

Metastatic Breast Lesion From Thymic Carcinoma

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Metastases to the breast from other organs are not common.¹ Among lesions metastatic to the breast, carcinoma of the opposite breast, multicentric lymphoid malignancies, and disseminated melanoma constitute the most likely sources.² Thymic carcinoma is a rare malignant neoplasm representing 0.2% to 1.5% of all malignancies.³ The incidence of distant metastasis from thymic carcinoma varies from 1.5% to 15.5%, and the tumor metastasizes most frequently to the liver, followed by the kidney and extrathoracic lymph nodes.⁴ We present a case of thymic carcinoma metastatic to the breast. To our knowledge, this is the first report of thymic carcinoma metastatic to the breast.

Case Report

A 51-year-old woman was referred to the hospital with 1-year history of stiffness of the neck and abnormal findings on chest radiography. Chest radiography showed an abnormal mass in the mediastinum (Figure 1). Computed tomography revealed the left anterior mediastinal mass abutting the ascending aorta, the aortic arch, and the main pulmonary artery and compressing the left brachiocephalic vein (Figure 2). The patient had a thoracotomy with resection of a mediastinal tumor. The histologic diagnosis was thymic carcinoma, poorly differentiated squamous cell type with focal involvement of the upper resection margin (Figure 3). The dissected mediastinal lymph nodes were free of carcinoma (Masaoka stage III). Subsequently during the next 5 months, the patient received adjuvant chemotherapy consisting of doxorubicin [40 mg/(m² · d)], cisplatin [75 mg/(m² · d)], vincristine [0.6 mg/(m² · d)], and cyclophosphamide [700 mg/(m² · d)] for 5 cycles and radiation therapy at 5940 cGy to the tumor area in the mediastinum after the third chemotherapy cycle.

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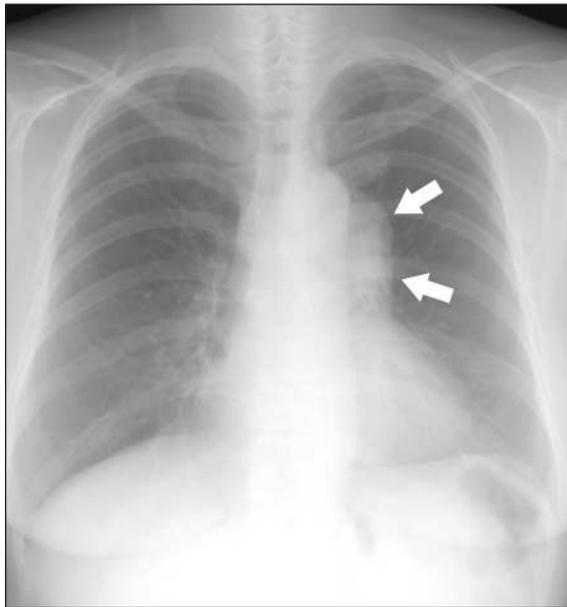


Figure 1. Posteroanterior chest radiograph shows a large mass in the left anterior mediastinum (arrows).

After the fifth chemotherapy cycle, the patient had a palpable mass in the right upper breast. Mammography revealed an oval mass in the right upper breast (Figure 4). On sonography, an oval, hypoechoic mass with a nonparallel orientation was depicted in the upper outer portion of the right breast, corresponding to the area of palpable abnormality (Figure 5). Increased vascularity in the mass was detected with color Doppler sonography. Sonographically guided 14-gauge core needle biopsy was performed with 5 passes, and the histologic diagnosis was metastatic kera-

tinizing squamous thymic carcinoma. Irregularly sized nests of polygonal cells were embedded in a densely fibrous stroma, and tumor cells were poorly differentiated with a small to moderate amount of eosinophilic cytoplasm, vesicular nuclei, and prominent nucleoli. Squamous pearls were found occasionally. The histologic features were similar to those of the mediastinal mass, which had been resected 6 months earlier (Figure 6). The patient was treated with radiation therapy at 3750 cGy to the tumor area in the right upper breast and subsequently with combined chemotherapy of irinotecan and methotrexate. The metastatic lesion decreased in size by 50% after 2 cycles, but chemotherapy was discontinued per the patient's request. Three months later, another metastatic lesion was discovered in the right forearm. Nine months later, a metastatic lesion was detected in the brain, and 1 year later, a metastatic right pleural lesion was discovered. The patient subsequently started receiving chemotherapy again.

Discussion

Thymic carcinoma is a rare malignant neoplasm, accounting for only 0.06% of thymic neoplasms. Thymic carcinoma arises from thymic epithelial cells with overt features of malignancy similar to those of carcinoma arising in any other organ, with a propensity for capsular invasion and metastasis.^{3,5} Histologically, thymic carcinoma is differentiated from thymoma by obvious cytologic atypia.⁶ Thymic carcinoma often metastasizes to the regional lymph nodes and variable

Figure 2. Contrast-enhanced computed tomograms at the level of the aortic arch (A) and the carina (B) show the left anterior mediastinal mass with heterogeneous enhancement and necrosis, measuring 5.5 × 5.0 cm, abutting the ascending aorta, the aortic arch, and the main pulmonary artery, stretching the left brachiocephalic vein, and extending to adjacent mediastinal fat.



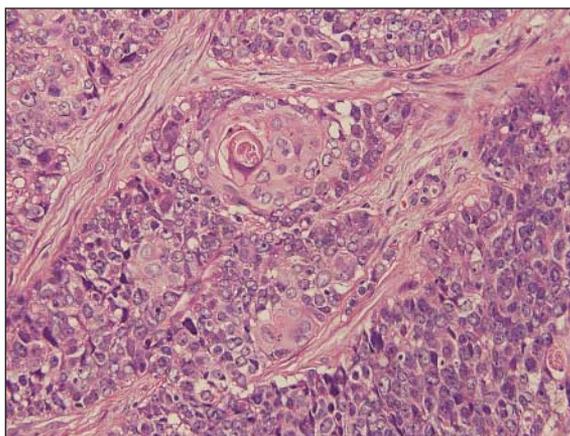
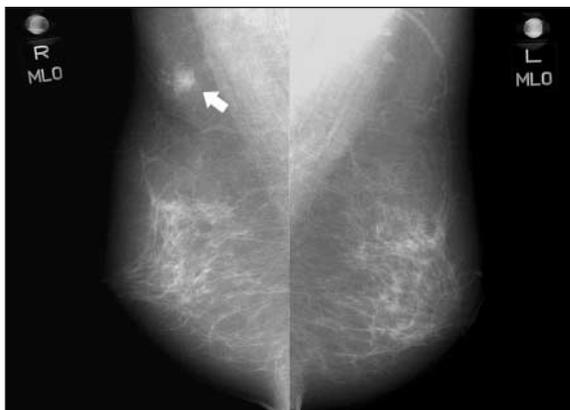


Figure 3. Microscopic specimen of the resected mediastinal mass shows keratinizing squamous thymic carcinoma. Irregularly sized nests of polygonal cells are embedded in a densely fibrous stroma with occasional squamous pearls (hematoxylin-eosin, original magnification $\times 400$).

extrathoracic organs, particularly bone, lung, and liver.⁷ To our knowledge, metastasis to the breast has not been reported.

Although primary breast cancer is the most common malignancy in women in the Western world,⁸ metastases to the breast from extramammary malignant neoplasms are rare and reportedly account for 0.5% to 6.6% of all breast malignancies.^{9,10} Approximately 400 patients with secondary involvement of the breast by extramammary primary tumors have been reported to date, and hematologic neoplasms, malignant melanoma, and lung carcinoma, in decreasing order of frequency, are the most commonly reported primary tumors to metastasize to

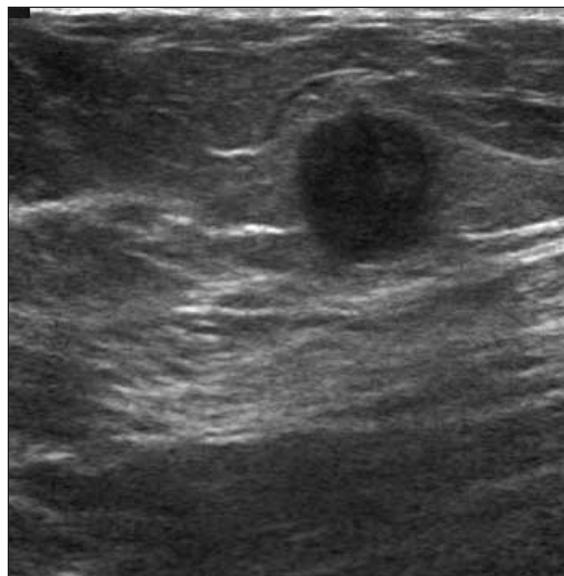
Figure 4. Bilateral mediolateral oblique (MLO) mammograms show an oval, hyperdense mass in the right (R) breast (arrow) with no abnormalities noted in the left (L) breast.



the breast.⁸ Most patients have a known diagnosis of carcinoma at the time of the appearance of breast metastases, as in this case. Approximately one third of patients are known to have systemic and diffuse metastatic disease before metastasis to the breast, but breast metastasis may be the first manifestation of disease in up to 25% of cases.^{11,12}

Hematogenous metastasis to the breast most commonly consists of single or multiple discrete nodules that tend to have similar sizes on palpation and mammography.⁹ Clinically, breast metastases occur as palpable, round masses that may not be easily differentiated from solid, benign nodules. Breast metastases are firm in consistency and freely mobile with no fixation to the skin or the underlying pectoralis muscle. Because these lesions show rapid growth, an important clue to their nature may be a rapid increase in the size of nodules between interval mammography or sonography.¹³ The most common mammographic appearance of breast metastases is that of 1 or more circumscribed round nodules with slightly irregular margins, located in the upper outer quadrants, without spiculations, calcifications, or other signs of a surrounding desmoplastic reaction that characterize most primary carcinomas.^{13,14} A variety of

Figure 5. Sonogram of the upper outer portion of the right breast in the region of the palpable abnormality shows a $10 \times 10 \times 10$ -mm oval, hypoechoic mass with a nonparallel orientation and an echogenic halo, which was classified as American College of Radiology Breast Imaging Reporting and Data System category 4.



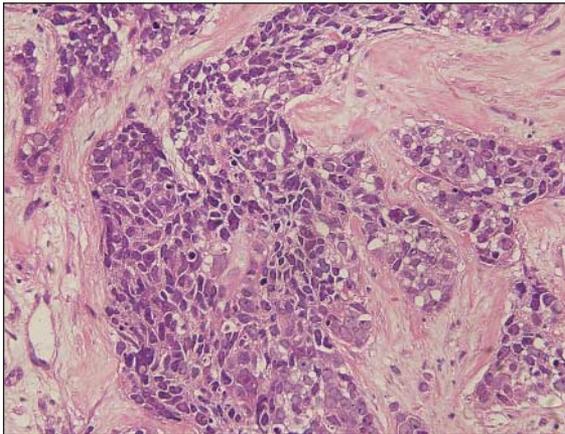


Figure 6. Microscopic specimen of the breast mass shows irregular nests of polygonal tumor cells with densely fibrous stroma, which are similar to those of the mediastinal mass of keratinizing squamous thymic carcinoma (hematoxylin-eosin, original magnification $\times 400$).

sonographic findings have been reported, including well-defined or poorly defined, hyperechoic or hypoechoic, solid masses with acoustic shadowing or increased through-transmission.^{15,16} Typical metastatic lesions are rounded or oval, with low echogenicity and a well-defined posterior wall.¹² Vascularity of some lesions can be visualized with color flow Doppler sonography. In this case, the mammographic and sonographic findings of the metastatic breast lesion were relatively typical, as discussed.

Distinguishing between primary breast adenocarcinoma and a metastatic deposit may be extremely difficult because of the wide spectrum of presentations of the metastatic nodules. Metastatic lesions may simulate primary breast carcinoma or benign abnormalities radiographically. Accurate diagnosis, differentiating primary from metastatic breast carcinoma, is important for rational and optimal therapy and avoidance of unnecessary mastectomies. Consequently, metastatic carcinoma must be confirmed by appropriate histopathologic and immunohistochemical examinations.⁸

In summary, we describe a case of thymic carcinoma metastatic to the breast. Metastatic nodules in the breast are uncommon. When mammography and sonography show a mass without the typical features of primary breast carcinoma in a patient with a known extramammary neoplasm, metastasis to the breast should be considered and confirmed by appropriate histopathologic examination.

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