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Case report
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INADEQUATE DIETARY INTAKE AND PEDICULOSIS AS THE UNDERLYING CAUSE OF IRON DEFICIENCY ANEMIA – CASE REPORT

NEADEKVATAN UNOS HRANE I PEDIKULOZA U OSNOVI ANEMIJE UZROKOVANE NEDOSTATKOM GVOŽĐA – PRIKAZ SLUČAJA

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Summary

Introduction. Causes of iron deficiency anemia include inadequate dietary intake, increased body requirements, reduced iron absorption, chronic inflammation, and chronic blood loss. Individuals residing in socioeconomically disadvantaged areas are prone to iron deficiency, primarily due to inadequate dietary intake, with parasitic infestations being a rare cause. Pediculosis, caused by *Pediculus humanus capitis*, is an ectoparasitic infestation of the human scalp. **Case Report.** We present the case of a 52-year-old Caucasian female who sought emergency medical attention due to progressive fatigue and pallor. The patient denied any history of gastrointestinal or genitourinary bleeding. Nutritional assessment revealed an inadequately balanced diet with a suspected deficiency of iron-rich foods. Physical examination was unremarkable, except for decreased muscle mass. A pronounced infestation with lice along with a large number of nits was observed on the head. Laboratory tests confirmed severe sideropenic anemia. Endoscopic, radiological and specific laboratory examinations failed to provide significant information about the etiology of the anemia. Initially, the patient received transfusions of deplasmatised erythrocytes, followed by oral ferrous sulfate preparations, which resulted in satisfactory substitution. Topical application of Permethrin 1% lotion was administered, followed by the use of a lice comb. **Conclusion.** This case underscores the significance of a comprehensive approach to patients with chronic head and body lice infestation, including basic laboratory analyses and an iron profile, if necessary. Many patients receive over-the-counter therapy without an adequate hematological assessment. Only through this approach can hematological disorders associated with chronic or recurrent pediculosis be promptly diagnosed and treated, thus preventing the potentially fatal complications of anemia.

Key words: Anemia, Iron-Deficiency; Diet; Iron Deficiencies; Lice Infestations; Socioeconomic Factors

Sažetak

Uvod. Uzroci anemije usled nedostatka gvožđa obuhvataju neadekvatan unos hrane, povećane telesne potrebe, smanjenu apsorpciju gvožđa, hroničnu inflamaciju i hronični gubitak krvi. Osobe iz socijalno ekonomski ugroženih sredina podložne su razvoju deficita gvožđa, pretežno zbog neizbalansirane ishrane, ređe i zbog parazitarne infestacije. Pedikuloza je ektoparazitska infestacija poglavine izazvana vrstom *Pediculus humanus capitis*. **Prikaz slučaja.** Predstavljamo bolesnicu starosti 52 godine, svetle puti, koja je zatražila hitnu medicinsku pomoć zbog progresivnog umora i bledila. Bolesnica negira istoriju gastrointestinalnog ili genitourinarnog krvarenja. Nutritivna procena otkrila je neadekvatno balansiranu ishranu sa mogućim nedostatkom unosa namirnica bogatih gvožđem. Fizikalni pregled bio je bez značajnih osobenosti, osim smanjenja mišićne mase. Na poglavini je uočena izražena infestacija vašima i velikim brojem jajašaca. Laboratorijski testovi su potvrdili izraženu sideropenijsku anemiju. Endoskopski, radiološki i specifični laboratorijski pregledi nisu pružili značajne informacije o etiologiji malokrvnosti. Bolesnici su inicijalno ordinirane transfuzije deplazmatiziranih eritrocita, potom i oralni preparati gvožđe-sulfata, što je dovelo do zadovoljavajuće supstitucije. Lokalno je primenjen permetrin u vidu losiona od 1%, uz upotrebu češlja za vaše. **Zaključak.** Ovim slučajem ističemo važnost sveobuhvatnog pristupa bolesnicima sa hroničnom infestacijom vašima na glavi i telu, uključujući osnovne laboratorijske analize i, ako je potrebno, analize metabolizma gvožđa. Mnogim bolesnicima se propisuje terapija bez recepta, bez adekvatne hematološke procene. Samo ovim pristupom mogu se dijagnostikovati i lečiti hematološki poremećaji u vezi sa hroničnom ili ponavljanom pedikulozom, sprečavajući potencijalno smrtonosne komplikacije anemije.

KLjučne reči: anemija uzrokovana deficitom gvožđa; ishrana; deficit gvožđa; pedikuloza; socioekonomski faktori

Introduction

Sideropenic anemia is a hypochromic, microcytic anemia caused by insufficient iron level in the

body. Globally, anemia affects approximately 33% of the world's population, encompassing about 1.62 billion individuals, with nearly half of the cases attributed to iron deficiency, thus constituting a sub-

Abbreviations

IgA – immunoglobulin A

stantial disease burden worldwide [1–3]. Causes of iron deficiency anemia include inadequate dietary intake, increased body requirements, reduced iron absorption, chronic inflammation, and chronic blood loss [4, 5]. Individuals residing in socioeconomically disadvantaged areas are particularly vulnerable to iron deficiency, primarily due to inadequate dietary intake and rarely due to parasitic infestations [6, 7]. Pediculosis, caused by *Pediculus humanus capitis*, is an ectoparasitic infestation of the human scalp and it is highly contagious, commonly transmitted through direct head-to-head contact with an infected individual. Indirect transmission through the sharing of personal items is less frequent. The prevalence of pediculosis varies depending on socioeconomic, demographic, educational and hygiene factors [8–10]. The parasite sustains itself by feeding on human blood, with estimated blood loss ranging from 0.008 ml/day to 0.7 ml/day in severe infections. Each milliliter of blood contains 0.4–0.5 mg of iron. In certain cases, the cumulative blood loss over time can precipitate symptoms of anemia in affected individuals [11, 12].

Case Report

A 52-year-old Caucasian female presented to the emergency department in May 2023 complaining of progressive fatigue and pallor. The patient denied any history of gastrointestinal or genitourinary bleeding,

as well as any change in bowel (diarrhea, constipation) or urine (dysuria, frequency, urgency) habits. Prior to hospitalization, she had not sought medical attention for over 20 years and had not been taking any medications. She reported regular menstrual cycles without overflow or any signs of menorrhagia until 12 months before her hospital admission, when menopause began. Nutritional assessment revealed imbalanced meals with suspected inadequate consumption of iron-rich foods.

Upon initial examination, her skin appeared notably pale, and she exhibited a significant infestation of head lice with numerous nits on the scalp. Vital signs were within normal limits. Systemic examination revealed no abnormalities except for muscle wasting and low fat stores. Her body mass index was 15.6 kg/m². There was no lice infestation on the rest of her body or pubic region, aside from the head.

Laboratory tests confirmed profound microcytic anemia, with white blood cells count, platelets, markers of inflammation, parameters of hemostasis, electrolytes, renal and liver functional tests all falling within normal ranges (**Table 1**). The iron profile indicated low iron and ferritin levels, as along with markedly elevated soluble transferrin receptor, which confirmed the diagnosis of iron deficiency anemia (**Table 2**). Fecal occult blood test was negative.

Following a local diagnostic protocol for evaluation patients with sideropenic anemia, upper and lower endoscopies were conducted, revealing no significant pathomorphological abnormalities in the esophageal, gastric, duodenal or colonic mucosa. Pathohistological analysis of gastric and duodenal mucosal biopsies did not indicate signs of *Helicobacter pylori* infection,

Table 1. Baseline laboratory parameters of the patient with iron deficiency anemia**Tabela 1.** Inicijalne laboratorijske vrednosti bolesnice sa sideropenijskom anemijom

	Baseline value/Osnovna vrednost	Normal range/Normalan opseg
RBC x 10 ¹² /L/ERCI x 10 ¹² /L	2.1	4.2–6.0
Hemoglobin g/L/Hemoglobin g/L	31.0	120–160
MCV fL	62.5	82–98
MCH pg	22.4	27–32
MCHC g/L	293	310–350
WBC x 10 ⁹ /L/LKCI x 10 ⁹ /L	5.54	4.0–10.0
PLT x 10 ⁹ /L/TRCI x 10 ⁹ /L	240	140–400
Urea mmol/L/Urea mmol/L	5.5	2.2–7.1
Creatinine µmol/L/Kreatinin	53	49–97
AST U/L	12	5–37
ALT U/L	16	5–48
Total Bilirubin umol/L/Ukupni bilirubin	5.5	3–21
Direct Bilirubin umol/L/Direktni bilirubin	2.0	0.1–5.2
Na mmol/L	139	135–148
K mmol/L	4.3	3.5–5.5
Cl mmol/L	104	98–112
CRP mg/L/CRP mg/L	0.5	0.0–5.0

Legend: RBC – Red Blood Cells, MCV – Mean Corpuscular Volume, MCH – Mean Corpuscular Hemoglobin, MCHC – Mean Corpuscular Hemoglobin Concentration, WBC – White Blood Cells, PLT – Platelets, AST – Aspartate Aminotransferase, ALT – Alanine Transaminase, Na – Sodium, K – Potassium, Cl – Chloride, CRP – C-reactive protein

Legenda: ERCI – eritrociti, MCV – prosečna zapremina eritrocita, MCH – prosečna količina hemoglobina u eritrocitu, MCHC – prosečna koncentracija hemoglobina u eritrocitima, LKCI – leukociti, TRCI – trombociti, AST – aspartat aminotransferaza, ALT – alanin aminotransferaza, Na – natrijum, K – kalijum, Cl – hlor, CRP – C-reaktivni protein

Table 2. Iron profile of the patient with iron deficiency anemia
Tabela 2. Profil gvožđa kod bolesnice sa sideropenijskom anemijom

	Baseline value/Osnovna vrednost	Normal range/Normalan opseg
Ferritin/Feritin ug/L	6.0	10-120
Transferrin/Transferin g/L	3.52	1.8-3.6
Fe/Gvožđe umol/L	5.0	9.0-30.4
sTfR mg/L	15.4	0.76-1.76

Legend: Fe – Mean iron, sTfR – Mean Soluble Transferrin Receptor
Legenda: Fe – Gvožđe, sTfR – Solubilni transferinski receptori

atrophic gastritis, or celiac disease. Serological tests for immunoglobulin A (IgA), anti-tissue transglutaminase and IgA anti-endomysial were negative, with total IgA falling within normal range values. Thyreoid function tests also fell within normal range (**Table 2**). Pelvic ultrasound, performed by the gynecologist, and a computed tomography examination conducted according to the chest-abdomen-pelvis protocol did not reveal any significant findings considering the etiology of sideropenic anemia.

The patient initially received several units of packed red blood cells, leading to subsequent normalization of hemoglobin levels. Oral ferrous sulfate was then administered. Following a dermatology consultation, permethrin 1% lotion was applied to the hair and scalp, followed by the use of a nit comb. The patient was advised to repeat the treatment one week later.

Discussion

In men, as well as in postmenopausal women, iron deficiency anemia typically arises from either gastrointestinal iron loss or decreased iron absorption in the gastrointestinal tract [13]. Here, we present a case of severe sideropenic anemia induced by recurrent *Pediculosis capitis* infestation and arguably inadequate dietary intake. Although inadequate dietary intake is a well-known cause of iron deficiency anemia, it is infrequent in developed

countries but quite common in developing ones. Hematologic disorders as complications of pediculosis are rarely recognized [14–16]. The population at high risk for sideropenic anemia in the context of pediculosis includes children, individuals with a history of psychiatric disorders, poor education, and low socioeconomic status [9]. The patient in question exhibited multiple precipitating factors, including low socioeconomic status, limited education, and poor personal hygiene, rendering her susceptible to profound iron deficiency and subsequent iron deficiency anemia. Despite extensive history-taking, laboratory, endoscopic and radiological investigations, no obvious underlying condition was identified to explain the anemia, aside from chronic and heavy lice infestation.

Conclusion

This case underscores the significance of adequate approach to patients with chronic head and body lice infestation, including, at least, basic blood work and an iron profile, if necessary, as most of them are simply provided with over-the-counter or prescription anti-lice medications by healthcare providers. It is imperative to adopt a comprehensive approach to diagnose and treat hematologic disorders associated with recurrent pediculosis promptly, which is crucial for averting potentially life-threatening complications arising from anemia.

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