



Isolated Severe Neutropenia Secondary to Vitamin B12 Deficiency in a Patient with Pernicious Anemia: A Case Report

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Introduction

Neutropenia is defined as an absolute neutrophil count below 1500 cells/mm³, with severe neutropenia <500 cells/mm³ [1]. Causes of neutropenia result from four basic mechanisms: Decreased production, ineffective granulopoiesis, the shift of circulating Polymorphonuclear cells (PMNs) to vascular endothelium or tissue pools, or enhanced peripheral destruction [1]. Here, we present a patient with isolated neutropenia from decreased production secondary to Vitamin B12 (VitB12) deficiency due to Pernicious Anemia (PA).

Case Study

A 31-year-old Hispanic male with a history of treated gonorrhea six months prior, presented to the ED with neutropenic fever, malaise, flank pain and was found to have severe neutropenia. On admission, he was hypotensive and febrile. Complete blood count demonstrated leukopenia at $1.02 \times 10^3/\mu\text{L}$ with severe neutropenia, absolute neutrophil count of $0.02 \times 10^3/\mu\text{L}$, and elevated myelocyte precursors and blasts. Red blood cells were normocytic, and the blood smear did not demonstrate hyper-segmented neutrophils. A comprehensive metabolic panel demonstrated an elevated protein gap at 5.2. Human immunodeficiency virus and hepatitis virus testing were negative, and protein electrophoresis was within normal limits. VitB12 level was <146 pg/mL, methylmalonic acid was 126 nmol/L, and Intrinsic Factor (IF) antibody was positive. CT abdomen/pelvis and Chest X-ray showed no acute findings. He was started on 1,000 micrograms daily VitB12 injections with prompt symptomatic improvement and improvement of lab values. Over the course of hospitalization, WBC count increased from a low of $0.58 \times 10^3/\mu\text{L}$ to a high of $1.88 \times 10^3/\mu\text{L}$ prior to discharge, and absolute neutrophil count showed an 1,100% increase from $0.02 \times 10^3/\mu\text{L}$ to $0.24 \times 10^3/\mu\text{L}$. The patient was discharged with instructions to continue daily VitB12 injections for one week, followed by weekly, then monthly injections.

Discussion

Vitamin B12 (VitB12) aids in the synthesis of Deoxyribonucleic Acids (DNA) and myelin and is naturally found in animal products [2]. It is first bound by an Intrinsic Factor (IF) produced by parietal cells and then absorbed in the terminal ileum [3]. Pernicious Anemia (PA) is one common cause of VitB12 deficiency [4]. While manifestations of VitB12 deficiency include macrocytosis, hyper-segmented neutrophils, leukopenia, thrombocytopenia, and peripheral neuropathy [5], these lab findings and symptoms are not always present, the absence of them should not preclude diagnosis [6,7] Our patient presented with atypical findings of VitB12 deficiency, including malaise and severe neutropenia. A positive IF antibody consistent with PA, and prompt resolution of symptoms as well as normalization of neutrophil count following VitB12 treatment confirms the diagnosis. Clinicians should be aware of the multiple etiologies associated with neutropenia and should consider the evaluation of VitB12 levels in the absence of other diagnostic findings.

References

- Schwartzberg LS. Neutropenia: Etiology and pathogenesis. Clin Cornerstone. 2006;8(Suppl 5):S5-11.
- Htut TW, Thein KZ, Oo TH. Pernicious anemia: Pathophysiology and diagnostic difficulties. J Evid Based Med. 2021;14(2):161-9.
- Ankar A, Kumar A. Vitamin B12 deficiency. [Updated 2022 Oct 22]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022.
- Pelling MM, Kimura ST, Han EJ, Shin YM. Severe vitamin B12 deficiency presenting as pancytopenia,

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- hemolytic anemia, and paresthesia: Could your B12 be any lower? *Cureus*. 2022;14(9):e29225.
5. Langan RC, Goodbred AJ. Vitamin B12 deficiency: Recognition and management. *Am Fam Physician*. 2017;96(6):384-9.
 6. Thompson WG, Cassino C, Babitz L, Meola T, Berman R, Lipkin M Jr, et al. Hypersegmented neutrophils and vitamin B12 deficiency. Hypersegmentation in B12 deficiency. *Acta Haematol*. 1989;81(4):186-91.
 7. Oosterhuis WP, Niessen RW, Bossuyt PM, Sanders GT, Sturk A. Diagnostic value of the mean corpuscular volume in the detection of vitamin B12 deficiency. *Scand J Clin Lab Invest*. 2000;60(1):9-18.