



SEVERE ANAEMIA WITHOUT EOSINOPHILIA IN A PATIENT WITH HOOKWORM INFECTION IN OUR STUDY –AN EXTREMELY RARE FINDING

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ABSTRACT

Objective: Severe anaemia is reported to occur in severe hookworm infection in many studies. But so far detailed study was not done to know about the occurrence of severe anaemia and its relation with eosinophilia in patients with hookworm infection found while doing upper gastro-intestinal endoscopy. Hence a detailed study was done to know about severe anaemia and its relation with eosinophilia in patients with hookworm infection found while doing upper gastro-intestinal endoscopy.

Methods: A study of 1137 patients who had undergone upper gastro-intestinal endoscopy for a period of four years and eight months from May 2009 to December 2013 was carried out. In each of these 1137 patients, the first and second part of duodenum were carefully examined to find out the presence of hookworms. In all the patients found to have hookworms in duodenum, investigations were done to know about the presence or absence of anaemia and severe anaemia and the presence or absence of eosinophilia. The results were found as given below.

Results: Out of these 1137 patients, 14 patients found to have hookworms in duodenum while doing upper gastro-intestinal endoscopy were taken into consideration for our study. Out of these 14 patients with hookworms in duodenum, 10 patients were found to have eosinophilia [71%]. 4 patients did not have any eosinophilia [29%]. Out of these 14 patients with hookworms in duodenum, 9 patients had anaemia and 2 of these 9 patients were found to have severe anaemia [haemoglobin <7g/dl or g%]. But one patient with severe anaemia did not have eosinophilia.

Conclusion: One patient with severe anaemia with hookworm infection did not have eosinophilia. Severe anaemia indicates significant loss of blood which will occur only due to heavy burden of hookworms in severe hookworm infection or the late stage of hookworm infection. Hence eosinophilia can be absent even in the late stage of hookworm infection with severe anaemia.

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INTRODUCTION

Severe anaemia is reported to occur in severe hookworm infection in many studies (1 to 16). But so far detailed study was not done to know about the occurrence of severe anaemia and its relation with eosinophilia in patients with hookworm infection while doing upper gastro-intestinal endoscopy. Hence a detailed study was done to know about severe anaemia and its relation with eosinophilia in patients with hookworm infection found while doing upper gastro-intestinal endoscopy.

MATERIALS AND METHODS

This study was conducted in the department of general surgery, Aarupadai Veedu Medical College and Hospital, Puducherry. A study of 1137 patients who had undergone upper gastro-intestinal endoscopy for a period of four years and eight months from May 2009 to December 2013 was

carried out. In each of these 1137 patients, the first and second part of duodenum was carefully examined to find out the presence of hookworms. In all the patients found to have hookworms in duodenum, investigations were done to know about the presence or absence of anaemia and severe anaemia and the presence or absence of eosinophilia. 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). The results were found as given below.

RESULTS

1. Out of these 1137 patients, 14 patients found to have hookworms in duodenum while doing upper gastro-

intestinal endoscopy were taken into consideration for our study.

2. Out of these 14 patients with hookworms in duodenum, 4 patients did not have any eosinophilia [29%].
3. Out of these 14 patients with hookworms in duodenum, 9 patients had anaemia and 2 of these 9 patients were found to have severe anaemia [haemoglobin <7g/dl or g%].
4. But one patient with severe anaemia did not have eosinophilia.

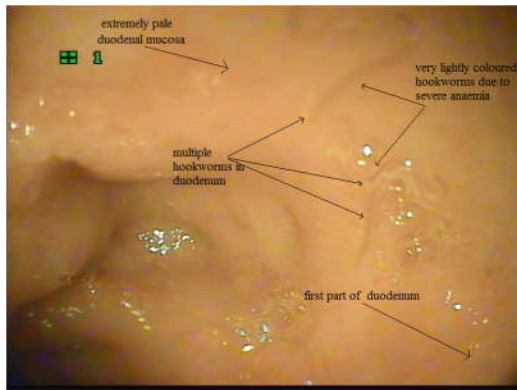


Fig 1 multiple hookworms in duodenum with severe anaemia [haemoglobin 2.1 g %] but without eosinophilia [absolute eosinophil count- 366cells/cu.mm] showing extremely pale duodenal mucosa and very lightly coloured hookworms due to extremely severe anaemia and very low haemoglobin 2.1 g%

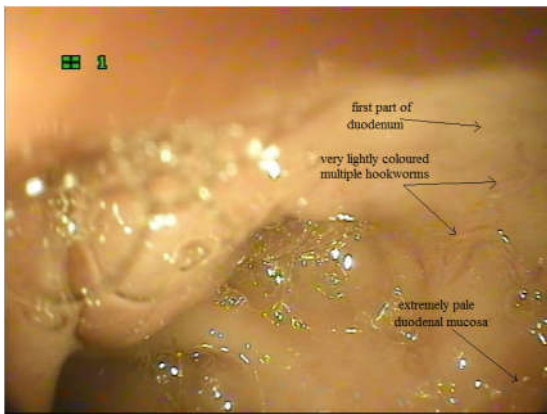


Fig 2 multiple hookworms in duodenum with severe anaemia [haemoglobin 2.1 g %] but without eosinophilia [absolute eosinophil count- 366cells/cu.mm] showing extremely pale duodenal mucosa and very lightly coloured hookworms due to extremely severe anaemia and very low haemoglobin 2.1 g% [different view].

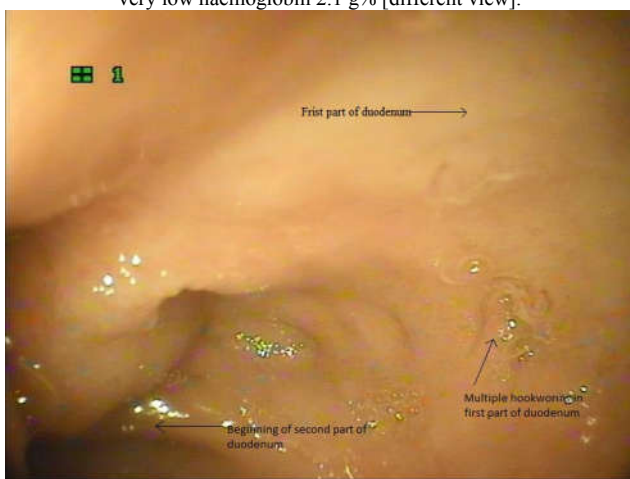


Fig 3 multiple hookworms in duodenum with severe anaemia but without eosinophilia [absolute eosinophil count- 366cells/cu.mm] [different view].

DISCUSSION

Severe anaemia with eosinophilia [1patient]

Out of the 2 patients with severe anaemia in our study, one patient had severe eosinophilia [haemoglobin 3.2g%, absolute eosinophil count-1100 cells/cu.mm]

Severe anaemia without eosinophilia [1patient]

1. Out of the 2 patients with severe anaemia in our study, one patient had severe anaemia [haemoglobin 2.1 g %] but did not have eosinophilia [absolute eosinophil count- 366cells/cu.mm] which is of extremely great significance.
2. Studies have also shown the occurrence of severe anaemia without eosinophilia [2,3,10,11].
3. Severe anaemia indicates significant loss of blood which will occur only due to heavy burden of hookworms in severe hookworm infection or the late stage of hookworm infection.
4. Hence eosinophilia can be absent even in the late stage of hookworm infection with severe anaemia.
5. This patient with severe anaemia due to severe hookworm infection with multiple hookworms shown in fig 1, 2, 3 had extremely pale duodenal mucosa and very lightly coloured hookworms due to extremely severe anaemia and very low haemoglobin 2.1 g%.
6. Thus even a very heavy burden of hookworm infection with severe anaemia with multiple hookworms in duodenum seen during endoscopy can present without eosinophilia.
7. Hence upper gastro-intestinal endoscopy should always be done in all patients with severe anaemia to confirm the presence of hookworms in tropical and subtropical countries even when there is no eosinophilia.

CONCLUSION

1. One patient with severe anaemia with hookworm infection did not have eosinophilia.
2. Severe anaemia indicates significant loss of blood which will occur only due to heavy burden of hookworms in severe hookworm infection or the late stage of hookworm infection.
3. Hence eosinophilia can be absent even in the late stage of hookworm infection with severe anaemia.
4. Hence upper gastro-intestinal endoscopy should always be done in all patients with severe anaemia to confirm the presence of hookworms even when there is no eosinophilia in tropical and subtropical countries.

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References

1. Hyun HJ, Kim EM, Park SY, Jung JO, Chai JY, Hong ST .A case of severe anemia by Necator americanus infection in Korea. *J Korean Med Sci.* 2010 Dec; 25(12):1802-4.
2. Wu KL, Chuah SK, Hsu CC, ChiuKW, Chiu YC, Changchien CS. Endoscopic Diagnosis of Hookworm Disease of the Duodenum: A Case Report. *J Intern Med Taiwan* 2002; 13:27-30.
3. Kuo YC, Chang CW, Chen CJ, Wang TE, Chang WH, Shih SC. Endoscopic Diagnosis of Hookworm Infection That Caused Anemia in an Elderly Person. *International Journal of Gerontology.*2010 ; 4(4) : 199-201
4. Nakagawa Y, Nagai T, Okawara H, Nakashima H, Tasaki T, Soma W, et al. Comparison of magnified endoscopic images of *Ancylostomaduodenale* (hookworm) and *Anisakissimplex*. *Endoscopy* 2009;41(Suppl. 2):E189
5. Basset D, Rullier P, Segalas F, Sasso M. Hookworm discovered in a patient presenting with severe iron-deficiency anemia *Med Trop (Mars).* 2010 Apr;70(2):203-4
6. LEE, T.-H., YANG, J.-c., LIN, J.-T., LU, S.-C. and WANG, T.-H. Hookworm Infection Diagnosed by Upper Gastrointestinal Endoscopy: —Report of Two Cases with Review of the Literature—. *Digestive Endoscopy*, 1994 6(1): 66–72
7. AnjumSaeed, Huma Arshad Cheema, ArshadAlvi, Hassan Suleman. Hookworm infestation in children presenting with malena -case series Pak J Med Res Oct - Dec 2008;47(4):98-100
8. A Rodríguez, E Pozo, R Fernández, J Amo, T Nozal. Hookworm disease as a cause of iron deficiency anemia in the prison population *Rev EspSanidPenit* 2013; 15: 63-65
9. Li ZS1, Liao Z, Ye P, Wu RP Dancing hookworm in the small bowel detected by capsule endoscopy: a synthesized video. *Endoscopy.* 2007 Feb;39Suppl 1:E97. Epub 2007 Apr 18.
10. Kalli T1, Karamanolis G, Triantafyllou K Hookworm infection detected by capsule endoscopy in a young man with iron deficiency. *Clin Gastroenterol Hepatol.* 2011 Apr;9(4):e33
11. Chen JM1, Zhang XM, Wang LJ, Chen Y, Du Q, Cai JT. Overt gastrointestinal bleeding because of hookworm infection. *Asian Pac J Trop Med.* 2012 Apr; 5(4):331-2.
12. Kato T, Kamoi R, Iida M, KiharaT.Endoscopic diagnosis of hookworm disease of the duodenum *J Clin Gastroenterol.* 1997 Mar;24(2):100-102
13. Cedrón-Cheng H, Ortiz C (2011) Hookworm Infestation Diagnosed by Capsule Endoscopy. *J Gastroint Dig Syst* S1:003. doi: 10.4172/2161-069X.S1-003
14. Yan SL, Chu YC. Hookworm infestation of the small intestine *Endoscopy* 2007; 39: E162±163
15. Chao CC1, Ray ML. Education and imaging. Gastrointestinal: Hookworm diagnosed by capsule endoscopy. *J Gastroenterol Hepatol.* 2006 Nov; 21(11):1754.
16. Christodoulou, D. K., Sigounas, D. E., Katsanos, K. H., Dimos, G., &Tsianos, E. V. (). Small bowel parasites is as cause of obscure gastrointestinal bleeding diagnosed by capsule endoscopy. *World journal of gastrointestinal endoscopy*, 2(11), 2010: 369.
17. Meltzer E, Percik R, Shatzkes J, Sidi Y, Schwartz E. Eosinophilia among returning travelers: a practical approach *Am J Trop Med Hyg.* 2008 May; 78(5):702-9.

