

Breast Cancer Metastasis to the Thyroid Gland: Case Report

Meme Kanserinin Tiroid Bezine Metastazı

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ABSTRACT Breast cancer metastasis can develop even after successful primary tumor treatment. Breast cancer with thyroid gland metastasis is rare. The present patient was diagnosed with TNM stage IIIB breast cancer and underwent a modified radical mastectomy followed by chemotherapy and hormone therapy. At 32 months postoperatively, a painful mass developed in the right thyroid region. Ultrasonography guided needle biopsy was performed, and histopathology tests revealed a malignant lesion. A total thyroidectomy was performed, and histopathology tests indicated that the lesion was a metastatic tumor from invasive ductal carcinoma of the breast. Although thyroid gland metastases are rare, a metastatic lesion should be considered when a patient with a history of malignancy presents with a thyroid nodule.

Key Words: Thyroid gland; neoplasm metastasis; breast; breast neoplasms

ÖZET Primer meme kanserinin başarılı bir şekilde tedavisinden sonra bile uzak metastaz gelişme riski vardır. Tiroid bezine metastaz yapmış meme kanseri nadirdir. Sunulan hasta TNM evre IIIB meme kanseri olarak teşhis edildi. Hastaya modifiye radikal mastektomi yapıldıktan sonra kemo-terapi ve hormonoterapi uygulandı. Ameliyat sonrası dönemin 32'inci ayında sağ tiroid bölgesinde ağrılı bir kitle meydana geldi. Ultrasonografi eşliğinde iğne biyopsisi yapıldı ve histopatolojik testler malign bir lezyonu ortaya koydu. Hastaya total tiroidektomi yapıldı ve piyesin histopatolojik inceleme sonucu memenin invaziv duktal karsinom metastazı ile uyumlu bulundu. Tiroid bezine metastaz nadir olmasına rağmen, öyküsünde malignitesi bulunan hastalarda tiroid bezinde nodül saptandığında nodülün metastatik lezyon olabileceği düşünülmelidir.

Anahtar Kelimeler: Tiroid bezi; tümör metastazı; meme; meme tümörleri

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Breast cancer metastasis can develop even after successful primary tumor treatment. Distant metastasis results in reduced quality of life, increased treatment costs, and is the form of breast cancer recurrence with the highest mortality rate.¹

Breast cancer metastases most frequently occur in the lungs, brain, bone and liver. Despite a rich blood supply, metastasis to the thyroid gland is rare and does not cause clinical symptoms.² Metastatic cancer comprises only 1-3% of thyroid cancers.^{3,4} Primary cancers that metastasize to the thyroid usually originate from the kidney, lung or breast.⁵⁻⁷

The present case report describes the clinical, pathological and radiological aspects of a patient who underwent breast cancer surgery, and who 32 months later was detected with a thyroid metastasis.

CASE REPORT

A 38-year-old female was diagnosed with a right breast invasive ductal carcinoma. A radical modified mastectomy was performed in April 2005. The tumor was determined to be TNM stage IIIB, estrogen receptor double positive (staining ratio: 50%), and progesterone receptor double positive (staining ratio: 60%). The patient underwent chemotherapy, radiotherapy and hormone therapy during oncological follow-up. At 32 months post-operatively, the patient complained of swelling and pain in the thyroid region. Physical examination revealed a hard, nodular palpable mass in the right thyroid lobe. Thyroid hormone and other laboratory tests returned normal findings. Thyroid ultrasonography showed a 31x26 mm nodule in the right lobe. A fine needle aspiration biopsy (FNAB) was performed, and histopathological examination of the specimen revealed atypical cells with malignant characteristics. A bilateral total thyroidectomy was performed. Immunohistochemical examination showed that the specimen was negative for estrogen, progesterone, c-erbB2, thyroglobulin and TTF-1 (thyroid transcription factor 1). Tumor cells stained positive for GCDFP-15 (gross cystic disease fluid protein 15) (Figure 1). These results were consistent with a metastasis from an invasive ductal carcinoma of the breast (Figure 2).

Positron emission tomography (PET) scans were performed following the thyroidectomy. The scans revealed hypermetabolic lymph nodes in the neck and mediastinum regions, and foci of increased fluorodeoxyglucose (FDG) uptake in the corpus regions of the L2 and L5 vertebrae. An excisional biopsy was performed to obtain a supraclavicular lymph node specimen. Histopathological examination showed that the specimen was estrogen positive, GCDFP-15 positive, and TTF-1 negative, and that it was consistent with a metastasis from an invasive ductal carcinoma of the bre-

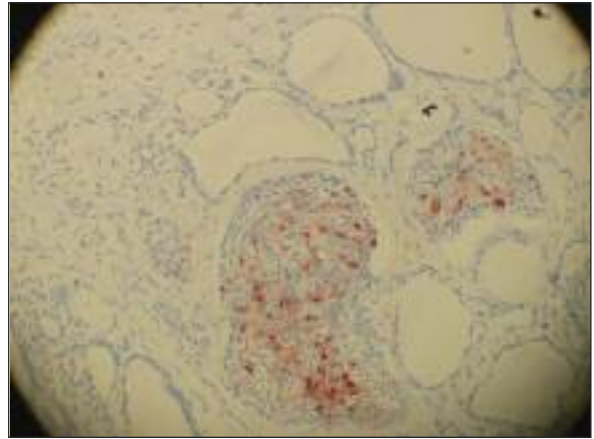


FIGURE 1: GCDFP-15 (Gross cystic disease fluid protein 15) positive metastatic carcinoma cells (x100).

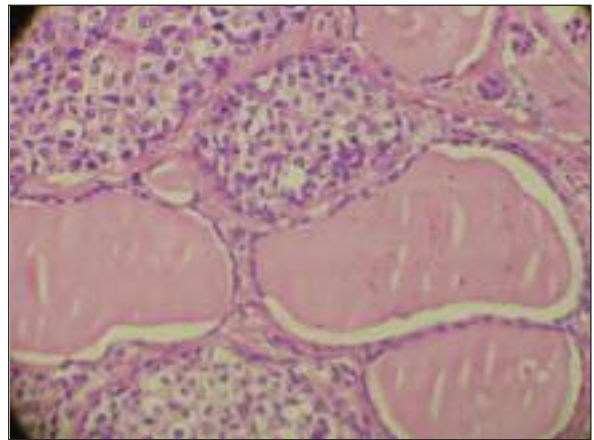


FIGURE 2: Invasive ductal carcinoma metastasis in the thyroid gland (HE, x400).

ast. Medical and radiotherapy were commenced. The patient is alive and has completed the 19th month in the post-thyroidectomy period.

DISCUSSION

The most common cause of mortality due to breast cancer is distant metastasis, and the most frequent sites of metastasis are the lungs, brain, bones and liver.¹ The average survival of a breast cancer patient with distant metastasis is 2-4 years. The thyroid gland is a rare site for metastasis. While clinical studies show metastatic malignancies comprise only 1-3% of all malignant thyroid gland lesions, postmortem studies show the rate is 1.25-24%.^{3,4,8} Most such malignancies are clinically occult tumors.⁸⁻¹¹ The tumor that most frequently metastas-

sizes to the thyroid gland is renal cell carcinoma, followed by breast, lung and gastrointestinal system tumors. Metastasis to the thyroid gland is frequently observed in female patients in the sixth and seventh decades of life.¹²⁻¹⁴

In the present case, the patient was diagnosed with a TNM stage IIIB breast cancer and was treated with a modified radical mastectomy followed by chemotherapy, radiotherapy and hormone therapy. The thyroid gland metastasis was identified approximately 32 months later. McCabe et al recommended that thyroid gland masses be considered metastatic until proven otherwise in patients with a history of cancer, even if the primary tumor has been removed.¹⁵ The time between primary tumor removal and thyroid metastasis detection varies between studies. Lam et al reported an average interval of 9 months, whereas Cichoń et al reported an average of 8.9 (range, 2-17) years.^{9,16} For renal cancers, this period was reported to average 7.6 years by Mirallié et al, 9.4 years by Heffess et al⁷ and 1-26 years by Nakhjavani et al.^{5,7,17} A long disease-free interval has also been reported for breast and cervix cancers.

Calcitonin and thyroglobulin tests return negative findings for tumors that metastasize to the thyroid. Immunohistochemical staining for TTF-1 is used to distinguish between primary and metastatic thyroid tumors.^{18,19} In the current case, immunohistochemical tests showed the tumor was thyroglobulin, calcitonin and TTF-1 negative, and that thyroid hormone levels were normal. Diagnosis of thyroid metastatic disease is difficult since metastasis has an asymptomatic course and the lesions are usually quite small. Ultrasonography guided FNAB is an important modality for assessing thyroid diseases. The sensitivity and specificity of thyroid FNAB in the diagnosis of malignant thyroid disorders is reported as 76% and 84%, respec-

tively.^{4,14} Lam KY detected malignancies in 80% of patients using thyroid gland FNAB, but the tumor origin was detected in only half of those patients.¹⁶

Thyroid gland metastasis is a systemic disorder usually accompanied by metastatic lesions in other organs; cases of thyroid involvement alone are rare.^{2,20} The prognosis in such cases is poor due to minimal response to traditional treatments. However, radical surgical interventions performed for isolated thyroid metastasis of renal carcinomas have produced favorable results. Although there is no consensus regarding surgical intervention for metastatic thyroid disease, total thyroidectomy appears to be the most appropriate treatment when considering the multifocal nature of metastatic lesions.¹⁴ Nakhjavani et al reported a lower survival rate in thyroid metastasis patients treated non-surgically (25 months) compared to those treated with surgery alone or surgery plus adjuvant treatment (34 months).⁵

Using PET scans following surgery, we detected hypermetabolic lymph nodes in the lymphatic stations of the neck and mediastinum region, and metastatic lesions in the corpus regions of the L2-L5 vertebrae. PET scans are used particularly in recurrent cancer screening based on the principle that cancer cells utilize more sugar FDG than normal cells. Leboeuf et al presented a primary thyroid cancer detected at the same time as a breast cancer that had metastasized to the thyroid gland as an incidentaloma.²¹

The present case shows that breast cancer metastasis to the thyroid gland can occur years after primary cancer surgery. Clinical and cytological assessments should be performed when a thyroid nodule is detected in a patient with a history of malignancy. Patients diagnosed with thyroid gland metastasis should also be evaluated with regard to other metastatic lesions.

REFERENCES

- Rabbani SA, Mazar AP. Evaluating distant metastases in breast cancer: from biology to outcomes. *Cancer Metastasis Rev* 2007;26(3-4):663-74.
- Kim TY, Kim WB, Gong G, Hong SJ, Shong YK. Metastasis to the thyroid diagnosed by fine-needle aspiration biopsy. *Clin Endocrinol* 2005;62(2):236-41.
- Barczyński M, Jamski J, Cichoń S, Barczyński M, Sułowicz W. [Diagnosis, treatment and prognosis in cases of renal clear cell carcinoma metastases into the thyroid gland]. *Przegl Lek* 2000;57(3):157-9.
- Bayram F, Soyuer I, Atmaca H, Demirci D, Gokce C, Canoz O, et al. Prostatic adenocarcinoma metastasis in the thyroid gland. *Endocr J* 2004;51(4):445-8.
- Nakhjavani MK, Gharib H, Goellner JR, van Heerden JA. Metastasis to the thyroid gland. A report of 43 cases. *Cancer* 1997;79(3):574-8.
- Ménégaux F, Chigot JP. [Thyroid metastases]. *Ann Chir* 2001;126(10):981-4.
- Heffess CS, Wenig BM, Thompson LD. Metastatic renal cell carcinoma to the thyroid gland: a clinicopathologic study of 36 cases. *Cancer* 2002;95(9):1869-78.
- Chung SY, Kim EK, Kim JH, Oh KK, Kim DJ, Lee YH, et al. Sonographic findings of metastatic disease to the thyroid. *Yonsei Med J* 2001;42(4):411-7.
- Berge T, Lundberg S. Cancer in Malmö 1958-1969. An autopsy study. *Acta Pathol Microbiol Scand Suppl* 1977;(260):1-235.
- Chen H, Nicol TL, Udelsman R. Clinically significant, isolated metastatic disease to the thyroid gland. *World J Surg* 1999;23(2):177-80.
- Bogges MA, Hester TO, Archer SM. Renal clear cell carcinoma appearing as a left neck mass. *Ear Nose Throat J* 1996;75(9):620-2.
- Calzolari F, Sartori PV, Talarico C, Parmeggiani D, Beretta E, Pezzullo L, et al. Surgical treatment of intrathyroid metastases: preliminary results of a multicentric study. *Anticancer Res* 2008;28(5B):2885-8.
- Congiu A, Nicolosi A, Mallocci A, Piga A, Calò PG, Murtas MG. [Isolated thyroid and skin metastases of renal carcinoma]. *Minerva Chir* 1994;49(3):223-7.
- Cichoń S, Anielski R, Konturek A, Barczyński M, Cichoń W. Metastases to the thyroid gland: seventeen cases operated on in a single clinical center. *Langenbecks Arch Surg* 2006;391(6):581-7.
- McCabe DP, Farrar WB, Petkov TM, Finkelmeier W, O'Dwyer P, James A. Clinical and pathologic correlations in disease metastatic to the thyroid gland. *Am J Surg* 1985;150(4):519-23.
- Lam KY, Lo CY. Metastatic tumors of the thyroid gland: a study of 79 cases in Chinese patients. *Arch Pathol Lab Med* 1988;122(1):37-41.
- Mirallié E, Rigaud J, Mathonnet M, Gibelin H, Regenet N, Hamy A, et al. Management and prognosis of metastases to the thyroid gland. *J Am Coll Surg* 2005;200(2):203-7.
- Feldman MD, Baloch ZW, LiVolsi VA. Metastatic breast carcinoma mimicking primary thyroid neoplasm in young women. *Endocr Pract* 1999;5(6):343-6.
- Wada N, Hirakawa S, Rino Y, Hasuo K, Kawachi K, Nakatani Y, et al. Solitary metachronous metastasis to the thyroid from renal clear cell carcinoma 19 years after nephrectomy: report of a case. *Surg Today* 2005;35(6):483-7.
- Wood K, Vini L, Harmer C. Metastases to the thyroid gland: the Royal Marsden experience. *Eur J Surg Oncol* 2004;30(6):583-8.
- Leboeuf R, Bénard F, Langlois MF. Thyroid cancer presenting as a PET incidentaloma in a patient with concomitant breast cancer metastases to the thyroid. *Clin Nucl Med* 2006;31(7):382-5.