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Thyroid Diseases Evaluated by RIA at Shaikh Zayed Hospital, Lahore

Mahmood Chengzee, M. Shahed Omar, Zafar Iqbal
Radioimmunoassay Laboratory, Shaikh Zayed Postgradate Medical Institute, Lahore

SUMMARY

A retrospective analysis of commonly performed thyroid profile for the assessment of patients with suspected thyroid disease were made. The results revealed: a) Of 425 patients, only 35.48% exhibited measurable thyrometabolic disturbances. b) The measurement of total serum thyroxine with the thyrotropic hormone (ultra TSH) were the most useful in vitro tests for assessing thyroid status.

INTRODUCTION

Thyroid, the largest endocrine organ, is first recognizable at about one month of intra-uterine life. The normal thyroid is made up of two lobes joined by a thin band of tissue, the isthmus. The right lobe of the thyroid is normally more vascular than the left which is often larger of the two and tends to enlarge more in disorders associated with a diffuse increase in size. Formation of normal quantities of thyroid hormones ultimately depends upon the availability of adequate quantities of exogneous iodine. In body, iodine is largely confined to extra-cellular fluid. The thyroid gland contains a transport mechanism which provides sufficient iodide substrate for subsequent steps in hormone formation. Iodide transported into the gland either is oxidized and organified or is free to diffuse back into the extra cellular fluid. The activity of the iodide transport mechanism is influenced by a variety of physiological factors, the most important being TSH levels. After entry into the thyroid, iodides undergo a series of reactions which ultimately lead to the synthesis of thyroxine and tri-iodothyronine.

Diseases of the thyroid gland usually manifest themselves through symptoms resulting from excessive or insufficient quantities of thyroid hormones. Diseases may also present with local symptoms in the neck i.e., pain, pressure, and/or compression of adjacent structures especially trachea by the goiter. Although the physician's attention is drawn towards clinical evidence, estimation of both anatomical and functional states of thyroid gland is important to reach a diagnosis. Nuclear medicine has played a key role in assessing the anatomical and functional state of the thyroid. The thyroid scan with TcO^-_4 and I^- (Na I-131) gives a clear picture of thyroid anatomy. The thyroid scan is more sensitive in assessing anatomical abnormalities than the thyroid functions. The I-131 thyroid uptake and serum levels of thyroid hormones help in achieving the definite diagnosis.

Thyrometabolic disorders like hyperthyroidism (and its subtypes) or hypothyroidism (and its subtypes) with their shades of intensity can be detected through these techniques[1,2]. In sub-clinical disease states, definitive diagnosis is difficult[3] and much criticism has been levied concerning the usefulness of individual or combinations of the lab tests. Guidelines to achieve valid conclusions[4] have been proposed.

The main purpose of this study was to look into the pattern of major types of thyroid diseases in the patient population attending the Shaikh Zayed Hospital (Lahore) and to analyse the usefulness of the lab tests. The present study is an assessment of current patterns of thyroid diseases in Shaikh Zayed Hospital, Lahore and an evaluation of available laboratory tests used to confirm or refute a clinical diagnosis of disturbed function.

MATERIAL AND METHODS

Equipment

1. Packard Gamma Counter (Minaxi gamma-Autogamma 5000 series, Model 5550)

2. Refrigerated centrifuge CRU-5000 Damon/IEC Division, England
3. Deep freezer (Presto, Pakistan)
4. Refrigerator (Meco, Pakistan)
5. Assay tubes (coat-a-count, size 12mm x 75 mm of polypropylene) from Diagnostic Product Corporation. Los Angeles, CA
6. Micropipetts (Socorex, Switzerland)
7. Decantation rack (Serono, Switzerland)
8. Automatic pipetter (Oxford, England)

A total of 425 consecutive new patients (July 1989 to June 1990) were referred to our RIA Lab. at Shaikh Zayed Postgraduate Medical Institute's Hospital, Lahore with suspected thyroid disease. Blood samples were drawn during the day time and immediately centrifuged at 20°C. Serum thus separated, was stored at 20°C until assayed. Samples were tested for Total T_3, Total T_4 and ultra TSH by using kits of coat-a-count from Diagnostic Production Corporation of Los Angles (California, USA).

RESULTS

Of the total 425 patients, 187 patients were euthyroid, 157 hyperthyroid and 81 were hypothyroid as per lab criteria.

Euthyroid

One hundred and eight seven patients were biochemically euthyroid duly confirmed by RIA methodologies with no significant recurrent illness and not taking any medication known to interfere with metabolism or plasma binding of thyroid hormone.

Thyrotoxicosis (Hyperthyroidism)

These one hundred and fifty seven confirmed patients were derived from a previously detailed investigation coming to our laboratory for initial thyroid function testing.

Hypothyroidism

These eighty one confirmed patients were clinically hypothyroid and had increased concentration of TSH in serum as measured by RIA methodology.

Table 1 shows the distribution of 425 subjects screened by RIA Lab. and presents the distribution of thyrometabolic disorders of patients. Table 2 presents the overall male to female ratio which was 1:3.0. Out of these 425 subjects, 105 were male (24.70%) and 320 females (75.30%). Table 3 presents the prevalence and distribution of 425 patients of thyrometabolic disorders by age and sex among the male and female patients. The overall prevalence of thyrometabolic disorders were tabulated in the tables in more presentable form for each group of age, sex and thyroid status i.e., thyrometabolic diseases.

Table 1: General distribution of male and female patients suffering from thyrometabolic disorders.

	Euthyroid	*Hypothyroid*	*Hyperthyroid*
Male	48	25	32
Female	139	56	125
Total	**187**	**81**	**157**

Table 2 : Male to female ratio at different stages of thyrometabolic disorders.

	Male	*Female*	*Ratio*
Euthyroid	48	139	1 : 2.90
Hypothyroid	25	56	1 : 2.20
Hyperthyroid	32	125	1 : 3.90
	105 (24.70%)	**320 (75.30%)**	**=425**

DISCUSSIONS

From the laboratory point of view, an ideal test of thyroid function is expected to provide some direct measure of thyroid hormone activity at the tissue level and should, therefore, successfully answer a question of some consequence to patient management. However, failure to attain these requirements at present has produced a shift in emphasis toward improving established hormone assays and developing new methodologies including some ingenious scientific and technical manouvers to measure the minute amount of the biologically active "free" thyroid hormone fractions in serum. Under these circumstances, accurate evaluations of

available tests are required in order to select the most reliable laboratory procedures to diagnose thyrometabolic diseases.

Table 3: Mean of thyrometabolic disorders by age, sex and disease.

	Age in years						
	1- 15 yrs		16-45 yrs		46-over		
	No.	%	No.	%	No.	%	Total
Euthyroid							
Male	8	16.70	21	43.70	19	39.60	48
Female	9	6.50	77	55.40	53	38.10	139
Hypo-							
Male	5	20.00	12	48.00	8	32.00	25
Female	4	7.10	36	64.30	16	28.60	56
Hyper							
Male	4	12.50	22	68.80	6	18.70	32
Female	6	4.80	95	76.00	24	19.20	125
	36		**263**		**126**		**425**

In general, our findings confirmed the commonly held belief[10] that the measurement of total T4 in serum still occupies a prominent position for its efficient performance during the initial stage of screening patients with suspected thyroid disease. This view was supported by the fact that the highest co-relation of TSH was observed with serum total T4, obviously an observation of significant pathophysiologic implications. Nevertheless, further evaluation of other well established tests (i.e., T3 and TSH) allowed certain aspects of mildly disturbed function to be more clearly defined.

An ideal test for thyroid functions should give an accurate measure of thyroid hormonal activity. The findings confirmed the experience of others[5] that the measurement of Total T4 in serum is till useful and thus prevalent in screening for suspected thyroid disease as it provides a good estimate. Correlation of TSH with serum Total T4 was most useful. Actual measurement of circulating levels of free thyroid hormones is certainly more accurate than the indirect approach of measuring serum TSH. Recently, more sensitive assays for TSH have been introduced. Though differences in technical performance have been seen, reports have shown a remarkable ability of the test to detect subtle thyroid disease[6,7]. In our study, the pattern of various thyroid diseases in patients referred appears to be similar to that seen in other countries[8-16].

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The Authors:

Mahmood Chengzee,
Senior Research Officer,
Radioimmunoassay Laboratory,
Shaikh Zayed Postgradate Medical Institute,
Lahore.

M. Shahed Omar,
Associate Professor,
Department of Medicine,
Shaikh Zayed Postgradate Medical Institute,
Lahore.

Zafar Iqbal,
Associate Professor,
Department of Medicine,
Shaikh Zayed Postgradate Medical Institute,
Lahore.

Address for Correspondence:

Mahmood Chengzee,
Senior Research Officer,
Radioimmunoassay Laboratory,
Shaikh Zayed Postgradate Medical Institute,
Lahore.