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Iron Deficiency Anemia in A 56-Year-Old Woman with a Differential Diagnosis of Ancylostomiasis

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Abstract

Ancylostoma duodenale hookworm infection through chronic intestinal blood loss. We report the case of a 56-year-old woman, a farmer with a history of recurrent anemia, who presented with weakness and heartburn. Blood tests revealed microcytic hypochromic anemia with an initial hemoglobin level of 3.6 g/dL, which increased to 9.6 g/dL after receiving a 5-pack PRBC transfusion. Her occupational history and habit of not always wearing shoes support the suspicion of ancylostomiasis, although stool examination could not be performed. The patient was managed with transfusions, supportive therapy, hypertension control, and a single dose of albendazole. This case emphasizes the importance of early detection and prevention of helminth infections to reduce the risk of iron deficiency anemia in endemic areas.

Introduction

Anemia deficiency iron is condition Where level substance red or hemoglobin (Hb) more low from normal value due to deficiency iron plays a role in formation heme . The World Health Organization (WHO) estimates that Woman 15 years old to on with anemia by 28%. Anemia contribute to death women in Asia. Southeast Asia is becoming region with prevalence incident anemia highest namely 42%. In Indonesia, the prevalence of anemia in adolescents is 32%, meaning that 3-4 out of 10 Indonesian adolescents suffer from anemia (Arya et al., 2022; Sari et al., 2022; Sari et al., 2022).

The most common causes of anemia include nutritional deficiencies, iron deficiency, folate deficiency, vitamin B12 and vitamin A, infectious diseases such as malaria, poor diet, infection, bleeding in the digestive tract, malabsorption, mothers suffering from anemia, premature birth and low birth weight (Fauzi, 2023; Obeagu et al., 2025; Verma et al., 2022).

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Anemia can be treated promptly when diagnosed early. Hemoglobin testing can only diagnose anemia in its late stages. Early detection of iron deficiency anemia can be achieved by using ferritin to assess decreased iron stores. Ferritin is a highly effective biomarker for anemia. However, ferritin cannot differentiate iron deficiency anemia from anemia due to inflammation/chronic disease (Kumar et al., 2022; Soni et al., 2025).

Soil-transmitted helminthiasis (STH) is an intestinal worm infection caused by a type of worm that requires soil as a medium for egg development until it reaches the infective stage. worm the including Ancylostoma duodenale, Necator americanus, Ascaris lumbricoides, and Trichuris trichiura. Ancylostoma duodenale is one of the type worm mines (Soil-Transmitted Helminths/STH) which are often found in the area with sanitation poor environment and hygiene low personal. Infection This cause problem health Serious like anemia and deficiency substance iron, especially in children age vulnerable schools Because often interact direct with contaminated soil. Eggs worm Ancylostoma duodenale that comes out together feces can growing in the ground with optimal temperature 23–33 °C, hatching become rhabditiform larvae, then develop become infective filariform larvae in 5–10 days. These larvae can penetrate human skin, especially through the gaps between the toes and the soles of the feet that are not protected by footwear while working. Although oral infection is rare, Ancylostoma duodenale can enter the body through contaminated food or drink and migrate through the blood vessels to the heart, lungs, bronchi, throat, esophagus, until finally settling and multiplying in the small intestine (Afia et al., 2025).

Case Report

Patient Identity

Name : Mrs. SL

Age : 56 years

Islam

Occupation : Farmer

Address : Mojogedang, Karanganyar

Javanese ethnic

Case Illustration

A 56-year-old woman (Mrs. SL) came to the Emergency Room of Karanganyar Regional Hospital on August 18, 2025 at 15:17 with a primary complaint of heartburn. This complaint was accompanied by weakness, dizziness, nausea, chest tightness, abdominal pain, decreased appetite, and fever. The heartburn had been felt since yesterday before entering the Emergency Room. The quality of the complaint had been continuous since yesterday. This complaint was very disturbing to the patient so that she could not carry out her usual activities. The complaint was felt suddenly. Factors that worsened during activity and relieved during rest. Previously, the patient had felt something similar about 6 months ago and had a history of anemia so that a 2-cold prc transfusion had been performed. The patient stated that she had previously been

hospitalized at Kartini Regional Hospital, Karanganyar due to similar complaints with Hb 4 and had a blood transfusion. A history of previous illnesses such as hypertension and DM was denied. A history of similar illnesses in the family was denied. And the patient's social history is that of a farmer who often goes to the rice fields.

On physical examination, the general condition was moderate, compos mentis consciousness (E4V5M6), blood pressure 151/92, pulse 86x/minute, temperature 36.9 Celcius, respiratory rate 21x/minute, and SpO2 99%. On head to toe examination, the head was found to be normocephalic, anemic conjunctiva, sclera not icteric, nose and ears were not found to be discharged, no mouth ulcers were found and there were no enlarged lymph nodes in the neck. Physical examination of the lungs, thorax inspection found a symmetrical chest wall shape, right and left chest expansion was not left behind, palpation fremitus was normal on the right and left, percussion was sonorous in both lung fields, auscultation of vesicular basic sounds did not find any additional sounds. Cardiac examination, inspection found no visible ictus cordis, palpation found ictus cordis palpable at SIC V linea midclavicula sinistra, percussion sounded dull, and auscultation found irregular S1 and S2 sounds and there was an additional sound of systolic heart murmur. Abdominal examination, inspection of the abdominal surface was flat, auscultation peristalsis was not increased, palpation found tenderness in the epigastric region, tympanic percussion. There was no extremity edema and no weakness of the extremities of the hands and feet.

On examination Supporting examinations carried out at the Emergency Room on August 18, 2025, obtained:

Table 1. Laboratory Examination Results Examination Date: August 18, 2025

Category	Test	Result	Reference Range
Hematology	Hemoglobin	K 3.6	11.7–15.5
Hematology	Hematocrit	K 13.8	35–47
Hematology	Leukocytes	7.75	3.6–11
Hematology	Platelets	H 467	150–440
Hematology	Erythrocytes	L 2.59	3.8–5.2
Hematology	MCV	L 53.3	80–100
Hematology	MCH	L 13.9	26–34
Hematology	RDW-CV	H 22.8	11.5–14.5
Hematology	RDW-SD	42.7	—
Differential Count	Neutrophils %	57.5	50.0–70.0
Differential Count	Lymphocytes %	30.6	25–40
Differential Count	Monocytes %	7.9	2.0–8.0
Differential Count	Eosinophils %	3.6	2–4
Differential Count	Basophils %	0.4	0.0–1.0
Differential Count	NLR	1.87	< 3.13
Differential Count	ALC	H 2.37	> 1.5
Kidney Function	Creatinine	0.70	0.6–1.2
Kidney Function	Urea	13.7	10–50

Glucose	Random Blood Glucose	98	70–150

Based on anamnesis results, examination physical and examination support, patient decide treated stay on August 18, 2025 with diagnosis enter anemia heavy with abdominal colic. Patient Then given therapy in the form of Infusion Nacl 20 tpm, Injection santagesic 500mg/12 hours, Injection Omeprazole 40mg/12 hours, and PRC transfusion 2 colf.

Anamnesis then done in a way autoanamnesis with patient on August 19 , 2025 in the Ward Mawar 2. During the anamnesis on August 19, 2025, the patient complained of still feeling weak, less dizziness, heartburn (-), chest pain (-). The patient said he had a history of low Hb and had been transfused with PRC 2 colf, as well as a history of stomach acid. On physical examination, the patient was found to be in moderate general condition, compos mentis consciousness (E4V5M6), blood pressure 149/83 mmHg, pulse 73x/minute, temperature 36.9 o C, respiratory rate 20x/minute, and SpO2 97 %, normocephalic head, anemic conjunctiva (+), icteric sclera (-), cyanotic mouth (-), atrophy of the tongue papillae (-), no secretions were found in the nose and ears, there was no enlargement of lymph nodes in the neck, physical examination of the lungs, inspection of the thorax found a symmetrical chest shape, no left-right chest expansion, normal fremitus palpation on the right and left sides, sonorous percussion on both lung fields, vesicular basic sound auscultation, no additional sounds. Cardiac examination, inspection found no visible ictus cordis, palpation found a strong ictus cordis in SIC V LMCS, percussion sounded dull, and auscultation found irregular S1 and S2 sounds and there was a systolic heart murmur. Abdominal examination, inspection of the abdominal surface was flat, auscultation normal peristalsis, palpation found no tenderness and tympanic percussion found. There was no extremity edema (-/-) and no weakness of the extremities of the hands and feet, koilonichia nails were found (+).

Table 2. Medical Record Summary Examination Date: August 18, 2025

Category	**Findings**
Subjective	Weak positive, dizziness decreased, heartburn negative, chest tightness negative, nausea and vomiting negative, history of low hemoglobin positive, history of sour stomach positive
Objective General Condition	Moderate
SpO2	97 percent
Blood Pressure	149 over 83 mmHg
Respiratory Rate	20 times per minute
Pulse	73 times per minute
Temperature	36.9 degree Celsius
Head	Normocephalic
Eyes	Anemia positive, icterus negative
Ears and Nose	No secretion
Mouth	Tongue papilla atrophy positive
Neck	No enlarged lymph nodes

Extremities	Edema negative, koilonychia positive
Lungs Inspection	Symmetrical
Lungs Palpation	Fremitus normal
Lungs Percussion	Sonor
Lungs Auscultation	Vesicular breath sounds
Heart Inspection	Ictus cordis visible
Heart Palpation	Ictus cordis palpable at fifth intercostal space
Heart Percussion	Dull
Heart Auscultation	S1 and S2 irregular, systolic murmur present
Abdomen Inspection	Flat
Abdomen Auscultation	Normal peristalsis
Abdomen Percussion	Tympanic
Abdomen Palpation	No tenderness
Assessment	Severe anemia
Plan Treatment	Normal saline infusion 30 drops per minute
	Santagesic injection 500 mg every 12 hours
	Omeprazole injection 40 mg every 12 hours
Plan Examination	Fecal examination
Plan Procedure	Transfusion of packed red cells 2 units

On examination physique found conjunctiva anemia, atrophy papilla tongue, and nails koilonychia so need searching for now reason anemia. Therefore, That planned inspection stool and smear blood edge For know whether There is infection worm as well as type anemia.

Table 3. Laboratory Examination Results Date: August 19, 2025

Category	Test	Result	Reference Range
Hematology	Hemoglobin	K 5.8	11.7–15.5
Hematology	Hematocrit	K 20.7	35–47
Hematology	Leukocytes	8.26	3.6–11
Hematology	Platelets	415	150–440
Hematology	Erythrocytes	L 3.27	3.8–5.2
Hematology	MCV	L 63.3	80–100
Hematology	MCH	L 17.7	26–34
Hematology	MCHC	L 28	32–36
Hematology	RDW-SD	68.7	—
Hematology	RDW-CV	H 31.8	11.5–14.5
Differential Count	Neutrophils %	H 71.3	50.0–70.0
Differential Count	Lymphocytes %	L 17.9	25–40

Differential Count	Monocytes %	6.7	2.0–8.0
Differential Count	Eosinophils %	3.9	2–4
Differential Count	Basophils %	0.2	0.0–1.0
Differential Count	NLR	H 3.98	< 3.13
Differential Count	ALC	1.48	< 1.5

After PRC 2 colf transfusion, it was carried out inspection blood routine For know mark haemoglobin.

Post transfusion PRC 2 colf Hb awal 3.6 rose to 5.8. Plus Again For PRC transfusion 2 colf because Hb is still low.

Table 4. Medical Record Summary Examination Date: August 19, 2025

Category	Findings
Subjective	Weak negative, dizziness decreased, nausea and vomiting negative, heartburn negative, chest tightness negative, no bowel movements positive
Blood Pressure	164 over 91 mmHg
Heart Rate	66 times per minute
Respiratory Rate	20 times per minute
Temperature	36.8 degree Celsius
SpO2	99 percent
General Examination	Scleral jaundice positive, tongue papilla atrophy positive, koilonychia positive
Heart Inspection	Ictus cordis visible
Heart Palpation	Ictus cordis palpable at fifth intercostal space left midclavicular line
Heart Percussion	Dull
Heart Auscultation	S1 and S2 irregular, systolic murmur present
Assessment	Severe anemia and hypertension
Treatment Plan	Normal saline infusion
	Santagesic injection 500 mg every 12 hours
	Omeprazole injection 40 mg every 12 hours
	Amlodipine 5 mg once daily orally

The patient's blood pressure increased, requiring additional medication, amlodipine, 5 mg once daily. The patient was unable to defecate, so a stool examination could not be performed.

Post PRC transfusion 2 colf Hb 5.8 increased to 8.3

Table 5. Laboratory Examination Results Examination Date: August 20, 2025

Category	Test	Result	Reference Range
Hematology	Hemoglobin	L 8.3	11.7–17.3
Hematology	Hematocrit	L 27	40–52

Hematology	Leukocytes	7.34	3.8–10.6
Hematology	Platelets	342	150–440
Hematology	Erythrocytes	4.07	3.8–5.2
Hematology	MCV	L 66.3	80–100
Hematology	MCH	L 20.4	26–34
Hematology	MCHC	L 30.7	32–36
Hematology	RDW-SD	73.4	—
Hematology	RDW-CV	H 31.8	11.5–14.5
Differential Count	Neutrophils %	67.7	50.0–70.0
Differential Count	Lymphocytes %	L 19.5	25–40
Differential Count	Monocytes %	H 8.4	2.0–8.0
Differential Count	Eosinophils %	4.0	2–4
Differential Count	Basophils %	0.4	0.0–1.0
Differential Count	NLR	H 3.47	< 3.13
Differential Count	ALC	1.43	> 1.5

Table 6. Medical Record Summary Date: August 21, 2025

Category	**Findings**
Subjective	Weakness negative, dizziness negative, heartburn negative, chest pain negative, no bowel movement positive, overall complaints reduced
Blood Pressure	157 over 93 mmHg
Heart Rate	77 times per minute
Respiratory Rate	20 times per minute
Temperature	36.9 degree Celsius
SpO2	98 percent
Assessment	Severe anemia and hypertension
Treatment Plan	Normal saline infusion 20 drops per minute
	Santagesic injection 500 mg every 12 hours
	Omeprazole injection 40 mg every 12 hours
	Amlodipine 5 mg once daily orally
	Candesartan 16 mg once daily orally
	Lactulax syrup three times daily one measuring spoon
Procedure Plan	Transfusion of packed red cells 1 unit

Pressure blood patient Still tall so that added candesartan 1x 16 mg and not yet can defecate so Not yet Can checked his feces as well as given lactulax syrup 3x C1. Added Again PRC transfusion 1 colf.

Table 7. Medical Record Summary Date: August 22, 2025

Category	**Findings**

Subjective	Weakness negative, dizziness negative, heartburn negative, chest pain negative, no bowel movement positive, overall complaints reduced
Blood Pressure	137 over 83 mmHg
Heart Rate	68 times per minute
Respiratory Rate	20 times per minute
Temperature	36.9 degree Celsius
SpO2	98 percent
Assessment	Severe anemia and hypertension
Treatment Plan	Normal saline infusion 20 drops per minute
	Santagesic injection 500 mg every 12 hours
	Omeprazole injection 40 mg every 12 hours
	Amlodipine 5 mg once daily orally
	Candesartan 16 mg once daily orally
	Lactulax syrup three times daily one measuring spoon
Discharge Medication	Albendazole 400 mg single dose orally
Disposition	Patient may go home today

Patient Still Not yet can defecate so No can done inspection feces.

After adding PRC transfusion 1 colf , Hb **8.3** increased to **9.6.** Total patients get PRC transfusion 5 colf , initial Hb **3.6** become **9.6** . Patients Already allowed For go home.

Table 8. Laboratory Examination Results Examination Date: August 22, 2025

Category	Test	Result	Reference Range
Hematology	Hemoglobin	L 9.6	11.7–15.5
Hematology	Hematocrit	L 33.6	35–47
Hematology	Leukocytes	9.6	3.6–11
Hematology	Platelets	311	150–440
Hematology	Erythrocytes	4.76	3.8–5.2
Hematology	MCV	L 70.6	80–100
Hematology	MCH	L 20.2	26–34
Hematology	MCHC	L 28.6	32–36
Differential Count	Neutrophils %	H 73.7	50.0–70.0
Differential Count	Lymphocytes %	L 18.3	20–40
Differential Count	Monocytes %	4.4	2.0–8.0
Differential Count	Eosinophils %	3.4	2–4
Differential Count	Basophils %	0.2	0.0–1.0
Differential Count	NLR	H 4.02	< 3.13
Differential Count	ALC	H 1.76	> 1.5

After less more than 1 week , results smear blood edge Already There is

Table 9. Peripheral Blood Smear (GDT) Examination Results

Parameter	Findings

Erythrocytes	Hypochromic microcytic anisopoikilocytosis, normocytes, ovalocytes, pencil cells, fragmentocytes, target cells, acanthocytes, teardrop cells, polychromasia, erythroblasts positive
Leukocytes	Normal count, neutrophil predominance, hypergranulated neutrophils, hypersegmented neutrophils, apoptotic neutrophils, activated monocytes, atypical lymphocytes, myelocytes and metamyelocytes present, blast cells negative
Platelets	High normal count, giant platelets positive, clumping negative, evenly distributed
Conclusion	Hypochromic microcytic anemia

Discussion

Implementation of Clinical Management with Patient Laboratory Results

The patient was admitted with a primary complaint of heartburn that began one day prior to emergency room presentation. The symptoms were accompanied by weakness, dizziness, nausea, chest tightness, abdominal pain, decreased appetite, and fever. The patient reported a previous similar episode six months earlier and had a documented history of severe anemia with hemoglobin level of 4 g per dL that required a two unit transfusion. This clinical history suggested recurrent anemia with possible gastrointestinal involvement.

Initial laboratory evaluation revealed severe anemia. Hemoglobin was 3.6 g per dL and hematocrit was 13.8 percent, both markedly decreased. Erythrocyte count was 2.59 million per microliter. Red cell indices showed MCV 53.3 fL and MCH 13.9 pg, indicating microcytic hypochromic anemia. MCHC was 26.1 g per dL. RDW CV was 22.8 percent, suggesting significant anisocytosis. Platelet count was elevated at 467 thousand per microliter, while leukocyte count was within normal limits at 7.75 thousand per microliter. ALC was 2.37 and NLR was 1.87. Kidney function tests showed creatinine 0.70 mg per dL and urea 13.7 mg per dL. Random blood glucose was 98 mg per dL. Peripheral blood smear examination demonstrated hypochromic microcytic anisopoikilocytosis with normocytes, ovalocytes, pencil cells, fragmentocytes, target cells, acanthocytes, teardrop cells, polychromasia, and positive erythroblasts. These findings strongly supported a diagnosis of severe microcytic hypochromic anemia.

During hospitalization, the patient received five units of packed red blood cells. Supportive therapy included normal saline infusion at 20 drops per minute, Santagesic 500 mg every twelve hours, and omeprazole 40 mg every twelve hours. Antihypertensive therapy consisted of amlodipine 5 mg once daily and candesartan 16 mg once daily. Lactulax syrup was administered three times daily. Clinical monitoring showed gradual symptomatic improvement following transfusion and supportive management.

The diagnosis of iron deficiency anemia can be confirmed through laboratory evaluation including complete blood count and iron status assessment to determine anemia type. Decreased hemoglobin levels accompanied by low MCV and MCH are characteristic of

microcytic hypochromic anemia. Peripheral blood smear and iron profile examination further support the diagnosis in suspected cases of iron deficiency anemia as reported by Kapoh et al. 2021. When iron studies are unavailable, therapeutic iron supplementation may be used as a diagnostic approach. Administration of elemental iron at a dose of 3 mg per kg per day or ferrous sulfate 200 mg three times daily orally can be given to anemic patients. An increase in hemoglobin greater than 2 g per dL within two to four weeks indicates a positive response and supports the diagnosis of iron deficiency anemia as described by Arya et al. 2022.

The diagnosis of iron deficiency anemia is made based on anamnesis, physical examination, and supporting examinations including:

Anamnesis: In the anamnesis, symptoms such as weakness, fatigue, lethargy, fatigue, headache, shortness of breath, lightheadedness, hair loss, decreased appetite, pica (liking to eat unusual foods such as ice cubes, paper, hair, etc.) seeing stars, decreased concentration, palpitations and restless legs can be found (Arya et al., 2022).

Physical examination

Anemia can be found in the conjunctiva, oral mucosa, palms, and tissue under the nails (without jaundice, organomegaly, and lymphadenopathy). In addition, changes in the number of epithelium can also be found: dysphagia, atrophy of the tongue papillae, glossitis, angular stomatitis, angular cheilosis, koilonychia (concave nails or spoon-shaped nails). On auscultation examination: a systolic murmur is found with or without cardiomegaly, tachycardia if complications have occurred (Wijayanti et al., 2024).

Supporting investigation

Complete blood laboratory examination: erythrocytes (Hb decreases, Hct decreases, MCV decreases, MCH decreases, MCHC decreases, RDW increases), eosinophils (eosinophilia if there is a worm infection), platelets are generally normal, in chronic anemia leukopenia can occur.

Peripheral blood smear (hypochromic microcytic, anisocytosis, pyocycytosis, pencil/cigar cells).

Iron status examination (decrease in serum ferritin levels, serum iron, and ferritin saturation. While the Total Iron Binding Capacity (TIBC) increased) (Kumar et al., 2022).

Trial of iron preparation administration (administration of ferrous sulfate 3 x 200 mg/day for 4 weeks accompanied by an increase in Hb > 2 gr/dl.

Bone marrow aspiration (decreased iron levels using Perls staining -> hyperplasia of the erythropoietic system and reduced hemosiderin).

Other examinations to find the cause of anemia (fecal examination for hookworms, examination for occult blood in the stool, endoscopy, barium intake/inloop) (Fauzi, 2023).

In this patient, iron deficiency anemia can be diagnosed based on a complete blood count and peripheral blood smear. Symptoms and a physical examination can also support the diagnosis.

Relationship Between Anemia And Ancylostomiasis

Ancylostoma duodenale is a type of soil-transmitted helminth (STH) often found in areas with poor environmental sanitation and poor personal hygiene. This infection causes serious health problems such as iron deficiency anemia.

The patient is a farmer who works in the rice fields daily. Furthermore, he also experiences recurring anemia, leading to suspicion of an infectious cause. Ancylostoma worm infection is suspected. However, this diagnosis cannot be confirmed because the patient is unable to defecate, preventing a stool examination.

The habit of not wearing shoes while working also increases the risk of ancylostoma worm infection, because the worm larvae can enter through the spaces between the toes, heels, or wounds on the skin. This patient's daily activities in the rice fields, and when asked if he was wearing shoes, he sometimes removed them, which can contribute to the occurrence of worm infections. Several factors contributing to the spread of this infection include a lack of knowledge about personal and environmental hygiene, the use of feces as fertilizer, and environmental conditions that support parasite development, such as moist, loose soil and protection from sunlight (González-Ramírez et al., 2022; Gizaw et al., 2022). Furthermore, many people do not have sanitation facilities such as latrines, so they are accustomed to defecating in random places, such as ditches, gardens, gutters, and yards, which can contaminate the environment with human feces. Behaviors such as not washing hands before eating and consuming unwashed vegetables are major risk factors for STH transmission (Zebua et al., 2025; Setyo et al., 2023; Rahim & Daud, 2022; Rohmah et al., 2022).

The infection cycle begins when worm eggs excreted in infected human feces enter the soil. Within a relatively short time, approximately 1 to 2 days, the eggs hatch into rhabditiform larvae. These larvae then develop further in the soil or within the fecal mass itself. After 5 to 10 days, the rhabditiform larvae metamorphose into filariform larvae, the third infective stage, capable of penetrating the skin of a new host. These filariform larvae can then penetrate unprotected human skin, such as the soles of the feet or hands, upon direct contact with contaminated soil. After successfully penetrating the skin, the larvae enter the bloodstream and begin a complex migration through the circulatory system, spreading to various vital organs, including the heart and lungs, before finally moving through the bronchi and throat, where they are swallowed and reach the small intestine. It is in the small intestine that the larvae mature into adult worms, attach to the intestinal wall, and begin reproduction, releasing thousands of eggs daily to continue the infection cycle. In addition, it can also cause inflammatory skin reactions at the point of larval penetration (dermatitis), as well as serious respiratory problems such as bronchitis and pneumonitis when the larvae migrate through the lungs, especially in individuals with high levels of sensitivity or exposure to severe infections (Siahaan et al., 2023).

Ancylostoma duodenale (hookworm) infection is closely linked to anemia, particularly iron deficiency anemia . This happen through a number of mechanism:

Intestinal mucosal adhesion and damage:

Adult Ancylostoma worms attach to the small intestinal mucosa using their teeth or buccal capsules. Upon attachment, the worms injure the mucosa and induce bleeding. This injury occurs not only during attachment but also continues because the worms secrete anticoagulants that prevent blood clotting.

Chronic blood loss

Every tail *Ancylostoma duodenale* can cause lost blood approximately 0.03–0.2 mL per day. If infection massive (hundreds) tail), total loss blood Can significant and ongoing chronic. This is cause reserves substance iron body drained.

Iron absorption disorders

Chronic inflammation in the intestinal mucosa can interfere with the absorption of iron and other nutrients, worsening the condition of iron deficiency anemia.

Anemia microcytic hypochromic

Chronic blood loss will decrease hemoglobin levels, hematocrit, and iron stores. The anemia seen in hookworm infections is generally a microcytic, hypochromic anemia due to iron deficiency.

Diagnosis can be confirmed by laboratory examination and parasitological examination (gold standard).

Laboratory examination

Complete blood count (low Hb, hct, MCV, MCH, MCHC). Results showed microcytic hypochromic anemia. Decreased serum ferritin, serum iron, ferritin saturation, and increased TIBC levels.

Parasitology Examination (gold standard)

Stool examination (microscopic): hookworm eggs (Ancylostoma duodenale / Necator americanus) were found. oval shaped with cytoplasm clear contains unsegmented ovum, thin walls.

Stool culture (Harada-Mori test) → sees filariform larvae (Situmorang *et al* ., 2023) .

The treatments that can be given are albendazole 400 mg PO single dose, mebendazole 2x100 mg for 3 days, pyrantel pamoate 10 mg/kg and ferrous sulfate (Tuuk *et al* ., 2020) .

Other Differential Diagnosis

Anemia can occur due to several things, so further examination is needed to determine the cause.

Anemia of Chronic Disease

Chronic inflammation, infection, and malignancy occur: >1-2 months (due to CKD). Lab results: low serum Fe, low TIBC, normal or increased ferritin, iron marrow bone (+). MDT results: pearl staining (+).

Sideroblastic anemia

B6 deficiency: genetic, alcohol, drugs (INH), intoxication tin . Serum Fe lab results are normal/increased, TIBC is normal/ decreased, ferritin is increased. MDT: ring sideroblast , Pappenheimer body, basophilic staining.

Thalassemia

Autosomal recessive Asymptomatic, Cooley facies, hair on end, splenomegaly. Lab: normal/increased serum Fe, Mentzer index <13, increased Hb electrophoresis Hba2, increased Hbf, Hba down. MDT: target cell, tear drop cell, howel jolly

Sickle cell anemia

Hand foot syndrome. Serum Fe labs are normal/increased, sickled erythrocytes.

Conclusion

Anemia deficiency iron in patients with factor risk environment like farmers who often contact with land barefoot necessary suspected as consequence infection Ancylostoma duodenale. Worms This can cause lost blood chronic through adhesion to the mucosa intestines and excretion anticoagulant, so that cause anemia hypochromic microcytic. The diagnosis is confirmed through inspection blood complete and confirm with inspection feces, although in cases This inspection feces No can A history of recurrent anemia and a habit of not always wearing shoes strongly suggest ancylostomiasis. Treatment includes blood transfusions, iron supplementation, control of comorbidities, and administration of anthelmintics such as a single dose of albendazole. This underscores the importance of early detection, improved sanitation, and prevention of worm infections to reduce the incidence of iron deficiency anemia in endemic areas.

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