Case Report

Hemolysis and Pancytopenia Related Vitamin B12 Deficiency: A Case Report

Ertan Sal*, İdil Yenicesu, Zeynep Eroltekin, Zühre Kaya, Ulker Kocak and Turkiz Gursel
Department of Pediatrics, Gazi University, Turkey

Abstract

Vitamin B12 deficiency in early infancy is particularly seen in babies of vegetarian mothers with vitamin B12 deficiency. Vitamin B12 deficiency may mimic megaloblastic anemia, pancytopenia, psychomotor retardation and, rarely, hemolytic anemia. This report describes a case with symptoms of apathy and inability to gain weight and findings of pancytopenia and hemolysis, diagnosed with vitamin B12 deficiency. Combined pancytopenia and hemolysis are rare hematological findings in cases of B12 deficiency, and this paper was intended to draw physicians’ attention to this rare form of presentation.

INTRODUCTION

Nutrition-related B12 deficiency is rare in early childhood. It is only seen in babies receiving breast milk and born to mothers whose diets are lacking animal products for economic reasons or else who are vegetarians [1,2]. Babies of mothers with such characteristics are born with inadequate vitamin B12 stores and are at risk from the first days of their lives. Deficiencies, especially in this period when growth is rapid, may cause permanent effects [1-3]. Vitamin B12 deficiency may lead to megaloblastic anemia and/or growth and development retardation [1–3]. Vitamin B12 deficiency-related pancytopenia or hemolytic anemia may also rarely be seen [4-9]. This paper describes a rare presentation of findings of combined pancytopenia and hemolysis in a 4-month-old girl.

CASE PRESENTATION

A 4-month-old girl presented with lack of interest in environment, decreased movement and sucking, hypotonia, lack of weight gain and vomiting. Her history revealed that she was born by Cesarean section without any complications, weighing 3350 g, from her mother’s first pregnancy, and that until the previous month growth and development had been appropriate for her age. The patient had been fed breast milk alone until time of admission, and apart from her mother being vegetarian there were no pathologic findings in her history. The patient had not taken any hemolysis associated drugs. At physical examination, her general condition was good, she was conscious, with body temperature of 36.6°C, pulse 140/min and rhythmic and respiratory rate 21/min. The patient's skin was pale. Body weight was 4900 g (3-10 p), height 58 cm (10-25 p) and head circumference 39 cm (10-25p). Systolic 2/6 murmur was found. The liver exceeded the costal margin by 3 cm in the midclavicular line. Other system examinations were normal. Laboratory tests were; aspartate aminotransferase 60 U/L, alanine aminotransferase 6 U/L, alkaline phosphatase 235 U/L, gamma glutamyl transferase 14 U/L, total bilirubin 2.2 mg/dL, direct bilirubin 0.3 mg/dL, lactate dehydrogenase 1652 U/L, albumin 3.6 g/dL, hemoglobin 6.0 g/dL, red blood cell 3 million/mm³, leukocyte 2060/mm³, thrombocyte 49,700/mm³, mean corpuscular volume 93 fl, mean corpuscular hemoglobin 34 pg/cell, mean corpuscular hemoglobin concentration 36 g/dL and reticulocyte count 5.7%. Macrocytosis, anisocytosis, poikilocytosis and spherocytes and polychromasia were observed in peripheral smear. The patient’s serum vitamin B12 level was 83 pg/mL (N: 187-883 pg/mL), and the mother’s 180 pg/mL. Serum folate and plasma homocysteine levels were normal. So, other causes of hemolytic anemias such as glucose-6-phosphate dehydrogenase (G6PD) and hemoglobin electrophoresis were normal, and direct coombs was negative. Megaloblastic changes were determined in bone marrow aspiration. The patient’s serum vitamin B12 level was 83 pg/mL (N: 187-883 pg/mL), and the mother’s 180 pg/mL. Serum folate and plasma homocysteine levels were normal. So, other causes of hemolytic anemias such as G6PDH deficiency, hereditary spherocytosis, autoimmune hemolytic anemia, hemolytic uremic syndrome were excluded. Vitamin B12 deficiency-related megaloblastic anemia was suspected, and intramuscular vitamin B12 therapy was initiated. All hematological findings resolved in the 1st month of the treatment. The patient has now completed 1 year under observation and no problems have been encountered.
DISCUSSION

Vitamin B12 deficiency in developing countries is generally seen due to a diet poor in animal products and continues to represent a significant health problem [10,11]. Other frequently seen causes of vitamin B12 deficiency are pernicious anemia, gastric or ileal resection and celiac and inflammatory intestinal diseases [1]. The genetic reasons of vitamin B12 deficiency such as transcobalamin II deficiency, intrinsic factor deficiency are usually symptomatic in the early months of life. In contrast to genetic reasons, the nutritional vitamin B12 deficiency is rarely symptomatic in the early months of life. It is generally seen in babies fed breast milk only, whose mothers are vegetarian, as in our case, or who are unable to consume animal protein for economic reasons and who thus develop vitamin B12 deficiency. Clinical findings associated with vitamin B12 deficiency may be seen in a wide spectrum, from lethargy to psychiatric symptoms [11,12,13]. In early childhood, clinical findings associated with vitamin B12 deficiency may be classified in two main groups, neuro developmental and hematological. Central nervous system findings associated with vitamin B12 deficiency in infants generally appear at 2-12 months with vomiting, lethargy and feeding disorder. Other neurological findings of the disease are hypotonia, retarded development, loss of stages of acquired development and optic atrophy [14,15]. Vomiting, feeding difficulty, hypotonia and lack of interest in environment were also present in our case. These symptoms resolved rapidly with vitamin B12 therapy. What must not be forgotten, however, is that if treatment is delayed, vitamin B12 deficiency can cause permanent neurological damage. It is particularly important for patients to be treated before the age of one year [14]. We think that early diagnosis and treatment played a significant role in the rapid resolution of our patient’s neurological symptoms. To prevent neurological vitamin B12 deficiency in the infancy period, also, mothers should consume nutrition with rich vitamin B12 such as meat, eggs or the vitamin B12 supplementation should be added to their diet in pregnancy and breastfeeding period in patients with the story of poor nutrition especially in the low socio-cultural arise.

Vitamin B12 deficiency also exhibits a variety of effects on the hematopoietic system, tissues with high mitotic activity. Like neurological findings, hematological findings can also range along a broad spectrum from simple macrocytosis to findings of dysplasia [1]. More than one hematological finding may be seen at the same time. However, it is very rare for pancytopenia and hemolysis, both already rare hematological findings, to be seen at the same patient [1,15,16]. One study of 201 patients with vitamin B12 deficiency reported hemolysis in 1.5% of cases and pancytopenia in 5% [17]. Hemolysis in vitamin B12 deficiency generally occurs as a result of infective erythropoiesis [18]. It has also been reported that a viral infection such as chicken pox can also lead to hemolytic anemia in children with severe vitamin B12 deficiency. The cold antibodies that form in such infections, particular of an immunoglobulin M character, lead to hemolytic anemia [19]. Finally, it has been suggested that the rise in homocysteine levels in cases of vitamin B12 deficiency may lead to hemolysis findings being more severe [20]. Increasing homocysteine leads to endothelial damage and contributes to hemolysis caused by ineffective erythropoiesis by establishing microangiopathy. This rise and hemolysis findings have been found to be more severe in patients with vitamin B12 deficiency and MTHFR (C677T) mutation [20]. In the absence of any finding of infection accompanying vitamin B12 deficiency in our case, Coombs test being negative and homocysteine levels being normal, we thought that the findings of hemolysis observed might be associated with infective erythropoiesis.

In conclusion, vitamin B12 deficiency with nonspecific findings should be rapidly diagnosed especially during early childhood to prevent permanent damage. Cases exhibiting severe hematological findings such as pancytopenia and hemolysis in addition to neurological findings, like in our case, are of interest to clinicians. The awareness of the findings to which vitamin B12 deficiency can be associated with, will increase the probability of early diagnosis and treatment. Pediatric specialists possessing detailed knowledge of vitamin B12 deficiency will contribute to ensure the health of future generations.

REFERENCES


