

EFFECT OF THYROXINE ON LDL AND TOTAL CHOLESTEROL IN HYPOTHYROID PATIENTS

Nimmy. N. John*, MP. Narmadha and KM. Binu

¹Nimmy N. John, Department of Pharmacy Practice, N.E.T Pharmacy College, Raichur, Karnataka, India.

²Narmadha M.P., Department of Pharmacy Practice, Swamy Vivekanandha College of pharmacy, Tiruchengode, Erode, India.

³Binu K.M, Department of Pharmacy Practice, N.E.T Pharmacy College, Raichur, Karnataka, India.

ABSTRACT

The study was carried out to assess the effect of I- thyroxine on low density lipoprotein(LDL), high density cholesterol(HDL) and total cholesterol(TC) in hypothyroid patients. 50 patients who were newly diagnosed with hypothyroidism and on treatment with thyroxine was taken for the study. Patient's demographic details, family history, symptoms experienced and laboratory investigation of TSH (Thyroid stimulating hormone), T3 (Triiodothyroxine), T4(Tetraiodothyronine) levels were collected and this were analysed by descriptive statistics methods. The study reveals that in case of hypothyroidism patients having age group below 45 years an increase in weight and increase in cholesterol level is observed. It is also observed that lower limits of TSH during the course of treatment and improvement in T3 and T4 levels in hypothyroid patients of the same age group. This detailed study of the investigations indicate that the normal level of TSH,T3,T4 and cholesterol level at the end of 3rd month and hence it can be concluded that the regular treatment with I- thyroxine for a period of 1 year may help to attain the normal levels.

Key words: Hypothyroism, Thyroxine, Triiodothyroxine, Tetraiodothyronine

INTRODUCTION

The survey of case study reveals that thyroid disorders are amongst the most common endocrine disorders in India. The prevalence and pattern of Thyroid disorders depends on sex, age, ethnic and geographical factors and especially on iodine intake. Iodine deficiency is a condition which is the preventable cause of mental retardation. It can lead to stillbirths, congenital anomalies and psychomotor defects. Iodine deficiency generally results due to challenges of poverty and other communicable diseases. The seriousness of

thyroid disorders should not be underestimated as thyroid storm and myxedema coma can lead to death in a significant number of cases.

Hypothyroidism can contribute to morbidity from osteoporosis, Hyperlipidemia, Hypercholesterolemia, Cardiovascular and neuropsychiatry disease in the population. Prevalence is more common in females. Insufficient and conflicting data were available regarding the efficacy of thyroxine in reducing cholesterol level of hypothyroidism. Hence, this study was carried out to assess the

effect of levo thyroxine on LDL and total cholesterol.

MATERIAL AND METHODS

The protocol was accepted by Institutional Ethics Committee. It was *prospective study* conducted at a tertiary care hospital in Calicut, Kerala from July 2009 to December 2009. Fifty female patients of above 18 year old were included in the study (Pre and Post menopausal), where as patients who have undergone radio active ablation and thyroidectomy were excluded from the study. Patients underwent the tests for thyroid hormone and Lipid profile. Blood samples were collected and thyroid tests like TSH, T3, T4 were performed by the method of chemiluminescence enzyme immunoassay. For checking the Lipid profile, blood samples were collected and tests like LDL, HDL, TC is performed by Autoanalyser. Thyroid tests and Lipid profile values were noted down at the time of diagnosis and during the course of treatment. In hypothyroidism patients, mean TSH value was 16.14m IU/ml before commencing treatment and it has reduced to 10.84m IU/ml and in 3 months to 5.89mIU/ml. Significant increase in mean T3 value and T4 value were observed with 6 months of treatment.

Thyroxine has significant effect in reducing cholesterol level. In our present study, out of 50 patients 19 patients (36.6%) experienced a reduction of 5mg/dl of total cholesterol in duration of 2 months and LDL-C of 12mg/dl reduction with three months.

RESULTS

Prevalence of hypothyroidism is more in the age group of 35-55 years. In her studies, Rebecca found out the highest number of hypothyroid patients were in the age group 40-49 years and hyperthyroid patients in the age group 40-60 years². In our study to the prevalence is found to be 60% in patients of 35-45 years.

Thyroid tests like TSH, T3, T4 were checked before initiating the treatment. The effect of Thyroxine on cholesterol level is assessed by performing lipid profile-LDL, HDL, TC and during follow up. TSH test is the most sensitive test for detecting the hypothyroid

state because the hypothalamic-Pituitary axis compensates very quickly for even slight decreases in circulating free hormone T3, T4 by releasing more TSH. TSH level is elevated in hypothyroidism and decreased in hyperthyroidism⁴ (table 2). Before the initiation of treatment mean TSH of patients was 16.14m IU/ml. After one month of treatment it has reduced to 10.84m IU/ml and in 3 months mean TSH reduced to 5.89mIU/ml. Saara³ reported an improvement of 50% of result in six months of treatment.

Serum T3 provides direct reflection of thyroid function indicating hormone availability to tissues. In hypothyroidism patients, mean T3 value before commencing treatment was 53.24ng/ml. But in duration of one month, T3 has increased to 67.2 ng/ml. And in three months mean value has come to 79.19ng/ml. A 25% result is obtained within 3 months of treatment.

Serum T4 level gives a direct image of any abnormality in thyroid gland. low T4 value is the indication of hypothyroidism and high T4 value indicates hyperthyroidism of 6 months. In hypothyroidism patients, mean T4 value before commencing treatment was 1.58ng/ml. But in a duration of one month, T4 has increased to 2.87 ng/ml. And in the duration of three months mean value has come to 4.26ng/ml. Since it's a long term treatment, achieving the normal range with in duration of 3 months is not possible. But considerable increment is observed in the hormone level.

CONCLUSION

In India, iodine deficiency disorders accounts 27 per 1000. Iodine deficiency or hypothyroidism can lead to mental retardation, still births, congenital anomalies, hypercholesterolemia and neuropsychiatry disease in the population⁵. Earlier study shows the effect of thyroxine in reducing the cholesterol level. In our study too we have evaluated the effect of Thyroxine in maintaining normal range of thyroid hormone and reducing cholesterol level in hypothyroidism patients.

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Table 1: Age distribution of Hypothyroid patients

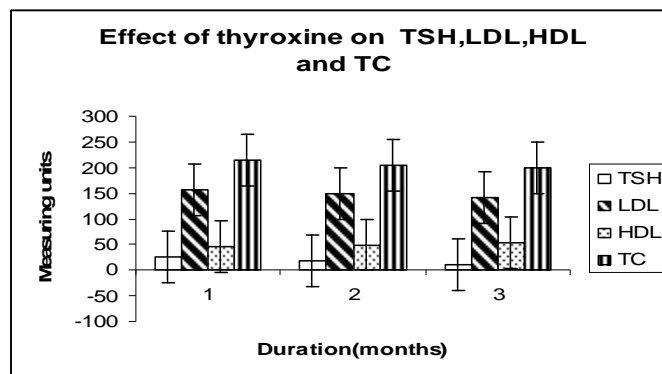
Age	Number of hypothyroid patients	percentage
≤45 years	30	60%
>45 years	17	40%

Table 2: Impact of levo thyroxine on Thyroid hormones (TSH, T3 and T4)

	TSH mean ±SD (SEM) (m IU/ml)	T3 mean ±SD (SEM) (ng/d L)	T4 mean ±SD (SEM) (ng/d L)
Before treatment	25.59±23.937(4.370)	49.776±15.665 (2.860)	1.583±0.7971(0.7971)
After 1 month of treatment	17.9±18.722(3.418)	64.163±12.639 (2.308)	2.876±0.6786(0.1239)
After 3 months of treatment	10.77±15.236(2.782)	77.47±7.447 (1.360)	4.26±0.6800 (0.1242)

Table 3: Effect of thyroxine on LDL, HDL and TC

	LDL mean ±SD (SEM) (mg/ d L)	HDL mean ±SD (SEM) (mg/ d L)	TC mean ±SD (SEM) (mg/ d L)
Before taking thyroxine	156.7±18.418 (3.363)	46.6±6.495 (1.186)	213.8±24.093 (4.399)
After 1 month	148.6±20.491 (3.741)	49.63±6.764 (1.235)	204.833±23.211 (4.238)
After 3 month	141.63±24.077 (4.396)	54.23±8.106 (1.480)	198.666±21.413 (3.909)

**Graph. 1: Effect of thyroxine on LDL, HDL and TC****REFERENCES**

1. Saravanan P, Chau WF, Roberts N and Gutierrez GH. Patients well being on adequate closing of thyroxine clin endocrinology. 2002;14:580-585.
2. Rebecca Abraham, Srinivasa V and Murugan P. Pukazhventhan thyroid disorders in women of puducherry. Indian journal of clinical bio chemistry. 2009;24(1):52-59.
3. Saara Metso, Pia Jaatinen and Huhtala H. Long term follows up study of radio iodine treatment of hyperthyroidism. Clinical endocrinology. 2008;61(5):641-648.
4. Amar K Chandra. Iodine nutritional status of school children in a rural area of Howrah district in west Bengal. Indian J Physiol Pharmacol. 2004;48(2):219-24.
5. Prema S. Biochemical hypothyroidism secondary to iodine

- deficiency Journal of nutrition. 1999;67(6):38-49.
6. Vander Pump MP and Turnbridge WM. Incidence of thyroid disorders in the community whikham survey. Clin endocrinol. 1995;43(1):55-68.
 7. Bunevicicus R, nazanaviuous G and Zatinke vicious R. Effects of thyroxine as compared with thyroxine plus tryiodothyroxine in patients with hypothyroidism N eng J Med. 1990; 340:424-429.
 8. Franklyn JA, Masonneuve P and Antonelli. Mortality after the treatment of hyperthyroidism with radioactive iodine. The new England journal of medicine. 338:712-718.
 9. Saara Metso, Pia Jaatinen and Huhtala H. Long term follows up study of radio iodine treatment of hyperthyroidism. Clinical endocrinology. 61(5):641-648
 10. Weetman AP, Ratana chaiyavong S and John R. Prediction of outcome in grave's disease after carbimazole treatment QJM. 59:409-19.
 11. Amar K Chandra. Iodine nutritional staus of school children in a rural area of Howrah district in west Bengal. Indian J Physcol Pharmacol. 2004;48(2):219-24.
 12. Vander Pump MP and Turnbridge WM. Incidence of thyroid disorders in the community whikham survey. Clin endocrinol. 1995;43(1):55-68.
 13. Fabrizio, Agheini-Lombardi, Lucia. Anton angeli. The spectrum of thyroid disorders in an iodine deficient community: The pescopagamo survey. Clin endocrinology. 1998;42(2) :58-62.
 14. Zein AZ, Haithamy SAI. The epidemiology of iodine deficiency disorders in Yemen. Public health nutrition. 1998;3(2):245-52.
 15. Canaris GJ, Manowitz NR, Mayor G and Ridgway EC. The Colorado Thyroid Disease Prevalence Study. Arch Intern Med. 2000;160:526-34.
 16. Davies MR. John Factors affecting thyroindism in Americans Indian Journal of Medical physiology. 1998;42(2):58-62.
 17. Hitman S and Kelly FC. Prevalence of congenital hypothyroidism. Indian Journal of Endocrinology. 1999;45(4):245-49.