CASE REPORT

A CASE OF PERNICIOUS ANEMIA DUE TO VITAMIN B_{12} DEFICIENCY

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A 50-year-old Chinese male presented with progressive weakness and paresthesia of lower extremities for 1 month. On examination he had grey hair, pallor without jaundice. His lower extremities showed weakness, impaired sensation both pain and vibratory modalities, hyporeflexia, no Babinski's reflex. The blood smear had pancytopenia macro-ovalocyte and hypersegmented neutrophils. Bone marrow showed megaloblastosis. Serum level of vitamin B_{12} was 120 pg/ml (Normal 200-800 pg/ml) and serum folate was 78 ng/ml (Normal 5-21 ng/ml). He was presumably diagnosed as pernicious anemia because of the existence of achlorhydria and antimicrosome antibody although the Schilling test was not performed. After treatment with parenteral vitamin B_{12}, his hematologic manifestations became normal but neurologic ones did not.

Pernicious anemia is a vitamin B_{12} deficient megaloblastic anemia due to intrinsic factor deficiency resulting in impairment of vitamin B_{12} absorption (Beck, 1983; Wintrobe, 1981). This vitamin is abundant in foods of animal products and fish sauce (Areekul *et al,* 1972), commonly used to season most Thai foods, so pernicious anemia is very rare in the Thai (Intaragumthornchai *et al,* 1984; Wiersinga *et al,* 1973) as in other oriental countries (Jayaratnam *et al,* 1967; Friedlander, 1934; Goldhammer *et al,* 1934). However Hathirat *et al* (unpublished data) conducted a study in school children, aged 9-11 years in Chon Buri Province, Thailand and found that 4.2% of them had serum vitamin B_{12} less than 100 pg/ml without clinical deficiency of either folate or vitamin B_{12}. We reported herein a case of pernicious anemia with typical findings of neurologic and hematologic manifestations.

A 50-year-old, male Chinese peasant complained of progressive weakness and paresthesia of lower extremities until he could not sit or walk within 1 month. His hair gradually turned grey while that of his 10 years older brother remained to be dark. He was not a vegetarian and had no gastro-intestinal operation or alcohol consumption.

On examination he was conscious, slim, moderately pale, bed ridden and cachectic. His hair looked grey. The tongue was beefy red and bald. Both lower extremities had abnormalities as described : motor power of flexor groups of hips and knees grade III, numbness, loss of vibratory sensation, hyporeflexia and no Babinski reflex.

The following laboratory findings were recorded : CBC : Hematocrit 22%, WBC 3100/mm^3, N 55%, E 2%, L 43%, with hypersegmented neutrophils and macro-ovalocytes, platelets 32000/mm^3 reticulocytes 0.2%.

No parasites or occult blood were detected in his stool.

Biochemistry : BUN/creatinine 13.0/0.8 mg/dl, normal electrolyte, fasting blood sugar and cholesterol, LDH 200 U/l (normal 24-78), direct/indirect bilirubin 0.4/2.0 mg/dl.

VDRL- Non reactive.

CSF was normal.

Non-fasting serum B_{12} and folate levels are shown in Table 1.

Table 1

Serum levels of vitamin B_{12} and folate.

	Vit B_{12} (pg/ml)	Folate (ng/ml)
Before Rx (after transfusion)	120.0	78.0
After Rx	1132.0	5.8
Normal	200-800	5-21

Bone marrow showed marked increase in iron storage and prominent megaloblastic changes in myeloid and erythroid precursors and typical nuclear/cytoplasmic asynchronism.

Gastroscopy revealed normal esophagus, stomach and duodenum; pH of gastric contents was 6.1. Long GI contrast media study appeared normal.

Anti-microsome antibody titer was 1:400, with negative anti-thyroglobulin antibody.

The final diagnosis was pernicious anemia and intramuscular injection of vitamin B_{12} 1,000 μg daily for 12 days and then weekly was administered. One unit of packed red blood cells was also transfused.

One month after treatment, the hematologic parameters became normal but neurologic ones did not. The second bone marrow study, serum vitamin B_{12} and folate levels were normal. After discharge he was injected monthly with vitamin B_{12} 1,000 μg. At the fourth month he was able to sit without support. His hair became dark and the tongue appeared normal.

The diagnosis of megaloblastic anemia in this case was initially based on laboratory findings such as pancytopenia, macro-ovalocytes, hypersegmented neutrophils in blood smear and megaloblastosis with typical nuclear/cytoplasmic asynchronism in bone marrow (Beck, 1983; Wintrobe, 1981; Herbert, 1985). Other evidence was ineffective erythropoiesis characterized by indirect hyperbilirubinemia, increased LDH and abundant stainable iron in bone marrow.

Megaloblastic anemias are result from folate or vitamin B_{12} deficiency. In our case vitamin B_{12} deficiency was considered to be the etiology because its level was rather low while that of folate was high. In general it should be less than 100 pg/ml in case of vitamin B_{12} deficient megaloblastic anemia, nevertheless, it is slightly higher in our case, possibly due to transfusion. Other important evidence was the neurological changes consisting of impairment of vibratory sensation, numbness and weakness of lower extremities, consistent with subacute combined degeneration (Wiersinga *et al,* 1973; Goldhammer, 1934) and also hyporeflexia unfound in folate deficiency. Other evidence was normalization of hematological bone marrow findings, tongue and hair after vitamin B_{12} therapy.

Because of high concentration of vitamin B_{12} in Thai foods (Areekul and Chantachum, 1980) including fish sauce inadequate vitamin B_{12} intake is unlikely to be the cause. In our patient, because he had no gastrectomy, no blind loop, no malabsorption and no *Diphyllobothrium latum* infestation which are common causes of pernicious anemia (Herbert, 1985), he was presumed to be perniciuos anemia, although tests such as Schilling (Lindinbaum, 1983; Zucker *et al,* 1984), anti-intrinsic factor and anti-parietal cell antibody (Irvine *et al,* 1969) determination and examination for atrophic gastritis (Borch and Liedberg, 1984) were not performed. This assumption was based on indirect evidence ie, he had achhlorhydria and anti-microsome antibody.

After treatment with vitamin B_{12} intramuscular injection, hematologic manifestations improved rapidly but paraparesis did not (Goldhammer *et al,* 1934). This situation was commonly found when vitamin B_{12} deficient megaloblastic anemia was treated with vitamin B_{12}. On the other hand, the neurologic signs would become worse if the patient was treated with folate, nevertheless, hematologic manifestation could be cured.

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