Thyroid hormone profile in breast cancer: A Case control study

Short running Title: *Breast Cancer on Thyroid.*

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Abstract

Introduction

In spite of routine iodine fortification of common salt, dishormogenesis of thyroid hormone remains a diagnostic challenge. Limited scientific data are available regarding the status of thyroid hormone in female breast malignancies.

We undertook the study to evaluate the status of thyroid hormones in breast carcinomas.

Materials and Methods

This is a laboratory observational study conducted in the Department of Pathology in association with the Department of Surgery and Biochemistry. The study population consist of the cases with suspected breast malignancies undergoing FNAC. Control group would be the healthy females with absence of breast lesions.

Results

Mean comparison in variables between benign and malignant categories indicate significant increase in FT3, TSH, ANTI-TPO, ANTI-THYRO and is statistically significant. T3 has no significant association with the variables but T4 and TSH have significant association ($p<0.01$).

Conclusion

Study of thyroid dysfunction is important as sub-clinical and overt hypothyroidisms are treatable conditions which will represent new avenues of therapeutic intervention.

Key words: Breast cancer, Thyroid disease, etiology

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Introduction

Disorders of thyroid hormones are one of the most common endocrine diseases in India. Various studies projected that approximately 42 million populations are affected by thyroid disorders in India.[1] In this postiodization era when India is transforming from iodine-deficient to iodine sufficient stage, there is paucity of pan-Indian data of thyroid disorder status among women.7 There are only few comparable data available from Jharkhand. We undertook this study to provide data for total triiodothyronine (T3), total thyroxine (T4), and thyroid-stimulating hormone (TSH) in women of this region and evaluate their status of thyroid function.[2,3]

Objectives

1. Estimate thyroid hormone in cases with breast mass.
2. Evaluate the association of thyroid hormone profile between benign and malignant tumours of breast.

Materials& Methods

Ours is a laboratory observational study. Study was conducted in Department of Pathology in association with department of General Surgery and Biochemistry.[4,5] Study subjects included cases with "mass in breast" advised for FNAC of both benign and malignant breast tumours. Control group included healthy individuals with absence of breast lesions confirmed clinically and radio logically. Informed consent was obtained from all study subjects.[6,7]

5mL fasting blood was collected and centrifuged at 3000rpm for 5 minutes. Serum, was separated by the blood will be centrifuge at 3000rpm for 5 minutes. Estimated in serum T3, T4, TSH, FT3, FT4, anti-TPO and anti–thyroglobulin antibodies using VITROS ECI immunodiagnostic system.[8] For breast lesions FNAC followed by histopathologic examination (HP) was done as per the standard protocols.

Statistical Association between the thyroid hormone profile between benign and malignant tumours of breast **were** assessed. Association of thyroid hormone

profile and clinic-pathological parameters of breast cancer **were also** noted.[9,10]

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Results

Comparison between Fibroadenoma and IDC groups

variables	Groups	N	Mean± Std. Deviation	Std. Error Mean	P value
T3	1	26	1.24±0.20	.03837	0.15
	2	18	1.42±0.49	.11629	
T4	1	26	6.16±2.0	.38892	0.70
	2	18	7.09±2.6	.61888	
FT3	1	26	7.93±11.7	2.30770	***.000**
	2	18	2.43±1.03	.24387	
FT4	1	26	2.33±1.23	.24141	0.50
	2	18	2.99±1.18	.27920	
TSH	1	26	1.36±0.62	.12168	***.012**
	2	18	1.38±0.30	.07113	
ANTI-TPO	1	26	2.44±465.0	91.15246	***.000**
	2	18	50.11±64.3	15.16810	
ANTI-THYRO	1	26	3.37±6.0	1.16317	***0.01**
	2	18	1.41±0.17	.04142	

Group 1: Fibroadenoma; Group 2: IDC

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Table 1: Mean comparison in variables between benign and malignant categories indicate significant increase in FT3, TSH, ANTI-TPO, ANTI-THYRO and is statistically significant.

From table 1 it is more clear that except Total T3 and Total T4 other parameters are statistically significant, Since FT3, FT4 are independent of protein building and to certain extent TSH, these hormones would have been proved statistically significant between group I and group II. However, in addition either albumin alone or other proteins needs to be evaluated.

Group1 Correlation (Benign category Fibroadinoma)

Correlation T3 with all variables

Table 2(a): Correlation analysis of T3 with FT3, FT4 and ANTI-THYRO (0.03).

		T4	FT3	FT4	TSH	ANTI-TPO	**ANTI-THYRO**
T3	Pearson Correlation	.107	-.157	-0.21	.112	.127	**-.432***
	Sig. (2-tailed)	.603	0.45	0.30	.586	.537	**.028**
	N	26	26	26	26	26	**26**

Correlation T4 with all variables (Benign category Fibroadinoma)

		T3	FT3	FT4	TSH	ANTI-TPO	ANTI-THYRO
T4	Pearson Correlation	.107	.140	-.331	.117	-.032	-.135
	Sig. (2-tailed)	.603	.494	.099	.570	.877	.509
	N	26	26	26	26	26	26

Table 2(b): Correlation between T4 and other variables.

Correlation analysis of T3 and T4 in benign category of fibroadenoma has shown significant 2- tailed test for T3 and non-significant for T4. However, the same is not with the malignant variant as depicted in table

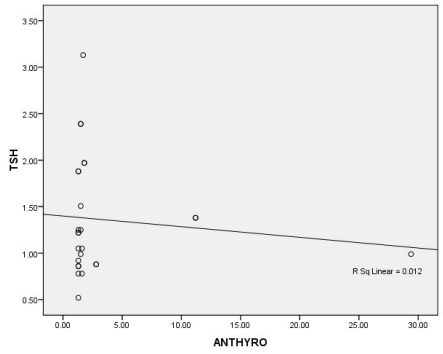

Figure 1(a): Correlation analysis TSH verses ANTI-THYRO Globulin.

3(a) and 3(b).

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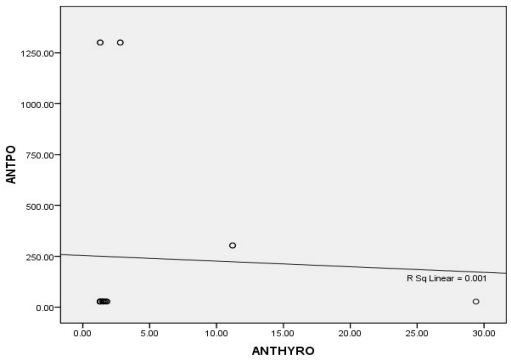

Figure 1(b): Correlation between ANTI-TPO verses ANTITHYRO Globulin.

Group 2

Correlation T3 with all variables (Malignant category IDC)

		G2T4	G2FT3	G2FT4	G2TSH	G2ANTI-TPO	G2ANTI-THYRO
G2T3	Pearson Correlation	-.062	.415	.060	-.039	-.075	-.157
	Sig. (2-tailed)	.808	.087	.814	.876	.768	.534
	N	18	18	18	18	18	18

Table 3(a): Here T3 has no significant association with the variables but T4 and TSH have significant association ($p<0.01$)

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Correlation T4 with all variables (Malignant category IDC)

		G2T3	G2FT3	G2FT4	**G2TSH**	G2ANTI-TPO	G2ANTI-THYRO
G2T4	Pearson Correlation	-.062	-.162	-.200	**.700****	-.015	.258
	Sig. (2-tailed)	.808	.521	.426	**.001**	.952	.301
	N	18	18	18	**18**	18	18

Table 3(b): Here T4 has significant association with ANTI-TPO ($p<0.029$) and ANTI-THYRO ($p<0.01$)

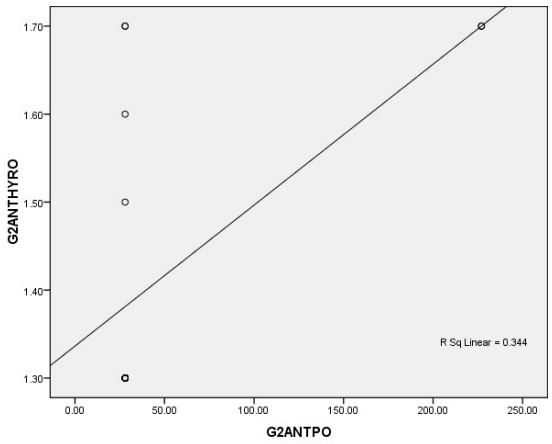

Figure 2(a): Positive correlation between TSH verses ANTI-THYRO Globulin.

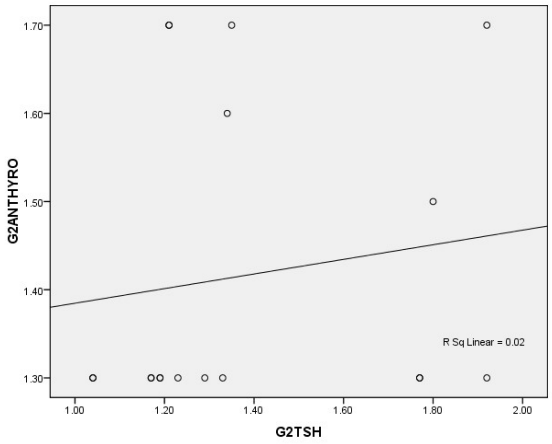

Figure 2(b): Positive correlation between ANTI-TPO verses ANTI-THYRO Globulin.

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Discussion

In our study we compared fibroadenoma with Interductal Carcinoma(IDC) of the thyroid parameters to find its impact on the clinical condition and outcome. We have observed FT3, Anti TPO, Anti Thyroid antibodies values are highly significant in fibroadenoma compared to IDC followed by statistical significant values of TSH. To our surprise FT4, Total T3 and Total T4 values are not statistically significant.[11] As T4 is further synthesized

after T3 followed by iodination and metabolic steps the reason as to why the FT4 stage of synthesis of the thyroid harmones are not iodination or post translation modification proteohysis of thyroglobulin to be understood and evaluate at cellualar level and molecular level. Metabolomie of the thyroid harmones synthesis has to be keenly studied before to derive a correlation.[12]

Pearson correlation coefficient to describe as "r" value, a common way of measuring a lenior correlation by using a numerical variables. It assigns a value between -1 and 1, zero depicts no correlation 1 is a to the positive correlation and -1 is a total negative correlation. In our present study depicted in table 2(a), 2(b), 3(a) and 3(b) for T3, T4, G2 T3, GT4 respectively verses other parameters anything between -0.9 to -1.00 is interpreted as very high positive correlations -0.7 to -0.9 high positive, -0.5 to -0.7 as moderate positive -0.30 to -0.50 low positive ; However, all are having a negative correlation values of 0.00-0.30 indicates a negligible correlation.[13] We have observed T3 v/s T4 Pearson correlation values of 0.107 indicating negligible correlation similarly with FT3, FT4, TSH Anti TPO and Anti thyroid antibodies in Benign category Fibroadenoma. To our surprise we would observed a significant also either between G2 T3 verses T4 and TSH with a p-values of <0.029 and 0.01 respectively the same is also shown in figure 2(a) and 2(b).[14]

With respect to significant 2-tailed test which with us the probability of being wrong about ruling out the null hyprothesis of no correlation between X and Y and completed using the 't' distribution; P-value 0.000 reported as P<0.001 have significant evidence to reject the null hypothesis that the correlation is zero.[15] As the p-value is small, the correlation is significant, this we have observed with respect to T3 verses Anti thyroid antibodies in Benign category

7fibroadenoma. However we did Pearson's correlation and Significant (2-tailed) with the number of study subjects (n) as shown in table 2(a), 2(b) 3(a) and 3(b) respectively.[16]

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Conclusion

Our study provided baseline scientific information regarding various aspects of on thyroid function in cases of breast neoplasm/tumors. In future multi-centric, randomized carcinoma should be undertaken to obtain more information in this regard.

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