

## Ceacal Trichuriasis Presenting as Severe Iron Deficiency Anemia: A Case Report and Review of Literature

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### 1. Case Report

A 24 years old male with no co morbidities presented to our out-patient department with complaints of exertional shortness of breath and easy fatigability of 6-month duration. On clinical examination he was grossly pale. There was no other significant finding on clinical history and examination. Ha emogram revealed hemoglobin of 6.7 g% with microcytic and hypochromic red cell indices. Peripheral blood film showed microcytic and hypochromic RBCs with no abnormal cells. Kidney and liver functions were normal, Iron profile

confirmed severe iron deficiency anemia, Stool examination was unremarkable for any cyst or ova. Upper GI endoscopy was normal (Figure 1), Colonoscopy revealed Trichuris trichura in ceacal part of small intestine (Figure 2a,b). Keeping in view whipworm as a rare cause of such severe anemia he was further evaluated in detail. Celiac profile was normal. Contrast imaging of abdomen as well as CT enterography was also unremarkable. He received oral mebendazole 100 mg twice a day for 3 days and total dose iron. He was discharged on oral maintenance Iron and Hemogram repeated after 6 weeks revealed Hemoglobin of 16.5 gm%.

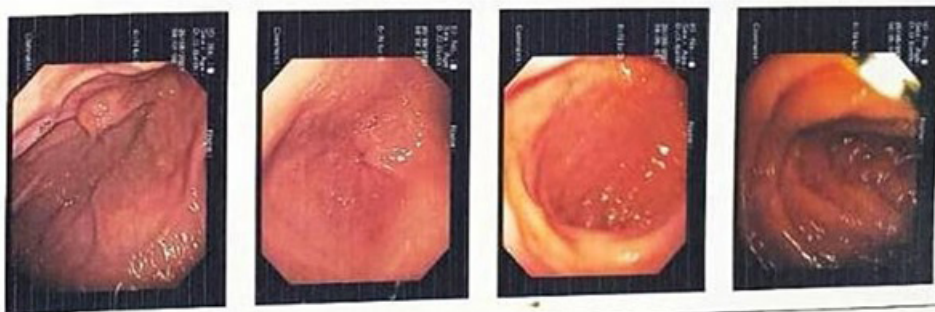
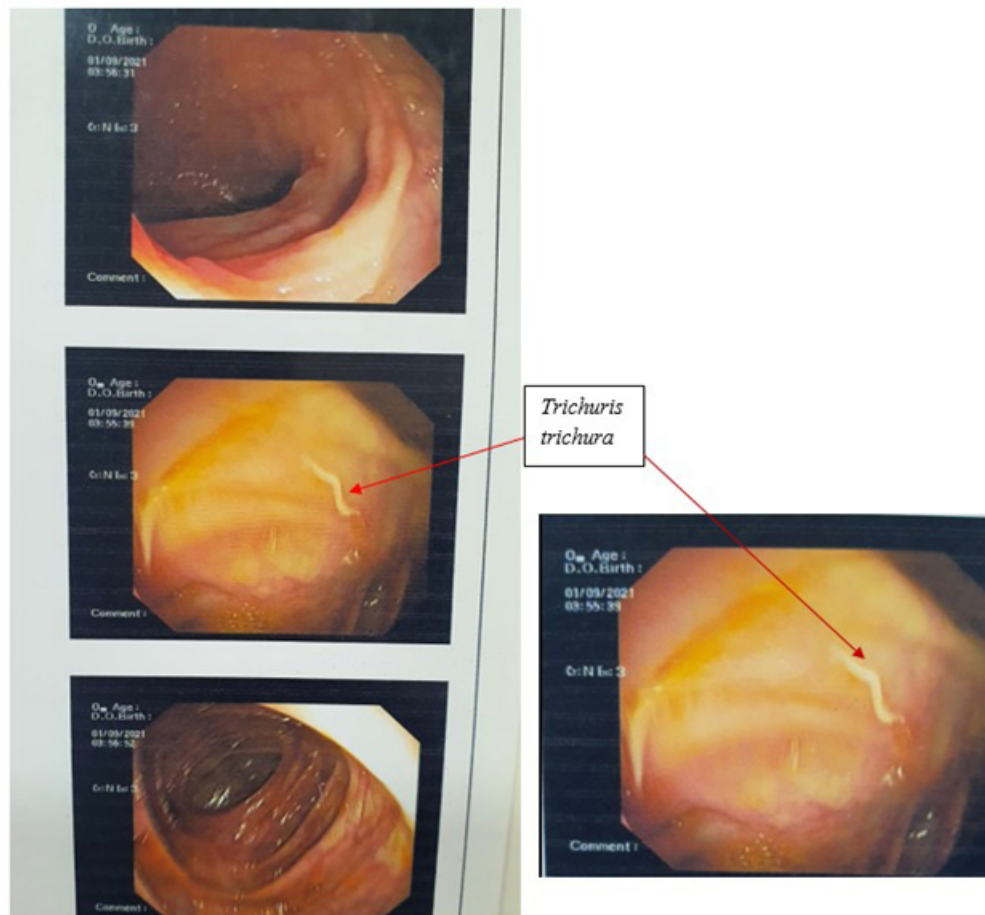


Figure 1: Image depicting unremarkable upper gastrointestinal endoscopy



**Figure 2a:** Colonoscopic image showing *Trichuris trichura* (whip-worm) adherent to colonic wall.

**Figure 2b:** Magnified view of figure 1a.

## 2. Discussion and Review of Literature

*Trichuris trichura* also known as whipworm (it loops like a whip with wide handles at the posterior end) is a round worm that causes Trichuriasis in humans. Its size varies from 3 to 5 cm [1]. The eggs laid by female worm are deposited in soil from human feces. After 14 to 21 days the eggs mature and enter an infective stage. If humans ingest embryonated eggs the eggs start to hatch in the small intestine and utilize the intestinal microflora and nutrients to multiply and grow. Majority of larvae move to cecum, penetrate the mucosa and mature into adult forms.

Trichuriasis is one of the 3 well documented soil transmitted helminth infections. It is considered as a neglected tropical disease by WHO and CDC. Children appear to be vulnerable to parasite and poor sanitation is associated with a heavy disease burden.

### 2.1. Etiology and Epidemiology

The most common cause of Trichuriasis is ingestion of infected eggs found in soil due to poor sanitary conditions including open defecation and using human feces as fertilizer. Some recent studies have shown that certain chromosomal traits have increased susceptibility for acquiring Trichuriasis [2]. The egg of worm is the infective stage and warm and humid climates are favorable conditions for its mat-

uration reflecting high disease burden in tropical climates especially Asia and less often in Africa and South America. Worldwide there are about 450 million to 1 billion active cases with most diagnosed in children. Partial immunity is known to develop with age [3, 4].

Worldwide almost half of the 5 billion people living in developing countries are infected at least with one soil transmitted helminth and 10% with two or more helminth species [4]. Young boys are more affected as they are more likely to play outside and exhibit pica behavior.

### 2.2. Pathophysiology

The worm is acquired through feco-oral transmission. A human host consumes eggs typically while eating and drinking contaminated food or water. The larvae hatch in small intestine and migrate to large intestine where the anterior ends lodge into mucosa leading to cell destruction and activation of host immune system, recruiting eosinophils, lymphocytes and plasma cells. This causes symptoms of rectal bleeding and abdominal pain. The parasite usually takes up residence in the terminal ileum and cecum. The worm may live anywhere from 1 to 4 years without treatment. Eggs are expelled in the host feces unembryonated and will become embryonated in 2 to 4 weeks and are then infective [5].

### 2.3. Approach To Patient

Patients with Trichuriasis reside in or have visited areas endemic to whip worm. patients usually complain of abdominal pain, painful passage of stools and mucus discharge. Diarrhea and constipation are also common presenting complaints. Nocturnal passage of stools is a common occurrence. Many patients are asymptomatic when parasite burden is low [5]. Rectal prolapse is known to occur in a heavy infestation. Children may develop anemia, growth deficiency as well as cognitive impairment due to iron deficiency anemia and poor nutrition secondary to worm burden [4, 6]. In general, the physical examination of these patients is normal. Signs of anemia can be present like in our case and prolonged infection may have clubbing.

### 2.4. Evaluation

Lab diagnosis is based on microscopic examination of stool samples to determine presence and number of eggs [5]. During heavy infestation the eggs may be seen on stool saline smear but has low sensitivity. The WHO recommends using the KATO-KATZ method for counting eggs per unit weight of faeces. They also recommend using 2 slides per sample. [5] One weakness of stool sample examination is that from the time the eggs are ingested to the development of mature worms there is time lag of 3 months. During this period there may be no signs of an infestation and the stool may not show any evidence of eggs or shedding. Stool samples may also demonstrate RBCs, WBCs specifically Eosinophils. Hemogram may show anemia. Diagnosis is sometimes based on colonoscopic findings which shows classic “COCONUT CAKE RECTUM” from white bodies of adult worms dangling from inflamed mucosa. Recent studies have shown a WHIPWORM DANCE on USG which is when the lumen of appendix wriggles continuously. This modality can be easily used in resource poor settings [7]. PCR assays are currently being developed which have improved sensitivity and specificity of detecting the whipworm [5, 8].

### 2.5. Management

Treatment of Trichuriasis is with Mebendazole with suggested dose of 100 mg BD for 3 days or Albendazole 200 to 400 mg BD for 3 days. Mebendazole is more effective and first line treatment. Ivermectin 200mcg/kg daily is not as effective as Mebendazole or Albendazole. It is important to keep in mind that there are often co infections with other helminths and patients often require multiple medications.

### 2.6. Prognosis

The whipworm tends to be more resistant to treatment than other helminths with some studies listing cure rates as low as 28% to 36%. whipworms can still be present after treatment, However, it is thought that low worm count leads to no significant disease burden. While Trichuriasis is not fatal it can cause anemia and nocturnal stooling like in our case. Many patients develop colitis and malabsorption. Children may have poor growth and rectal prolapse

### 2.7. Complications

Trichuris Dysentery Syndrome (TDS) can be found classically in children with rare cases in adults and is seen when there is very high worm burden. This often leads to diarrhea, tenesmus, iron deficiency anemia and poor growth. The poor growth is typically secondary to poor nutrition and ultimately causes cognitive delay. Pearls and other issues: ongoing studies are being performed with regards to hygiene hypothesis which has shown improved symptoms of diseases such as crohn's or ulcerative colitis with the use of the *Trichuris suis* (pig tapeworm) ova [10, 11, 12].

After treatment of Trichuriasis education of the patient is vital to prevent recurrence. The infectious disease nurse should have emphasized the need to improve personal hygiene, wash all fruits and vegetables and teach everyone about the importance of hand washing. Global initiatives have been started which focus on improved sanitation and periodic preventive chemo therapy in the form of mass drug administration(MDA) to school children [13]. The development of vaccine has been studied but no vaccines against *T. trichura* are being evaluated in clinical trials [9].

### 3. Conclusion

Trichuriasis is very rare infectious disease among adult population. Our reference case is one such rare example in whom after extensive evaluation the cause of his iron deficiency anemia was finally attributed to worm infestation in small intestine. In addition to case description this review also provides a comprehensive and updated discussion on Trichuriasis.

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