

A Cross Section Study of Role of Serum TSH as A Biochemical Predictor of Malignancy in Suspicious Thyroid Swelling In the Tertiary Centre of Jharkhand

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Abstract:-Thyroid malignancies account for almost 90% of all the endocrine malignancies. The treatment strategy for these malignancies has undergone a tremendous change over the past few decades with the advent of multidisciplinary approach for early diagnosis and management. The incidence of thyroid malignancies has increased over the past three decades, however of the many patients who present with thyroid swelling only 5-6% of them are malignant. Hence detecting malignancy early in these patients and adequate surgical clearance will provide them with increased survival rates. A cross sectional study was conducted on 50 patients in the Department of General Surgery, Rajendra Institute of Medical Sciences, Ranchi with thyroid swellings clinically suspicious of malignancy between April 2014 to September 2016. Role of serum TSH as a biochemical predictor of malignancy in suspicious thyroid swellings were assessed. In our study we evaluated the utility of preoperative serum TSH levels as a predictor of malignancy and it did show a statistically significant correlation ($p < 0.01$) between higher TSH levels and malignant nodules.

Keyword:-Thyroid malignancy, Thyroid stimulating hormone, Thyroid nodule

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I. Introduction

Thyroid malignancies account for almost 90% of all the endocrine malignancies. The treatment strategy for these malignancies has undergone a tremendous change over the past few decades with the advent of multidisciplinary approach for early diagnosis and management. The incidence of thyroid malignancies has increased over the past three decades, however of the many patients who present with thyroid swelling only 5-6% of them are malignant^[6,7]. Hence detecting malignancy early in these patients and adequate surgical clearance will provide them with increased survival rates. There are many methods for detection of malignancy in a thyroid nodule. As in any case a thorough clinical examination is the first step for the assessment of a thyroid swelling, clinical features of a malignant swelling can be identified. Thyroid function tests has to be done for all cases followed by 'fine needle aspiration cytology' (FNAC) which is the present gold standard and primary tool for the detection of thyroid malignancy^[1]. Other tests like ultrasonography, thyroid scintigraphy, CT scan and MRI can also be of use. Recent studies have found serum TSH to be an independent predictor of thyroid malignancy^[2,3,4]. In this study we investigated the role of this biochemical marker in the prediction of thyroid malignancy along with a clinical study of thyroid malignancies.

II. Aims and objective

1. To evaluate the role of serum TSH as a biochemical predictor of malignancy in suspicious thyroid swellings.
2. To study the clinical presentation and pathology of thyroid malignancies.

III. Material and Method

This cross sectional study included 50 patients who were admitted and treated in the Department of General Surgery, Rajendra Institute of Medical Sciences, Ranchi with thyroid swellings clinically suspicious of malignancy between April 2014 to September 2016. After taking written consent from patients and prior clearance was obtained from institutional ethics committee.

Inclusion criteria:

1. Patients with thyroid swelling
2. Thyroid profile especially serum TSH measured before any medical intervention
3. All patients must be euthyroid

Exclusion criteria:

1. Patients who were not in euthyroid state
2. Patients who were not willing/ unfit for surgery

Methodology:

A detailed history and clinical examination was done followed by routine preoperative investigations. All patients underwent thyroid function tests and FNAC. Preoperative indirect laryngoscopy was done for all. Clinical diagnosis, FNAC report, serum TSH and the final HPE report were correlated.

IV. Results

Table 1: Gender wise distribution of patients

Gender	Number of patients	%
Male	8	16
Female	42	84
Total	50	100

Total no. of patients studied= 50 Female: male= 5:1 Total no. of patients with malignancy= 17 Female: male= 3:1

Table 2: Age wise distribution of the patients

Age in years	No. of patients	%
<20	1	2
21-30	10	20
31-40	9	18
41-50	16	32
51-60	9	18
>60	5	10
Total	50	100

Mean± SD=44.62±15.12 Patient ages ranged from 17 years to 85 years with 32% presenting in the 4th decade. Mean age was 44.62± 15.12. Mean age of malignancy: 40 years

Table 3: Duration of the disease

Duration	No. of patients	%
<1 year	3	3
1-2 years	17	34
2-5 years	14	28
>5 years	16	32
Total	50	100

Majority of patients had a rapidly growing thyroid tumour of duration 1-2 years whereas many had symptoms for more than 5 years as well.

Table 4: Symptoms of the patients

Symptoms	No. of patients	%
Swelling	45	90
Pain	2	4
Dyspnoea	1	2
Dysphagia	1	2
Dysphonia	1	2

90% of the patients presented with a thyroid swelling, of which 25 patients presented as solitary nodule of thyroid and 20 with multi nodular goitre. 5 patients presented with primary complaints other than swelling, with pain and discomfort in the neck as the next common complaint. Only 3 patients presented with compressive symptoms.

Table 5: FNAC results of the patients studied

FNAC	No. of patients	%
Colloid goitre	36	72
Papillary carcinoma	12	24
Follicular neoplasm	2	4
Total	50	100

The commonest malignancy picked up by FNAC was papillary carcinoma, with 12 cases. Two cases of follicular neoplasm was reported which turned out to be follicular carcinoma in the final HPE. There were 3 false negative results for malignancy.

Table 6: Histopathology of the patients studied

Histopathology	No. of patients (n=50)	%
CG	33	66
PCA	15	30
FCA	2	4

66% of the cases were benign and 34% was found to be malignant. Papillary carcinoma was the most common variant of malignancy.

Table 7: TSH level of the patients studied

TSH level mU/L	No. of patients	%
0.40-1.39	16	32
1.40-4.99	30	60
>5.0	4	8
Total	50	100

Mean ± SD= 2.39±1.42 Mu/L .All patients were euthyroid.

Table 8: Comparison of TSH values between histopathologically confirmed benign and malignant disease.

TSH	Benign lesions	Malignant lesions
Min-max	0.43-4.42	1.72-5.28
Mean±SD	1.80±1.03	3.71±1.22
95% CI	1.36-2.24	3.00-4.42

p value- t=5.124; p<0.001 .The mean TSH value was higher in histopathologically confirmed carcinoma of thyroid (3.71±1.22 mU/L) when compared with those with benign disease (1.80±1.03 mU/L).

Table 9: Incidence of malignancy according to TSH values

TSH values	No. of patients	No. of patients with malignancy	%
0.40-1.39	16	0	0
1.40-4.99	30	14	46.6
>5.0	4	3	75

Inference- higher TSH values are associated with significantly higher incidence of malignancy.

V. Discussion

TSH is a known thyroid growth factor and well differentiated thyroid cancers express TSH receptors^[8,9] and many studies have shown a definite relationship between preoperative serum TSH levels and malignancy. Furthermore, TSH levels are higher in patients with more aggressive tumours. Although oncogenes and other factors are involved in the pathogenesis of thyroid malignancy^[10,11], since well differentiated thyroid cancers have TSH receptors it seems probable that TSH can act as a cancer stimulus. This hypothesis is supported by the improved survival rates seen in patients on levothyroxine suppressive therapy^[12] and by cases of tumour growth post T4 withdrawal or recombinant TSH administration^[13]. Some studies have shown higher TSH levels associated with advanced stages of thyroid cancer. An increased incidence of thyroid cancer is seen in patients with antibody evidence of hashimoto’s thyroiditis also supports the role of TSH receptor in the pathogenesis of thyroid malignancies. This study had 8 male patients and 42 female patients. Of these, 17 patients (13 females and 4 males) turned out to have malignancy. This distribution is comparable to other studies.

Table 10: comparison of gender distribution of malignant cases

Our study	Jemal et al ^[14]	Dorairajan et al ^[15]	Chennai Cancer Institute	p value
3:1	3:1	3.5:1	3.2:1	p<0.001

The age distribution of the study ranged from 19 years to 85 years. The mean age for thyroid malignancy was 40 years which is comparable to other studies^[3,15,16]. Mean age in males was 59 years and for females it was 38.

Table 11: comparison of mean age of malignancy

Our study	Chennai Cancer Institute ^[15]	Fiore et al ^[18]	Haymart et al ^[3]
40	40	45	46

The most common presenting symptom is a thyroid swelling. Majority presented with a solitary nodule of thyroid. Others presented with a dominant nodule in a multinodular goitre. The next common complaint was pain and discomfort in the neck (8%). 17% of the patients had compressive symptoms in the form of dyspnea, dysphonia and dysphagia. Incidence of malignancy in a solitary nodule of thyroid was higher (36%) than the incidence of malignancy in multinodular goitre (19%). In this study all were well differentiated carcinomas with papillary carcinoma (88%) being the commonest followed by follicular carcinoma (12%).

Table 12: Comparison of histopathological type of malignancy

	Papillary carcinoma	Follicular
Our study	88%	12%
Haymart et al ^[3]	87%	7%
Bailey & love ^[1]	60%	20%
Devita et al ^[5]	80-85%	10%
Mazzaferrri et al ^[17]	70-80%	10%

In this study the mean preoperative TSH value was: 2.39±1.42 mU/L. All patients were euthyroid. The mean TSH value was significantly higher in malignancy than in benign disease i.e. 3.71±1.22 mU/L vs. 1.80±1.03 mU/L. This is comparable to the results of Haymart et al^[3], Fiore et al^[18] and Jonklaas et al^[12]. On analysis of the preoperative TSH values it was observed that TSH level was an independent predictor of malignancy. Patients with values of 0.40-1.39 mU/L had 0% chance of malignancy. Those with range of 1.40-4.99 mU/L had 36.7% chance of malignancy whereas those with TSH levels >5mU/L had 75% chance of malignancy.

VI. Conclusion

Thyroid malignancies have a varied clinical presentation. The commonest presentation being that of a solitary thyroid nodule. Though there are many predictors of thyroid malignancy, none of them can conclusively predict the nature of a thyroid nodule. In our study we evaluated the utility of preoperative serum TSH levels as a predictor of malignancy and it did show a statistically significant correlation ($p < 0.01$) between higher TSH levels and malignant nodules.

However, as all patients with a thyroid swelling undergo a thyroid function test it is important to pay special attention to the TSH values. TSH levels could be used as predictor in clinically suspect malignant thyroid swelling with a benign FNAC report. In such cases where TSH value is high, the FNAC can be relooked to confirm the diagnosis.

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