 2 were found to have severe anaemia [haemoglobin <7g/dl or g%] due to severe hookworm infection. But in both these patients, stool examination was negative for occult blood despite a heavy burden of hookworm infection with severe anaemia.

Conclusion: Thus even a heavy burden of hookworm infection with severe anaemia can present with negative stool examination for occult blood. Hence upper gastro intestinal endoscopy should be done to confirm the presence of hookworms in all patients with severe anaemia even when stool examination is negative for occult blood.

Keywords: severe anaemia, severe hookworm infection, stool examination for occult blood, upper gastro intestinal endoscopy

Introduction

Many studies have shown the presence of severe anaemia in severe hookworm infection. [1-17]. Stool examination for occult blood in patients with severe anaemia due to severe hookworm infection in our study was compared with other studies.

Materials and Methods

This study was conducted in the department of general surgery, Aarupadai Veedu Medical College and Hospital, Puducherry. A study of 1100 patients who had undergone upper gastro-intestinal endoscopy for a period of four and half years from May 2009 to October 2013 was carried out. In each of these 1100 patients, the first and second part of duodenum were carefully examined to find out the presence of single or multiple hookworms. In all the patients found to have hookworms in duodenum, investigations were done to know about the presence of anaemia. In patients with severe anaemia [haemoglobin <7g/dl or g%] stool examination was done to look for the presence or absence of occult blood. Anaemia is defined as haemoglobin < 12g/dl or 12g% in women and haemoglobin or < 13g/dl or13g% in men. Mild anaemia is taken as haemoglobin 10to12g/dl or g%, moderate anaemia is taken as haemoglobin 7to10g/dl or g% and severe anaemia is taken as haemoglobin <7g/dl or g%. The results were found as given below.

Results

Out of these 1100 patients, 14 patients found to have hookworms in duodenum were taken into consideration for our study. Out of these14 patients, 9 patients had anaemia and 2 of these 9 patients were found to have severe anaemia [haemoglobin <7g/dl or g%]. Severe anaemia indicates significant loss of blood which will occur only due to heavy burden of hookworms in severe hookworm infection.

Severe anaemia with negative stool examination for occult blood in patients with severe hookworm infection in our study.

In both the patients with severe anaemia due to severe hookworm infection in our study [haemoglobin 2.1 g%, 3.2g%], stool examination was negative for occult blood despite heavy burden of hookworm infection (Fig1, 2).

1. Multiple hookworms in duodenum in a patient with severe anaemia [haemoglobin 2.1 g %] due to severe hookworm infection but with negative stool examination for occult blood is shown in fig 1.
2. Multiple hookworms in duodenum in the patient with with severe anaemia [haemoglobin 3.2 g %] due to severe hookworm infection but with negative stool examination for occult blood is shown in fig 2.

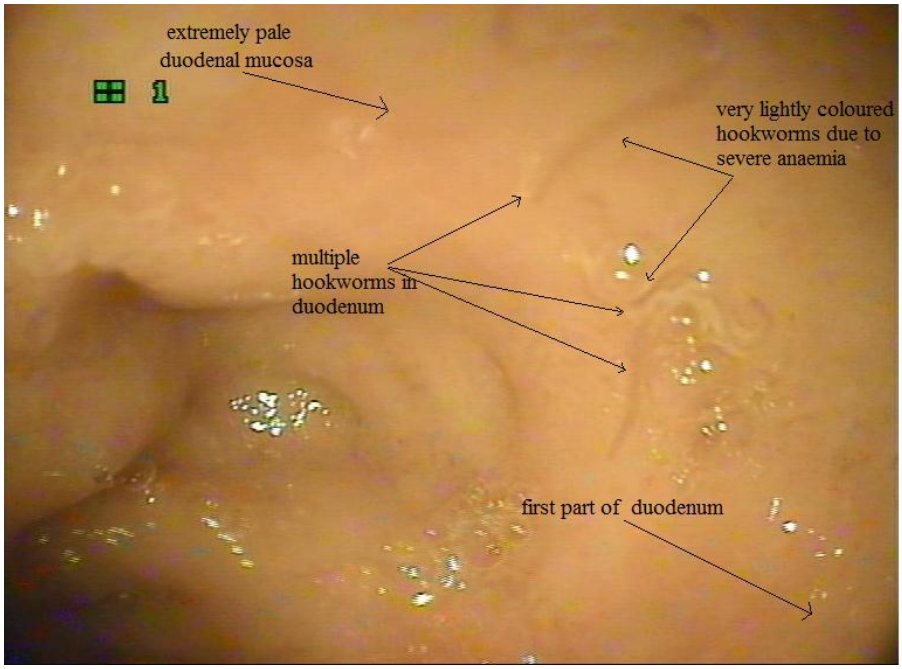

Fig 1: Multiple hookworms in duodenum in the patient with severe anaemia [haemoglobin 2.1 g %] due to severe hookworm infection but with negative stool examination for occult blood

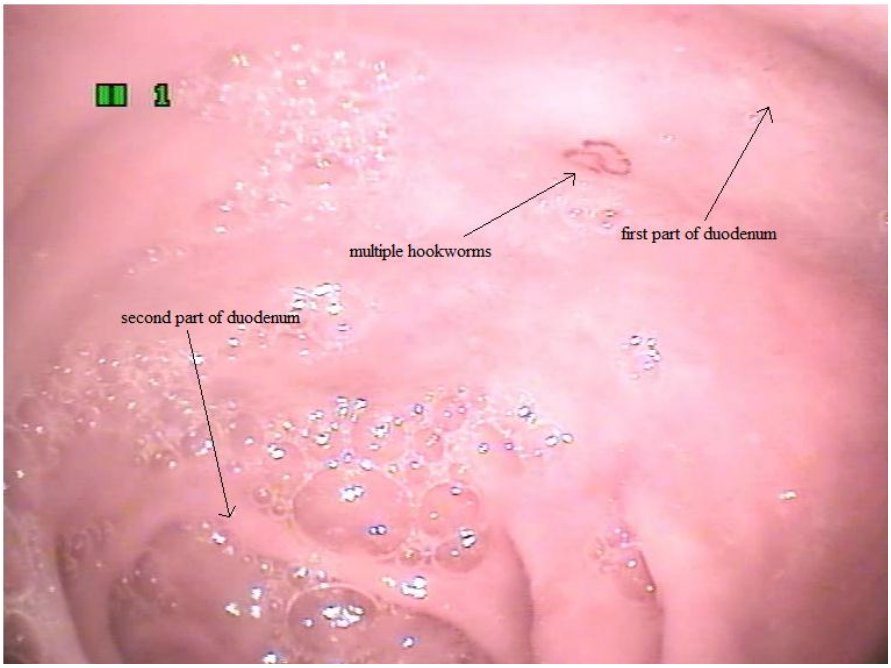

Fig 2: Multiple hookworms in duodenum in the patient with severe anaemia [haemoglobin 3.2 g %] due to severe hookworm infection but with negative stool examination for occult blood

Discussion

There are two human-specific hookworms, namely Ancylostoma duodenale and Necator americanus [2]. Hookworm is a common cause of occult gastrointestinal bleeding and anemia especially in the tropical countries [2]. The most common laboratory finding in hookworm infection is iron deficiency anemia resulting from chronic occult blood loss [14]. The degree of anemia depends on hookworm burden and the species, because Ancylostoma duodenale causes more blood loss than Necator americanus [14].

Each worm sucks between 0.1 and 0.4 mL of blood/day [17]. It can be responsible for a blood loss of up to 250 mL/day in heavy infection [17]. The severity of blood loss in hookworm disease depends on the acuteness and magnitude of infestation [17]. Acute heavy infection is usually presented as bloody or tarry stools, whereas chronic infestation is usually associated with occult bleeding only with the presence of occult blood in stool examination [17].

Stool examination for occult blood in severe hookworm infection in our study compared with other studies

a) In both the patients in our study, stool examination was negative for occult blood despite heavy burden of hookworm infection with severe anaemia (Fig1, 2).

b) But in many studies, stool examination was positive for occult blood in patients with heavy burden of hookworm infection with severe anaemia [2, 3, 9, 11, 14, 17]. This is the expected result since heavy burden of hookworm infection with severe anaemia produces significant loss of blood in the small intestine.

i) In the study conducted by Wu KL et al (2) in Taiwan, a 78-year-old man complained of intermittent black color stool passage for 4 months. Laboratory data showed iron-deficiency anemia. Stool routine examination showed positive occult blood. Upper gastro intestinal endoscopy showed live worms measuring 4-6 mm in length were found in the second portion of the duodenum. They were removed by using the biopsy forceps and these worms were identified as adult hookworms of Necator americanus species.

ii) In the study conducted by Kuo YC et al (3) in Taiwan, a 61-year-old male farmer complained of general malaise and melena for 6 months. Laboratory data showed iron-deficiency anemia(hemoglobin of 6.5 g/dL). Stool examination was positive for occult blood. Upper gastro intestinal endoscopy showed several squirming red worms in the duodenal bulb. Hookworm (Ancylostoma duodenale) infection was diagnosed histologically from a specimen obtained endoscopically.

iii) In the study conducted by Li ZS et al (9) in Shanghai, China, a 38-year-old Chinese woman complained of 3-month history of black stool passage and dizziness. Laboratory test results included hemoglobin, 40 g/L(normal: 120 - 160 g/L). A capsule endoscopy performed to evaluate the patient further for occult gastrointestinal tract bleeding showed multiple hookworms.

iv) In the study conducted by Chen JM et al (11) in China, a 53-year-old male patient complained of intermittent tarry stool with fatigue and shortness of breath for 1 week. Laboratory data revealed hemoglobin of 66 g/L(normal: 120 - 160 g/L). The patient's fecal occult blood was positive, which suggested gastrointestinal bleeding with anemia. A capsule endoscopy performed to evaluate the patient showed multiple hookworms.

v) In the study conducted by Yan SL et al (14) in China, a 60−year−old male farmer presented with intermittent melena and anemia for 1 month. Laboratory data revealed a hematocrit of 24.2% (normal: 42± 52%). The patient's fecal occult blood was positive. The patient underwent push enteroscopy, demonstrating several reddish worms grazing in the duodenum. Three worms were removed with biopsy forceps and were identified on microscopic examination as hookworm, Necator americanus.

vi) In the study conducted by Bamanikar S et al (17) in *Pune, Maharashtra, India*, a 35-year-old male presented with iron-deficiency anemia (hemoglobin: 4.6 g/dl). Stool routine examination showed presence of occult blood. Upper gastro intestinal endoscopy showed live worms. They were removed by using the biopsy forceps and these worms were identified as adult hookworms of Ancylostoma duodenale species histologically.

c) Hence stool examination with negative result for occult blood despite heavy burden of hookworm infection with severe anaemia seen in our study is unexpected, extremely rare and is only very rarely reported in the literature.

d) Only in one study, stool examination was negative for occult blood despite heavy burden of hookworm infection with severe anaemia [1].

Conclusion

1. In many studies, stool examination was positive for occult blood in patients with severe anaemia due to severe hookworm infection.
2. But in both our patients with severe anaemia due to severe hookworm infection, stool examination was negative for occult blood.
3. Thus even a very heavy burden of hookworm infection with severe anaemia can rarely present with negative stool examination for occult blood.
4. Hence upper gastro intestinal endoscopy should be done to confirm the presence of hookworms in all patients with severe anaemia in tropical countries even when stool examination is negative for occult blood.

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