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The Effect of Vitamin B12 Deficiency in Infant

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This report is related to activity in BMS

Abstract:

Cobalamin or Vitamin B12 is essential for nucleic acid synthesis, which has many sources but the most important source is the animal protein, that it has many effect in nervous system maturation that their deficiency ,which has various causes include: dietary insufficiency which is a rare cause, decreased production of intrinsic factors, gastrectomy, H.pylori infection, will lead to serious complications such as neuro-developmental, so to prevent these complication sufficient amount of vitamin B-12 must be given as soon as possible.This report discuss different studies about Vitamin B12 deficiency and its aim is the review of the effects of vitamin B12 in neonates and young infants.

Introduction:

Vitamin B12 that also called cobalamin is an essential coenzyme for nucleic acid synthesis, and the animal protein is the major dietary source of vitamin B12.¹

Vitamin B12 deficiency is a vital and an accepted cause of neurological morbidity in infants also lead to megaloblastic anemia . There are many causes of infantile vitamin B12 deficiency are heterogeneous, include from dietary deficiency in a breast feeding mother to specific inborn errors of metabolism.¹

A deficiency of vitamin B12 impairs DNA synthesis in any cell in which chromosomal replication and division are taking place. An early sign of deficiency of these vitamins is megaloblastic anemia.² The main storage site for vitamin B12 is the liver.² Deficiencies in vitamin B12 can occur due to the lack of intrinsic factor (pernicious anemia), malabsorption of vitamin B12, deficiencies in the diet, or metabolism of vitamin B12 by intestinal parasites. The clinical presentation of vitamin B12 deficiency is typically a megaloblastic anemia.¹ The diagnosis of vitamin B12 deficiency is confirmed by a low plasma concentration of this vitamin. Prompt replacement of vitamin B12 is indicated in patients who are found to be deficient.²

Discussion:

One research that study a total of 20 case of vitamin B 12 deficiency at age group of 6 + or – 4.5 month, found that the most common symptoms of the patients were; infections in 30 %, pallor in 25 %, hypotonia and neuro-developmental delay in 25 %, refusal to solid food or to suck in 20 %, failure to thrive in 15 %, fatigue in 10 %.¹ Twenty-five percent of patients had neurologic signs and symptoms.¹ Anemia was found in 16/20 (80 %) patients.¹ Three (15 %) patients had leukopenia, 7 (35 %) had neutropenia, 2 (10 %) patients had thrombocytopenia.¹ All of the mothers had vitamin B12 deficiency.¹ All of the patients were fed with breast milk.¹

Compared with another study about Vitamin B12 deficiency in infants secondary to maternal causes, the first case was a case of A nine-month-old female infant presented with a two-day history of vomiting, diarrhea and decreased urine output, along with a three-month history of lethargy and reduced tone.³ Her early development had been normal, but regression of skills had begun three months before presentation, with a loss of gross motor skills progressing to a loss of head control.³ The child had been exclusively breastfed until solids were slowly introduced over the last month the laboratory examination shows Vitamin B12 level was less than 37 (range 133–695)pmol/L, and the folate level was 14 (range 7–36) nmol/L.³ A bone marrow biopsy showed morphological changes consistent with megaloblastic anemia. Magnetic resonance imaging (MRI) of the patient's brain showed generalized atrophy.³ Because this case was breast fed; they examined her mother and they found normal values except for vitamin B12 which level was low at 63 (adult reference range 133–695, deficient < 107) pmol/L.³

The other case was a case of a seven-month-old male infant presented with a two-week history of lethargy and a loss of previously acquired milestones, as well as a two-month history of diarrhea and being generally unwell. He had been seen by his family doctor on multiple occasions and treated with antibiotics with no identified source of infection. He was exclusively breastfed, on neurologic examination, they found that he had generalized decreased tone, with brisk reflexes in the extremities, The blood smear showed pancytopenia with evidence of red blood cell macrocytosis.³ No blast cells were seen.³ A bone marrow biopsy showed megaloblastic anemia in keeping with vitamin B12 deficiency.³ The vitamin B12 level was less than 37 (133–695) pmol/L, and the folate level was 30 (range 7–36) nmol/L. An MRI of the patient's brain showed generalized symmetric cortical atrophy and incomplete subcortical myelination.³ Because the patient was exclusively breastfed, the mother was examined and found to have antibodies to intrinsic factor

and gastric parietal cells, and undetectable vitamin B12 levels. The clinical features of infant vitamin B12 deficiency from either maternal dietary deficiency or maternal pernicious anemia do not appear to depend on cause, but rather on the severity of B12 deficiency, with many children being asymptomatic and presenting only with megaloblastic anemia found on blood work.¹³ When infants show clinical effects, the effects usually present between 2 and 12 months of age, when neonatal stores have been depleted and dietary vitamin B12 is inadequate.³ Typically, symptoms of vitamin B12 deficiency include poor feeding, weight loss and irritability; glossitis and infections have also been reported.³

When we compare those cases with the first report we will find that vitamin B12 deficiency in infants is important to recognize because early treatment can prevent potentially devastating neurologic and developmental sequelae, such as hypotonia and developmental regression.^{1,3}

Also there is a result reached by other research, which is that the clinical presentation of vitamin B12 deficiency is typically a megaloblastic anemia and the diagnosis of vitamin B12 deficiency is confirmed by a low plasma concentration of this vitamin in addition a Prompt replacement of vitamin B12 in patients who are found to be deficient is important.²

Conclusion:

To conclude vitamin B-12 is very important factor, that help in maturation of blood and nervous system and its deficiency presented with multiple symptoms that vary among infants for unknown cause which include infections that is the most common, neurological delay and many other symptoms.

References:

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3-Canadian Medical Association or its licensors (2012). *Vitamin B12 deficiency in infants secondary to maternal causes*. CMAJ, pp.1593-1596.