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Case Study

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HEMOLYTIC ANEMIA AS A PRESENTATION OF VITAMIN B12 DEFICIENCY: A CASE REPORT

[1]*Dr. Zahoor Hussain Daraz, [2]Dr. Pramesh Kumar Yadav and [3]Dr. Berkheez Shabir

[1]Consultant Paediatrics HA. Alif Dhidhoo Atoll Hospital, Ministry of Health, Maldives.
[2]Medical Officer, Dhidhoo Atoll Hospital, MOH Maldives.
[3]Consultant Gynaecologist, MOH Maldives.

***Corresponding Author: Dr. Zahoor Hussain Daraz**

Consultant Paediatrics HA. Alif Dhidhoo Atoll Hospital, Ministry of Health, Maldives.

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ABSTRACT

Vitamin B12, a water soluble vitamin is synthesized by micro-organisms of human gut. Vitamin B12 absorption takes place in the terminal ileum after binding with intrinsic factor which is a type of glycoprotein secreted by the parietal cells of the stomach. Pernicious anemia is commonly seen in vitamin B12 deficiency which is due to lack of intrinsic factor. Usually, this is secondary to autoimmune phenomenon against gastric parietal cells. Complete blood count findings in Vitamin B12 deficiency include anemia, leukopenia, thrombocytopenia and peripheral blood film shows macrocytosis and hypersegmented neutrophils. Vitamin B12 deficiency is a very uncommon cause of hemolytic anemia (approximately 1.5% of cases). Here, we present a case of an 11-year-old male found to have severe anemia (obvious hemolytic features) secondary to marked vitamin B12 deficiency and improved after vitamin supplementation and provide a brief review of literature.

KEYWORDS: Cobalamin/Vitamin B12; Hemolytic anemia; Hemolysis; Vitamin deficiency.

INTRODUCTION

Vit B12 deficiency rarely presents with hemolytic anemia. Pernicious anemia that results due to lack of vitamin B12 may present with certain life threatening complications in a small percentage of patients like pancytopenia, severe anemia or hemolysis or even pseudomicroangiopathy.[1,2] However, with the invention of latest techniques early detection is possible and such complications can be avoided. Hemolytic anemia due to vitamin B12 deficiency is a rare phenomenon and is not well described. Therefore, precise clinical suspicion is required for timely diagnosis and management.

CASE

An 11-year-old boy with no significant past medical history presents with complaints of anorexia, progressive pallor, jaundice, easy fatigability, lethargy, tingling sensation of lower limbs, hematuria and significant weight loss over last 6months. Additionally, the patient complained of having lost interest in all daily activities and abstinence in school was a big worry. Lack of interest in food and intake was considerably decreased. Additional complains of nausea and giddiness after mild exercise and long standing were apparent. The patient visited to the concerned primary health center various times where symptomatic treatment was given and later referred to our Dhidhoo Atoll Hospital for proper evaluation and management. We received the patient and on examination he was deeply icteric and severely pale, temp: 98.6 degrees Fahrenheit, respiratory rate of 22 breaths/minute, heart rate of 88 beats/ minute, blood pressure of 100/55 mmHg and pulse oximetry of 98% on room air. The systemic examination revealed soft abdomen with no organomegaly with normal bowel sound and no palpable lymph nodes, unremarkable cardio and lung examination and neurological examination revealed normal reflexes. Our laboratory findings showed hemoglobin (Hgb) 5.8 g/dl, Total Leukocyte count (WBC) of 10.8 k/µl with neutrophil count of 70%, hematocrit (Hct) 16.5%, Platelets 178 k/µl, and a mean corpuscular volume (MCV) 133.9 fl (80-100 fl). Liver function tests showed alkaline phosphate 111 U/L, aspartate aminotransferase 63 U/L (reference range 5-34 U/L), alanine aminotransferase 16 U/L (10-40 U/L), and total bilirubin of 6.09 mg/dl. USG of whole abdomen excluded renal and other lithiasis. Stool occult blood test was negative and routine microscopic examination of urine revealed few pus cells and few RBC per high power field. Additional investigations showed marked elevation lactate dehydrogenase (LDH)>915 U/L, iron profile was normal; combs test (Direct and Indirect) was negative. Hepatitis B and C screening was negative. We managed the patient with transfusion of 2 units of packed red blood cells, followed by intramuscular injection of vitamin B12 daily. On hospital day two laboratory investigations were repeated which showed drastic improvement on various parameters like bilirubin level

decreased to 4mg/dl, Hb increased to 8g/dl and reddish colored urine color visibly changed to straw. We decided to keep the patient in hospital for further treatment and avoided further investigation that needed referral to higher center. Given the patient's clinical features and laboratory findings we diagnosed this case as hemolytic anemia secondary to severe vitamin B12 deficiency. We continued vitamin B12 injections and monitored the patient for an additional 24 hours. The patient's symptoms improved drastically and on examination there was no icterus and mood fluctuations were almost abolished, appetite returned to normal. So we decided to discharge the patient on oral multivitamins and proper dietary advice.

DISCUSSION

In a vast review of literature, case reports of Vitamin B12 deficiency causing severe hemolysis and anemia are very rare. Usually Cobalamin (Vitamin B12) deficiency, can present with multiple hematological and neurological features depending on the severity of deficiency and duration of disease.[2,6] The patient in this case report presented with clinical and lab features of vitamin B12 deficiency, and laboratory findings were consistent with features of hemolytic anemia. Vitamin B12 deficiency was suggested by the presence of macrocytic anemia, with an MCV>120 fl. Folic acid deficiencies were also in the differential diagnosis.[4,3,7] Due to more false positive and false negative results of Vit B12 estimation doctors have been advised to proceed further with the measurement of other parameters in blood, such as homocysteine or methylmalonic acid levels.[2] Biochemical pathways require Cobalamin as a co-factor for nucleic acid synthesis (DNA/RNA).[5,8] Vitamin B12 helps in the regeneration of tetrahydrofolate and converts homocysteine to methionine.[4,5] As the second process of conversion is dependent on Cobalamin+ level so its deficiency will result in the increased level of homocysteine.[8,9]

Replacement with Vit B 12 was found to be effective in our patient and studies have proven the therapy to be effective in nutritional vitamin deficiency and also in pernicious anemia, with visible reductions in MCV and improvements in hematocrit.[10,11]

Destruction of RBC intramedullary is a well-established phenomenon but the actual explanation is not definite.[12] However increasing levels of homocysteine has a role in toxicity and breakdown of RBC's which is considered as the cause of hemolytic anemia.[4,12] But the mechanism of hemolysis in such setting is not properly understood. One of the proposed mechanisms related is the oxidation ability of homocysteine leading to endothelial damage and subsequent microangiopathy.[13,14] Further laboratory investigation is required to understand the pathophysiology of hemolytic anemia in Vit-B12 deficiency.

CONCLUSION

Precise history and high clinical suspicion is required for the diagnosis of hemolysis caused due to Vit B 12 deficiency. Although autoimmune cause of Pernicious anemia against intrinsic factor in parietal cells is the most common but nutritional deficiency must be ruled out before proceeding for invasive lab investigations. Depending upon the appropriate facilities methylmalonic acid levels and homocysteine levels should be estimated because high levels of homocysteine cause cell toxicity and hemolysis.

REFERENCES

1. Stabler SP, Allen RH (2004) Vitamin B12 deficiency as a worldwide problem. Annu Rev Nutr., 24: 299-326.
2. Hittingbottom MC, Sweetman L, Nyhan W (1978) A syndrome of methylmalonic aciduria, homocystinuria, megaloblastic anemia and neurologic abnormalities in a Vit B12 deficient breast-fed infant of strict vegetarian. N Engl J Med., 299: 317–323.
3. Oh R, Brown DL.Am Fam Physician, 2003 Mar 1; 67(5): 979-86. Review
4. Boushey, C.J., Beresford, S.A.A., Omenn, G.S. & Motulsky, A.G. (1995) A quantitative assessment of plasma homocysteine as a risk factor for vascular disease: probable benefits of increasing folic acid intakes. *Journal of the American Medical Association*, 274: 1049–1057.
5. The spectrum of vitamin B12 deficiency. *Clementz GL, Schade SG. Am Fam Physician, 1990 Jan; 41(1): 150-62.*
6. Pruthi RK, Tefferi A (1994) Pernicious anemia revisited. Mayo Clin Proc., 69: 144-150.
7. Lin JS, Shen MC, Cheng WC, Tsay W, Wang YC, et al. (2002) Age, sex and vitamin status affect plasma level of homocysteine, but hyperhomocysteinaemia is possibly not an important risk factor for venous thrombophilia in Taiwanese Chinese. Br J Haematol, 117: 159-163.
8. Stabler SP (2013) Clinical practice. Vitamin B12 deficiency. N Engl J Med., 368: 149-160.
9. Scaglione F, Panzavolta G (2014) Folate, folic acid and 5- methyltetrahydrofolate are not the same thing. Xenobiotica, 44: 480 488.
10. Andres E, Affenberger S, Zimmer J, Vinzio S, Grosu D, et al. (2006) Current hematological findings in cobalamin deficiency: A study of 201 consecutive patients with documented cobalamin deficiency. Clin Lab Haem, 28: 50-56.
11. Kuzminski AM, Del Giacco EJ, Allen RH, Stabler SP, Lindenbaum J (1998) Effective treatment of cobalamin deficiency with oral cobalamin. Blood, 92: 1191-1198.
12. Antony AC (2005) Hematology, Basic principles and practice. 4. Philadelphia, PA: Elsevier, Inc. Megaloblastic anemias, 519-556.
13. Olinescu R, Kummerow FA, Handler B, Fleischer L (1996) The hemolytic activity of homocysteine is

increased by the activated polymorphonuclear leukocytes. Biochem Biophys Res Commun, 226: 912-916.

14. Ventura P, Panini R, Tremosini S, Salvioli G (2004) A role for homocysteine increase in haemolysis of megaloblastic anemias due to vitamin B12 and folate deficiency: Results from an in vitro experience. Biochim Biophys Acta., 1739: 33-42.