Leukemoid reaction in megaloblastic anemia of the puerperium: An unusual cause

Dear Editor,

A 30-year-old vegetarian female from a rural background presented after 5 days of her uneventful full-term normal vaginal delivery because of fatigability, breathlessness, and facial puffiness. Her obstetric history was G3P3A0. Her antepartum history was uneventful, and she irregularly attended antenatal checkup visits. She denied history of bleeding from anywhere in the body, blood transfusion in the past, chronic illness, or addictions. On examination, she had pallor and mild icterus. The vital parameters were stable except a tachycardia of 110 beats/min. There was a hemic murmur on the pulmonary area. Further clinical examination was not contributory. Hemogram revealed anemia, thrombocytopenia, and leukocytosis. Peripheral blood film (PBF) showed macrocytosis, nucleated red blood cell, neutrophilic leukocytosis with few immature cells, and 2% reticulocytes count. The leukocyte alkaline phosphatase (LAP) score was high [Table 1]. The liver function, renal function tests, and coagulation profile were within normal limit. The serum Vitamin B12 level was 169 pg/mL (279–996 pg/mL), and serum folic acid level was 6.1 ng/L (5.4–18.0 ng/mL). The bone marrow aspiration showed megaloblastic erythropoiesis. The blood and urinalysis were sterile. She tested negative for malaria, hepatitis B, and hepatitis C viruses. The chest X-ray, electrocardiogram, and echocardiography were normal. Ultrasonography showed bulky postpartum uterus without any significant abnormality. Treatment consisted of two unit of packed cell given on day 1, injectable methylcobalamin 1000 μg, and tablet folic acid 5 mg given daily. At the end of 7th days, the counts normalized, and the hemoglobin rose to 9.4 g/dL. At the follow-up of one fortnight, she was asymptomatic with normal hematology.

Leukemoid reaction (LR) refers to a reactive, excessive leukocytosis outside the bone marrow in the absence of hematological malignancy and has been described in response to inflammation, severe infection, malignancies, hemorrhage, acute hemolysis, or bone marrow stimulants. There is a significant increase in mature neutrophils in the peripheral blood and a differential count showing marked left shift.[1] The underlying mechanism for LR is attributed to increased cytokines and interleukins production.[2]

Pregnancy is commonly associated with various hematological changes such as anemia, thrombocytopenia, coagulopathy, and leukocytosis. The leukocytes count starts to increase from 4th week of gestation and remain throughout the pregnancy. This occurs because of the physiological stress of the pregnancy and immune tolerance, immunosuppression, and immunomodulation of fetus in pregnancy which leads to inflammatory response.[3] The increase in the leukocytes count is predominantly neutrophilic because of impaired neutrophilic apoptosis in pregnancy. These neutrophils have toxic granulation in cytoplasm, immature forms, and depressed chemotaxis and phagocytic activity with increased oxidative metabolism during pregnancy. This indicates to bone marrow response to an increased drive for erythropoiesis occurring during pregnancy.[4-6] During throughout of pregnancy, circulating levels of C-reactive protein, granulocyte macrophage colony-stimulating factor, and lactoferrin are found to be increased and their level tends to settle down after the puerperium.[2] LR in puerperium with megaloblastic anemia is rarely reported.[7,8]

Our case of megaloblastic anemia, presenting in the puerperium, was associated with LR. The total and differential leukocytes counts gradually returned to normal while the folic acid and Vitamin B12 therapy were given. The possible etiology for megaloblastic anemia in our case might be due to dietary

Table 1: Laboratory investigations

Parameters	Hb (g/dL)	TLC (cells/mm^3)	Platelets (cells/mm^3)	MCV (fL)	PBF	LAP	CRP	LDH (U/L)
July 23, 2014	2.7	43,730	69,000	119	RBC-macrocytic normochromic 3-NRBC/100 WBC, leukocytosis myelocytes metamyelocyte 8%, band form 12%, neutrophil 60%, shift to left, no toxic granules, thrombocytopenia	170	36	699
July 25, 2014	4.7	28,000	108,000	109				
July 27, 2014	6.7	16,000	153,000	101				
July 30, 2014	9.4	9360	253,000	95	Normocytic normochromic with normal differential count and platelets		6	
August 05, 2014	10.5	8750	425,000	88				

Hb: Hemoglobin; TLC: Total leukocytes count; LDH: Lactate dehydrogenase; MCV: Mean corpuscular volume; LAP: Leukocyte alkaline phosphatase; PBF: Peripheral blood film; RBC: Red blood cell; CRP: C-reactive protein; WBC: White blood cell; NRBC: Nucleated red blood cell

deficiency of Vitamin B12 and folic acid in pregnancy. Folic acid requirement is increases, and absorption is decreases during pregnancy. The LR in the puerperium is might be due to outpouring of various stress hormones, steroid hormone, and cytokines secondary to excessive stress and inflammation during delivery. Therefore, a proper septic workup, a good PBF examination, and LAP score should be done to look for the cause of excessive leukocytes count of the puerperium.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/2249-4863.222019

How to cite this article: Pahadiya HR, Lakhotia M, Choudhary A, Choudhary S. Leukemoid reaction in megaloblastic anemia of the puerperium: An unusual cause. J Family Med Prim Care 2017;6:698-9.