Research Paper

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A Detailed Study of Various Grades of Eosinophilia In Patients with Hookworm Infection Diagnosed by Doing Upper Gastro Intestinal Endoscopy

Medical Science

KEYWORDS : eosinophilia, severe eosinophilia, hookworm infection, upper gastro-intestinal endoscopy.

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ABSTRACT

Objective: Eosinophilia is commonly reported to occur in hookworm infection. Hence a detailed study was done to know about the various grades of eosinophilia in patients with hookworm infection diagnosed by 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 to know about the various grades of eosinophilia in patients with hookworm infection diagnosed by doing upper gastro intestinal endoscopy .

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 these14 patients with hookworms in duodenum, as many as 10 patients with hookworms in duodenum were found to have eosinophilia [71%]. Severe eosinophilia was found in 4 out of 10 patients with eosinophilia(40%).

Conclusion: Hence, eosinophilia occurs commonly in patients with hookworm infection Severe eosinophilia also occurs in significant number of patients with hookworm infection .

Introduction:

Eosinophilia occurs very commonly in hookworm infection (1to13). But so far detailed study was not done to know about the occurrence of various grades of eosinophilia in patients with hookworm infection diagnosed by doing upper gastro intestinal endoscopy. Hence a detailed study was done to know about the occurrence of various grades of eosinophilia in patients with 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 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 of eosinophilia and severe eosinophilia. Eosinophilia is defined as eosinophils> or = 500 cells/cu.mm (14). Severe eosinophilia is defined as eosinophils>1000 cells/cu.mm (4). 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 these14 patients with hookworms in duodenum, as many as 10 patients with hookworms in duodenum were found to have absolute eosinophil count > or = 500 cells/cu.mm or eosinophilia[71%].
3. 6 out of 10 patients with eosinophilia had absolute eosinophil count between 500 cells/cu.mm and 1000 cells/cu.mm.
4. 4 out of 10 patients with eosinophilia(40%) had absolute eosinophil count>1000 cells/cu.mm or severe eosinophilia.
5. Single hookworm in duodenum with eosinophilia[absolute eosinophil count - 858cells/cu.mm] seen in a patient in our study is shown in fig 1. The hookworm in duodenum is identified by its bent head which looks like a hook (Fig 1) and by its S-shaped appearance(15) (Fig 1) .
6. Single hookworm in duodenum with eosinophilia[absolute eosinophil count - 870cells/cu.mm] seen in a patient in our study is shown in fig 2. The hookworm in duodenum is identified by its bent head which looks like a hook (Fig 2) and by its S-shaped appearance(15) (Fig 2) .
7. Multiple hookworms in duodenum seen in a patient with severe eosinophilia(absolute eosinophil count - 1100cells/cu.mm) is shown in Fig 3.
8. Multiple hookworms in duodenum seen in a patient with severe eosinophilia[absolute eosinophil count - 1248cells/cu.mm)] is shown in Fig 4.

Discussion:

Hookworms are soil-transmitted helminths: infective larvae burrow through the skin and are activated in the process, after which they migrate through the heart and lungs to the gut, where they mature to adults, feed on host blood and produce eggs which are deposited in the faeces(16). Deposited eggs then develop to infective larvae, completing the life cycle .Hookworm infection also causes changes to the cells of the innate immune system, most obviously blood eosinophilia. In both experimental and endemic infections, eosinophilia is evident within 4 weeks after exposure (16). Eosinophils from hookworm-infected individuals also show increased expression of activation markers compared to uninfected individuals(16). It is now recognized that eosinophils are competent antigen-presenting cells as well as effector cells, as they have been shown to process and present antigen on MHC class II molecules and stimulate T cells. Thus, eosinophils may be important cells in initiating or maintaining the immune response during hookworm infection(16).

Eosinophilia is defined as the absolute eosinophil count of more than 500 cells/mm3 (14) and one of its outstanding causes is the parasitic infestation. The cause of the eosinophilia in any individual who has intraluminal parasites may be truly the tissue parasites or larval stage of the intraluminal parasites(17). Focusing on the adult hookworm infection, the eosinophilia is found in 30 to 60% of hookworm cases(17).

In general, blood eosinophilia results from enhanced eosinophilopoiesis (i.e. increased production of eosinophils in the bone marrow) (18). Peripheral blood eosinophilia can be further categorized as primary, secondary and idiopathic(18). Primary eosinophilia usually occurs in the context of hematologic malignancies and proliferative disorders that result in increased numbers of progenitors leading to increased numbers of eosinophils in the bone marrow and blood(18). Secondary eosinophilia is the most common form of eosinophilia and often occurs in response to other primary disease processes such as overproduction of the cytokine IL-5 (often by T-cell lymphocytes) leading to elevated production of eosinophils (18). Idiopathic eosinophil-

ia is often associated with moderate to severe eosinophilia with no identifiable cause(18) .

Secondary eosinophilia is diagnosed when eosinophilia occurs as an immunological response to an offending agent which may be infectious or non infectious(19). The examples of secondary eosinophilia includes tissue invasive parasite, allergic disorders, medications, toxins, autoimmune diseases, Hodgkin's and non-Hodgkin lymphoma and endocrine disorders, like Addison's disease(19). The underlying cause for eosinophilia can range from benign (parasitic) to sinister(malignancy) . In a tropical country like India, the most common cause is the parasitic infestation(19) .Parasitic infestation especially those with a tissue migration phase in their life cycle very commonly cause eosinophilia(19). Eosinophils play an important role in mediating the antibody dependent damage to helminthes and modulating Type I hypersensitivity reaction(19). The eosinophilic response to parasitic infection depends on the duration of exposure with shorter duration of exposure (travelers) having more eosinophilia compared to longer duration (residents of endemic area who no longer have eosinophilia). In developed countries the most common etiology for eosinophilia is seasonal and perennial rhinitis, hay fever, asthma and allergic drug reaction(19) .

Conclusion:

1. Out of 14 patients with hookworms in duodenum, as many as 10 patients with hookworms in duodenum were found to have eosinophilia [71%] as per our study.
2. Severe eosinophilia was found in 4 out of 10 patients with eosinophilia(40%) indicating that significant number of patients with hookworm infection had very high eosinophil count.
3. Hence, eosinophilia occurs commonly in patients with hookworm infection
4. Severe eosinophilia also occurs in significant number of patients with hookworm infection .

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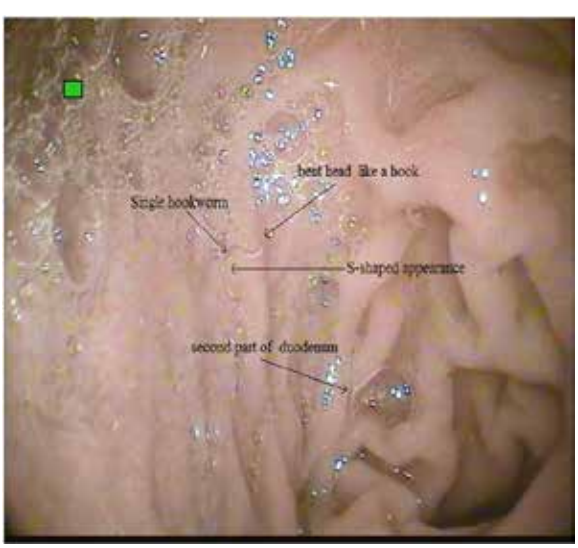

Fig 1: Single hookworm in duodenum with its bent head and S-shaped appearance in a patientwith eosinophilia[absolute eosinophil count - 858cells/cu.mm]

Fig 2: Single hookworm in duodenum in a patient with its bent head and S-shaped appearance with eosinophilia[absolute eosinophil count – 870 cells/cu.mm]

Fig 3: Multiple hookworms in duodenum in a patient with severe eosinophilia [absolute eosinophil count - 1100cells/cu.mm]

Fig 4: Multiple hookworms in duodenum in a patient with severe eosinophilia [absolute eosinophil count – 1248 cells/cu.mm]

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