



Anemia Gravis Caused by Chronic Multiple Infection of Helminthiasis on Geriatric: An Evidence-Based Case Report

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DOI : 10.33086/iimj.v7i1.6629

ARTICLE INFO

Keywords:
Helminthiasis,
Anemia gravis,
Worm infection,
Tropical disease,
Parasitology

Submitted: Nov
13th 2024

Reviewed: Jan 4th
2025

Accepted: April
14th 2025

ABSTRACT

Introduction: Soil-transmitted helminth (STH) infections remain the most prevalent parasitic diseases globally. In elderly individuals, such infections can lead to significant morbidity, including anemia, fatigue, decreased activity levels, cognitive impairment, nutritional deficiencies, and gastrointestinal disturbances. This case report aims to highlight a rare instance of severe anemia caused by worm infestation in an elderly patient.

Case: A 57-year-old male presented with a 7-day history of fatigue, dizziness, and marked pallor, accompanied by worsening abdominal pain over the past 5 days. Physical examination revealed moderate illness with pale conjunctiva, a mildly distended abdomen, and hyperactive bowel sounds. Laboratory tests showed a significant drop in hemoglobin, hematocrit, erythrocyte count, serum iron, TIBC, and ferritin levels. Endoscopic evaluation revealed esophagitis, a Forrest III gastric ulcer, and multiple worms in the duodenum, later identified macroscopically as *Ascaris lumbricoides*.

Discussion: Worm infection is the most recent known diagnosis. The patient has undergone a complete stool analysis, but no worm eggs were found microscopically. This condition is very likely a false negative due to various factors, such as a less fresh stool sample (not examined immediately within 30 minutes) and human error by the analyst. The diagnosis was made after an endoscopic examination and multiple worms were found in the duodenum. When viewed from the large number of worms, it is likely that the patient has a severe and chronic worm infection. This is what causes the patient to suffer from anemia gravis with Hb 5.9.

Conclusions: Initial clinical and laboratory assessments led to a diagnosis of anemia gravis. The patient received three units of packed red cells. Further investigations confirmed microcytic hypochromic anemia due to iron deficiency and chronic inflammation, with parasitic infection as the underlying cause. Treatment with a single 400 mg dose of albendazole resulted in clinical improvement, allowing for safe discharge.

Introduction

Worm disease not only infects children, but also adolescents, adults, and the elderly.

The most common worm infection is caused by soil-transmitted helminths (STH). Globally, an estimated 1.4 billion people

worldwide are infected with worms (WHO, 2023). The highest prevalence of worms is found in Asia, sub-Saharan Africa, China, and South America. Indonesia is the country with the largest prevalence in Southeast Asia (Harjono, *et al.* 2024). In Indonesia, the prevalence of STH infections is generally still high, especially in areas with poor sanitation (Sari SK, *et al.* 2024). A recent study in Indonesia reported that the prevalence of worms in children reached 30.5% with 67.2% infected by more than one type of intestinal parasite (Athiyyah, *et al.* 2023).

WHO targets worm infection control in 2025 to reach 75% of preschool and school-age children with regular treatment. Indonesia is included in the <75% coverage category based on the worm treatment and prevention program. Worm conditions in Indonesia have a prevalence of 45% -65%. In 2023, around 29 out of 100 children have health complaints in the past month. Where the highest child morbidity rate is in the 0-6 year age group of 13.55%, an increase from 11.74% in the previous year (Gunawan A, *et al.* 2024).

Worms in the elderly will have morbid effects in the form of anemia, weakness, drowsiness, laziness to learn, cognitive decline, impaired productivity, malnutrition, and abdominal disorders. Factors that cause the risk of worms in the elderly include food contaminated with

worm eggs, not wearing shoes, indiscriminate defecation habits, being lazy to wash hands, not maintaining nail hygiene, not having a toilet in the house, lack of clean water availability, and socioeconomic factors, level of education and knowledge. STH worm infections are also transmitted due to the influence of environmental conditions, poor sanitation, such as water sources, human waste disposal, and food contamination (Sinaga S, *et al.* 2024).

One of the clinical manifestations of worms in the elderly is diarrhea due to poor hygiene and unhealthy living behavior (PHBS). Health problems related to personal hygiene in the elderly still receive less attention, so that they will cause health problems, such as worms, diarrhea and acute respiratory infections (ARI). According to WHO, 100,000 people die from diarrhea in Indonesia every year. According to the Ministry of Health, 300 out of every 1,000 people were infected with diarrhea throughout 2023 (Junaidin, *et al.* 2024).

The most worrying incidence of worms in adults is when they attack pregnant women. This condition is a health problem that requires serious attention. STH infection in pregnant women has a serious impact on the health of the mother and the development of the fetus she is carrying. Several studies have shown that worm

infections in pregnant women will cause serious complications, including anemia, stunted fetal growth, premature birth, and other pregnancy problems. Therefore, efforts to prevent worms in pregnant women and other adults do not only involve direct treatment, but also the importance of good personal hygiene as a preventive measure (Winarti, *et al* . 2024).

Based on this, it is very important to conduct further research on worms in adults and the elderly. Because research in Indonesia so far has only focused on toddlers and children. Worms in adults can cause complications in the form of anemia, decreased productivity, and concentration at work. The purpose of writing this article is to report the incidence of worm infections in the elderly, which are the cause of anemia gravis.

Case

A 57-year-old male patient came to the Banten Regional Hospital Emergency Room with complaints of weakness for 7 days before being admitted to the hospital. Complaints were accompanied by dizziness, fatigue, and the patient looked pale. The patient also complained of abdominal pain that had worsened over the last 5 days. Since 2021, the patient has complained of recurring abdominal pain and weakness, the patient has been treated three times at the nearest hospital from his

home between 2021-2024, in the middle of the year the patient complained of black stools, abdominal pain, and worsening weakness so he was immediately directed to the Banten Regional Hospital Emergency Room. The patient looked thin with a body weight of 54 kg and a height of 163 cm. The patient had never experienced black stools before. Every day, the patient works in the rice fields and never wears footwear while working. There is no family history of similar experiences, and the patient also rarely washes his feet and hands with soap after going to work.

On physical examination, GCS 4/5 (compos mentis) was found. The patient appeared moderately ill, with a heart rate of 76 times per minute, body temperature of 36.7, pulse strong, and blood pressure 122/68 mmHg. Respiratory rate 20 times per minute, with SpO₂ 100% in room air. Head and neck: Anemic conjunctiva (+), cyanosis (-), jaundice (-), droopy eyes, enlargement of spleen (-), increase of jugular vein pressure (-). Thorax: symmetrical (+), bronchovesicular (+), rhonchi (-), wheezing (-). Abdomen: slightly distended, increased bowel sounds, pain on palpation (-), organomegaly (-). Extremities: pale warm acral, CRT < 2 seconds.

Initial laboratory examination, Hb: 5.9 (low), Hct: 22 (low), Leucocyte: 10.7 (high), Thrombocyte: 614 (high),

Erythrocyte: 3.0 (low), urea: 16, creatinine: 0.84, blood glucose at time: 79, sodium: 138, potassium: 4.4, chloride: 105. Based on the examination, the initial working diagnosis of the patient is anemia gravis. The patient was given first aid in the form of IVFD RL therapy 500 cc/8 hours, paracetamol tablets 500 mg, omeprazole capsules 20 mg, and transfusion of packed red cells (PRC) 3 pockets.

The next day, further laboratory examinations were performed in the form of peripheral blood analysis. Erythrocytes: anisocytosis, microcytic hypochromic dominance, polychromacy (+), ovalocytes (+), pencil cells (+), and 1/100 leukocytes were found to have a nucleus. Leukocyte count obtained 1/12/0/72/12/3, blast (-), with the impression: sufficient number, normal morphology, and hypereosinophilia (+). Platelet count increased, large platelets (+) are visible, and the distribution is even. Serum iron examination: 22 (low), total iron binding capacity: 239 (low), ferritin: 22.52 (low). Based on these examinations, the patient's diagnosis was hypochromic anemia. Microcytes and causa deficiency iron and inflammation chronic, hemoglobinopathy, hypereosinophilia, thrombocytosis reactive and suspected cause of infection by parasites. The patient was then given further therapy in the form of lansoprazole and iron tablets.

The next day, a routine blood test was performed as a follow-up to the PRC transfusion. The results showed an increase in Hb from 5.9 to 8.4, an increase in Hct from 22 to 29, an increase in erythrocytes from 3.0 to 3.8, a decrease in leukocytes from 10.7 to 9.0, and a decrease in platelets from 614 to 424. However, these changes were still not within normal limits. The patient's general condition seemed to improve, but the complaint of abdominal pain had not disappeared. The patient still received the same therapy as the previous day.

Next, immunoserology and hemostasis function examinations were performed on the patient. The results showed negative anti-HIV, non-reactive HBsAg, negative anti-HCV, prothrombin time (PT): 12.2, APTT: 42.1, INR: 0.93. In a complete stool examination, macroscopically it appeared brown, soft consistency, mucus (-), blood (-), typical stool odor, food residue (+). Microscopically, 1-2 leukocytes, 0-1 erythrocytes, macrophages (-) were found in the stool examination, amoeba (-), worm eggs (-), starch (-), fat (+), epithelium (+). The examination has not directed the etiology of anemia gravis experienced by the patient. The doctor referred the patient for an endoscopy.

Table 1. Patient laboratory examination results

Date	Results	Interpretation
8/23/2024 (Routine Blood Test)	Initial Hb: 5.9	Low
	Hct: 22	Low
	Leukocytes: 10.7	High
	Thrombocyte: 614	High
	Erythrocyte: 3.0	Low
8/24/2024 (Peripheral Blood Analysis)	Erythrocytes: anisocytosis is seen, microcytic hypochromic dominance, polychromacy (+), ovalocytes (+), pencil cells (+), and erythrocytes with nuclei are found in 1/100 leukocytes.	
	Leukocyte count obtained 1/12/0/72/12/3, blast (-), with the impression: sufficient number, normal morphology, and hypereosinophilia (+).	
	The number of platelets increased, large platelets (+) were seen, with even distribution.	
8/25/2024 (Iron Analysis)	SI: 22	Low
	TIBC: 239	Low
	Ferritin: 22.52	Low
8/23/2024 (Routine post-transfusion blood tests)	Initial Hb: 8.4	Low
	Hct: 29	Low
	Leukocytes: 9.0	Normal
	Thrombocyte: 424	High
	Erythrocyte: 3.1	Low

Endoscopic examination results showed grade II esophagitis in one-third of the lower esophagus, multiple ulcers were found in the gastric antrum, and multiple worms were found in the duodenum areas 1 and 2. Based on the endoscopy results, it was concluded that there was esophagitis, gastric ulcer Forrest III, and worm infection. Worms were taken from the duodenum and macroscopically identified as *Ascaris lumbricoides*. The patient was then given PPI drugs and albendazole 400 mg in a single dose. The patient's condition improved, and he was allowed to go home.

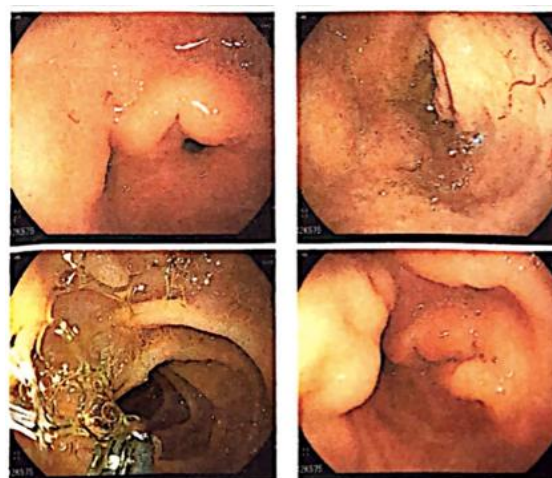


Figure 1. Multiple worms found in the duodenum on endoscopic examination

Source: Courtesy of Dr. Yugo Hario Sakti Dua, Gastroenterology Division, Department of Medicine, Banten Regional Hospital, Serang, Banten; with permission.



Figure 2. Findings multiple worms in duodenum-1 during endoscopic examination

Source : Courtesy of Dr. Yugo Hario Sakti Dua, Gastroenterology Division, Department of Medicine, Banten Regional Hospital, Serang, Banten; with permission.

Discussion

Worms, in a way can be cumulative and can cause the loss of substances that are useful for survival in elderly life, such as carbohydrates and proteins. Infection with worms can also cause anemia and complications for others. The Banten Provincial Health Service reported in 2023 that the prevalence of worm infestation varies from 2.5% to 62% in each city or district. The P2PL filariasis and worms sub-directorate stated that the prevalence of worm infestation in the Regency Pandeglang by 58.3% (Tjahyadi D, *et al.* 2024).

People whose work is often related to land, such as farmers, fishermen, plantation workers, and livestock breeders, are at risk

of experiencing worms. Transmission can occur either orally (contamination of food and drink) or through skin penetration with direct contact with animal waste used as plant fertilizer. Animal waste contains eggs and worm larvae that can disrupt the ecological system, one of which is the transmission of worm disease in humans and animals (Anggraini, *et al.* 2020)

Based on WHO's report, World Wide Prevalence of Anemia, it was found that the total of the world's population suffering from anemia is 1.62 billion people. The results of the 2022 Riskesdas show that the proportion of anemia in the age group teen-adult by 18.4%. More than 267 million Indonesian residents live in areas that are the habitat of STH worms, so they need intervention prevention and treatment in an intensive way (Agustina, *et al.* 2021).

Man is the most common host to suffer from infection by parasite worm type intestinal nematodes. Worms this type is transmitted into the body through the soil and is still a problem. Health is spread widely in temperate regions and tropical areas such as Indonesia. Species classified as STH are *Trichuris trichiura*, *Ascaris lumbricoides*, and hookworms (*Ancylostoma duodenale* and *Necator americanus*). These worms will affect food intake, digestion, absorption and metabolism (Ginting, *et al.* 2022)

Intestinal nematodes usually mature in the small intestine. Most adult worms attach to the intestinal villi with suction cups, causing the host to lose nutrients and blood, until allergic reactions and intestinal irritation occur. Patients will experience decreased Hb function in exchanging oxygen carried throughout the body. In addition, there will be a decrease in the absorption of nutrients needed by the body, so that Hb levels decrease and cause anemia which has an impact on productivity disorders in the elderly (Husniar, *et al.* 2022).

Anemia is a symptom characterized by decreased Hb levels due to a lack of nutritional intake such as iron, folic acid and vitamin B12. In addition, anemia can also be caused by parasitic infections, such as malaria and worms. Adult worms that live in the human intestines contribute greatly to the incidence of anemia due to decreased Hb. Based on previous research in Banjarbaru City, it was found that STH worms cause blood loss of 2.2 cc/day or 66 cc/month. This condition causes a decrease in Hb levels as the intensity of infection increases (Nurmayani, *et al.* 2020).

Another study reported that someone with a history of worm infection will cause the patient to lose 0.08-0.34 cc/day of blood (Sucipto C, 2020). Therefore, worms can be dangerous because they cause iron deficiency anemia if chronic infection

occurs. Iron deficiency anemia begins with normochromic microcytic. Then, as the iron deficiency worsens, it will become hypochromic microcytic. This condition is characterized by a decrease in the number of erythrocytes (RBC), Hb, Hct, MCV and MCHC. When anemia worsens, MCHC also decreases and thrombocytosis can occur. The risk of worms in this case can be prevented by washing hands, cutting nails, and wearing footwear (Wijaya, 2021).

The worms found in this case are the *Ascaris lumbricoides* species. The life cycle of this nematode begins with adult worms laying eggs in the small intestine. The immature eggs will come out with the feces. In a suitable environment, the fertilized eggs develop into an infective form in about 3 weeks. This infective form is then swallowed by humans, hatching in the small intestine into larvae. Then the larvae penetrate the wall of the small intestine to the lymphatic vessels or blood vessels. Furthermore, the larvae are carried by the bloodstream to the lungs. In the lungs, the larvae penetrate the alveolar walls and enter the tracheal cavity. From the trachea, the larvae rise to the pharynx, triggering a cough. This condition is known as Loeffler's syndrome. When coughing, the larvae will be swallowed back into the stomach and small intestine. In the duodenum, the larvae develop into adult worms. This life cycle lasts for about 2 months (Ulfa AR, 2021).

Abdominal discomfort, diarrhea, nausea, vomiting, weight loss, and malnutrition are clinical symptoms of *Ascaris lumbricoides* worm infection. In addition, intestinal obstruction can also occur due to the bolus produced by the worm, and migrating larvae can cause pneumonia and eosinophilia. In patients with Ascariasis, all of these symptoms can be caused by adult worms and larvae that are usually located in the lungs. In people who are susceptible to infection, there is minor bleeding in the alveolar walls and lung symptoms such as cough, fever, and eosinophilia. Disorders caused by adult worms are usually mild and sufferers sometimes experience mild intestinal symptoms such as nausea, loss of appetite, diarrhea, and even constipation (Lydia L, *et al.* 2022).

Ascaris lumbricoides can produce about 20,000 eggs per day, or about two to three eggs per second, this can cause anemia, and if in large numbers can cause toxemia due to toxins produced by *A. lumbricoides* and appendicitis because adult worms can enter the lumen of the appendix. Adult worms can also cause lactose intolerance, malabsorption of vitamin A, and micronutrients. If the worms clump in the intestine, it can cause intestinal obstruction, or if adult worms enter the appendix, it can cause acute appendicitis. If adult worms enter and block the bile duct, they can cause colic, cholangitis, cholecystitis,

pancreatitis, and liver abscess (Lydia L, *et al.* 2022).

STH worm infections are infections associated with the presence of body responses that produce several substances as mediators, causing type 1 hypersensitivity, such as eosinophils, basophils, and dahn mast cells. IL-5 will cause the release of eosinophils, and activation of eosinophils will cause an increase in the amount of eosinophils in the blood. So it can be concluded that the high amount of eosinophils can indicate the presence of STH worm infections (Ulfiana D, *et al.* 2024).

In this case report, parasitic worm infection was the most recent diagnosis. The patient had undergone a complete stool analysis, but no worm eggs were found microscopically. This condition is very likely a false negative due to various factors, such as a less fresh stool sample (not examined immediately within 30 minutes) and human error by the analyst. The diagnosis was made after an endoscopic examination and multiple worms were found in the duodenum. When viewed from the large number of worms, it is likely that the patient had a severe and chronic worm infection. This is what caused the patient to suffer from anemia gravis with Hb 5.9.

Conclusion

A 57-year-old male patient came with complaints of weakness for 7 days before admission to the hospital. Complaints were accompanied by dizziness, fatigue, and the patient looked pale. The patient also complained of abdominal pain that had worsened over the last 5 days. On physical examination, the patient appeared moderately ill, with anemic conjunctiva (+), abdomen: slightly distended, and increased bowel sound. On initial laboratory examination, Hb: 5.9 (low), Hct: 22 (low), Leucocyte: 10.7 (high), Thrombocyte: 614 (high), Eritrocyte: 3.0 (low) were obtained. Based on these examinations, the initial working diagnosis of the patient was anemia gravis. The patient was given first aid in the form of IVFD RL therapy 500 cc/8 hours, paracetamol tablets 500 mg, omeprazole capsules 20 mg, and packed red cell (PRC) transfusion 3 pockets. On further laboratory examination in the form of peripheral blood analysis. Erythrocytes: anisocytosis, microcytic hypochromic dominance, polychromacy (+), ovalocytes (+), pencil cells (+), and erythrocytes with nuclei were found in 1/100 leukocytes. Leukocyte count showed 72 eosinophils, with an impression of hypereosinophilia (+). The number of platelets increased, large platelets (+) were seen. Serum iron examination: 22 (low), total iron binding capacity: 239 (low), ferritin: 22.52 (low).

Based on these examinations, the patient was diagnosed with hypochromic anemia. Microcytes and causa iron deficiency and chronic inflammation, hemoglobinopathy, hypereosinophilia, thrombocytosis reactive and suspected cause infection parasites. The patient was then given further therapy in the form of lansoprazole and iron tablets. Next, a routine blood test was performed as a follow-up to PRC transfusion. The results showed an increase in Hb from 5.9 to 8.4. The results of the endoscopy examination showed grade II esophagitis in the lower third of the esophagus, multiple ulcers were found in the gastric antrum, and multiple worms were seen in the duodenum area 1 and 2. Based on the results of the endoscopy, it was concluded that there was esophagitis, gastric ulcer Forrest III, and worm infection. Worms were taken from the duodenum and macroscopically identified as *Ascaris lumbricoides*. The patient was then given PPI drugs and a single dose of albendazole 400 mg. The patient's condition improved and he was allowed to go home.

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