Vitamin B12 deficiency common in primary hypothyroidism.

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ABSTRACT
OBJECTIVES: The objective of this study is to know the level of serum Vitamin B12 in hypothyroidism patients. To assess the prevalence of vitamin B12 deficiency in hypothyroid patients. The content of the Vitamin B12 in the serum of patients was determined and compared to that of normal subjects. METHOD & Materials: Serum sample of fifty patients of known case of hypothyroidism and fifty normal subjects was taken. Serum vitamin B12 was measured in Abbott 1000sr by CMIA (chemiluminescent micro particle immunoassay) method. RESULT: The results showed that serum vitamin B12 level of hypothyroidism patients was significantly lower as compared to the normal subjects (p value<0.05). CONCLUSION: There is a high (approx 64%) prevalence of B12 deficiency in hypothyroid patients. Traditional symptoms are not a good guide to determining presence of B12 deficiency. Screening for vitamin B12 levels should be undertaken in all hypothyroid patients. Replacement of B12 leads to improvement in symptoms.

KEY WORDS: Hypothyroidism, Serum Vitamin B12.

Introduction:
Vitamin B12 is a water-soluble B vitamin also known as cobalamin. There are 4 forms of vitamin B12: cyanocobalamin, hydroxocobalamin, methylcobalamin and adenosylcobalamin. While cyanocobalamin is the most popular form, it has to be converted to the two active vitamers, adenosylcobalamin and methylcobalamin, before the body utilizes the vitamin. Vitamin B12 is found in every cell of the body. It is required for cellular metabolism and energy production, the production and regulation of the DNA and for fatty acid metabolism. Many people suffering from hypothyroidism are prescribed thyroid hormone replacement or other thyroid drugs.

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Of the two thyroid hormones, T3 is widely regarded to be clinically more effective than T4. However, even with T3 replacement, some patients do not fully recover from the symptoms of their deficiency. Vitamin B12 deficiency worsens hypothyroidism. Unfortunately, both deficiencies can go unnoticed and they can be difficult to diagnose. Vitamin B12 (cyanocobalamin) deficiency occurs in 3-4% of the general population. Pernicious anaemia is present more frequently in subjects with primary autoimmune hypothyroidism with reports of association in up to 12% of hypothyroid patients. Antibodies to gastric parietal cells are seen in 1/3 rd of patients with primary hypothyroidism. Vitamin B12 deficiency in hypothyroid patients may also be due to other causes, including inadequate intake or altered intestinal absorption due to sluggish bowel motility, bowel wall oedema and bacterial overgrowth. Non autoimmune causes of B12 deficiency in hypothyroid patients have not been evaluated in detail and may vary according to dietary habits in
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different population groups. Hypothyroid patients often present with symptoms of
paraesthesia, numbness, weakness and poor memory, despite being on adequate
replacement doses of thyroxine. We noted these symptoms to be common among our
hypothyroid patients and hence undertook to evaluate vitamin B12 levels in patients
with primary thyroidism. Material And Method: The cross sectional study was
conducted in civil hospital, ahmedabad during august 2015 to december 2015.Fifty
hypothyroidism patients (cases) (n=50), their age range between 18-64 years (34 female and 16 male) participated in this study. The mean age of patients was found to be 39.48±14.19. The severity of hypothyroid is moderate to sever and all patients were on hormone replacement therapy. The patients were diagnosed depending on the results of the following examinations: clinical examinations, serum hormones level (T3, T4 and TSH). Patients, who were vegetarian, had a history of gastric or ileal resection, or pancreatic insufficiency were excluded. Fifty normal Controls healthy persons (n=50) aged 18-64 years (38 female and 12 male) were used as control. The mean age of control was found to be 35.86±14.34. Venous blood samples were collected from patients with Hypothyroidism in fasting condition and similar conditions were maintained while taking the blood samples of controls. About five millilitres of venous blood from were drawn by utilizing disposable plastic syringes in the morning and transferred into sterile test tube. The blood was allowed to clot and centrifuged at 5000 rpm for 5 minute. Sera were separated and stored at -4ºC until analysis. The supernatant blood serum was used for the analysis of vitamin B12 level in Abbott Architech 1000SR by CMIA principal. The patients were diagnosed vitamin B12 deficiency depending on the results of the serum vitamin B12 level(Normal range for vitamin B12 is 200 to 900 pg/ml). The biochemical vitamin B12 deficiency was defined at a concentration below <200 pg/ml. And results were analysed with Graphpad Instat software by using student’s t-test for statistical significance of 0.05. Result : Table (1) showed the results of serum vitamin B12 level expressed as mean±standard deviation. Serum vitamin B12 level of hypothyroidism patients are significantly lower (p<0.05) than the level in normal subjects.

Table. 1- Level of trace elements in controls & cases.

<table>
<thead>
<tr>
<th></th>
<th>Control (Normal Subject) (mean ±SD)</th>
<th>Cases Hypothyroid Patients (mean ±SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.86±14.34</td>
<td>39.48±14.19</td>
<td>-</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>365.17±45.82</td>
<td>187.38±35.89</td>
<td>&lt; 0.05</td>
</tr>
</tbody>
</table>

CONCLUSION: In our study we concluded that there is a significant decrease in serum vitamin B12 level in hypothyroid patients as compare with normal subject. We studied prevalence of B12 deficiency in hypothyroid patients and found 32 of 50 (64%) patients to have low B12. Our study correlates well with other different researches (Abdul Jabbar et al.2008; Snow CF et al., 1999; Lewitt et al. 1993; Ness-Abramof et al. 2006). One possible explanation for these findings, that the autoimmune activity in their body may not be limited to attacking their thyroid. It may also attack the parietal cells in the stomach, causing atrophic gastritis. Atrophic gastritis causes about one-quarter of all cases of chronic vitamin B12-deficiency anemia. Atrophic gastritis
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Hypothyroidism may be associated with pernicious anaemia as part of the autoimmune polyglandular endocrinopathy.8 Vitamin B12 deficiency may occur as a result of autoimmune pernicious anaemia, malabsorption, malnutrition or use of drugs including proton-pump inhibitors, H2 receptor antagonists or metformin.13,14 Clinical signs of vitamin B12 deficiency may take long to manifest and often affected patients are asymptomatic for several years.4 Occasionally, haematological or neuropsychiatric manifestations may present as early markers of deficiency but many non specific complaints are attributed to aging. Hypothyroid and B12 deficient patients often have common symptoms of weakness, lethargy, memory impairment, numbness and tingling. We noticed that several patients, despite being on adequate thyroxine replacement, had persistence of symptoms and subsequently were found to be B12 deficient.4 Anaemia with or without macrocytosis, tend to occur later in B12 deficiency, and may be absent in B12 deficiency.15,16 There was a significant improvement reported in symptoms within 3-6 months of initiating B12 treatment in hypothyroid individuals with low B12 levels.4 Our study showed vitamin B12 deficiency to be common in this population of hypothyroid patients. Screening for B12 deficiency should be undertaken early in the diagnosis of hypothyroidism and periodically thereafter. Patients should be followed and evaluated for suggestive symptoms. Surrogate markers including anaemia and macrocytosis cannot be relied upon to select out likely B12 deficient individuals. There is improvement in symptoms after initiating B12 treatment in these patients .Initiation of early therapy will prevent the long term sequele of vitamin B12 deficiency. More investigations are required using larger sample size and severe hypothyroidism to be sure about the lack of correlation between the disease and vitamin B12. Hence, the correlation between hypothyroidism and serum vitamin B12 is not a simple correlation and needs more specific studies.

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