

# Cardiomyopathy with Pancytopenia in a Pregnancy: Case Reports

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## ABSTRACT

Anemia, a common symptom in pregnancy, can lead to life-threatening cardiomyopathy.

A 30-years old gravida 2 para 1 woman was admitted at 34 weeks of gestational age with asymptomatic pancytopenia and vitamin B12 deficiency in the laboratory tests. She also had a diet-controlled gestational diabetes, megaloblastic changes in Bone marrow aspiration and cardiomyopathy shown by echocardiography. The patient recovered from pancytopenia and cardiomyopathy after one week treatment with vitamin B12 and folate.

In this case, cardiomyopathy worsened with anemia. By treating vitamin B12 deficiency, cardiomyopathy can be prevented or controlled during pregnancy. Careful consideration is needed when assessing anemia in pregnant women on vegetarian diet and at higher risk.

## Introduction

Megaloblastic anemia is a rather common finding in pregnancy, due to vitamin B12 and folate deficiency. Megaloblastic anemia could cause pancytopenia, and in severe cases dilated cardiomyopathy. These two symptoms are of special importance in the presented case; dilated cardiomyopathy might not be detected in pregnant women since its primary symptoms, tachycardia and fatigue, are mostly neglected in pregnancy. This case report presents a pregnant woman with pancytopenia and cardiomyopathy which can be explained by megaloblastic anemia.

## Case Report

A 30-year-old gravida 2 para 1 pregnant woman was admitted at 34 weeks of gestational age, with asymptomatic severe anemia, which was diagnosed in the laboratory tests. Her hemoglobin level was 5.5 g/dL. The patient was referred for evaluation after receiving 2 units of packed cell. On examination, her blood pressure was

110/65 mmHg and heart rate was 90 beats per minute and not febrile. She had normal body weight and height (80 kg 165 cm) at 34 weeks of gestation. She was pale without any abnormality in examination. Uterine size was proportional to gestational age. Her previous pregnancy resulted in a 9-year-old daughter in good healthy conditions. The patient had a history of gestational diabetes from the 22nd week of gestation, controlled by a vegetarian diet.

She has been taking folic acid supplements (1mg daily) from early pregnancy and she had normal Laboratory test results a month prior to admission. Laboratory tests at the time of admission showed a pancytopenia (Table 1-1, 1-2, 1-3). Echocardiography of the patient showed gestational cardiomyopathy (EF: 30%, PAP: 25-30). Her serum Iron, ferritin and folate levels were normal (Table 1-4, 1-5). Plasma lactate dehydrogenase (LDH) level and thyroid stimulating hormone (TSH) were high (Table 1-4, 1-6) but other laboratory results such as liver and renal function tests were normal. Testing for rheumatic factors was done, all of which were normal. Specific lab tests were done and only determined serum vitamin B12 was slightly low 190 pg/mL (normal 200-835 pg/mL).

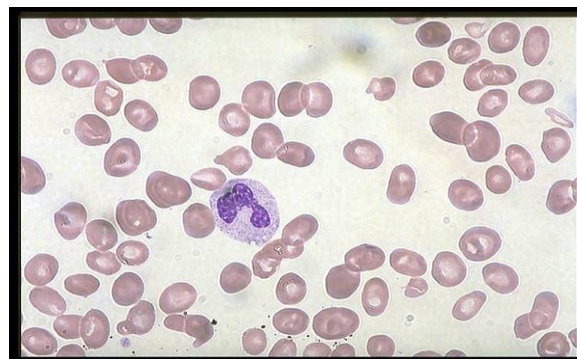
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In peripheral blood smear (PBS), anisocoria (+ 2), macrocytosis (+1) and hyper segmented Neutrophils were detected. The ultrasound was normal for DVT. Mild splenomegaly (133 \* 45 mm), gallstones with a maximum diameter of 15 mm with normal liver and pancreas parenchyma in abdominal sonography were reported. Megaloblastic changes were seen in the patient's bone marrow aspiration (Figure 1).

Transfusion two units of packed red cell for her and treated orally with Folate (600 mcg) and levothyroxine (50 mcg) daily. In addition, she received intramuscular vitamin B12 (1000 mg daily) for 7 days and then weekly until delivery. After 7 days of treatment, the patient's blood profile (Table 2) and cardiomyopathy improved (EF: 45%). She went into spontaneous labor at 38 weeks gestation. The baby weighted 2750g and had normal Apgar scores. No complications were seen in her infant.



**Figure 1- Megaloblastic changes in Bone marrow aspiration**

**Table 1-1- Primary blood parameters**

Parameters	Value	Unit	Normal Value
WBC	2.99	1000/mm <sup>3</sup>	4.1-10.1
RBC	2.39	Million/mm <sup>3</sup>	4.2-5.8
Hgb	7.5	g/dl	12-16
HCT	22.1	%	36-51
MCV	92.5	fl	77-94
MCH	31.4	pg	26-33
MCHC	33.9	g/dl	31-37
RDW-CV	18.6	fl	11-16
RDW-SD	52.7	%	39-46
PLT	120	1000/mm <sup>3</sup>	150-400
PDW	12.1	fl	7.1-20
MPV	10.3	fl	9.1-13
P-LCR	26.5	%	13-43

**Table 1-2- Serology**

Test	Result
Coombs Wright	Negative
Indirect Coombs	Negative
2ME Wright Test	Negative

**Table 1-3- Hematology**

Test	Result	Unit	Normal
Retic	0.3	%	0.5-1.5
Corrected Retic	0.1	%	

**Table 1-4- Biochemistry**

Test	Result	Unit	Normal
LDH	1538	U/l	<480

Haptoglobin	19	Mg/dl	30-200
Fe/Iron	240	µg/dl	50-170
TIBC	419	µg/dl	250-450

**Table 1-5- Serology and Immunology**

Test	Result	Unit	Normal
Folic Acid	7	Ng/ml	>3.0
Ferritin	129	Ng/ml	10-124
Vitamin B12	190	pg/ml	200-835
NT-PRO-BNT	>12000	pg/ml	Up to 125

**Table 1-6- Hormones**

Test	Result	Unit	Normal
TSH	6.5	mIU/l	0.3-5.0

**Table 2- Blood parameters after treatment**

Parameters	Value	Unit	Normal Value
WBC	3.59	*1000/mm <sup>3</sup>	4.1-10.1
RBC	2.43	Million/mm <sup>3</sup>	4.2-5.8
Hgb	7.9	g/dl	12-16
HCT	22.5	%	36-51
MCV	92.6	fl	77-94

MCH	32.5	pg.	26-33
MCHC	35.1	g/dl	31-37
RDW-CV	18.6	fl	11-16
RDW-SD	52.4	%	39-46
PLT	132	*1000/mm <sup>3</sup>	150-400
PDW	12.4	fl	7.1-20
MPV	10.3	fl	9.1-13
P-LCR	27.2	%	13-43

## Discussion

The incidence of cardiovascular disease is about 1-4% in all pregnancies. Cardiomyopathy is defined as a myocardial disorder in which the heart muscle is structurally and functionally abnormal, in the absence of coronary artery disease, hypertension, valvular disease and congenital heart disease. Patients with cardiomyopathy had the highest mortality rate (2.4%), as well as the highest incidence of arrhythmia and heart failure.

Cardiomyopathies can be either acquired or inherited and include different types, such as hypertrophic cardiomyopathy (HCM), arrhythmogenic right ventricular cardiomyopathy (ARVC), left-ventricular non-compaction, restrictive forms (RCM) and dilated cardiomyopathy (DCM).

Types of DCM include 50% idiopathic, 35% hereditary and rare cases have been seen in pregnancy [1].

As the symptoms of cardiomyopathies and the underlying heart failure could be neglected due to their similarity with the symptoms of pregnancy itself, it is important to consider the diagnosis for those at a higher risk and try to avoid a delayed diagnosis. Common risk factors such as coronary or valvular heart disease history, cigarette smoking, hypertension, obesity, diabetes, Vitamin D deficiency and anemia should be considered. Additionally, biomarkers such as brain natriuretic peptide/N-terminal pro-brain natriuretic peptide and echocardiograms help diagnose heart failure.

One of the causes of heart failure is anemia. Anemia is a common manifestation in 41% of pregnant women in the world and 56% in developing countries. Reducing the amount of hemoglobin is effective in pregnancy mortality, so that hemoglobin less than 5 g/dl increases mortality 10 times.

Anemia in pregnancy is divided into two categories: physiological and pathological. Megaloblastic anemia is the second most common cause of nutritional anemia during pregnancy and includes foliate and vitamin B 12 deficiency.

The first step is to diagnose the history, Physical examination may show pallor, bounding pulse, and systolic flow murmur (hemic murmur) and may detect cause as in antepartum bleeding. Decreased serum folate and vitamin B12 in laboratory data [4].

Symptoms and signs of vitamin B12 deficiency appear between 2 to 12 months and include vomiting, lethargy,

failure to thrive, hypotonia, and arrest or regression of developmental skills. Treatment with vitamin B12 corrects these metabolic abnormalities very rapidly within few days [5]. Pregnancy is associated with a steady and physiologic fall in serum vitamin B12 as well as red blood cell counts. Vitamin B12 with reports of mean serum vitamin B12 to be 300pg/ml in the first trimester, 250pg/ml in the second and 190pg/ml in the third trimester. Vitamin B12 deficiency commonly presents with megaloblastic anemia, and rarely, pancytopenia [4].

Causes of vitamin B12 deficiency in patients with nutritional deficiencies (as the described case), inadequate absorption of vitamin B12 due to intrinsic factor deficiency, gastric bypass, and holotranscobalamin deficiency. Pernicious anemia is also rarely seen in women of reproductive age [4-5]. Among patients with type 2 diabetes (T2D), vitamin B12 deficiency is common owing to medication interactions (e.g., metformin) or malnutrition [6-7].

Complications of vitamin B12 deficiency in pregnancy are spontaneous abortion, intra-uterine death, low birth weight infant, increased insulin resistance, developmental defects, neurological sequelae, intellectual impairment [7].

The prevalence of folate deficiency in pregnancy is reported to be 1-50%, which is higher in low socioeconomic areas [8]. A low serum folate level (<7.1 ng/mL) was associated with a higher risk of cardiovascular disease (CVD) and mortality. In addition, both low (<369.1 pg/mL) and high (506.1 pg/mL) serum levels of vitamin B12 were associated with a higher risk of CVD and mortality. Folate deficiency may lead to the accumulation of homocysteine, which has been associated with increased risk of stroke, CVD, dementia, and pregnancy complications [6].

## Management

Giving vitamin B12 oral supplements to pregnant and lactating women at risk of vitamin B12 deficiency (in the dose of 2.6 mcg daily), as recommended by the World Health Organization [4, 9]. Most prescribed prenatal vitamins contain 1 mg of folate, which is more than sufficient to meet the increased needs of pregnancy. A higher supplementation dosage, such as 5 mg per day, is recommended for women who have increased demands for folate (multiple pregnancies, hemolytic disorders, folate metabolism disorders and those on a vegetarian

diets) and for women at an increased risk of neural tube defects (personal or family history of neural tube defect, pre-gestational diabetes, or epilepsy on valproate or carbamazepine) [8].

### Conclusion

By treating vitamin B12 deficiency, cardiomyopathy can be prevented during pregnancy in such cases. Initial screening is only recommended for women on vegetarian diet and at higher risks.

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