

Vitamin B₁₂ Deficiency Presenting as Pancytopenia with Hepatosplenomegaly in an Infant

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ABSTRACT

Deficiency of vitamin B₁₂ due to nutritional insufficiency is common in developing part of world. Serum vitamin B₁₂ level in infants is determined by the foetal storage during pregnancy. Therefore, evaluation on vitamin B₁₂ level during pregnancy is essential for prevention of vitamin B₁₂ deficiency in infancy. Here we report a vitamin B₁₂ deficient infant who presented with hepatosplenomegaly with pancytopenia including normocytic anaemia and circulating atypical cells. It is also a reminder to clinicians about the uncommon manifestation of vitamin B₁₂ deficiency which mimics haematological malignancy.

Key words: Hepatosplenomegaly; pancytopenia; vitamin B₁₂



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INTRODUCTION

Vitamin B₁₂ is an important micronutrient for hematopoiesis, CNS myelination and development. Vitamin B₁₂ is important for protein and nucleic acid biosynthesis and helps as a cofactor in lipid and carbohydrate metabolism.

Vitamin B₁₂ is present in many animal products, including meats, dairy products, fish, poultry and eggs. Vitamin B₁₂ is not present in plant food.¹ The most common cause of vitamin B₁₂ deficiency in children is inadequate intake of animal source foods due to dietary restriction or lack of accessibility to food.² And several studies have shown poor vitamin B₁₂ status in children of south Asia including Nepal mainly due to inadequate intake.^{3,4}

CASE REPORT

A seven months old infant presented in our OPD with complaints of progressive paleness of face for three months associated with irritability. His past medical history included two admissions for respiratory problems at four and five months where he had pancytopenia both the times.

On examination, he was irritable, pale with failure to thrive and had microcephaly. He had few petechial rashes in left thigh and left arm with liver palpable 2.5 cm below right subcostal margin and spleen palpable 1.5 cm below left subcostal margin. He was able to roll over but could not sit with support, he had bidextrous grasp and could recognise mother conferring his developmental age of around four months. Other examination findings were within normal limits.

Complete blood count revealed pancytopenia with haemoglobin of 6.2 gm%, total leukocyte counts 3,400/mm³ and platelet counts 50,000/mm³. MCV was 87.5 fl, MCH was 28.1 pg, MCHC was 32.1%, RDW was 14.8. Peripheral blood smear showed normocytic normochromic RBC which is a very rare finding in vitamin B₁₂ deficiency anaemia. WBC count was low. Platelets were markedly reduced. In suspicion of haematological malignancy, bone marrow aspiration (BMA) and biopsy was done. It revealed predominantly erythroid precursors with dyserythropoietic changes in the form of nuclear budding,

binucleation and sieve-like chromatin. There were also a few hyper segmented neutrophils, giant metamyelocytes and bands. Megakaryocytes were normal in number and morphology.

Considering the absence of markers of haematological malignancy, other haematological conditions were considered. His serum vitamin B₁₂ level was sent and was below 150 pg/ml (normal range: above 200p g/ml). His serum folic acid was 11.9 ng/ml which was normal. His ANA, anti-ds DNA were negative, thyroid function test was normal. Since our patient was exclusively breastfed his mother's serum vitamin B₁₂ level was evaluated. However, it was 310 pg/ml, which was within normal limit.

Since the family's socioeconomic status was very low, and their diet did not contain sufficient animal products, we assumed the mother might have been deficient during pregnancy leading to low vitamin B₁₂ reserve in the foetus. Therefore, we diagnosed our patient as vitamin B₁₂ deficiency due to nutritional inadequacy and planned for supplementation. He was treated with 500 micrograms of cyanocobalamine intravenous on alternate days for one week on inpatient basis, then 500 micrograms weekly intramuscular for a month and once a month for three months in outpatient basis.

After one week of treatment, CBC showed reticulocyte count of 2.6% with Hb of 9.4 gm%, WBC of 7630 and platelet count of 1,40,000 per micro liter. After three weeks of treatment, liver

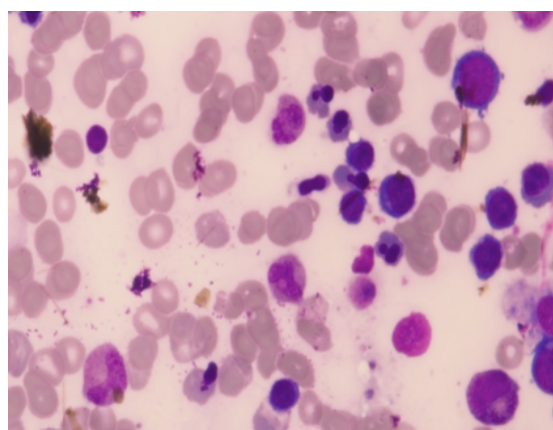


Figure 1. Bone marrow aspiration finding showing dyserythropoietic changes in the form of nuclear budding and sieve like chromatin

was palpable 1.5 cm below right subcostal margin and spleen tip was palpable. Patients symptoms were significantly improved. At four weeks, spleen was not palpable, he was able to sit with support and showed stranger's anxiety. His complete blood count was normalised and repeated serum vitamin B₁₂ level was 410 pg/ml.

DISCUSSION

Vitamin B₁₂ deficiency is a reversible cause of bone marrow suppression and neurological signs. Many individuals with vitamin B₁₂ deficiency presents with non-specific symptoms of fatigue, irritability, cognitive decline, which are likely attributable to anaemia.⁵ Even though macrocytosis is mentioned as the earliest and most common haematologic finding that precedes anaemia by months⁶, the exact prevalence of macrocytosis in vitamin B₁₂ deficiency is not known. Many studies have reported patients with vitamin B₁₂ deficiency having no macrocytosis or haematologic abnormalities.^{7,8} Only two-third patients of B₁₂ deficiency may manifest haematological abnormalities.⁹ Haematological abnormality namely pancytopenia is a less well known manifestation of vitamin B₁₂ deficiency even though vitamin B₁₂ deficiency is a common cause of pancytopenia.¹⁰ The prevalence of pancytopenia and hepatosplenomegaly in vitamin B₁₂ deficiency is also not known. Our patient had hepatosplenomegaly with PBS report showing normocytic, normochromic anaemia with markedly reduced WBC counts and platelet counts, this presentation can be very concerning as it can mimic haematological malignancy. Therefore, thorough history and physical examination of the patient along with laboratory findings is required to make final diagnosis. However, determining the cause of vitamin B₁₂ deficiency with normal maternal serum vitamin B₁₂ level in the resource limited setting is

challenging. Our patient was seven months old exclusively breastfed child belonging to low socioeconomic status who started showing symptoms from four months of age with normal maternal B₁₂ level, but his serum MMA could not be evaluated due to unavailability of test in our centre and financial constraints. Vitamin B₁₂ deficiency is a treatable cause of pancytopenia. Early recognition and treatment of this deficiency can reverse the complication without any sequel. Nevertheless, the long-term prognosis of B₁₂ deficiency is related to severity and duration of deficiency. For this reason, efforts should be directed toward prevention, early recognition and prompt treatment of the deficiency.

CONCLUSIONS

The major determinant of vitamin B₁₂ status during infancy is the amount of the vitamin stored by the foetus during pregnancy; therefore, evaluation of the vitamin B₁₂ status of pregnant and lactating women is necessary to prevent newborns and infants from suffering the potentially severe consequences of vitamin B₁₂ deficiency. It can present with hepatosplenomegaly with pancytopenia and few or no macrocytes in peripheral blood smear which can easily mimic leukemia.

REFERENCES

1. Office of Dietary Supplements - Vitamin B12 [Internet]. [cited 2020 May 3]. Available from: <https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/>
2. Allen LH. How common is vitamin B-12 deficiency? *Am J Clin Nutr.* 2009;89(2):693-6. DOI 10.4066/AMJ.2014.1872
3. Ulak M, Chandyo RK, Thorne-Lyman AL, Henjum S, Ueland PM, Midttun O, et al. Vitamin Status among Breastfed Infants in Bhaktapur, Nepal. *Nutrients.* 2016;8(3):149. DOI 10.3390/nu8030149

4. Taneja S, Bhandari N, Strand TA, Sommerfelt H, Refsum H, Ueland PM, et al. Cobalamin and folate status in infants and young children in a low-to-middle income community in India. *Am J Clin Nutr.* 2007;86(5):1302–9. DOI 10.1093/ajcn/86.5.1302
5. Green R. Vitamin B12 deficiency from the perspective of a practicing haematologist. *Blood.* 2017;129(19):2603–11. DOI 10.1182/blood-2016-10-569186
6. Carmel R. Macrocytosis, Mild Anemia, and Delay in the Diagnosis of Pernicious Anemia. *Arch Intern Med.* 1979;139(1):47–50. DOI 10.1001/archinte.1979.03630380031013
7. Luong KV, Nguyen LT. Folate and vitamin B12-deficiency anemias in Vietnamese immigrants living in Southern California. *South Med J.* 2000;93(1):53–7. PMID: 10653066
8. Stott DJ, Langhorne P, Hendry A, Mckay PJ, Holyoake T, Macdonald J, et al. Prevalence and haemopoietic effects of low serum vitamin B12 levels in geriatric medical patients. *Br J Nutr.* 1997;78(1):57–63. DOI 10.1079/BJN19970118
9. Andrés E, Affenberger S, Zimmer J, Vinzio S, Grosu D, Pistol G, et al. Current hematological findings in cobalamin deficiency. A study of 201 consecutive patients with documented cobalamin deficiency. *Clin lab Haematol.* 2006;28(1):50–6. DOI 10.1111/j.1365-2257.2006.00755.x
10. Anitha P, Sasitharan R, Thambarasi T, Krithika P, Mohan M, Venkataraman P, et al. Vitamin B12 deficiency presenting as pancytopenia and retinopathy in a young boy—*Helicobacter pylori*, a novel causative agent. *Australas Med J.* 2014;7(3):143–8. DOI 10.4066/AMJ.2014.1872