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Evaluation of Thyroid Functions in Surgical Patients

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Abstract

Aim & Objectives: The present study was done to evaluate the thyroid function in surgical patients. The objectives were to correlate with the disease state to outcome and to correlate the functional state with effect of iodination of salt.

Material & Methods: This clinical study included 25 patients who were examined and investigated for the presence of thyroid disorder. The dietary habits of salt intake was also recorded**.**

Results: 92% patients were Euthyroid and 8 % were hypothyroid while none of them were hyperthyroid. Even in this small group the two patients who were found to be hypothyroid were females .Commonest presentation in present study of thyroid is hypothyroidism.In present study 15 out of 25 patients were found to take non iodinized salt in their meals and all of them were clinically as well as biochemically euthyroid. While in rest 10 patients who were using iodinized salt in their meals, 2 of them were found to have clinically as well as biochemically hypothyroid.

Conclusion: Based on the findings we hereby propose that people should be educated to add salt after cooking the food, to gain maximum benefit from salt fortification**.**

Keywords: Thyrotoxicosis, euthyroid, hypothyroid, iodine.

Introduction

The primary function of thyroid gland is the production of sufficient thyroid hormone for appropriate regulation of cellular metabolism throughout the body. Thyroid disorders presents with hypo or Hyper functions of gland or enlargement of gland that may either be diffuse or nodular.[1] These are numerous tests to assess the activity of thyroid gland based on certain physiological and biochemical features of thyroid gland. Beside thyroid disorders thyroid function test are also altered in a number of extra thyroidal disorders as for example genetic disorders and acute illness can cause abnormalities in thyroid hormone binding proteins and various drugs (Phenytoin, Carbamazepins, Salicylates and nonsteroidal anti-inflammatory drugs) can interfere with thyroid hormone binding. Surgical patients are a special group where outcome of surgery also depends on a normal functioning thyroid.[2,3]

Commonest presentations of thyroid disorder is neck swelling, thyroid gland is not palpable normally. The term goiter is used for generalized enlargement of thyroid gland. A discrete swelling with one lobe with no palpable

abnormality elsewhere is termed and isolated (solitary) swelling. Discrete swelling with evidence of abnormality elsewhere, in the gland, is termed dominant. [1,4]

Simple goiter may develop as result of stimulation of the thyroid gland by TSH, either as result of inappropriate secretion from a microadenoma in anterior pituitary or in response to a chronically low level of circulating thyroid hormones. Simple goiter may be diffuse hyperplastic, multinodular or solitary nodule goitre.[5]

Enlarged thyroid may be functionally hyperactive cause rise in plasma T3 and T4 and responsible for symptoms of thyrotoxicosis, toxic manifestation includes neurological, cardiovascular , ophthalmic signs and other systemic manifestation. Enlarged thyroid may cause pressure symptoms like dysphasia, strider hoarseness of voice which are usually associated with malignancy. It is very difficult to detect malignancy clinically in an enlarged thyroid. However, hard quality of gland, rapid growth, pressure symptoms lymphnodes involvement may make one suspicious of the underlying malignancy nature. [2,3,6,7]

Diagnosis and investigations

Early detection of malignant lesion with morphological investigations like ultrasound and FNAC is associated with very god prognosis. A logical sequence is followed to reach the diagnosis. A part from meticulous clinical examination which consist of proper history taking, general and local examination to decide the thyroid status a battery of investigation are employed to confirm the cytological , morphology and functional status of thyroid.[8,9]

A. Test Of Metabolic Consequence Of Thyroid Harmone

Includes Sleeping pulse rate- (Sleeping pulse rate of over 80/ min is suggestive of hyperthyroidism). Basal metabolic rate (Hyperthyroidism patients are hypermetabolic and consume oxygen at greater than normal rate). Raised Serum cholesterol and Serum creatinine levels.[4,5,9,11]

B. Physiological Or Thyroid Function Test

Serum Thyroxin (T_4), Total serum triiodothyronine, Serum thyroid stimulating hormone, Test of hypothalamic pituitary axis (TRH test), T_3 Resin uptake,Free thyroid index (FTI) and Serum protein bound iodine (PBI).[10]

C. Morphological Investigations In Thyroid Swelling

Preoperative includes X- ray chest and X-RAY cervical region, Thyroid scanning , Ultrasonography ,Fine needle aspiration cytology (FNAC) and CT scan. Intraoperative includes Frozen section biopsy. [3,7,8,12]

Materials & Methods

The study shows has been done at GM and Associated Hospital. Chhatrapati Shahuji Maharaj Medical University (Upgraded King George's Medical College) Lucknow, between july 2002 and june 2003. It included all the patients admitted in surgery department of GM and AH irrespective of their thyroid status. Total 30 patients were studied out of which 5 patients were excluded due to improper follow up.

Study were done under following headings:

- History

Usual presentation of thyroid disorders are swelling in neck, symptoms related to hypothyroidism and symptoms related to hyperthyroidism. Usual symptoms of hypothyroidism are Increase in weight in spite of poor appetite, Cold intolerance,Puffiness of face, Lethargy/muscle fatigue , Constipation and Oligomenorrhoea . Symptoms of Primary Thyrotoxicosis are loss of weight Inspite of good appetite, Heat intolerance, excessive sweating , Nervous excitability , irritability, Insomnia ,Tremors of hand, weakness of muscle, Palpitation ,Tachycardia and Exophthalmos. While symptoms of secondary thyrotoxicosis are related with cardio-vascular system- Palpitation, Ectopic beats

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,Cardiac arrhythmia ,Dyspnoea on exertion, Chest pain, pedal oedema. Beside these points on history we also enquired about family history and post history of thyroid disorder in our study group.

- Clinical Examination

Clinical criteria of Wynes (1960) was used to determine functional status of thyroid gland.

- Preoperative Investigation

It included complete haemogram, serum T3, T4 ,TSH and investigations related to specific diseases. It included T3, T4 and TSH, in our study, two patients were found to have hypothyroidism.

Results

In our study 92% patients were Euthyroid and 8 % were hypothyroid while none of them were hyperthyroid. Even in this small group the two patients who were found to be hypothyroid were females this shows that thyroid disorders are more common in females. Out of all 25 patients 5 (20%) were males and 20(80%) were females Youngest patient was 28 years , old female with retrorectal benign teratoma with euthyroid and oldest patient was 62 years old female with carcinoma rectum with hypothyroidism. Commonest presentation in present study of thyroid is hypothyroidism.(Table1)

In present study 15 out of 25 patients were found to take non iodinized salt in their meals and all of them were clinically as well as biochemically euthyroid. While in rest 10 patients who were using iodinized salt in their meales, 2 of them were found to have clinically as well as biochemically hypothyroid.

Iodination of salt

In our study 15 out of 25 patients were found to use noniodinated salt in their meals inspite of that their T3, T4 and TSH values are normal , most of these patients are of slum area , while 10 patients who are using iodinated salt , in 2 of them, clinical as well as biochemical feature of hypothyroidism seen. Though both of these patients are not found to have iodine deficiency goitre. (Table 2)

This shows that fortification of salt with iodine have not caused much impact over thyroid status. Cause of this is the manner of which food is cooked . in a usual way of food cooking in india salt is added very early during cooking and then food is cooked either at high temperature or at high pressure. Iodine evaporated when temperature exceeds 60 ^{0} C and the slat fortification become worthless for that very meal.

Discussion

The name thyroid is derived from the Greek description of a shield shaped gland in the anterior neck (“Thyroid”). Classic anatomic description of thyroid were available in the 16th & 17th centuries, but the function of gland was not well understand. By 19th century pathological enlargement of thyroid or goiter was described. [4,6,8]

Thyroid is a bilobed structure that lies immediately next to thyroid cartilage in a position anterior & lateral to the junction of the larynx and trachea (from the level of thyroid cartilages to the 5th or 6th tracheal ring). Two lobes are joined at the midline by on isthmus to the anterior surface of the trachea, at the level of the 2nd and 3rd tracheal rings. secretary and storage elements. Arterial supply of the thyroid gland is supplied by four main arteries , two superior and two inferior . Three pairs of venous system drain the thyroid. Superior venous drainage is immediately adjacent to superior arteries and joins internal jugular vein & the inferior thyroid veins are into the in nominate and brachiocephalic veins. Within the gland, lymphatic channels occur immediately beneath the capsule and communicate between lobes through the isthmus. This drainage connects to structure immediately adjacent to the thyroid with lymphatic channels into the regional lymph nodes. [10]

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In a study of the influence of different degrees of chronic lymphocytic thyroiditis on thyroid function after surgery for benign, non-toxic goitre. Of 220 patients, surgically treated for benign, non -toxic goitre with unilateral procedures during a six –year period, 201 could be followed up, on average, 8 years postoperatively. Twenty four patients were treated with thyroxine immediately postoperatively {"recurrence prophylaxis "} ; in the other patents thyroxine was only given in cases of hypothyroidism (significant increase of S-TSH). Occurrence of lymphoid infiltration in the removed lobe was subjectively quantified according to a five point scale. Five of the 15 patients with pronounced inflammation developed hypothyroidism whereas 5 of the 137 patients without inflammation had hypothyroidism (p less than 0.05). There was a significant difference in S-TSH postoperatively between patients with no or, only a slight degree of, chronic inflammation , and patients with pronounced inflammation. The study indicates that histologic grading of lymphocytic infiltration in the thyroid gland may be useful for predicting the risk of postoperative hypothyroidism. [11]

In a study of long term follow up after enucleation and resection for autonomously functioning thyroid nodules. The aim of this study was to evaluate the influence of the operative method (i.e std. resection vs enucleation) on postoperative function of the thyroid. Uni-or multifocal thyroid autonomy was resected (group I & III) or selectively enucleated (group II & IV) postoperative function was determined after 6 and 12 months and again after 3-5 years "Selective" treatment shows minor postoperative hypothyroidism, but goitrous, nodular or functional disorders are more often present compared to resection cases (4.4% Vs 12 %). [10,12]

Summary

The overall incidence of thyroid disorders are more in females. The clinical manifestations of disease are the representation of local effect of thyroid mass and functional status of thyroid. The thyroid function tests (T3,T4 & TSH) are useful in assessing functional status of thyroid. Beside thyroid disorder, thyroid function tests are also altered in a number of extra thyroidal disorders for example genetic disorders and acute illness. Drugs (phenytoin, carbamazepine, salicylates and NSAIDs) can interfere with thyroid hormone binding.

Conclusion

Goitrogens i.e. cabbage and kale etc. should be avoided from the meals. As we know that traditional method of cooking make salt fortification worthless so people should be educated to add salt after cooking the food, to gain maximum benefit from salt fortification.

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Legends for tables

Table 1: Thyroid status of study group

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Thyroid status	**Total**	**%**	**Male**	**Female**
Euthyroid	23	92	5	18
Hypothyroid	2	8	0	2
Hyperthyroid	0	0	0	0
Total	25		5	20

Table 2: Comparison between function state with effect of iodination of salt.

Table 2: Comparison between function state with effect of iodination of salt			
Thyroid state	Quality of salt	No of patients	Percentage
Euthyroid	Iodinized	8	32
	Non-iodinized	15	60
Hypothyroid	Iodinized	2	8
	Non-iodinized	-	-

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