

## Synchronous primary cancer of the thyroid and breast

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**Background:** The present case is of a synchronous primary classical thyroid carcinoma and primary ductal carcinoma of the breast in a 57 year old lady. Though the incidence of both thyroid cancer and breast cancer have been rising in recent years, it is very rare to find a single person with both of these cancers. **Case summary:** Patient underwent total thyroidectomy and right breast lump excision. Post operative histopathological examination identified papillary carcinoma thyroid, classical type, of the right lobe with metastasis to central compartment lymph nodes and invasive ductal carcinoma of the right breast. Now the patient is on regular follow up. Thus the aim of the current report was to improve the understanding of synchronous primary tumors of the thyroid and breast by presenting a review of the associated literature regarding breast and thyroid carcinoma.

**Conclusion:** Although synchronous primary tumors of the thyroid and breast are very rare, they remain a possibility, therefore more attention should be paid to this cancer.

**Keywords:** Synchronous, FNAC, Papillary thyroid

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Rakshitha H.M., Department of Pathology, Kidwai Memorial Institute of Oncology, Bangalore, Karnataka, India. Email: <a href="mailto:rakshita.201@gmail.com">rakshita.201@gmail.com</a>	Rakshitha HM, Suma MN, Arjunan R, Malathi M, Priya D, Premalata CS. Synchronous primary cancer of the thyroid and breast. Trop J Pathol Microbiol. 2019;5(7):461-465. Available From <a href="https://pathology.medresearch.in/index.php/jopm/article/view/296">https://pathology.medresearch.in/index.php/jopm/article/view/296</a>	

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## Introduction

Synchronous malignancy is two or more histologically different malignancies detected within 6 months of the diagnosis of the first primary malignancy. Certain criteria have been laid down to diagnose synchronous malignancy; for example both the tumors should be malignant and neither should be a metastasis from the other, and the tumors should be separate from each other in terms of microscopic and morphologic features. The relationship and coincidence of breast cancer with thyroid disorders is a subject of extensive debate and controversy. Many studies have shown that thyroid diseases are common among women with breast cancer [1]. Breast carcinoma and thyroid carcinoma are the two most common malignancies that occur in women.

However, synchronous primary tumors of the thyroid and breast are very rare in clinical practice. Although differentiated thyroid and breast cancer carry a lower risk of death or disease recurrence than other malignancies, their incidences have been steadily increasing for at least 2 decades [1], and they have become the most common malignancies in females [2, 3]. Dual malignancy was first reported by Billroth in 1889 [4]. Here in, the present case report was a rare case of a 53 year old female who was diagnosed with synchronous primary papillary thyroid carcinoma and invasive ductal cancer of the breast. Ghosh et al also reported a rare case of a synchronous anaplastic carcinoma thyroid with ductal carcinoma breast [4].

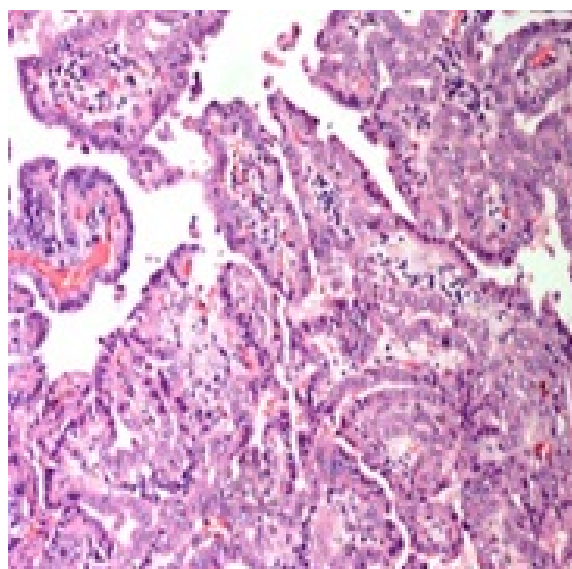
## Case Report

In the month of May 2018, a 57 year old postmenopausal lady presented to the surgical oncology OPD with complaints of swelling in front of the neck for past one year. She had incidentally noticed a lump in the right breast for one month duration. On clinical examination the swelling in the neck moved with deglutition and overlying skin was intact. Local examination of the breast revealed no discharge from the nipple /retraction of the nipple. USG neck revealed, a large heteroechoic lesion in the right lobe of thyroid measuring 2.8X3 cms with vascularity and calcifications within, peripheral hypoechoic halo appears disrupted at some places. CT neck revealed diffuse enlargement of thyroid gland, a hypodense lesion noted in right lobe of thyroid measuring 3.5X3.3X4.3 cm.

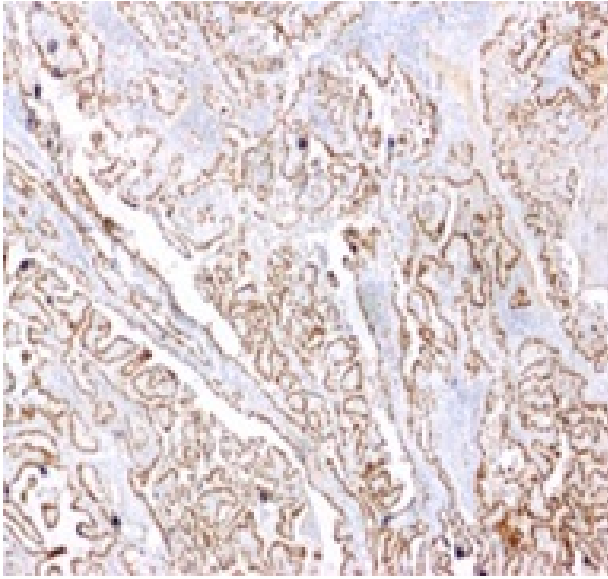
Bilateral mammography was done and revealed BIRADS IV-A in right breast and BIRADS- I in left breast.

FNAC of both thyroid and breast lesion was performed. FNA of the thyroid mass was reported as papillary carcinoma thyroid. FNAC of the breast- Showed groups and clusters of neoplastic epithelial cells, a few discohesive cells and occasional ill defined papillary architecture. Suggested to exclude metastatic lesion before considering it as primary breast lesion and biopsy was advised. CT scan abdomen and pelvis did not reveal any significant abnormalities.

Later patient underwent total thyroidectomy and right breast lump excision in the same sitting. Central compartment lymph node dissection was performed along with total thyroidectomy. Histopathological examination of the lumpectomy revealed, invasive carcinoma, grade 2. Histopathological examination of the total thyroidectomy showed papillary carcinoma with metastasis to the central compartment. IHC was performed on the breast tumor as well as thyroid carcinoma. Tumor cells of the breast were positive for ER, PR and negative for HER 2 neu, TTF-1 and Ki 67 proliferation index was 10%. Papillary thyroid carcinoma cells were positive for TTF-1. This ruled out metastasis and diagnosis of synchronous primary invasive duct carcinoma of breast and papillary thyroid carcinoma of the thyroid was made.

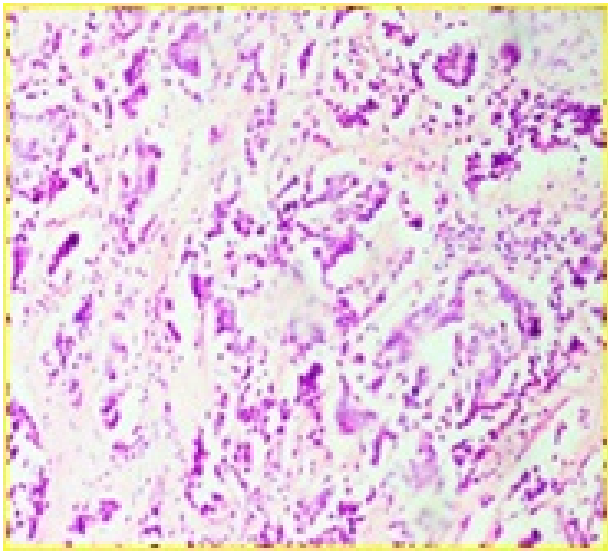


A.

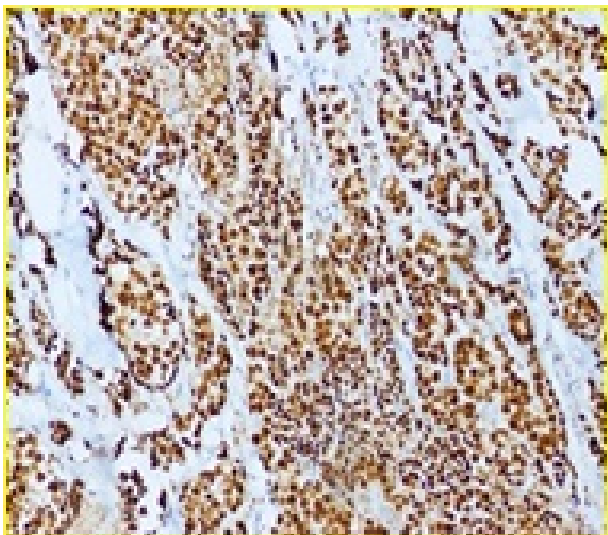


B.

**Figure 1: A.H & E X 100, shows neoplasm with characteristic nuclear features of papillary carcinoma thyroid. B. The tumor cells are (TTF-1) Thyroid Transcription Factor 1 positive (100x).**

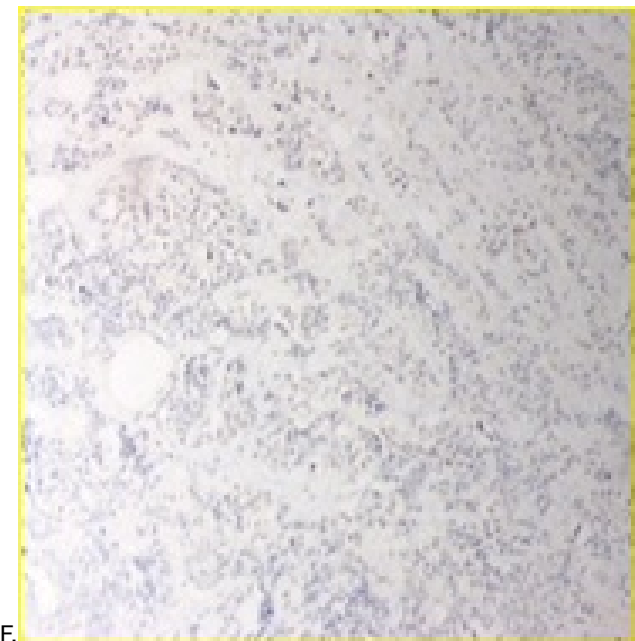
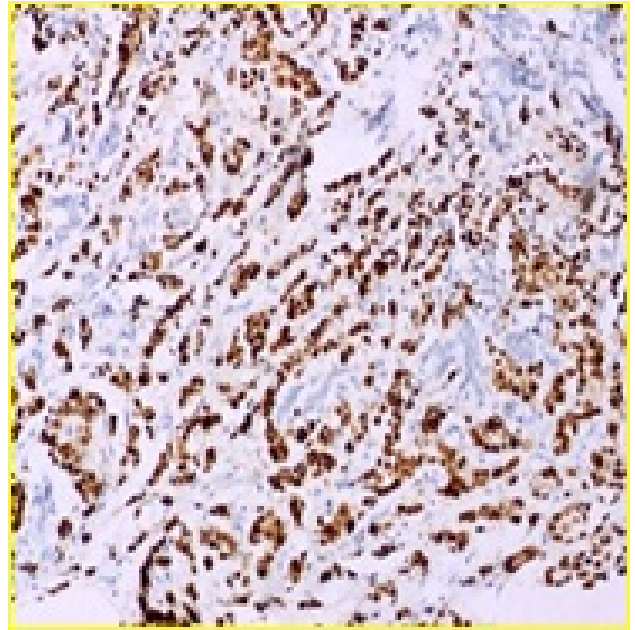


C.



D.

E.



F.

**Figure 2: C.H & E X 100, shows invasive carcinoma breast, grade 2, D. Estrogen Receptor (ER) is positive, E. Progesterone Receptor (PR) is positive (100 x), F. Thyroid Transcription Factor-1(TTF-1) is negative (100 x).**

Bone scan was performed post operatively and no abnormal concentration of the radiotracer was seen either in axial/appendicular skeletal region.

## Discussion

Breast carcinoma and thyroid carcinoma are the 2 most common malignancies that occur in women. However, synchronous primary tumors of the thyroid and breast are very rare in clinical practice.

Dual malignancy was first reported by Billroth in 1889 [4]. According to the guidelines, these two malignancies can be synchronous but should not be metachronous [5, 6]. Both the tumors should be malignant and neither should be a metastasis from the other. According to the guidelines, the incidence of a second primary tumor in cancer patients is approximately 10% [5, 7]. Previous studies have mainly focused on possible increases in the incidence of contralateral breast carcinoma. However, the risk of concurrent thyroid carcinoma among women with breast cancer has not been explored in recent years [8]. Analysis of the USA National Cancer Institute's Surveillance, Epidemiology, and End Results data has demonstrated that the incidence of thyroid cancer is higher in patients with a pre-existing malignancy than in patients without a preexisting malignancy and that the incidence of other malignancies is higher in patients with thyroid cancer than in patients without thyroid cancer [9], findings consistent with the current guidelines [5]. A previous study revealed that a history of any thyroid disorder or subsequent treatment was not associated with an increased risk of developing breast cancer.

However, this study revealed that parous females with a history of thyroid cancer exhibited an increased risk of developing breast cancer [10]. The presence of breast cancer did not increase the risk of thyroid cancer. It is well known that the use of radiotherapy to treat cancer may increase the risk of developing a second malignancy. For breast carcinoma, the most common risk factor for a second soft tissue sarcoma is postoperative radiotherapy, especially radiotherapy targeting the thyroid, which is very sensitive to radiation. Although the breast and thyroid are both endocrine organs, there is no evidence of a relationship between these organs with respect to the development of simultaneous breast and thyroid cancer. Liu et al [11] performed a literature review to elucidate the mechanism underlying the development of synchronous breast and thyroid cancer and focused on thyroid hormones. He proposed mechanisms underlying the activation of associated oncogenes, such as a sodium iodide symporter that acts as a potential co-passageway and facilitates thyroid and breast cancer development [12, 13].

**Table-1: Case Reports with synchronous occurrence of both tumors are common in postmenopausal age group.**

Case reports	Age	Gender	Pre or postmenopausal	Pathological examination	Metastasis	Follow up	Outcome
Agarwal (18)	50	F	Postmenopausal	Papillary carcinoma of thyroid and infiltrating ductal carcinoma of the breast.	No metastasis	2y	No recurrent metastasis.
Kim (19)	70	F	Postmenopausal	Papillary carcinoma of thyroid and invasive ductal carcinoma of the breast, adenocarcinoma of the pancreas and a gastro intestinal stromal tumor.	Unknown	8 m	Deceased
Ghosh (4)	61	F	Postmenopausal	Anaplastic carcinoma of the thyroid with ductal carcinoma of the breast	Metastasis to lung and left axillary lymphadenopathy	-	unknown
Liu (11)	-	F	Premenopausal	Papillary carcinoma of thyroid and invasive ductal carcinoma of the breast.	No Recurrent Metastasis.	2 y	No recurrent metastasis
Zhong (20)	61	F	Post menopausal	Papillary carcinoma of thyroid and invasive ductal carcinoma of the breast.	Left supraclavicular lymph nodes.	-	No recurrent metastasis
Present case	57	F	Postmenopausal	Papillary carcinoma of thyroid and invasive ductal carcinoma of the breast.	Central compartment node.	On follow up	On follow up

Additionally, previous studies have suggested that amplified levels of nuclear protein 1 [14], retinoid-inducible nuclear factor [15] and nuclear receptor co-activator [16] in the breast served as potential oncogenic co-activators of and biomarkers for thyroid and breast cancers. Furthermore, it has been reported that the risk of synchronous thyroid and breast cancer is associated with Cowden syndrome and Cowden-like syndrome, which usually cause multiple cancers via flavin adenine dinucleotide (FAD)/nicotinamide adenine dinucleotide (NAD)-dependent destabilization of P53 [17]. According to one of the recent retrospective study by Iikel et al, Increased risk of breast cancer in follow-up period of thyroid cancer or vice versa has been reported. However, they have some associations, synchronous presentation of these tumors is rare and they presented 12 patients diagnosed as breast and thyroid cancer and treated at the same time, and they observed that they were common among post menopausal women, similar to the present case and most common among them being papillary carcinoma thyroid [3].

## Conclusion

Although synchronous primary tumors of the thyroid and breast are very rare, they remain a possibility, therefore more attention should be paid to these cancer, especially in elderly postmenopausal women and association of these tumors should be evaluated by large scaled studies.

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