

Thyroid Disorders and Breast Cancer

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Abstract: Introduction: A possible link between thyroid disorders and breast cancer has been a subject of debate, since thyroid extract was first used to treat breast cancer in 1896. Many researchers have suggested an increased risk of breast cancer in women with thyroid disorders and others have indicated a decreased risk. **Purpose:** To determine if there is a relationship between thyroid disorders and breast cancer in women. **Method:** An evidence based literature review using Medline, AbstractsFirst, and Cochrane using the terms: hypothyroidism, hyperthyroidism, thyroid dysfunction, breast cancer, and breast carcinoma. Criteria for article selection: publication in a peer reviewed journal, level 3 evidence or higher, and the relevance of the data to this study. **Results:** Twenty articles met criteria for this study: 11 show an association and 9 show no association. **Conclusion:** There is no definitive association between thyroid dysfunction and breast cancer. However, recent studies continue to suggest a biologic link between hypothyroidism and breast cancer etiology in post-menopausal women.

1. Introduction

The association between breast cancer and thyroid disorders has been a subject of debate for many years. In 1896, Beatson used thyroid extract to treat metastatic breast cancer[1]. Since then other researchers have extensively investigated the relationship between the two conditions. Cristofanilli et al. reported a decrease in the risk of developing invasive breast cancer in women with primary hypothyroidism[2]. In another study, Gogas et al. suggest that there was evidence of an increase in Hashimoto's thyroiditis in patients with breast cancer[3]. In contrast, a meta-analysis by Sarlis et al. revealed no association between Hashimoto's thyroiditis and breast cancer[4]. Simon et al. reported that neither disorders of the thyroid nor the treatment for these conditions substantially alters the risk of breast cancer.[5] The purpose of this study is to further investigate the possible relationship between thyroid disorders and breast cancer risk.

2. Experiment, Results, Discussion, and Significance

This project is an evidence based literature review conducted using the databases of Medline, AbstractsFirst, and Cochrane. The search terms used included: hypothyroidism, hyperthyroidism, thyroid dysfunction, breast cancer, and breast carcinoma. Articles were chosen based on the following criteria: publication in a peer reviewed journal, level 3 evidence or higher, and relevance of the data to this study. Inclusion articles were ones of studies where the participants were tested before any treatment was performed not including biopsy or surgery. Articles were excluded if the thyroid disorder was diagnosed after the patients had received chemotherapy, radiation therapy or hormonal therapy for their breast cancer. Thyroid disorders were defined as enlargement, goiter, hypothyroidism, hyperthyroidism, thyroid adenoma, and autoimmune thyroiditis.

The search resulted in twenty articles which included nine level 1 and two level 2 articles showing there is an association between thyroid disorders and breast cancer risk. It also included three level 1 and six level 2 articles showing no association between the two conditions. These numbers combine to be 11 articles concluding there is an association between the two conditions and 9 concluding no association. These results are inconclusive for determining if there is an association between thyroid disorders and breast cancer.

The results of this study show the need for further evaluation of the association between thyroid disorders and breast cancer. Study to establish whether there is an exact biologic link between thyroid disorders and breast cancer or if the association is merely a result of the coincidence that the two conditions are more common in women, particularly post-menopausal women, need to continue. Laboratory evidence exists implicating thyroid hormone exerting an effect on mammary cells [6, 7]. There continues to be conflict in the laboratory as well. Gonzalez-

Sancho et al found that T3 reduced the proliferation of mammary epithelial cells[7]. Dinda et al, on the other hand, found that thyroid hormone exhibits an estrogen-like effect on the regulation of tumor suppressor proteins in breast cancer cells[6]. Further investigation is needed to determine the complete molecular effect of thyroid hormone on breast tissue and how that translates to the final effect in vivo.

3. Conclusions

A recommendation can not be made based on the current evidence. The data is inconclusive in determining the possibility of an association between thyroid disorders and breast cancer risk. Further evaluation is needed. Continued study on the molecular effects of thyroid hormone on mammary tissue will be needed to find the biological link between thyroid disorders and breast cancer that has been suggested here.

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