J. Dhaka National Med. Coll. Hos. 2020; 26 (02): 20-22

Original Article

Evaluation of Vitamin B_{12} Deficiency in Newly Diagnosed Hypothyroid Female Patients in Dhaka City

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Abstract:

Background: Vitamin B_{12} deficiency may remain latent in the early phase of hypothyroidism. Symptoms of neuropathy may occur due to combination of deficiency of thyroxin & vitamin B_{12} in newly diagnosed hypothyroid female patients.

Objectives: To assess the prevalence and clinical features of vitamin B_{12} deficiency in newly diagnosed hypothyroid female patients in Dhaka.

Methods: This cross-sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College (SSMC) between July' 2015 to June' 2016 on 80 newly diagnosed hypothyroid female patients with clinical features of vitamin B_{12} deficiency. Their serum TSH, FT_4, FT_3 levels were estimated for assessment of thyroid function status by ELISA method. Vitamin B_{12} level was also estimated to observe its level by using standard method. The statistical analysis was done by ANOVA test, paired, independent sample't' test.

Results: In this study, a total 80 newly diagnosed hypothyroid female patients were evaluated among them 34 patients had low vitamin B_{12} level. Generalized weakness, impaired memory, depression, numbness and decreased reflexes were more frequently noted in vitamin B_{12} deficient patient. Additionally 16 subjects were complained of symptoms consistent with vitamin B_{12} deficiency, but had normal range of vitaminB_{12} level.

Conclusion: The present study revealed that there is a high (approx 42.5%) prevalence of vitamin B_{12} deficiency in newly diagnosed hypothyroid female patients. Traditional symptoms are not a good guide to determining presence of vitamin B_{12} deficiency. Screening for vitamin B_{12} level should be undertaken in all newly diagnosed hypothyroid female patients.

Key words: Hypothyroidism, Thyroxine, Vitamin B_{12}.

Introduction

Hypothyroidism is a clinical condition resulting from reduced circulating levels of free thyroxine (FT_4) and triiodothyronine(FT_3).[1] However, the thyroid hormones increase the metabolic activities of almost all tissues of the body. The basal metabolic rate can increase 60 to 100 percent above normal when large amount of hormones are secrected.[2] The thyroid gland is not essential for life, but its absence or hypo function during fetal and neonatal life results in severe mental retardation and dwarfism.[3]

The prevalence of primary hypothyroidism is 10/1000 but increases to 50/1000 if patients with sub-clinical hypothyroidism (normal FT_4, raised TSH) are included and the female: male ratio is approximately 6:1.[4]

However, hypothyroidism might be reversible at early stages; on the other hand irreversible cases might have longer duration of diseases or might present etiologies other than hypothyroidism. Long term accumulation of mucinous tissue is the possible cause of irreversibility.[5]

Most of the hypothyroid patients complain some sensory symptoms like tingling sensation, numbness, paraesthesia, burning pain and some motor symptoms like weakness, muscle fatigability, stiffness and cramp.[6] Again, decreased tendon reflexes, decreased muscle strength, positive Phalen's test and Tinel's sign at the wrist (test for clinical diagnosis of carpal tunnel syndrome) were also found in some hypothyroid female.[7]

Some investigator revealed that, sensory and motor sign/symptoms such as tingling sensation, numbness, loss of vibration, pain, decreased muscle strength and

delayed tendon reflexes were still persisted in hypothyroid patients even after 1 year of thyroxine replacement therapy.[8]

In a follow-up study, some researchers demonstrated that these symptoms to be common among our hypothyroid patients & to evaluate vitamin B_{12} levels in patients with primary hypothyroidism.[9]

Methods

This cross-sectional study was carried out in the Department of Physiology, Sir Salimullah Medical College (SSMC) between July' 2015 to June' 2016. In this study, 80 newly diagnosed hypothyroid female patients with symptom of peripheral neuropathy, age ranged from 20-45 years was selected. All the study subjects were selected from out patients department of SSMC and BSMMU. They were belonged to middle socioeconomic status. Subjects with hypertension, diabetic Mellitus, heart disease, kidney disease, hyperthyroidism, past history of neuropathy or neuromuscular diseases, use of drugs known to cause neuropathy or myopathy, malignancy or other serious diseases, pregnancy or lactation, history of gastric or ileal resection were excluded from the study. Their serum TSH, FT_4, FT_3 levels were estimated for assessment of thyroid function status by ELISA method. Vitamin B_{12} level was also estimated to observe its level by using standard method. The ethical permission was taken from the authority.

Results

In this study, 80 newly diagnosed hypothyroid female were evaluated, age ranges from 20-45 years, among them 34(42.5%) had vitamin B12 deficiency (Figure: 01). Symptoms of numbness, paraesthesia were seen more commonly in B_{12} deficiency patients compared to B_{12} sufficient patients. The frequency of the commonly recognized symptom associated with vitamin B_{12} deficiency among our hypothyroid patients is noted in table-I.

Figure-I:

Table-I: Frequency of symptoms in hypothyroid patients with low & normal B_{12} level

Symptom	Total No.	vitaminB_{12} <200pg/ml	vitaminB_{12} >200pg/ml
Weakness	61/80	35 (43.75%)	26 (32.5%)
Numbness	22/80	14 (17.5%)	8 (10%)
Loss of vibration	11/80	8 (10%)	3 (3.7%)
Muscle weakness	33/80	21 (26.25%)	12 (15%)
Delayed tendon reflex	21/80	15 (18.75%)	6 (7.5%)
Decreased sensitivity	16/80	11 (13.75%)	5 (6.25%)

Discussion

Vitamin B_{12} is known as cobalamin, was first isolated in 1948 & soon after found to be effective in treatment of pernicious anemia.[10] Prevalence of vitamin B_{12} has been reported up to 15-25% in certain population groups particularly in elderly.[11] We have studied prevalence of vitamin B_{12} in hypothyroid patients & found 34 out of 80 patients (42.5%) have low B_{12} level.

Vitamin B_{12} deficiency may occur as a result of autoimmune pernicious anemia, malabsorption, malnutrition or use of drugs including proton pump inhibitors, H_2 receptor antagonists or metformin.[12] Metformin may cause malabsorption secondary to its effects on ileal mucosa or membrane receptors.[13] Ptoton pump inhibitors & H_2 receptor antagonists causes gastric hypoclorhydria and malabsorption of vitamin B_{12}. Untreated helicobactor pylori infection is occationally associated with B_{12} deficiency.[14] In our study we found no association between use of drugs and B_{12} deficiency but we found frequent occurrence of B_{12} deficiency in hypothyroid patients, it was not possible to determine the underlying etiology of this association.

Clinical signs of vitamin B_{12} deficiency may take long to manifest & often affected patients as asymptomatic for several years. Occasionally, hematological or neuropsychiatric manifestations may presents as a early marker of deficiency but non specific complaints are attributed to aging.[15] The neuropsychiatric features include fatigue, weakness, numbness, loss of vibration, delayed tendon reflex, loss of memory, demensia and depression.[16] Hypothyroid & vitamin B_{12} deficient patients often have common symptoms of weakness, lethargy, memory impairment, numbness and tingling.[17] We have noticed that several patients, despite being on adequate thyroxine replacement, had persistence of symptoms and subsequently we found to be B_{12} deficient.

Our study showed vitamin B_{12} deficiency to be common in the hypothyroid female patients. Screening for B_{12} deficiency should be undertaken early in the diagnosis of hypothyroidism and periodically therefore. Patients should be followed and evaluated for suggestive symptoms.

Conclusion

From the result of the study, it can be concluded that, peripheral neuropathy along with deficiency of vitamin B_{12} was observed in newly diagnosed hypothyroid female before starting their treatment.

Acknowledgement

Authors of this study acknowledge the huge support from Neurology departments of BSMMU for conducing nerve conduction study. The authors are also thankful to the study subjects for their active and enthusiastic participation.

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