

Multi - Vitamin Deficiency Presenting as Hemolytic Anaemia with Failure

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Abstract

Twenty years old vegetarian male admitted with features suggestive of hemolytic anemia and pancytopenia. Laboratory investigations revealed Multiple vitamin deficiencies (B1, B6, B12). After the replacement patient showed clinical improvement, lab parameters improved on follow-up visits. We present this case to emphasize the atypical presentation of Multiple - Vitamin deficiency.

Keywords - Vitamin deficiency, Haemolytic anemia, Pancytopenia, Vitamin B12, Vitamin B1, thiamine.

Introduction

Vitamins are essential components of the human diet (1). Vitamins are synthesized inadequately or not in the human body(2). Vitamin B1 deficiency wet beriberi presents as high output cardiac failure, and Shoshin beriberi presents as cardiovascular collapse and death within hours if untreated (3). Vitamin B12 is a water-soluble vitamin in animal products (2). Physiologic functions of vitamin B12 include erythropoiesis, the synthesis and maintenance of myelin sheath, and the synthesis of nucleic acid (DNA) (4 -9). Vitamin B12 Deficiency is one of the correctable causes of hemolysis due to ineffective erythropoiesis (10).

We report this case to emphasize the atypical presentation of Multiple - Vitamin deficiency as hemolytic anemia.

Case details

Twenty years old vegetarian male with no known co-morbidities admitted with complaints of yellowish discoloration of eyes, easy fatigability, loss of appetite, and Breathlessness (NYHA IV) for the past month. On examination, the Patient was Obese, tachypnoeic at rest (RR-37/ minute), pallor, icteric, and JVP were elevated.

Vitals: PR 135/minute, Spo2 – 80% RA, BP – 120/70. Cardiovascular, Per-abdomen and neurological examinations are within normal limits. Respiratory system bilateral basal crepitations were present.

Laboratory results on admission and follow ups

Investigation	On admission	After 1 week	After 4 weeks
Haemoglobin	1.8 gm/dl	5.8 gm/dl	8.8 gm%
Total count	3100 /cu.mm	7000 / cu.mm	6500 / cumm
Platelets	47000 /cu.mm	115000 /cu.mm	2,10,000 /cumm
MCV	107	95	87
HCT	8	20	32
Urea/creatinine	20/0.7 mg/ dl	32/0.7 mg%	
Bilirubin (indirect + direct)	15.4 (10.7 + 4.7) mg/dl	6.0 (4.3 + 1.7) mg %	2.2 mg%
Total protein/Albumin	5.7/3.6 Gm/dl	5.5/ 3.4 gm%	5.3 / 3.5 gm %
SGOT/SGPT	261/97 U/L	45/22 U/L	33/22 U/L
Urine bile salts and pigments	Negative	Negative	

Serum LDH was 1596 U/L, ANA – Negative, DCT – Negative. The peripheral smear showed Pancytopenia - microcytic hypochromic anemia with markedly decreased macro ovalocytes, WBC, and platelets. CT chest bilateral minimal pleural effusion. Ct Abdomen – Minimal

ascites. The reticulocyte production index – is 0.08%. ECG – sinus tachycardia and echocardiogram -Mild MR, Mild TR, and minimal pericardial effusion.

Test name	Value	Normal value
Vitamin B1/ Thiamine	< 0.3 ng/ml	0.5 – 4.0 ng/ml
Vitamin B2/ Raiboflavin	22.7 ng/ml	1.6 -68.2 ng/ml
Vitamin B3/ Nicotinic acid	0.33ng/ml	0.3 – 9.8 ng/ml
Vitamin B5 /Pantothenic acid	25.4 ng/ml	11- 150 ng/ml
Vitamin B6 /P5P	3.72 ng/ml	5-50 ng/ml
Vitamin B7 / Biotin	0.24 ng/ml	0.2 – 3 ng/ml
Vitamin B9 / Folic acid	0.7 ng/ml	0.2 – 20 ng/ml
Vitamin B12	95 pg/ml	211- 911 pg/ml

Treatment

He was started on 1 point packed cell transfusion, INJ. Vitamin B12 1000mcg iv od , T. Folic Acid 5 mg od, Inj. Thiamine 200 mg Iv TDS and supportive case as per the clinical condition. On Day 3, her breathlessness decreased, Tachycardia and tachypnoea subsided, and SPO2 was 99 percent in room air. Repeat investigations after one week showed improvement in Haemoglobin, Total count, platelets, and a decrease in Total bilirubin and Normal echocardiogram. He was discharged monthly with IM Vitamin B12, T. thiamine, and T. Vitamin B6. He is on regular follow-up with good clinical improvement.

Discussion

Vitamin B12 is crucial for DNA synthesis and erythropoiesis, a deficiency that could manifest as Haemolytic anemia, reversible with Replacement. In severe B12 deficiency, intramedullary hemolysis with leukocyte and

megakaryocyte destruction leads to high LDH levels, low haptoglobin levels, and pancytopenia (4-9). Subacute combined degeneration due to demyelination in the spinal cord's dorsal and lateral columns could also manifest B12 deficiency. Present case: Multiple vitamin deficiencies (B1, B6, B12) presented as Haemolytic jaundice in failure. Though Failure symptoms could be attributed to severe anemia, Vitamin B1 deficiency could also present as High output cardiac failure (Wet beriberi). Further investigations to rule out malabsorption cannot be done because of limited resources. But Vitamin B1, B6, and B12 Deficiencies can be explained by a vegetarian diet for the patient.

References

1. Jameson J, & Fauci A.S., & Kasper D.L., & Hauser S.L., & Longo D.L., & Loscalzo J(Eds.), (2018). *Harrison's Principles of Internal Medicine, 20e*. McGraw Hill, Page 683-684
2. Vasudevan, M.M. and Sreekumari, S. (2013) Textbook of Biochemistry (For Medical Students). 7th Edition, Japee Brothers Medical Publishers (P) Ltd., New Delhi, 514.
3. Yamamura M, Murai H, Kaneko S, Usui S, Furusho H, Takamura M. Case report: pericardial effusion with constrictive physiology in a patient with wet beriberi. *Nutr J.* 2016 Apr 8; 15:37. doi: 10.1186/s12937-016-0156-y. PMID: 27059308; PMCID: PMC4826515.
4. Koury MJ, Ponka P. New insights into erythropoiesis: the roles of folate, vitamin B12, and iron. *Annu Rev Nutr.* 2004; 24:105-31. doi: 10.1146/annurev.nutr.24.012003.132306. PMID: 15189115.
5. Prueksaritanond S, Barbaryan A, Mirrakhimov AE, Liana P, Ali AM, Gilman AD. A puzzle of hemolytic anemia, iron and vitamin B12 deficiencies in a 52-year-old male. *Case Rep Hematol.* 2013;2013:708489. doi: 10.1155/2013/708489. Epub 2013 Sep 5. PMID: 24083040; PMCID: PMC3780631.
6. Keskin EY, Keskin M. Severe vitamin B12 deficiency in a 15-year-old boy: presentation with haemolysis and pancytopenia. *BMJ Case Rep.* 2015 May 14;2015:bcr2015209718. doi: 10.1136/bcr-2015-209718. PMID: 25976204; PMCID: PMC4434362.
7. Dasari S, Naha K, Prabhu M. An unusual cause for recurrent jaundice in an otherwise healthy male. *AMJ* 2012, 5, 10, 541-543. <http://dx.doi.org/10.4066/AMJ.2012.1404>

8. Acharya U, Gau JT, Horvath W, Ventura P, Hsueh CT, Carlsen W. Hemolysis and hyperhomocysteinemia caused by cobalamin deficiency: three case reports and review of the literature. *J HematolOncol.* 2008 Dec 18;1:26. doi: 10.1186/1756-8722-1-26. PMID: 19094231; PMCID: PMC2626597
9. Katakam, P. K., Hegde, A. P., &Venkataramaiahappa, M. (2018). Vitamin B 12 deficiency: Unusual cause of jaundice in an adolescent. *BMJ Case Reports*, 2018, [bcr-2017-222302]. <https://doi.org/10.1136/bcr-2017-222302>
10. McMahon B, Kamath S. Pancytopenia in a Patient With Hypothyroidism. *JAMA.* 2016 Apr 19;315(15):1648-9. doi: 10.1001/jama.2016.2155. PMID: 27092833