

Severe Anaemia And Its Relation With Stool Examination For Occult blood in Patients With Severe Hookworm Infection Found While Doing Endoscopy

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Abstract - Objective: A detailed study was done to know about severe anaemia and its relation with stool examination for occult blood in patients with severe hookworm infection found while doing upper gastro intestinal endoscopy.

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%] 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 these 14 patients, 2 were found to have severe anaemia [haemoglobin <7g/dl or g%]. Severe anaemia is suggestive of severe hookworm infection due to heavy burden of hookworms. 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 hook worms in all patients with 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

I. INTRODUCTION

Many studies have shown the presence of severe anaemia in severe hook worm infection. [1 to 16]. But so far detailed

study was not done to know about the occurrence of severe anaemia and its relation with stool examination for occult blood in patients with severe hookworm infection. Hence a detailed study was done to know about severe anaemia and its relation with stool examination for occult blood in patients with severe hookworm infection found while doing upper gastro intestinal endoscopy.

II. 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 hook worms in duodenum, investigations were done to know about the presence of anaemia and eosinophilia. 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 <13g/dl or 13g% in men. Mild anaemia is taken as haemoglobin 10 to 12g/dl or g%, moderate anaemia is taken as haemoglobin 7 to 10g/dl or g% and severe anaemia is taken as haemoglobin <7g/dl or g%. Eosinophilia is defined as eosinophils > or = 500 cells/cu.mm [17]. Severe eosinophilia is defined as eosinophils > 1000 cells/cu.mm [18]. The results were found as given below.

III. RESULTS

Out of these 1100 patients, 14 patients found to have hookworms in duodenum were taken into consideration for our study. Out of these 14 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 hook worms in severe hook worm infection.

a. Severe anaemia and its relation with stool examination for occult blood.

In both the patients with severe anaemia in our study [haemoglobin 2.1 g%, 3.2g%], stool examination was negative for occult blood despite heavy burden of hook worm infection with severe anaemia (Fig 1, 2).

b. Severe anaemia with negative stool examination for occult blood and its relation with eosinophilia.

1. Out of the 2 patients with severe anaemia with negative stool examination for occult blood in our study, one patient had severe eosinophilia [absolute eosinophil count-1100 cells/cu.mm] but the other patient did not have eosinophilia [absolute eosinophil count- 366 cells/cu.mm].

2. Other studies have also shown the occurrence of severe anaemia with eosinophilia [7,14].

3. Studies have also shown the occurrence of severe anaemia without eosinophilia [2,3,10,11].

4. Multiple hookworms in duodenum with severe anaemia [haemoglobin 2.1 g %] due to heavy burden of hookworm infection but without eosinophilia [absolute eosinophil count- 366 cells/cu. mm] is shown in fig 1.

5. Multiple hookworms in duodenum with severe anaemia [haemoglobin 3.2 g %] due to heavy burden of hookworm infection with severe eosinophilia [absolute eosinophil count-1100 cells/cu. mm] is shown in fig 2.

IV. DISCUSSION

Hookworm is one of the most common parasites in the world, about 1.3 billion of people are infected globally [2]. It is also a common cause of occult gastrointestinal bleeding and anemia especially in the tropical countries [2]. There are two human-specific hookworms, namely *Ancylostoma duodenale* and *Necator americanus* [2].

Gastrointestinal blood loss associated with hookworm infestation is always occult but massive bleeding is uncommon [2]. Although it is less common than other diseases such as neoplasm and ulcer, parasite infection should always be considered as a differential diagnosis in patients with iron-deficiency anemia and unexplained gastrointestinal blood loss, especially in poor sanitary areas [2]. A heavy worm burden, a prolonged duration of infection, and an inadequate iron intake may result in iron deficiency anemia (IDA) in heavy infection [3]. 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 [16].

The most common laboratory findings are eosinophilia and iron deficiency anemia resulting from chronic occult blood loss [14]. However, patients with hookworm infection may present with acute massive gastrointestinal bleeding [14]. Furthermore, the degree of anemia depends on hookworm burdens and the species, because *Ancylostoma duodenale* causes more blood loss than *Necator americanus* [14].

The most common hookworm-related disease in man is iron deficient anemia (IDA), as was seen in both our patients [19]. This occurs when the adult parasites cause intestinal blood loss [19]. The teeth of the adult worm allow it to grip the villus of intestinal mucosa [19]. The worm secretes an anticoagulant that facilitates ingestion of blood and juices from the host [19]. They periodically change their location, leaving bleeding points [19]. This can lead to multiple, different stage ulcers [19]. The mechanism of blood loss is not only mechanical through mucosal injury by worm sucking blood but also chemical [19]. The adult hookworms release anti-clotting agents (one of these, a novel factor VIIa/tissue factor inhibitor) [19]. Each worm sucks between 0.1 and 0.4 mL of blood/day [19]. It can be responsible for a blood loss of up to 250 mL/day in heavy infection [19]. The severity of blood loss in hookworm disease depends on the acuteness and magnitude of infestation [19]. 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 [19].

Severe anaemia and its relation with stool examination for occult blood.

a. In both the patients in our study, stool examination was negative for occult blood despite heavy burden of hookworm infection with severe anaemia (Fig 1, 2).

b. But in many studies, stool examination was positive for occult blood in patients with heavy burden of hook worm infection with severe anaemia [2,3,9 to 11,14,19]. This is the expected results in heavy burden of hook worm infection with severe anaemia produces significant loss of blood in the small intestine.

c. Hence stool examination with negative result for occult blood despite heavy burden of hook worm 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].

Importance of upper gastro intestinal endoscopy in the diagnosis of hookworm infection.

a. In both our patients, stool examination was negative for occult blood despite a very heavy burden of hookworm infection with severe anaemia.

b. In both our patients, hookworm infection could be diagnosed despite negative stool examination for occult blood only by doing upper gastro intestinal endoscopy.

c. Hence upper gastro intestinal endoscopy is an extremely useful investigation and is very helpful in the diagnosis of hookworm infection even when stool examination is negative for occult blood.

V. CONCLUSION

1. In both our patients with severe anaemia due to severe hookworm infection, stool examination was negative for occult blood.

2. Thus even a very heavy burden of hookworm infection with severe anaemia can present with negative stool examination for occult blood.

3. Hence upper gastro intestinal endoscopy should be done to confirm the presence of hookworms in all patients with anaemia in tropical countries even when stool examination is negative for occult blood.

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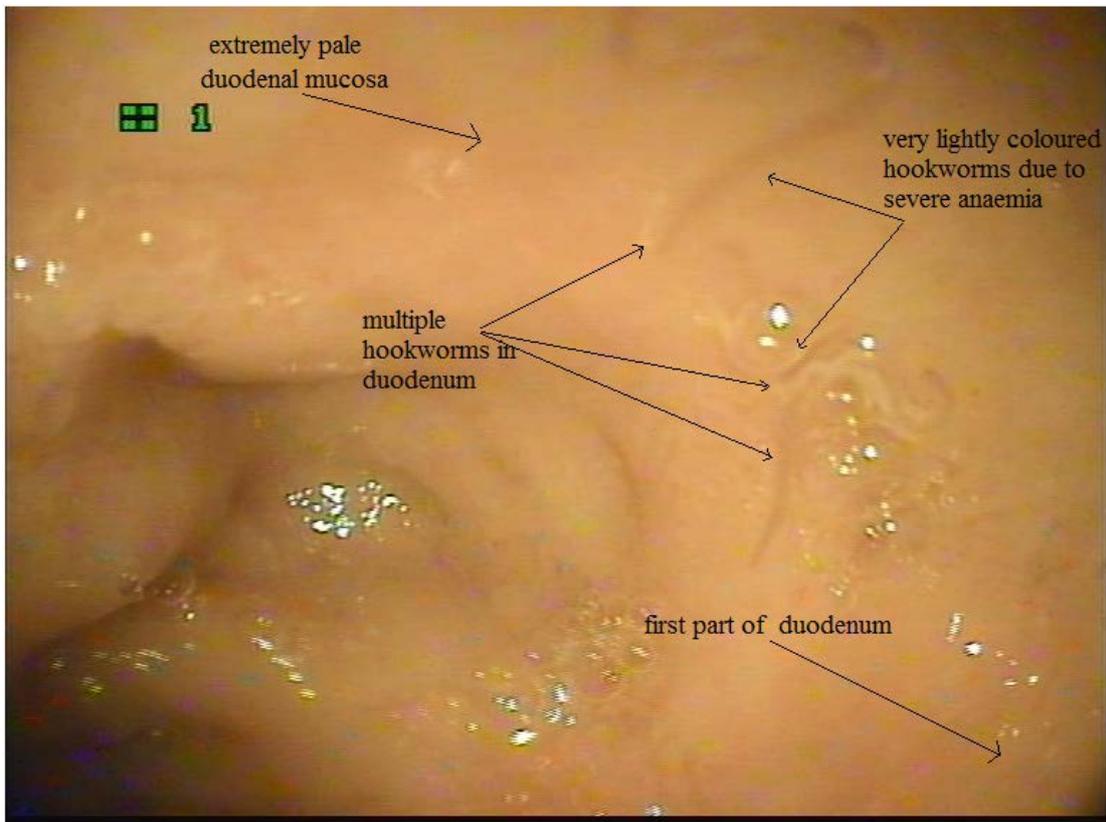


Fig 1:multiple hookworms in duo denum with evere anaemia [haemoglobin 2.1 g %] due to heavy burden of hookworm infection but without eosinophilia [absolute eosinophil count- 366cells/cu.mm]

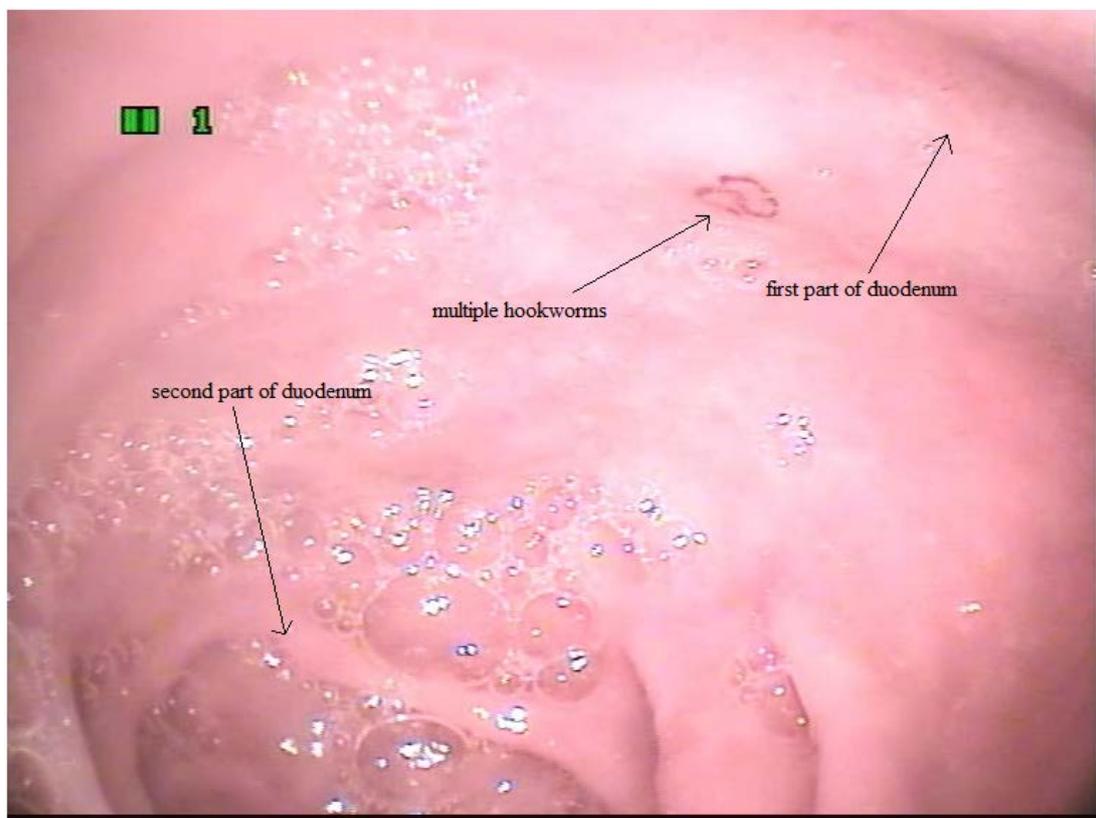


Fig 2 :multiple hookworms in duo denum with evere anaemia[haemoglobin 3.2 g %]due to heavy burden of hookworm infection with severe eosinophilia [absolute eosinophil count-1100 cells/cu.mm]