



## A CASE REPORT ON MEGALOBlastic ANAEMIA IN A PURE VEGAN WOMAN

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## ABSTRACT

Megaloblastic anemia is a condition in which the bone marrow produces structurally large and abnormal red blood cells and the most common cause is vitamin B 12 (cobalamin) or vitamin B 9 (folate) deficiency. Here we discussed about a patient with nutritional megaloblastic anemia due to her persistent vegetarianism.

**KEYWORDS :** megaloblastic anemia, vegetarians, leukopenia, neutropenia, fortified

## INTRODUCTION

Vitamin B12, a water-soluble vitamin exists in several forms and contains the mineral cobalt [1-4], so compounds with vitamin B12 activity are collectively called "cobalamins".

Vitamin B12 attached to protein in food is released by the activity of hydrochloric acid and gastric protease in the stomach. Cleaved vitamin B12 then combines with intrinsic factor, a glycoprotein secreted by the stomach's parietal cells, and the resulting complex undergoes absorption within the distal ileum by receptor-mediated endocytosis [5, 6]. Strict vegetarians and vegans are at an increased risk than lacto-ovo vegetarians and nonvegetarians of developing vitamin B12 deficiency because natural food sources of vitamin B12 are confined to animal foods. Fortified breakfast cereals and fortified nutritional yeasts are few sources of vitamin B12 from plants and can be used as dietary sources of vitamin B12 for strict vegetarians and vegans.

Vitamin B12 deficiency is clinically manifested as megaloblastic anemia, fatigue, weakness, constipation, loss of appetite, and weight loss [1,3,7]. Neurological changes, such as numbness and tingling in the hands and feet are also a manifestation. Neurologic manifestations are caused by progressive demyelination and can include peripheral neuropathy, areflexia, and the loss of proprioception and vibratory sense (8). Treatment of Vitamin B12 deficiency can be done with intravenous, intramuscular injections or oral vitamin B12 therapy.

## LITERATURE REVIEW

1. Pawlak R. Vitamin B12 in Vegetarian Diets. Middle East Journal of Rehabilitation and Health. 2015 Oct 1;2(4) - Vegetarians need to ensure they ingest a reliable B12 source. Intake of eggs, milk and dairy products does not guarantee adequate B12 status. In fact, B12 intake from these products is likely inadequate to maintain sufficient serum B12 concentration (9,10). This would be especially true for elderly vegetarians. Although fortified foods may help to delay the onset of deficiency, low B12 concentrations and B12 deficiency have been reported in studies with vegetarians who used fortified foods and those who used supplements (perhaps indicating inadequate dose of a supplement).

2. Herrmann W, Geisel J. Vegetarian lifestyle and monitoring of vitamin B-12 status. Clinica chimica acta. 2002 Dec 1;326(1-2):47-59 - Vegetarians are at risk to develop deficiencies of some essential nutrients, especially vitamin B-12 (cobalamin). Low nutritional intake of vitamin B-12 may lead to negative balance and, finally, to functional deficiency when tissue stores of vitamin B-12 are depleted. Early diagnosis of vitamin B-12 deficiency seems to be useful because irreversible neurological damages may be prevented by cobalamin substitution.

3. Pawlak R, Lester SE, Babatunde T. The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: a review of literature. European journal of clinical nutrition. 2014 May;68(5):541-8 - The findings of this review show that individuals who follow a vegan diet, and do not take vitamin B12 supplements nor eat foods fortified with this vitamin, have higher prevalence of a deficiency compared with those adhering to other types of vegetarian diets. Similarly, 'strict' vegans were found to have a higher prevalence of deficiency when compared with 'moderate' vegans. In fact, every study that reported the prevalence of deficiency for vegans separately from other vegetarians showed higher prevalence of deficiency among vegans. Thus, vegetarians, and especially vegans, should strongly consider using vitamin B12 supplements to ensure adequate vitamin B12 intake, and to help prevent deficiency.

4. Stabler SP, Allen RH. Vitamin B12 deficiency as a worldwide problem. Annu. Rev. Nutr.. 2004 Jul 14;24:299-326 - Dietary deficiency of vitamin B12 due to vegetarianism is increasing and causes hyperhomocysteinemia. The breast-fed infant of a vitamin B12-deficient mother is at risk for severe developmental abnormalities, growth failure, and anemia. Dietary vitamin B12 deficiency is a severe problem in the Indian subcontinent, Mexico, Central and South America, and selected areas in Africa. Dietary vitamin B12 deficiency is not prevalent in Asia, except in vegetarians. Areas for research include intermittent vitamin B12 supplement dosing and better measurements of the bioavailability of B12 in fermented vegetarian foods and algae.

## CASE REPORT

A 44-year-old female patient was presented with the complaints of:

Fever x 2 days  
Vomiting x 3 days  
Loose stools x 1 day

## History of presenting illness

The patient was normal 3 days ago when she developed vomiting - watery, non-projectile (3- 4 episodes per day). On the very next day evening, she developed fever with occasional chills. She had c/o loose stools (watery, foul-smelling).

No h/o melena, hematochezia.  
No h/o headache, cough, chest pain, palpitation, abdominal pain, giddiness, dysuria.  
No h/o chronic diarrhea.  
No h/o intake of PPI, Metformin.

Past History  
No comorbidities.  
H/o menopause in April 2020.  
No h/o bleeding /PV discharge.

H/o D & C in March 2020  
No other history of any surgical procedures.

Diet History - Pure vegetarian

General Examination  
O/E Patient conscious, oriented.  
Pallor +++  
PR - 78 /min  
BP- 110/60 mm Hg  
CVS - S1 S2 normally heard  
Chest - Clear  
P/A - Soft, non-tender. Bowel sounds heard, No hepatosplenomegaly  
CNS - Normal, ankle jerks present

#### Initial Investigations

#### COMPLETE BLOOD COUNT (CBC)/HEMOGRAM

Total Leucocyte Count L: 3400 / $\mu$ L (4800 - 10800)  
Poly: 58 % (43 - 72)  
Lymph: 36 % (20 - 50)  
Mono: 06 % (0 - 10)  
Hb: 5.6 g/dL (11.00 - 15.00)  
RBC Count L: 1.44 Million (4.20 - 5.40)  
Packed Cell Volume L: 17.4 % (37.00 - 47.00)  
MCV: 120.9 fL (80.0 - 100.0)  
MCH: 39.2 pg 27.0 - 34.0  
MCHC: 32.4 g/dl 31.5 - 36.0  
Mentzer Index\*\*: 83.96 15 - 19  
RDWH: 16.7 % 12.10 - 14.00  
Platelets Count: 0.74 Lakh/ $\mu$ L 1.50 - 4.50  
ESR - 54mm/hr

CRP- 18.2 mg/l  
INR- 1.14

#### RENAL FUNCTION TEST

UREA- 32.6 mg/dl  
CREATININE - 1.04 mg/dl

#### ELECTROLYTES

MAGNESIUM- 1.79 mEq/L  
SODIUM- 133 mEq/L  
POTASSIUM - 3.96 mEq/L  
CALCIUM - 7.80 mEq/L

#### LIVER FUNCTION TEST

BILIRUBIN-(TOTAL /DIRECT/INDIRECT) - 1.37 mg/dl  
/0.27md/dl /1.10md/dl  
PROTEIN- 6.12 g/dl  
ALBUMIN- 3.97 g/dl  
GLOBULIN- 2.27 g/dl  
SGOT-76 IU/L  
SGPT- 42 IU/L  
ALP- 79 IU/L

#### URINE ROUTINE:

SUGAR, ALBUMIN- NIL  
PUS 0-1/hpf  
EPITHELIAL CELLS 8-10/hpf  
BACTERIA - ABSENT

CXR- Normal  
ECG - Normal Sinus Rhythm

#### PERIPHERAL SMEAR

Film: PANCYTOPENIA RBCS: Widely spaced anisocytosis  
+, macrocytes +, macroovalocyte +, normochromia  
WBC: Leukopenia, neutropenia  
Suggestive of megaloblastic anaemia

STOOL C & S - Culture negative for Salmonella sp., Shigella

sp. and Vibrio sp.  
URINE C & S - E.coli  
BLOOD C & S - No growth  
STOOL OCCULT BLOOD - Negative

Iron(Fe), Total, Serum L 19.20 ug/dl (60.00 - 180.00)  
Vitamin B12, Serum < 12.50 pg/mL (200.00 - 1100.00)  
Folate, Serum 19.10 ng/mL (5.21 - 20.00)

Coombs Test- Direct (Direct Antiglobulin Test (DAT)) - Negative

#### DISCUSSION

Megaloblastic anemia consists of vitamin b 12 deficiency and folate deficiency. Unlike many other B vitamins, B12 is not found in any plant food other than fortified cereals. It's present largely in many meats and fish, and smaller amounts in milk and eggs. Vitamin B12 in eggs seems to be poorly absorbed (< 9%) relative to other animal food products [10]. This makes it difficult for people following a strict vegetarian diet to get the necessary amount of vitamin B12.

#### CONCLUSION

A patient with nutritional megaloblastic anemia was presented to us. It is a rare entity in literature. The patient is a pure vegetarian for more than 40 years. No history of long-standing Upper GI or lower GI symptoms related to atrophic gastritis and any pathology related to terminal ileum. So we excluded by careful history about the other cause of megaloblastic anemia and we have come to a good clinical conclusion of long-standing history of vegetarianism, can produce megaloblastic anemia which is very rare. Hence we treated this patient with injection vitamin B 12 and oral iron and the patient improved remarkably with normal hemoglobin level.

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