



Relation between Thyroid Disease and Breast Cancer

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Abstract

Aim: Benign thyroid nodules are most common surgically treated endocrine disorder. Breast cancer is the most common cancer type among women. In the recent study, we aimed to detect the relation between breast cancer and benign thyroid nodules.

Materials and methods: The patients operated because of breast cancer and have a definite diagnosis with pathological evaluation were included in this prospective study.

Findings: Thyroid nodules were detected in 27 out of 133 breast cancer patients. Of the detected nodules 24 (88.9%) were solid and 3 (11.1%) were cystic. Thyroid hormone levels did not differ in between the groups. Autoimmune thyroiditis is diagnosed with positivity of Anti-TPO or Anti-TG antibodies. Autoimmune thyroiditis prevalence was significantly higher in the study group (40.7% and 21.7%, respectively).

Conclusion: Nodular thyroid diseases are found to be significantly more common in cases with breast cancer. In cases with thyroid disease over 50 years of age, a careful breast cancer screening should be done.

Keywords

Breast cancer, Thyroid disease, Nodular goiter, Autoimmune thyroiditis

In the recent study, we aimed to detect the relation between breast cancer and benign thyroid nodules.

Materials and Methods

The study was conducted prospectively between November 2012 and November 2014. The patients operated because of breast cancer and have a definite diagnosis with pathological evaluation were included in the study. All the patients were informed about the study protocol and after signing the informed consent form; patients were evaluated by thyroid ultrasonography (USG). Nodule diameter and characteristics were recorded. Patients' free T3, Free T4, Thyroid Stimulating Hormone (TSH), Anti-Thyroid peroxidase antibodies (Anti-TPO) and Anti-thyroglobulin antibodies (Anti-TG) were measured from the serum sample. According to thyroid hormone levels patients were divided as hypothyroid (low T3 and T4, high TSH), euthyroid (normal T3, T4 and TSH) and hyperthyroid (high T3 and T4, low TSH). Any positivity of Anti-TPO or Anti-TG was accepted as autoimmune thyroiditis.

One hundred and thirty three proven breast cancer patients were included in the study. Thyroid nodules were detected 27 of the patients. The patients with thyroid nodules were accepted as the study group and without thyroid nodules were accepted as the control group.

In statistical analysis, IBM SPSS 20 software was used. In analysis of nominal data chi-square test was used. A student T test was used in comparison of quantitative data. Level of statistical significance was accepted as 0.05.

Findings

The mean age of the patients was 54 ± 9.9 . Thyroid nodules were detected in 27 out of 133 breast cancer patients.

The mean age of the cases and controls were similar (56.2 ± 9.7 and 54.5 ± 10 , respectively) ($p > 0.05$). One hundred and three patients (92.5%) had invasive ductal carcinoma, six patients (4.5%) had invasive lobular carcinoma and four patients (3%) had mixed (both invasive ductal and lobular) carcinoma. Types of breast tumors were similar in between the groups ($p > 0.05$). Regarding the tumor grade 26.3% of patients had Grade 1 tumor, 43.6% had Grade 2 tumor, 20.3% had Grade 3 tumor and 9.8% had Grade 4 tumor. Distribution of tumor grades according to groups is shown in [table 1](#).

Introduction

Benign thyroid nodules are most common surgically treated endocrine disorder [1]. In population based studies the prevalence of thyroid nodules are reported to be 4-6.5% [2-4]. As an endemic goiter zone prevalence of thyroid nodules are reported to be 7-10% [5,6]. The disease is an important problem in terms of human resources and health care expenses. Breast cancer is the most common cancer type among women [7]. Moreover it is leading cause of cancer related death for women [8]. In our country, the prevalence of breast cancer is 20-50 cases in 100000 [9-12].

There are conflicting results about the relation of those hormone dependent diseases. Some reports advocate that there is relation between the two [13-17], however, some reports failed to show a relation [18-21]. In many studies both a relation between breast cancer and autoimmune disorders and benign thyroid nodules are shown.

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Table 1: Distribution of tumor grades according to groups.

			Nodule (+)	Nodule (-)
Tumor grade	1	N	8	27
		%	29.6%	25.5%
	2	N	12	46
		%	44.4%	43.4%
	3	N	5	22
		%	18.5%	20.8%
	4	N	2	11
		%	7.4%	10.4%
Total	N	27	106	
	%	100.0%	100.0%	

The receptor positivity of the groups were similar ($p > 0.05$). Of the detected nodules 24 (88.9%) were solid and 3 (11.1%) were cystic. The mean nodule diameter was found to be 13.5 ± 9.7 mm. According to thyroid hormone levels six (4.5%) were hypothyroid, 121 (91%) were euthyroid and 6 (4.5%) were hyperthyroid. Thyroid hormone levels did not differ in between the groups. Autoimmune thyroiditis is diagnosed with positivity of Anti-TPO or Anti-TG antibodies. Autoimmune thyroiditis prevalence was significantly higher in the study group (40.7% and 21.7%, respectively).

Discussion

There are several studies evaluated the relation between breast cancer and thyroid diseases. Results of those studies are controversial. Some supports the relation, others do not. Whereas, the studies aimed the relation between thyroid and breast cancers we aimed to evaluate the relation between thyroid diseases and breast cancer. In our study 20.3% of patients operated for breast cancer had thyroid nodules. Increased incidence of breast cancer in endemic goiter zones, courage those studies [22]. Iodine accumulation in both thyroid and breast tissue may explain this relation. Moreover, the presence of iodine receptors is shown in breast epithelium [23]. Another reason is that; thyroid hormone receptor, especially TSH receptors are shown in the fatty tissue of breast [24]. Besides, increased level of circulation estrogen levels in fatty women may cause those hormone dependent disorders.

Hereditary conditions like Cowden syndrome can be useful to explain the relation between thyroid disease and breast cancer. In Cowden syndrome there is loss of a tumor suppressor gene that causes DNA damage. The same situation is seen in both breast cancer and Cowden syndrome. There can be a similar relation between breast cancer and thyroid nodules.

There are studies reporting the increased incidence of thyroid nodules in women with breast cancer. Turken *et al.* detected thyroid nodules in 50% of cases with breast cancer [25]. Similarly, in our study nodular goiter was significantly more common in women with breast cancer, compared to normal population.

In cases with thyroid cancer mix type breast tumors are more common, however, in cases of benign thyroid disorders similarly with normal population, invasive ductal carcinoma are more common [26]. In our study, invasive ductal carcinoma is more common and there is no difference in terms of breast tumor types between the groups.

According to Talamini *et al.* breast tumors with nodular goiter or ovarian cysts tend to be lower grade [26]. However, in our study there was no difference in tumor grades.

According to Turken *et al.* thyroid hormone levels did not affect breast cancer [25]. Similarly, we could not find any relation between hormone levels and breast cancer.

In relation of thyroid disorders and breast cancer Anti TG and Anti TPO are most commonly evaluated parameters. In report by Smyth PPA *et al.*, level of Anti TPO was found to be increased in breast cancer cases [27]. Moreover, they reported that breast cancer prognosis was better in cases with increased Anti TPO level. Gogas

J et al. reported the similar results [28]. Similarly, we found high incidence of autoimmune thyroiditis. However, we evaluated only as positivity of Anti TPO. This is one of the main limitations of our study.

In our study we did not include cases with thyroid cancer. However, several current studies suggest the relation between breast and thyroid cancers.

The current study evaluates the relation between thyroid disorders and breast cancer. Nodular thyroid diseases are found to be significantly more common in cases with breast cancer. In cases with thyroid disease over 50 years of age, a careful breast cancer screening should be done. Current knowledge shows that; we need larger prospective studies to evaluate the relation between breast cancer and thyroid disorders.

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