

## The Utility of Pre operative Serum Thyroid Stimulating Hormone Level For Predicting Malignancy in Nodular Thyroid Disease And Their Clinical Study

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**Abstract:** Many patients present to the surgical department with a thyroid nodule. However not all require surgery and only 5-6% of these are malignant. There are many methods to diagnose and predict malignancy in a thyroid nodule. This study throws light on the usefulness of TSH (thyroid stimulating hormone) estimation and its role in predicting malignancy. This is a prospective study involving 100 patients admitted to our hospital with thyroid swellings suspicious of malignancy. The objective was to evaluate the utility of serum TSH (thyroid stimulating hormone) estimation as a biochemical predictor of malignancy in suspicious thyroid nodules and to study the clinical presentation of thyroid malignancies. The mean preoperative TSH value was  $2.39 \pm 1.42$  mU/L. Mean TSH value in malignancy was higher ( $3.71 \pm 1.22$  mU/L) compared to those with benign disease ( $1.80 \pm 1.03$  mU/L). Incidence of malignancy increased with higher TSH values. We concluded in our study the utility of pre-operative serum TSH level as a predictor of malignancy and it showed statistically significant ( $p < 0.01$ ) between higher TSH levels and malignant nodules. TSH levels could be used as predictor in clinically suspect malignant thyroid swelling with a benign FNAC (fine needle aspiration cytology) report. In such cases where TSH value is high, the FNAC (fine needle aspiration cytology) can be relocked to confirm the diagnosis.

**Keywords:** Thyroid stimulating hormone fine needle aspiration cytology, histopathology, thyroid malignancies, papillary follicular malignancies.

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### I. Introduction

Thyroid diseases have always been an enigma. The management of thyroid diseases has undergone a tremendous change over the ages, from the crude surgeries of the ancient times to the multidisciplinary approach of the modern era. However in the present scenario surgery still plays an important role especially in the management of thyroid malignancies. Thyroid malignancies account for 90% of endocrinal malignancies. The incidence of thyroid malignancies has increased three fold over the past 3 decades. Many patients present to the surgical outpatient department with a thyroid nodule. However not all these patients require surgery as only 5-6% of these are malignant [11,12]. There are many methods to diagnose and predict malignancy in a thyroid nodule. A clinical examination is always the first step to assess a nodule. A thyroid profile is also essential. This is accompanied by certain tests which increase the rate of detection. Fine needle aspiration cytology (FNAC) is the present gold standard and primary tool for assessing risk of malignancy [1]. Other tests include ultrasonography, thyroid scintigraphy, CT scan (computer tomography) and MRI (magnetic resonance imaging). Recent studies have found levels of serum TSH to be an independent predictor of malignancy in thyroid nodules [2,3,5]. This biochemical marker could be used as a screening test for malignancy. In this study we investigated the utility of TSH in predicting malignancy and the common clinical presentation of thyroid malignancies.

### II. Methodology

This is a prospective study conducted at Justice K.S.Hegde Charitable Hospital, Deralakatte, Mangalore, Karnataka, India. It was done after obtaining ethical committee approval from September 2014 to September 2016. A total of 100 patients were included into the study. **Inclusion Criteria** Cases presenting with Thyroid swelling, Age more than 18 years, Cases must be clinically euthyroid, FNAC should be done in all cases. **Exclusion Criteria** Those cases not in euthyroid state, Patients not willing for FNAC and surgery, Patients in whom TSH levels obtained while on thyroid hormone therapy. Thyroid lymphomas, thyroiditis, Graves disease, Patient with a final pathological diagnosis of medullary thyroid carcinoma. **METHOD** A proforma is designed for the study. Data will be collected by personal interview or hospital records. Thyroid swelling examination will be done. From these patients preoperative TSH levels will be measured. TSH will be compared with the histopathological report after thyroid surgery and their management follow up will be done.

My Study	Chennai Cancer Institute <sup>[17]</sup>	Fiore Et Al <sup>[19]</sup>	Haymart Et Al <sup>[3]</sup>
41	40	45	46

### III. Results

This is a prospective study involving 100 patients admitted to our hospital with thyroid swellings suspicious of malignancy. The objective was to evaluate the utility of serum TSH estimation as a biochemical predictor of malignancy in suspicious thyroid nodules and to study the clinical presentation of thyroid malignancies. The observations of this study can be summarized as follows

Most patients were females with mean age of 44.2±15.3 years. Mean age of malignancy was 40 years with a higher mean age in males, as compared to females. Commonest presentation was a rapidly growing thyroid swelling of short duration. In some cases there was history of a longstanding goiter with sudden development of secondary symptoms such as pain and compressive symptoms. Majority of patients presented with a SNG (solitary nodular goiter). The incidence of malignancy was higher in SNG (solitary nodular goiter) (35%) compared to MNG (multinodular goiter) (33.33%). 4 patients presented with primary complaints other than a neck swelling. 2 patients (4%) presented with cystic swelling of neck which turned out to be cervical lymph node metastasis. The incidence of neck nodes was 15% and distant metastasis was 1%. 20% of patients had FNAC positive for malignancy with 2% doubtful results. Papillary carcinoma was the most common histopathological type. The mean preoperative TSH value was 2.39±1.42 mU/L. Mean TSH value in malignancy was higher (3.71±1.22mU/L) compared to those with benign disease (1.80±1.03mU/L). Incidence of malignancy increased with higher TSH values.

### IV. Discussion

In this study we had a total of 100 patients who presented with clinical features suspicious of thyroid malignancy. The main objective was to evaluate the role of TSH as a biochemical predictor of malignancy. Only patients that were euthyroid were included. A descriptive analysis of the clinical presentation and management was done. The observations and results were subjected to statistical analysis and compared with other studies.

#### Gender Distribution

84 female patients and 16 male patients were included in the study. 34 out of 100 patients had proven malignancy.

#### Sex Distribution Of Malignant Cases

My Study	Jemal Et Al <sup>[16]</sup>	Dorairajan Et Al <sup>[17]</sup>	Chennai Cancer Et Al	P Value
3:1	3:1	3.5:1	3.2:1	< 0.001

- Thyroid disease are more common in females and also thyroid carcinoma more in female sex.

### V. Age Distribution

#### Mean Age Of Malignancy

- 18- 85 years age group included in this study and mean age was 43 +/- 12.12 years.
- Mean age of thyroid malignancy was 41 years.

### VI. Risk Factors

In my study no patient had history of exposure to goitrogens ionizing radiation, high iodine diet nor family history and incidence of cancer more in extremes of age. There was higher incidence of malignant nodules in male patients similar to Haymart, et al<sup>[3]</sup>. Hence, male sex is a risk factor for cancer thyroid<sup>[11,12]</sup>.  
 Comparison Between Incidence Of Malignant And Non Malignant Nodules According To Gender

GENDER	HAYMART ETAL		MY STUDY		
	NO MALIGNANCY N = (602)	MALIGNANCY N = (241)	NO MALIGNANCY N = (66)	MALIGNANCY N= (34)	P VALUE
MALE	99	63	8	8	0.01
FEMALE	503	178	58	26	0.01

### Duration Of Disease

Most patients presented with rapidly growing thyroid swellings of duration of 12years. Some patients had goitre for more than a decade and presented with a recent change in size or appearance of certain new symptoms. A sudden rapid increase in the size of a thyroid swelling or any compressive symptoms such as dyspnea, dysphagia, dysphonia or Horner's syndrome is suggestive of a malignant change.

### Comparison Of Duration Of Disease

STUDY	AVERAGE DURATION OF THYROID SWELLING
MAZZAFERRI ETAL	5 - 10 YEARS
DORAIRAJAN ETAL	3 - 4 YEARS
OUR STUDY	5 - 7 YEARS

### Clinical Features

Swelling is the major complaint in our study most of them presented with multinodular goiter remaining presented with solitary nodule goiter. Few presented with pain and discomfort. In our study cancer rates are higher in SNG (35%) when compared to multinodular goiter(33.3%).

### Lymph Node Metastasis

33 to 61% of patients with papillary carcinoma will have involvement of cervical lymph nodes at the time of diagnosis<sup>[6]</sup>.

### Cervical Lymph Node Involvement

My Study	Mazzaferrri Et Al <sup>[18]</sup>	Dorairajan Et Al <sup>[17]</sup>	Chennai Cancer Institute <sup>[17]</sup>
15%	33-61%	26-50%	59%

- Presence of neck lymph nodes was significant clinical indicator of malignancy.

### VII. Distant Metastasis

The incidence of distant metastasis in this study was 1%. This patient presented with metastasis to proximal part of left humerus and compression fracture of sixth cervical vertebra.

### Comparison Of Incidence Of Distant Metastasis

My Study	Chennai Cancer Institute <sup>[37]</sup>	Dorairajan Et Al <sup>[37]</sup>	Mazzaferrri Et Al <sup>[41]</sup>
1%	8%	5%	1%

### Histopathology

In our study all were well differentiated carcinoma 77% were papillary carcinoma 23% were follicular carcinoma.

Comparison Of Histopathological Type Of Malignancy

	PAPILLARY CARCINOMA	FOLLICULAR CARCINOMA
MY STUDY	77 %	23%
HAYMART ET AL	87%	7%
MAZZAFERRI ET AL	60%	20%
BAILEY AND LOVE	80 – 85%	10%
DEVITA ETAL	70 – 80%	10%

### Tsh Levels And The Risk Of Malignancy

In this study the mean preoperative TSH value was: 2.39±1.42mU/L. All patients were euthyroid. The mean TSH value was significantly higher in malignancy than in benign disease i.e. 3.71±1.22mU/L vs. 1.80±1.03mU/L. This is comparable to the results of Haymart et al<sup>[3]</sup>, Fiore et al<sup>[19]</sup> and Jonklaas et al<sup>[14]</sup>.

Comparison Of Mean Tsh Value In Benign Vs Malignant Disease

	BENIGN	MALIGANANT	P VALUE
MY STUDY	1.80 +- 1.03	3.71 +- 1.62	P < 0.001
HAYMART ET AL	1.4 +- 0.4	3.7 +- 2.3	P <0.001
FIORE ET AL	0.70 +-0.40	1.10 +- 0.6	P <0.0001

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 1.40-4.99mU/L had 36.7% chance of malignancy whereas those with TSH levels >5mU/L had 75% chance of malignancy.

**Ethical approval:** “All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional ethics committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”

**Informed consent:** Informed consent was obtained from all the participants included in the study

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