



A STUDY TO ANALYSE THE CORRELATION BETWEEN TISSUE EXPRESSION OF ER,PR AND THYROID FUNCTION TEST IN DIFFERENT TYPES OF THYROID LESIONS

Dr. Ipsita Saha

MD (pathology), Demonstrator, Department of Pathology, Medical College, Kolkata, West Bengal, India Pin Code-700014

Dr. Sarmila Sen

MD (pathology), Associate Professor, Department of Pathology, Calcutta National Medical College, 32 Gorachand Road, Kolkata, West Bengal, India Pin Code-700014
* Corresponding Author

Prof Sulekha Ghosh

MD(pathology), Professor, Department of Pathology, Bankura Sammelani Medical College, Bankura, West Bengal, India Pin Code-700014

Prof Anindya Dasgupta

MD(Biochemistry), Professor & Head, Department of Biochemistry, Calcutta National Medical College, 32 Gorachand Road, Kolkata, West Bengal, India Pin Code-700014

ABSTRACT

Thyroid disorders are most common among all endocrine diseases in India. Studies show that serum concentration of TSH is an independent predictor for the diagnosis of thyroid malignancy in patients with nodular thyroid disease. Thyroid malignancies are more frequent in women. The purpose of this study is to correlate between tissues expressions of ER, PR and thyroid function test in different types of thyroid lesions. This study includes 46 cases of thyroidectomy and is based on the biochemical, histopathological findings and immunohistochemical staining of thyroid lesions. Out of 46 cases studied 5 cases of papillary carcinoma showed positive results for ER expression and significant difference existed between the mean values of serum TSH in ER positive cases and ER negative cases of thyroid lesions ($p=0.034$). So at the end it can be concluded that there may be a correlation between ER expression and thyroid function test.

KEYWORDS : Thyroid lesion, ER, PR, TSH

Introduction

Thyroid disorders are the most common among all the endocrine diseases in India¹. Thyroid cancer is the most common cancer of the endocrine system and the sixth most common cancer in women in the United States².

There is mounting evidence that the serum concentration of TSH is an independent predictor for the diagnosis of thyroid malignancy in patients with nodular thyroid disease. Furthermore, preoperative serum TSH concentrations are higher in patients with more aggressive tumours, suggesting a potential role for TSH in the progression of differentiated thyroid cancer^{3,4,5}.

Thyroid diseases are more prevalent in women particularly between puberty and menopause⁶. Carcinomas of the thyroid are three-times more frequent in women than in men and peak incidence occur earlier in women.

This has prompted research into the presence of estrogen, progesterone receptor in neoplastic thyroid follicular epithelial cells. Therefore Estrogen Receptor, Progesterone Receptor, may have a role in pathogenesis of thyroid lesions similar to that postulated in breast cancer. Following the identification of these receptors, much of the original work was performed in the context of Breast⁷, Ovary⁸, Endometrium⁹, Prostate¹⁰ cancers etc. Further study is necessary to reveal whether there is any significance of ER, PR receptors in the pathogenesis of neoplastic thyroid lesions or not.

Materials:

- Knife for tissue cutting
- Formalin for fixation
- Alcohol, xylene & wax for tissue processing
- Paraffin for blocking
- Microtome for section cutting
- IHC kit (Immunohistochemical staining with monoclonal antibodies against ER, Pr)
- Light Microscope
- ELISA kits for T3, T4, TSH assay

- ELISA reader with washer

Method:

This study was conducted in the Department of Pathology in collaboration with the Department of Biochemistry, Calcutta National Medical College and Hospital, Kolkata. All thyroidectomy specimens sent to the department of Pathology for histopathological examination during the period, from 2014 to 2015 were included in this study.

METHOD OF COLLECTION OF DATA:

Inclusion criteria:

1. Biopsy specimens sent to the department of Pathology for histopathological examination were analysed in this study.

Exclusion Criteria:

1. Patient with thyroid disease who already received any form of treatment [Surgery/Chemotherapy/Radiotherapy/ Hormone Therapy].2
2. Women with any co-morbid conditions (HIV, Diabetes, tuberculosis)

Result and analysis

Bar diagram:1 DISTRIBUTION OF STUDY POPULATION ACCORDING TO THEIR THYROID STATUS

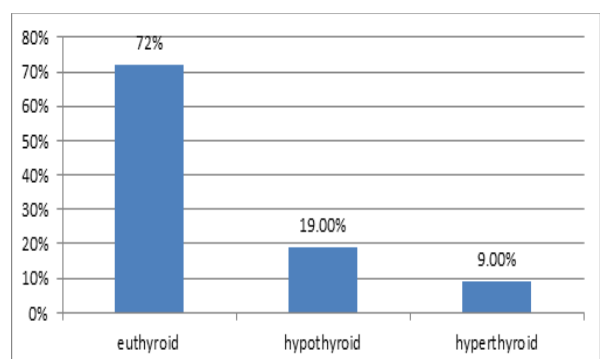


Table1: DISTRIBUTION OF STUDY POPULATION ACCORDING TO HISTOPATHOLOGICAL DIAGNOSIS

Histopathological diagnosis	Number of cases	Percentage
Hashimoto's thyroiditis	3cases	7%
Adenomatoid goitre	13 cases	28%
Cystic lesion	9 cases	19%
Papillary carcinoma	11 cases	24%
Follicular adenoma	3cases	7%
Follicular carcinoma	3 cases	7%
Hurthle cell adenoma	2cases	4%
Medullary carcinoma	1 case	2%
Anaplastic carcinoma	1 case	2%
Total-	46	100%

Table2:DISTRIBUTION OF STUDY POPULATION ACCORDING TO ER POSITIVITY IN RELATION TO THEIR THYROID STATUS

Histopathological diagnosis	ER positivity (no of cases)	Percentage	Thyroid status in ER positive cases
Hashimoto's thyroiditis	0/3	0%	-
Adenomatoid goitre	0/13	0%	-
Cystic lesion	0/9	0%	-
Follicular adenoma	0/3	0%	-
Follicular carcinoma	0/3	0%	-
Papillary carcinoma	5/11	45.45%	3cases hypothyroidism (6.2 and 9) and 2 cases euthyroidism
Hurthle cell adenoma	0/2	0%	-
Medullary carcinoma	0/1	0%	-
Anaplastic carcinoma	0/1	0%	-

- None of the cases were positive for PR (Progesterone Receptor) expression.

Table3:DISTRIBUTION OF STUDY POPULATION ACCORDING TO PREOPERATIVE THYROID STATUS IN RELATION TO THEIR HISTOPATHOLOGICAL DIAGNOSIS

Histopathological diagnosis	Serum TSH level
Hashimoto's thyroiditis-3	1=hypothyroidism 2= euthyroidism
Adenomatoid goitre-13	1=hypothyroidism 1= hyperthyroidism 11= euthyroidism
Cystic lesion-9	1= hyperthyroidism 8= euthyroidism
Papillary carcinoma thyroid-11	5= hypothyroidism(3 ER +ve) 6= euthyroidism(2 ER +ve)
Follicular adenoma-3	1=hypothyroidism 2= euthyroidism
Follicular carcinoma-3	1=hypothyroidism 1=hyperthyroidism 1=euthyroidism
Hurthle cell adenoma-2	1= hyperthyroidism 1= euthyroidism
Medullary carcinoma thyroid-1	1= euthyroidism
Anaplastic carcinoma-1	1= euthyroidism

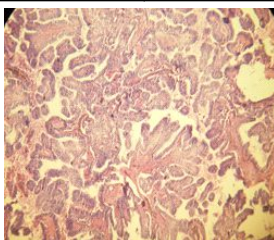


Fig 1a: Photomicrograph showing histopathology of papillary carcinoma of thyroid (H&E,10X)

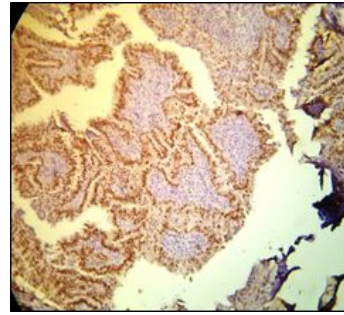


Fig 1b: Photomicrograph showing ER positivity in papillary carcinoma thyroid (IHC, 10X)

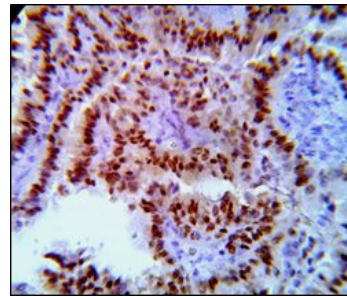
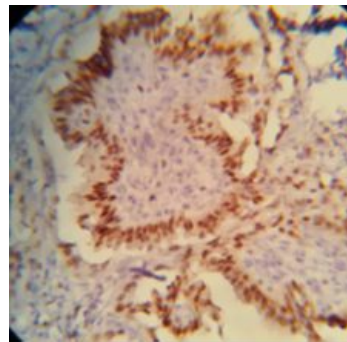


Fig 2a. Photomicrograph showing ER positivity papillary carcinoma thyroid (IHC,40X)

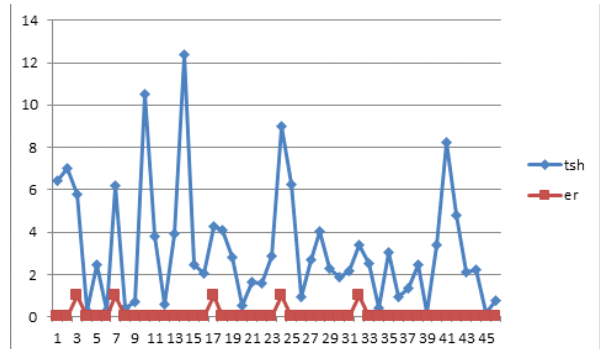


Photomicrograph showing ER positivity in papillary carcinoma thyroid (IHC,40X)

Table4:SHOWING DIFFERENCE IN MEAN VALUES OF SERUM TSH BETWEEN ER+VE AND ER-VE CASES OF THYROID LESIONS:

	ER +ve cases (n=5)	ER-ve cases (n=41)
Serum TSH	5.7±2.15 (Mean ± SD)	2.92±2.75 (Mean±SD)
T test value	2.15	
P value	0.034	

FIG:1 SHOWING THE RELATION BETWEEN ER EXPRESSION AND SERUM TSH LEVEL IN STUDY POPULATION



Discussion:

Epidemiological studies show that the incidence of thyroid disorders is greater in women than in men. Thyroid cancer is 2.5 times more common females than in males during reproductive life¹¹.

Out of the 46 cases studied 43 cases were female. Therefore in the present study female patients outnumbered male patients (M:F=1:14.3). This finding is comparable to other recent studies conducted by Sangalli et al¹², Mondal et al¹³, where the females were the dominant population.

The age of the patients in the present study ranged between 0 to 80 years with a peak between 31 to 40 years (26%). Among 46 cases studied 33 cases (72%) were euthyroid; this finding is slightly different from the study conducted by Godinho Matos Let al¹⁴ where 88% cases were euthyroid.

In this study out of 46 thyroidectomy specimens commonest histopathological diagnosis was Adenomatoid goiter 13 cases (28%), followed by papillary carcinoma thyroid 11 cases (24%), benign cystic lesion 9 cases (19%), Hashimoto's thyroiditis 3 cases (7%), Follicular adenoma 3 cases (7%), Follicular carcinoma 3 cases (7%), Hurthle cell adenoma 2 cases (4%), Medullary carcinoma 1 case (2%) and Anaplastic carcinoma thyroid 1 case (2%).

In this study immunohistochemical staining for expression of ER, PR were done in all 46 cases and the results were compared with thyroid function test and histopathological diagnosis.

In immunohistochemical study out of 11 cases of papillary carcinoma thyroid, 5 cases showed positive results for ER expression.

None of the 46 cases studied showed positive expression for Progesterone receptor (PR).

The incidence of ER positivity is higher in well differentiated thyroid lesion which is comparable to the study conducted by Tavangar S M et al¹⁵ worked on 351 cases of thyroid lesions for ER expression. In this study the positivity rate for ER expression was 24% for nodular goiter, 22% for follicular adenoma, 11% for follicular carcinoma, 31% for papillary carcinoma thyroid, 0% for medullary carcinoma and 0% for undifferentiated carcinoma.

Similar result was seen in the study conducted by Nobuo Takeichi et al¹⁶.

Another study conducted by Shilpi Bhargava et al¹⁷ worked on 11 cases of thyroid to establish a cytopathological and histopathological correlation and to analyze their ER and PR expression. Out of 11 cases studied only 1 case showed positive result for PR.

In the present study significant difference existed between the mean values of serum TSH in ER positive cases and ER negative cases of thyroid lesions (p=0.034).

So at the end of the study it can be concluded that there may be a correlation between ER expression and thyroid function test results in thyroid lesion, but further studies with larger number of patients need to be undertaken to ascertain whether application of ER, PR expression could be done for diagnostic purpose of thyroid lesions.

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