

THYROID HORMONE PROFILE IN EARLY BREAST CANCER PATIENTS

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ABSTRACT

BACKGROUND

Breast cancer is the most common malignant tumour in women worldwide. The relationship between breast cancer and thyroid disease is a controversy. Many of the studies showed hypothyroidism as the commonly found thyroid abnormality in breast cancer.^[1] There is considerable evidence for an increased risk of thyroid and breast cancer in patients with iodine deficiency. This ability of iodine to reduce the risk of breast cancer is attributed to the ability of iodine and its compounds to induce apoptosis so that appropriate cell death occurs. Instead, in the absence of optimum level of iodine in the body the transformed cells continue to grow and divide resulting in cancer.

AIMS

1. To find out the association of thyroid hormones and breast cancer in early breast cancer patients.
2. To find out the association of thyroid peroxidase antibodies in early breast cancer patients.

Settings

Cases: 82 breast cancer patients in early stage who attended the breast clinic.

Controls: 82 age matched controls (Between 25-80 years).

Design: Case control study.

MATERIALS AND METHOD

In this study, investigated for thyroid function test (T3, T4, TSH) and thyroid peroxide antibody level in 82 early breast cancer patients.

STATISTICAL ANALYSIS

SPSS 16.

RESULTS

Statistically significant low T₄ and high TSH in breast cancer patients, along with elevated thyroid peroxidase antibody.

CONCLUSION

Compared to hyperthyroidism, hypothyroidism was found to be clinically significant in breast cancer patients.

KEYWORDS

Hypothyroidism, Hyperthyroidism, Thyroid Stimulating Hormone, Thyroid Peroxidase Antibody, Early breast cancer, Invasive Ductal Carcinoma, Estrogen Receptor, Progesterone Receptor.

HOW TO CITE THIS ARTICLE: Thazhath RV, Purayil LP, Purayil AV. Thyroid hormone profile in early breast cancer patients. J. Evid. Based Med. Healthc. 2016; 3(44), 2213-2215. DOI: 10.18410/jebmh/2016/490

INTRODUCTION: Breast cancer is the most frequently diagnosed life threatening cancer in women and it is the leading cause of female cancer death worldwide. Extensive clinical and experimental researches as well as epidemiological studies have been carried out to explore the aetiology of breast cancer. But still remains elusive; however, various risk factors are now considered significant

in its aetiology and there is general consensus that endocrine factors play an important role in mammary cancer.

Among this, the role of prolonged oestrogen stimulation in breast cancer has been established and synthetic anti-oestrogens are already in use as adjuvant treatment in breast cancer.

The other endocrine factor incriminated in the aetiology of breast cancer relates to one of the major endocrine organ in the body of the thyroid gland.^[1] The thyroid hormone is a very powerful co-factor of experimental carcinogenesis and the role of thyroid hormone in human cancers has yet to be clearly elucidated. Researchers suggest that thyroid

Financial or Other, Competing Interest: None.

Submission 10-05-2016, Peer Review 24-05-2016,

Acceptance 31-05-2016, Published 02-06-2016.

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DOI: 10.18410/jebmh/2016/490

hormone has a direct and crucial role in the development of breast cancer.

The thyroid hormone profile may be altered in various disorders which include hypothyroidism, hyperthyroidism, tumours and tumour like conditions.

Among all these disorders, hypothyroidism is the one suspected to be a risk factor in breast cancer. However, as of now, the biological link between breast cancer and thyroid dysfunction remains controversial. A better understanding of this relation is possible with further scientific research and in turn may help the physician to develop newer diagnostic and treatment modalities and so also help to take preventive measures.

One of the causes of this geographical variation in the incidence of breast cancer was attributed to iodine intake in diet.^[2] Many studies showed association of autoimmune thyroid disease with breast cancer.^[3] Few studies showed prevalence of hypothyroidism in breast cancer patients.^[1,4,5,6] But some other studies failed to get any significant correlation.

The one area in which thyroid and breast functions overlap is in the uptake and utilisation of dietary iodide and there is strong evidence that lack of iodine predisposes to cancer. The mammary glands have a trapping system for iodine similar to that of thyroid gland. The breast effectively competes with the thyroid gland for ingested iodine. This distribution of iodine to both breast and thyroid gland explains why goitre is many times more common in girls than pubertal boys.

There is considerable evidence for an increased risk of thyroid and breast cancer in patients with iodine deficiency. This ability of iodine to reduce the risk of breast cancer is attributed to the ability of iodine and its compounds to induce apoptosis so that appropriate cell death occurs. Instead, in the absence of optimum level of iodine in the body the transformed cells continue to grow and divide resulting in cancer.

Mittra et al's study explained that thyroid hormone modulates mammatrophic effect of prolactin and hypothyroidism permits increased prolactin activity which may lead to mammary dysplasia and neoplastic transformation.^[7] The possible interactions between the two glands are based on the common property of both these glands' epithelial cells to concentrate iodine by a membrane active transport mechanism as well as TSH receptor presence in fatty tissue which is in plenty in breasts.^[8]

MATERIALS AND METHODS: The present cross-sectional study included 82 early breast cancer patients who attended breast clinic for a period of 18 months from Jan 2013-Jun 2013. Most of the patients belonged to lower socioeconomic group. All the patients were confirmed by FNAC of the breast, and all showed infiltrating ductal carcinoma (IDC). The study was conducted before they subjected to treatment. Detailed history evaluation, examination of breast was done. Only early stage breast cancers i.e. up to breast lump of size <5 cm; with mobile nodes or absent lymphadenopathy were taken. All the patients were subjected with investigation of serum T3, T4, TSH and thyroid peroxidase antibody.

T3, T4, TSH were determined based on enzyme immunoassay techniques using commercially available kits. TPO Ab were also analysed based on similar technique.

The normal range of the parameters set as T3: 0.7-2, T4: 55-135, TSH: 0.2-4, TPO Ab<30. Statistical analysis was done using SPSS Vs16.

RESULTS AND DISCUSSION: Thyroid profile was done in those 82 patients. The age group of the patients was between 25-80 years. The mean values of T3, T4, TSH and TPO Ab of cases and controls are given in the table given below.

		T3	T4	TSH	TPO Ab
Controls	Mean	1.0657	78.4268	3.8557	59.1939
	SD	0.4612	2.8269	1.0484	9.0786
Cases	Mean	1.0354	67.5976	3.2874	36.0732
	SD	0.56899	3.2171	2.8095	2.6425

Table 1: Mean value of T3, T4, TSH and TPO Ab

In our study, we found that hypothyroidism is more common in the studied group. TPO AB also showed higher levels in breast cancer patients.

	T3			T4			TSH		
	Hypo	Normal	Hyper	Hypo	Normal	Hyper	Hypo	Normal	Hyper
Case	22	54	6	33	45	4	27	48	7
Control	12	67	3	9	71	2	12	68	2
P value	0.069			0.000			0.002		

Table 2: Comparative Study of TFT between Cases and Controls

	TPO Antibody	
	Positive	Negative
Case	46	36
Control	24	58
P value	0.001	

Table 3: Comparative Study of TPO Antibody between Cases and Controls

Similar results were demonstrated in few studies.^[1,4,5,6] Smith et al suggested a better prognosis for breast cancer among patients with elevated TPO levels.^[9] Elevated TPO levels may also be due to autoimmune thyroid. But a direct association between autoimmune thyroiditis and breast cancer failed to prove in studies. It is not proved that whether the presence of anti-TPO Ab in serum from patients with breast cancer is related to an increased risk of breast cancer or is it due to a general autoimmune response to the malignancy.

Hormonal receptive status (ER, PR, HER-2/neu) was compared with stages of breast cancer (T stage, N stage) and did not show any statistical significance. Thyroid hormone profile study was also compared between premenopausal and postmenopausal women in case group which also did not show any statistical significance.

But our results definitely suggest a biological link between breast cancer and serum anti-TPO antibodies in women.

CONCLUSION: The increased serum anti TPO levels and hypothyroidism in our study showed an association between the two organs. Increased risk of thyroid and breast cancer in patients with iodine deficiency as the evidence suggests, from various studies,^[2] can be attributed as a risk factor, since most of the patients belonged to low iodine intake area. But the exact relation and the possible researches in the field of breast cancer prevention and treatment modifications are yet to be explored.

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