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CONCURRENT NUTRITIONAL ANEMIA AND SYMPTOMATIC VITAMIN D DEFICIENCY: A COMPREHENSIVE CASE REPORT

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ABSTRACT Nutritional anemia and vitamin D deficiency are common public health issues with significant overlapping features. This case report details the clinical presentation, diagnosis, and management of a 35-year-old female patient presenting with fatigue, pallor, and bone pain. Laboratory investigations revealed severe anemia (hemoglobin 7.2 g/dL) and markedly low serum vitamin D levels (10 ng/mL). The patient's dietary history indicated poor intake of iron-rich foods and limited sun exposure. Treatment involved iron supplementation, vitamin D3 therapy, and dietary modifications. Over three months, the patient's hemoglobin levels improved, and symptoms resolved. This case underscores the importance of a holistic approach in diagnosing and managing concurrent nutritional deficiencies, emphasizing the need for integrated public health strategies to address dietary inadequacies and promote optimal health.

KEYWORDS :

INTRODUCTION

Nutritional deficiencies, particularly anemia and vitamin D deficiency, are prevalent globally, affecting various age groups and contributing significantly to morbidity. Nutritional anemia is primarily caused by inadequate dietary intake of essential nutrients like iron, vitamin B12, and folate. It presents with symptoms such as fatigue, pallor, and dyspnea. Vitamin D deficiency, on the other hand, results from insufficient dietary intake, poor sunlight exposure, or malabsorption. It manifests with symptoms including bone pain, muscle weakness, and increased risk of fractures.Iron deficiency anemia (IDA) is the most common type of anemia worldwide. It results from inadequate iron intake, poor absorption, or chronic blood loss. Symptoms include fatigue, weakness, and pallor. IDA can lead to impaired cognitive function and reduced quality of life. Vitamin D deficiency is prevalent in regions with limited sunlight exposure and among individuals with inadequate dietary intake. It leads to decreased calcium absorption, resulting in bone demineralization and conditions such as rickets in children and osteomalacia in adults.The coexistence of nutritional anemia and vitamin D deficiency can complicate the clinical picture, making diagnosis and management challenging. Both conditions share common risk factors such as poor dietary habits, malabsorption syndromes, and socioeconomic factors. This case report highlights the clinical presentation, diagnostic process, and therapeutic approach for a patient with both nutritional anemia and symptomatic vitamin D deficiency, illustrating the importance of comprehensive nutritional assessment and management in clinical practice.

Case Report

A 35-year-old female presented to the outpatient clinic with complaints of progressive fatigue, generalized weakness, and bone pain over the past six months. She also reported dyspnea on exertion and palpitations. Her medical history was unremarkable, with no significant past illnesses or surgeries. She had a vegetarian diet and limited sun exposure due to her indoor occupation.On physical examination, the patient appeared pale and lethargic. Vital signs were stable, but she had tachycardia with a heart rate of 105 beats per minute. The cardiovascular examination revealed a systolic flow murmur. There were no signs of hepatosplenomegaly or lymphadenopathy. Musculoskeletal examination showed tenderness over the ribs and long bones.

Laboratory investigations were conducted, revealing the following:

- Hemoglobin: 7.2 g/dL (reference range: 12-16 g/dL)
- Mean corpuscular volume (MCV): 72 fL (reference range: 80-100 fL)
- Serum ferritin: 8 ng/mL (reference range: 15-150 ng/mL)
- Serum iron: 30 μg/dL (reference range: 50-170 μg/dL)
- Total iron-binding capacity (TIBC): 410 μg/dL (reference range: 250-450 μg/dL)
- Serum 25-hydroxyvitamin D: 10 ng/mL (reference range: 30-100 ng/mL)
- Serum calcium: 8.1 mg/dL (reference range: 8.5-10.2 mg/dL)
- Serum parathyroid hormone (PTH): 85 pg/mL (reference range: 10-65 pg/mL)

The diagnosis of iron deficiency anemia was confirmed based on low hemoglobin, low MCV, and low serum ferritin. The diagnosis of vitamin D deficiency was established by the markedly low serum 25-hydroxyvitamin D level. The elevated PTH level suggested secondary hyperparathyroidism due to vitamin D deficiency.The patient was started on oral ferrous sulfate (325 mg twice daily) and cholecalciferol (vitamin D3) 50,000 IU weekly. She was also advised to increase dietary intake of iron-rich foods and vitamin D-fortified foods, and to spend at least 15 minutes daily in sunlight exposure.At the three-month follow-up, the patient's hemoglobin had increased to 11.0 g/dL, and her serum 25-hydroxyvitamin D level had risen to 30 ng/mL. She reported significant improvement in fatigue, bone pain, and overall well-being. Her treatment was continued with maintenance doses of iron and vitamin D, and she was referred to a nutritionist for long-term dietary counseling.

DISCUSSION

The coexistence of nutritional anemia and vitamin D deficiency poses a diagnostic and therapeutic challenge, necessitating a thorough clinical and laboratory evaluation. This case exemplifies the importance of considering multiple nutritional deficiencies in patients presenting with nonspecific symptoms such as fatigue and bone pain.Iron deficiency anemia (IDA) is prevalent, especially among women of reproductive age, due to menstrual blood loss and inadequate dietary intake. IDA is characterized by microcytic hypochromic anemia, with low hemoglobin, MCV, and serum ferritin levels. The patient in this case had typical laboratory findings of IDA, along with clinical features such as pallor, fatigue, and tachycardia. Vitamin D deficiency is another widespread condition, often underdiagnosed due to its subtle and nonspecific symptoms. It results from inadequate sun exposure, poor dietary intake, or malabsorption. The patient's

limited sun exposure and vegetarian diet likely contributed to her vitamin D deficiency. The deficiency can lead to secondary hyperparathyroidism, as seen in this case, where elevated PTH levels indicate the body's attempt to maintain calcium homeostasis despite low vitamin D levels.The treatment of IDA involves iron supplementation and addressing the underlying cause. Oral ferrous sulfate is commonly used due to its effectiveness and low cost. Vitamin D deficiency is treated with high-dose cholecalciferol to replenish stores, followed by maintenance doses. Both deficiencies require dietary modifications to prevent recurrence. This case highlights the interconnectedness of various nutritional deficiencies. Vitamin D deficiency can impair iron metabolism and erythropoiesis, exacerbating anemia. Conversely, anemia can reduce physical activity and sun exposure, further contributing to vitamin D deficiency. Hence, a comprehensive approach is crucial in managing such cases, including supplementation, dietary changes, and lifestyle modifications. Public health measures are essential to address these deficiencies on a broader scale. Education on balanced diets, fortification of foods, and promotion of outdoor activities can help prevent nutritional deficiencies. Regular screening, especially in high-risk populations such as women of reproductive age, can aid early detection and treatment.

CONCLUSION

Nutritional anemia and vitamin D deficiency are significant public health issues with overlapping clinical features. This case report demonstrates the importance of a comprehensive approach in diagnosing and managing these conditions. The patient's successful recovery highlights the efficacy of combined supplementation, dietary modifications, and lifestyle changes. Public health strategies focusing on education, food fortification, and regular screening are crucial in preventing and managing nutritional deficiencies. Clinicians should maintain a high index of suspicion for multiple deficiencies in patients presenting with nonspecific symptoms, ensuring holistic and effective patient care.

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