Nigerian Journal of Clinical Practice
June 2002, Vol. 5 (1); 29–31

RELATIONSHIP BETWEEN THYROID HORMONE LEVELS AND HYPERTHYROID SIGNS AND SYMPTOMS

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ABSTRACT

Objective: Assessment of thyrotoxic patients often involves laboratory and clinical evaluation. We have therefore investigated the relationship between the magnitude of hyperthyroid symptoms and thyroid hormone levels in a set of newly diagnosed thyrotoxic patients.

Methods: Fifteen subjects with untreated, newly diagnosed thyrotoxicosis were prospectively studied to investigate the relationship between symptom severity and the degree of hormone elevation. Two standardized symptom rating scales the "Waynes score" (WS) and the "Hyperthyroid symptom score" (HSS) as well as laboratory tests of serum T3, T4 and TSH was employed.

Results: Four (26.6%) subjects were men, while 11 (73.3%) were women. The mean age of subjects was 43.9±13.3 years. 12 (80%) had Graves disease while 3 (20%) had toxic multinodular goiter. All subjects had elevated thyroid hormones and Waynes score but HSS was normal in 6 (40%) patients. WS correlated positively with HSS ($r=0.66$, $p<0.05$). There was no significant correlation between both parameters and thyroid hormone levels.

Conclusion: Our findings show that none of the symptom rating scales for hyperthyroidism was significantly related to thyroid hormone levels. The Waynes score may however be more reliable than the HSS in the initial assessment of suspected thyrotoxicosis.

KEYWORDS: ***Hyperthyroidism, symptoms, thyroid hormones***

INTRODUCTION

The diagnosis of thyrotoxicosis is often hinged on clinical features and confirmed by routine thyroid function tests[1]. As well, the choice of therapy is also frequently based on the clinical severity of the disease and the predicted response to the available treatment modalities[2].

It is however widely observed that variations and discrepancies may occur in the magnitude of clinical features vis-a-vis the serum levels of the thyroid hormones[3,4]. The results of thyroid function tests may be markedly abnormal when the patient is only mildly symptomatic, and sometimes the converse may also obtain.

We have therefore prospectively studied fifteen (15) newly diagnosed thyrotoxic patients with a view to investigating the relationship between symptom severity and the degree of hormone elevation in an attempt to highlight this observation.

METHODS

Consecutive newly diagnosed and previously untreated thyrotoxic patients at the Obafemi Awolowo University Teaching Hospital, Ile-Ife were recruited for the study. All the patients gave informed consent and the hospital's ethical committee approved the study. None of the subjects were on B-blockers or antithyroid medications.

Symptom severity was assessed using two standardized symptom rating scales for hyperthyroidism, the Waynes score (WS)[5], and the Hyperthyroid symptom score (HSS)[6]. Symptoms and signs of hyperthyrodism such as nervousness, diaphoresis, heat intolerance, appetite for food, weight loss, tremors, eye signs, pulse rate, presence of a goiter, overall functional impairment etc were assessed using both scales.. Symptom intensity was then weighted and scored. Scores of + 20 or more is considered diagnostic of hyperthyroidism on both scales. Other standard information about age, sex, body mass index, duration of disease and diagnosis were also assessed. Laboratory determinations of serum T3, T4 and TSH were done in all subjects using enzyme immunoassay technique.

The relationship among the parameters of interest was determined by linear regression analysis. Other results are presented as mean ± SD. Statistical significance was set at $P<0.05$.

RESULTS

Four (26.6%) subjects were males while 11 (73.3%) were females (Table 1). The mean age was 43.9 ±13.3 years, the age range being 25-65 years. 12(80%) of patients had primary thyrotoxicosis as the cause of their hyperthyroidism while 3 (20%)

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others had toxic multinodular goiter. The body mass index of the subjects ranged between 15.2 kgm^{-2} and 31.6kgm^{-2}, mean 22.3 ± 3.9. Symptoms of hyperthyroidism had been present for a mean of 11.8 ±7.6 months in them. All had laboratory features of hyperthyroidism. Waynes score was elevated in all subjects but only 9 had high HSS scores. The overall false negative rate for the HSS was 40%.

Table 1: **Clinical Characteristics of Patients Studied (n=15)**

Parameter	Mean ± SD	Range
Age (Years)	43.9 ± 13.3	25 – 65
Sex (Male/Female)	4/11	
Body Mass Index (Kg/M^2)	22.3 ± 3.9	15.2 ± 31.6
Diagnosis		
Graves Disease	12 (80%)	
Toxic Multinodular Goiter	3 (20%)	
Disease Duration (months)	11.8 ± 7.6	3 – 24
Waynes Score	32.9 ± 6.4	21 – 44
HSS Score	20.9 ±3.4	16 – 26
T3 (nnom/L)	4.2 ± 2.3	1.3 – 8.8
T4 (nnom/L)	215.8 ± 87.1	76 – 386
TSH (miu/L)	0.57 ± 0.34	0.15 – 1.6

Table 2: **Correlation Matrix showing relationship between parameters**

	AGE	BMI	DIS.DU	WS	HSS	T3	T4
AGE	1						
BMI	0.35	1					
DIS.DU	-0.32	0.17	1				
WS	-0.25	-0.04	0.38	1			
HSS	-0.04	-0.55	0.47	O.66*	1		
T3	-0.05	-0.07	-0.23	0.04	-0.32	1	
T4	-0.06	-0.01	-0.01	-0.02	-0.33	0.8*	1

*p < 0.05

Waynes score correlated positively with the HSS (r=0.66, P<0.05), (Table 2). There was however no statistically significant correlation between either of the scaling indexes (WS and HSS) and either of the thyroid hormones. Each of WS and HSS showed negative correlation with body mass index (r= -0.4 and -0.55 respectively) but none reached statistical significance.

DISCUSSION

Our findings showed that none of the symptom rating scales for hyperthyroidism could predict the serum levels of thyroid hormones. While the Waynes score correctly diagnosed hyperthyroidism in all subjects, the HSS was falsely negative in 6 subjects.

While our findings are consistent with those of earlier reports, we have similarly demonstrated a lack of correlation between symptom severity and hormone levels. It has been suggested that the inability of the hormone levels to predict the degree of symptom severity is due to individual variations in the sensitivity of the thyroid hormone receptors to thyroid hormones. In turn, the receptors are influenced by the degree of expression of the genes coding for the different intranuclear thyroid hormone receptors[7]. Evidence also exists to show that some of the peripheral endocrine and central nervous system thyrotoxic symptoms may be related to changes in catecholamines induced by elevated thyroid hormone levels[8].

The importance of clinical assessment as the basis for the diagnosis of thyroid dysfunction has been emphasized by different workers[4-6,9-11]. In a review of 100 consecutive Nigerian patients with goiters, Ibrahim et al[4], found a 100% correlation between clinical diagnosis (using the Waynes score)[5], and laboratory diagnosis in their male subjects and in all patients above the age of 35 years. That study also showed that there was no statistically significant difference between the clinical diagnosis of thyroid function and diagnosis based on radioimmunoassay results when all patients were considered ($p<0.05$). Olurin[11], had also previously presented a similar observation.

Although the Waynes score proved to be more reliable than the HSS in the initial diagnosis is hyperthyroidism in this study, the HSS is easier to administer and it is has been shown to have high degree of interrater reliability[6]. It is to be noted that the HSS in contrast to the Waynes score, was not primarily devised to diagnose thyrotoxicosis but to assess clinical status and response in patients on therapy. This may in part explain these findings.

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