



A DETAILED STUDY TO KNOW ABOUT THE OCCURRENCE OF CHRONIC DIARRHEA IN ADDITION TO SEVERE ANAEMIA AND SEVERE EOSINOPHILIA IN PATIENTS HAVING HOOKWORMS IN DUODENUM WHILE DOING UPPER GASTRO-INTESTINAL ENDOSCOPY IN HEALTHCARE INSTITUTE

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ABSTRACT

Objective: Severe anaemia and severe eosinophilia are commonly reported to occur in hookworm infection. But chronic diarrhea is not commonly reported to occur in hookworm infection. Hence a detailed study was done to know about the occurrence of chronic diarrhea in addition to severe anaemia and severe eosinophilia in patients having hookworms while doing upper gastro-intestinal endoscopy in our institute.

Methods: A study of 1259 patients who had undergone upper gastro-intestinal endoscopy in our institute for a period of 5 years from May 2009 to April 2014 was carried out in order to find out the occurrence of chronic diarrhea in addition to severe anaemia and severe eosinophilia in patients having hookworms in duodenum while doing upper gastro-intestinal endoscopy.

Results: Of these 1259 patients, as many as 18 patients were found to have hookworms in duodenum while doing upper gastro-intestinal endoscopy. Of these 18 patients, 4 patients were lost for follow up and full details about their investigations were not available. Among the remaining 14 patients, one patient was found to have severe anaemia but without chronic diarrhea. Three patients were found to have severe eosinophilia or hypereosinophilia [absolute eosinophil count or aec more than 1000 cells/cu.mm] but without chronic diarrhea. But interestingly, one patient was found to have severe anaemia and severe eosinophilia [absolute eosinophil count or aec -1100 cells/cu.mm] along with chronic diarrhea. Hence full details about this patient with chronic diarrhea in addition to severe anaemia and eosinophilia is thoroughly analysed and discussed in detail in this article.

Conclusion: Severe anaemia and eosinophilia are commonly reported to occur in hookworm infection. But chronic diarrhea also occurs rarely in hookworm infection. It is a well known fact that hookworm infection should be suspected strongly in patients with significant anaemia and eosinophilia. But hookworm infection should also be suspected in patients with chronic diarrhea, especially in tropical and subtropical countries.

Key Words: Severe anaemia, Severe eosinophilia, Chronic diarrhea, Hookworms in duodenum, Upper gastro-intestinal endoscopy

INTRODUCTION

There has been many reports of finding severe anaemia in patients with hookworm infection diagnosed by upper gastro-intestinal endoscopy (1-8). There has been also many reports of finding severe eosinophilia in patients with hookworm infection [(7-14)]. But chronic diarrhea

is reported to occur only rarely in hookworm infection (9, 14). In our study also, only one patient with hookworm infection was found to have chronic diarrhea. This patient with chronic diarrhea was also found to have severe anaemia and severe eosinophilia and multiple hookworms in endoscopy. Hence upper gastro-intestinal endoscopy should always be done in all patients with chronic

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diarrhea associated with eosinophilia or anaemia to confirm the presence of hookworms in tropical and subtropical countries.

MATERIALS AND METHODS

This study was conducted in the department of general surgery, Aarupadai Veedu Medical College And Hospital, Puducherry. A study of 1259 patients who had undergone upper gastro-intestinal endoscopy in our institute for a period of 5 years from May 2009 to April 2014 was carried out in order to find out the occurrence of chronic diarrhea in addition to severe anaemia and severe eosinophilia in patients having hookworms in duodenum while doing upper gastro-intestinal endoscopy. Severe eosinophilia or hypereosinophilia is defined as eosinophils >1000 cells/cu.mm (10). In each of these 1259 patients, the first and second part of duodenum were carefully examined to find out the presence of hookworms. Then a detailed study was made to know about the occurrence of chronic diarrhea in addition to severe anaemia and severe eosinophilia in patients having hookworms in duodenum and the results were found out as given below.

RESULTS

Of these 1259 patients, as many as 18 patients were found to have hookworms in duodenum while doing upper gastro-intestinal endoscopy. Of these 18 patients, 4 patients were lost for follow up and full details about their investigations were not available.

a. Severe anaemia but without chronic diarrhea

Among the remaining 14 patients, one patient was found to have severe anaemia [haemoglobin 2.1g%] but without chronic diarrhea.

b. Severe eosinophilia but without chronic diarrhea

Three patients were found to have severe eosinophilia or hypereosinophilia [absolute eosinophil count or aec 1000, 1260 and 1246] but without chronic diarrhea.

c. Severe anaemia, severe eosinophilia and chronic diarrhea all occurring together in one patient

But interestingly, one patient was found to have severe anaemia [hb 3.2g%] and severe eosinophilia [absolute eosinophil count or aec-1100 cells/cu.mm] along with chronic diarrhea. Hence full details about this patient with chronic diarrhea in addition to severe anaemia and

eosinophilia is thoroughly analysed and discussed in detail in this article.

A 47 year old female patient was admitted in our hospital on 04/07/2012 with chronic diarrhea and upper abdominal pain for 6 months. Her haemoglobin was 3.2g% [normal range 12-16g%], Absolute Eosinophil Count or AEC was 1100 cells/cu.mm [normal range 40-440 cells/cu.mm], Red Blood Cells or RBC count 2.09 million cells/cu.mm [normal range 4.2-5.4 million cells/cu.mm], mean corpuscular volume or MCV 50.7 femolitres or fl [normal range 82-92 fl] and mean corpuscular haemoglobin or MCH 15 picograms or pg [normal range 27-32pg]. Her peripheral smear showed severe microcytic, hypochromic anaemia and severe eosinophilia.

Her stool examination for ova and cyst was negative. She was treated with two pints of blood transfusion, haematinics and mebendazole 100mg twice daily for 3 days. Another course of mebendazole was given after 2 weeks. After one month her haemoglobin improved significantly to 9g%, but her chronic diarrhea persisted.

After 6 months on 28/02/2013, she was again admitted with history of loose stools 5 times daily for one week. She was given intravenous fluids and antibiotics along with metronidazole for her diarrhea. Her haemoglobin was 9.2g%, but her severe eosinophilia persisted with absolute eosinophil count more than 1000 cells/cu.mm. But her stool examination for ova and cyst was again negative. But since she was having persistent severe eosinophilia along with chronic diarrhea for many months, she was subjected to upper gastro-intestinal endoscopy on 06/03/2013 to rule out any worm infestation. Very interestingly, multiple hookworms were found in the first part of duodenum (Fig 1, 2).

Hence her severe iron deficiency anaemia at her initial admission was due to severe hookworm infection and the diagnosis of hookworm infection was completely missed at that time since upper gastro-intestinal endoscopy was not done at that time. The two full courses of mebendazole treatment given to her has failed to eradicate her hookworm infection and hence she was treated this time with a single dose of 400mg of albendazole along with haematinics and she started showing much clinical improvement.

1. Haemoglobin

Our patient had very severe anaemia and her haemoglobin was only 3.2g%. Various other studies have also shown the presence of severe anaemia in patients with hookworm infection diagnosed by upper gastro-intestinal endoscopy (1-8). The haemoglobin of the patients in the first three studies were 3.4g%, 3.7g% and 6.5g% respectively.

2. Haemoglobin and iron deficiency anaemia

Hookworm infection produces iron deficiency anaemia and iron deficiency anaemia is defined by low haemoglobin (18-22). In our patient also with severe hookworm infection, haemoglobin is very low-3.2g% [normal range12-16g%].

3. Mean corpuscular volume or mean red cell volume [MCV]

Our patient also had very low levels of mean red cell volume or MCV50.7 femolitres or fl [normal range 82-92 fl] in addition to low levels of haemoglobin. In one study also, patients with hookworm infection had very low levels of mean red cell volume or MCV in addition to low levels of haemoglobin(22).

4. Mean corpuscular haemoglobin or MCH

Mean corpuscular haemoglobin or MCH was also very low 15 picograms or pg [normal range 27-32pg] in our patient . In one study also, patients with hookworm infection had low levels of mean corpuscular haemoglobin or MCH in addition to low levels of haemoglobin (23).

5. Severe eosinophilia or hypereosinophilia

Eosinophilia means Absolute Eosinophil Count or AEC more than 500 cells/cu.mm and hypereosinophilia means Absolute Eosinophil Count or AEC more than 1000 cells/cu.mm (10).

The patient had severe eosinophilia or hypereosinophilia [Absolute Eosinophil Count or AEC – 1100 cells/cu.mm]. Various other studies have also shown the presence of severe eosinophilia in patients with hookworm infection (7-14). Eosinophilia is significantly associated with the presence of intestinal helminthes and especially with hookworm infection (11, 12) , but not with the presence of ecto parasites(10).

6. Chronic diarrhea

The patient also had chronic diarrhea. Chronic diarrhea is reported to occur only rarely in hookworm infection (9, 14). But other studies have shown the presence of acute diarrhea in patients with hookworm infection (13,15-17). In one study,the ova of necator americanus was found in the diarrhetic stool. (17). In another study, hookworm constituted 10.2% of the intestinal parasites in diarrhoeal disease in children(16). In another study also, hookworm ova was found in addition to the ova or cyst of the intestinal parasites in diarrhoeal disease in children(15). In three studies, watery diarrhea was found in patients with hookworm infection (9,13,14).

7. Albendazole is more effective than mebendazole

In the patient, the two full courses of mebendazole treatment given to her at her initial admission has failed to eradicate her hookworm infection and hence she was treated subsequently with a single dose of 400mg of albendazole and she started showing much clinical improvement. One very important study has also clearly shown that albendazole is more effective than mebendazole against hookworm infection (24). Other studies have also clearly shown that albendazole cleared hookworm infection completely (25, 26).

8. Anaemia, eosinophilia and diarrhea all occurring together

Anaemia and eosinophilia occur commonly in hookworm infection (7). Anaemia and eosinophilia occur commonly in many children with hookworm infection (8). Diarrhea along with eosinophilia is only rarely reported to occur in hookworm infection. But anaemia, eosinophilia and diarrhea all occurring together in a single patient with hookworm infection like in our patient is extremely rare and is only very rarely reported. In only one study, a 55 year old dutch male patient who has returned from Philippines with severe hookworm infection was reported to have chronic diarrhea, severe anaemia and extremely severe eosinophilia (9) almost like our patient.

9. Though anaemia and eosinophilia occur commonly in hookworm infection (7,8), anaemia, eosinophilia and diarrhea all occurring together in a single patient with hookworm infection like in our patient is extremely rare and is hence highlighted in this article.

DISCUSSION

a. Haemoglobin

Hookworm infection produces iron deficiency anaemia and iron deficiency anaemia is defined by low haemoglobin [18-22]. Anaemia is defined as the reduction in haemoglobin concentrations below the expected values [WHO,1972] [ref 20]. In our patient haemoglobin is very low 3.2g% [normal range12-16g%] .

b. Mean corpuscular volume or or mean red cell volume [MCV]

Our patient also had very low levels mean red cell volume or MCV in addition to low levels of haemoglobin.

c. Mean corpuscular haemoglobin or MCH

Mean corpuscular haemoglobin or MCH was also very low 15 picograms or pg [normal range 27-32pg] in our patient.

d. Red blood cells or RBC count

Our patient had also undergone red blood cells or rbc count which was very low -2.09 million cells/ cu.mm [normal range 4.2-5.4 million cells/ cu.mm] .

e. Peripheral smear

Our patient had also undergone peripheral smear examination which showed severe microcytic, hypochromic anaemia and severe eosinophilia.

Thus our patient had undergone 5 investigations to confirm her severe anaemia and the type of her anaemia namely 1. blood haemoglobin concentration, 2. mean red cell volume or mean corpuscular volume or MCV, 3. mean corpuscular haemoglobin or MCH, 4. red blood cells or RBC count- all of which showed very low values and 5. peripheral smear examination which showed severe microcytic, hypochromic anaemia.

Thus our patient had undergone extremely detailed and thorough investigations to confirm her severe anaemia and the type of her anaemia and the interpretations of her various results are discussed below in detail.

1. Anaemia is defined as the reduction in haemoglobin concentrations below the expected values[WHO,1972] [20]. In our patient haemoglobin is very low 3.2g% [normal range12-16g%].
2. Mean corpuscular volume or MCV is the mean volume of all red blood cells or RBCs counted in the sample. Normocytic means blood with a normal mean corpuscular volume or MCV. When the mean corpuscular volume or MCV is low, the blood is said to be microcytic.
3. Mean corpuscular haemoglobin or MCH represents the mean mass of haemoglobin in the red blood cells or RBCs. Since small red blood cells [microcytic or low mean corpuscular volume] have less haemoglobin [low mean corpuscular haemoglobin] than large red blood cells, low mean corpuscular volume [MCV] corresponds to low mean corpuscular haemoglobin [MCH]. Thus variation in mean corpuscular haemoglobin [MCH] corresponds to variation in mean corpuscular volume[MCV] .
4. Our patient had also undergone red blood cells or RBC count which was very low.
5. Our patient had also undergone peripheral smear examination which showed severe microcytic, hypochromic anaemia.

CONCLUSION

Severe anaemia and eosinophilia are commonly reported to occur in hookworm infection. But chronic diarrhea is not commonly reported to occur in hookworm infection.

In our study also, only one patient with hookworm infection was found to have chronic diarrhea. It is a well known fact that hookworm infection should be suspected strongly in patients with significant anaemia and eosinophilia. But hookworm infection should also be suspected in patients with chronic diarrhea, especially in tropical and subtropical countries. The patient with chronic diarrhea was also found to have severe anaemia and severe eosinophilia and multiple hookworms in endoscopy in our study. Hence upper gastro-intestinal endoscopy should always done in all patients with chronic diarrhea associated with eosinophilia or anaemia to confirm the presence of hookworms in tropical and subtropical countries.

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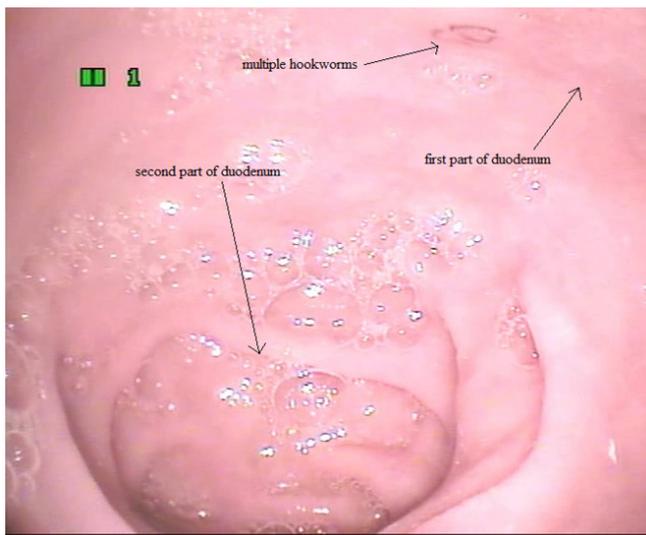


Figure 1: Showing multiple hookworms in the first part of duodenum.

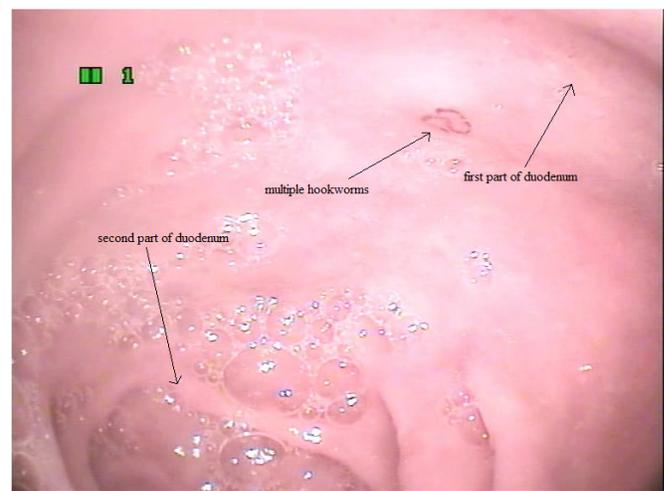


Figure 2: Showing multiple hookworms in the first part of duodenum.