



## ABSENCE OF BOTH ANAEMIA AND EOSINOPHILIA IN A PATIENT WITH HOOKWORM INFECTION IN OUR STUDY -AN EXTREMELY RARE FINDING.

**Govindarajalu Ganesan**

Associate professor, Dept. of General surgery, Indira Gandhi Medical College and Research Institute, Puducherry.- 605009.

**ABSTRACT** **Objective:** Many studies have shown the presence of anaemia and eosinophilia in hookworm infection. But so far detailed study was not done to know about the absence of anaemia and eosinophilia in hookworm infection. Hence a detailed study was done to know about the absence of anaemia and eosinophilia in hookworm infection diagnosed by 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 each of these 1100 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 eosinophilia. The results were found as given below.

**Results:** Out of these 1100 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, 5 patients did not have anaemia. Out of these 14 patients, 4 patients did not have eosinophilia. Out of these 14 patients, one patient had absence of anaemia and also had absence of eosinophilia.

**Conclusion:** Hence, upper gastro intestinal endoscopy is a very useful investigation to diagnose hookworm infection of duodenum even when there is absence of anaemia and eosinophilia.

**KEYWORDS :** Absence Of Eosinophilia, Absence Of Anaemia, Hookworm Infection, Upper Gastro-intestinal Endoscopy

### INTRODUCTION:

Many studies have shown the presence of anaemia in hookworm infection (1 to 13). Many studies have also shown the presence of eosinophilia in hookworm infection (10 to 23). But so far detailed study was not done to know about the absence of anaemia and eosinophilia in hookworm infection. Hence a detailed study was done to know about the absence of anaemia and eosinophilia in hookworm infection diagnosed by 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 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 or absence of anaemia and eosinophilia. Anaemia is defined as haemoglobin < 12g/dl or 12% in women and haemoglobin < 13g/dl or 13% in men. Eosinophilia is defined as eosinophils > or = 500 cells/cu.mm (24). The results were found as given below.

### RESULTS:

1. Out of these 1100 patients, 14 patients found to have hookworms in duodenum while doing upper gastro-intestinal endoscopy were taken into consideration for our study.
2. 14 patients with hookworms in duodenum while doing upper gastro-intestinal endoscopy were taken into consideration for our study.
  - a. 5 patients did not have anaemia (Table 1).
  - b. 4 patients did not have eosinophilia (Table 2).
  - c. But out these 14 patients with hookworms in duodenum, one patient had absence of anaemia and also had absence of eosinophilia (Table 3).

### DISCUSSION:

**a. 5 patients did not have anaemia (Table 1).**

1. 4 male patients did not have anaemia and have haemoglobin (18%, 16%, 14%, 17.6%).
2. One female patient did not have anaemia (haemoglobin 12.8%).
3. The male patient with haemoglobin 17.6% had only single hookworm in duodenum while doing upper gastro-intestinal endoscopy.
4. While doing upper gastro intestinal endoscopy, the hookworm in duodenum is identified by its bent head (Fig 1) and by its S-shaped appearance (9) (Fig 1).

**b. 4 patients did not have eosinophilia (Table 2).**

1. 3 female patients did not have eosinophilia and have eosinophil count (=396 cells/cu.mm, 366 cells/cu.mm, 364 cells/cu.mm).

2. One male patient did not have eosinophilia (eosinophil count = 160 cells/cu.mm).
3. The female patient with (eosinophil count = 364 cells/cu.mm) had only single hookworm in duodenum while doing upper gastro-intestinal endoscopy.
4. While doing upper gastro intestinal endoscopy, the hookworm in duodenum is identified by its bent head (Fig 2) and by its S-shaped appearance (9) (Fig 2).

**c. Absence of both eosinophilia and anaemia indicating very early stage of hookworm infection [1 patient] (Table 3).**

1. One male patient with hookworm infection in our study neither had eosinophilia (absolute eosinophil count - 160 cells/cu.mm) nor had anaemia (haemoglobin - 14%) (Table 3) which is of extremely great significance.
2. This patient had adequate amount of haemoglobin indicating clearly that the patient was in the extremely early stage of hookworm infection.
3. Anaemia is absent due to very minimal loss of blood due to very low burden of hookworms.
4. Eosinophilia only peaks at 5 to 9 weeks after the onset of infection (21).
5. Hence eosinophilia will not be present in very early stage of hookworm infection before 5 to 9 weeks after the onset of infection.
6. Since this patient had absence of anaemia and also had absence of eosinophilia, hookworm infection in this patient is in the very early stage just before 5 to 9 weeks after the onset of infection as described above.

**Upper gastro intestinal endoscopy helping in the diagnosis of hookworm infection when there is absence of anaemia and eosinophilia**

1. Anaemia is a very important indicator of hookworm infection.
2. Eosinophilia is another important indicator of hookworm infection.
3. But both anaemia and eosinophilia can be absent very rarely as seen in our study in the very early stage of hookworm infection.
4. Hence upper gastro intestinal endoscopy helps in the diagnosis of hookworm infection of duodenum when there is absence of anaemia and eosinophilia even in the very early stage of hookworm infection.

### CONCLUSION:

Hence upper gastro intestinal endoscopy is a very useful investigation to diagnose hookworm infection of duodenum even when there is absence of anaemia and eosinophilia in tropical and subtropical countries.

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**Table 1(Patients Did Not Have Anaemia)**

Serial No	Date of doing endoscopy	Hospital No (Outpatient No/ In patient No)	Name	Age	Sex	haemoglobin in gm/dl	Presence or absence of anaemia. anaemia means haemoglobin < 12g/dl in women and haemoglobin <13g/dl in men.
1	15/06/09	18451	Anandh	25	Male	18	absence of anaemia
2	04/08/09	21188	Parithi Sivashankar	27	Male	16	absence of anaemia
3	17/12/09	41592	Sampath	22	Male	14	absence of anaemia
4	21/01/11	1768	Sathish	26	Male	17.6	absence of anaemia
5	08/04/11	11027	Parameswari	28	Female	12.8	absence of anaemia

**Table 2(4 Patients Did Not Have Eosinophilia)**

Serial No	Date of doing endoscopy	Hospital No (Outpatient No/ In patient No)	Name	Age	Sex	Total WBC Count (cells/cu.mm)	Total and Differential WBC Count(N-Neutrophils, L-Lymphocytes, E-Eosinophils, M-Monocytes) Eosinophil count (cells/cu.mm)	Presence or absence of eosinophilia (eosinophilia means >500 cells/cu.mm)
1	08/09/09	29622	Kavitha	32	Female	6600	WBC Count=6600 N55 L39 E6 Eosinophil count =6% of 6600 =396	absence of eosinophilia
2	17/12/09	41592	Sampath	22	Male	16000	WBC Count=16000 N82 L7 E1 Eosinophil count =1% of 16000 =160	absence of eosinophilia
3	14/06/10	18870	Poorani	60	Female	6100	WBC Count=6100 N65 L29 E6 Eosinophil count =6% of 6100 = 366	absence of eosinophilia
4	04/10/13	207275	Seetha	39	Female	9100	WBC Count=9100 E4 Eosinophil count =4% of 9100=364	absence of eosinophilia

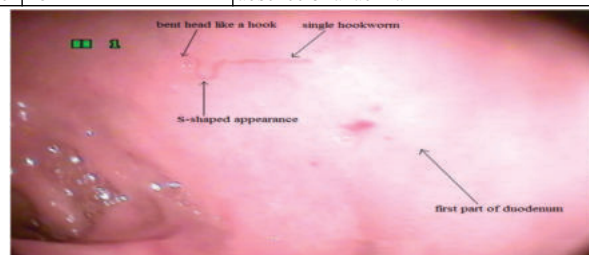
**Table 3(Absence Of Both Eosinophilia And Anaemia Indicating Very Early Stage Of Hookworm Infection) [1 Patient]**

Serial No	Date of doing endoscopy	Hospital No (Outpatient No/ In patient No)	Name	Age	Sex	haemoglobin in gm/dl	Presence or absence of anaemia. anaemia means haemoglobin < 12g/dl in women and haemoglobin <13g/dl in men.	Total and Differential WBC Count(N-Neutrophils, L-Lymphocytes, E-Eosinophils, M-Monocytes) Eosinophil count (cells/cu.mm)
1	17/12/09	41592	Sampath	25	Male	18	absence of anaemia	WBC Count=16000 N82 L7 E1 Eosinophil count =1% of 16000 =160 absence of eosinophilia

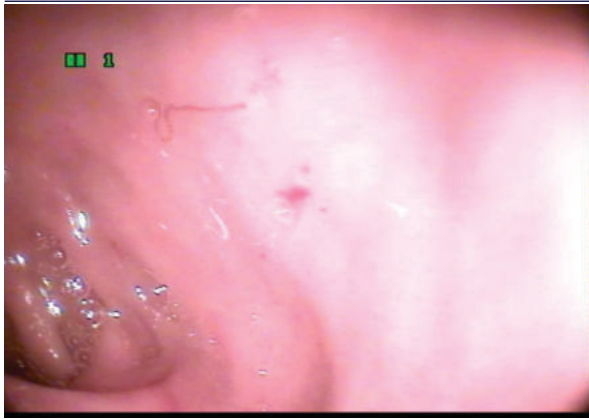
Serial No	Date of doing endoscopy	Hospital No (Outpatient No/ In patient No)	Name	Age	Sex	haemoglobin in gm/dl	Presence or absence of anaemia. anaemia means haemoglobin < 12g/dl in women and haemoglobin <13g/dl in men.
1	15/06/09	18451	Anandh	25	Male	18	absence of anaemia



**Fig 1:** Single hookworm in duodenum with its bent head and S-shaped appearance in a male patient without anaemia [haemoglobin 17.6g%]



**Fig 2:** Single hookworm in duodenum with its bent head and S-shaped appearance in a female patient without eosinophilia (eosinophil count =160 cells/cu.mm).



**Fig 3:** Single hookworm in duodenum with its bent head and S-shaped appearance in the same patient without eosinophilia [different view].

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