

Metastasis of Breast Carcinoma to Intercostal Muscle Detected by Breast MRI: A Case Report¹

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Breast cancer can metastasize to any organ; however, distant metastases are unusual at the time of diagnosis. Furthermore metastasis to skeletal muscle is an uncommon manifestation of malignancy. We report a case of a 45-year-old woman diagnosed with cancer of the left breast with metastases to the ipsilateral intercostal muscle. To the best of our knowledge this is the first report of intercostal muscle metastasis from breast cancer in the English literature.

Index words : Intercostal Muscles
Neoplasm Metastasis
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Breast cancer is the most common malignancy in women and the second most important cause of death from cancer (1). The tumor size, lymph node status, and histological tumor grade of the tumor nuclei are important factors determining the likelihood that metastatic disease develops (2). The primary prognostic factor for breast cancer is axillary lymph node metastasis (3). The significant cause of death in patients with breast cancer is the neoplastic extension to vital organs (4). For that reason, from onset, breast cancer has been regarded as a systemic disease (4). The most frequent sites of metastasis from breast cancer, in decreasing order, include lung, bone, lymph nodes, liver, and pleura (4). On the other hand, metastases to skeletal muscle are extremely rare (5, 6). To our knowledge, there is no report of intercostal muscle metastasis from breast cancer in the literature. So, we present a case of metastatic involvement of the intercostal muscle from breast cancer with image find-

ings.

Case Report

A 45-year-old woman presented with a palpable mass in her left breast that she had been aware of for two weeks. The mammogram revealed an approximately 3.0 cm, irregularly-shaped, spiculated, high density mass with internal calcifications and adjacent architectural distortion in the upper outer quadrant of the left breast.

Ultrasonography of the breast demonstrated a hypochoic mass measuring about 3.2 × 1.9 cm with an irregular shape, angular margin, containing internal microcalcifications in the 2 o'clock position of the left breast, about 3.0 cm from the nipple. Mammographic and sonographic findings were consistent with BI-RADS category 5, highly suggestive of malignancy. An US-guided 14 gauge core biopsy was performed and the pathologic result was determined to be an invasive ductal carcinoma. For pre-operative staging, the patient underwent breast MRI, and whole body PET scan. On breast MRI, left breast cancer was presented as mass measuring about 3.0 cm with irregular shape and margin, appear-

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ing as a low signal intensity on T1-weighted axial images, high signal intensity on fat saturated T2-weighted axial images, and heterogeneous strong enhancement on dynamic contrast enhanced T1-weighted axial images (Fig. 1). Another oval-shaped enhancing mass was also seen in left 7th intercostal muscle on contrast enhanced T1-weighted axial images (Figs. 1B-D). This lesion showed the same signal intensity with the breast mass, low signal intensity on T1-weighted axial images (Fig. 1A), high signal intensity on fat saturated T2-weighted axial images (Fig. 1B), and heterogeneous strong enhancement on dynamic contrast enhanced T1-weighted axial images (Fig. 1C). A whole body PET scan revealed increased F-18 fluorodeoxyglucose (FDG) uptake in both the left breast cancer and intercostal lesion

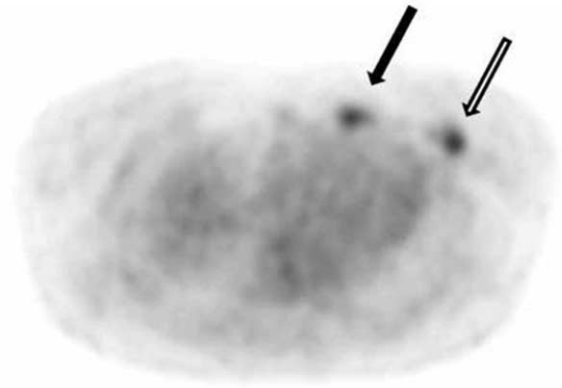


Fig. 2. Axial image of PET scan shows increased FDG uptake foci in the Lt. anterior chest wall (black arrow, SUV = 2.4) and left breast (open arrow, SUV = 4.5).

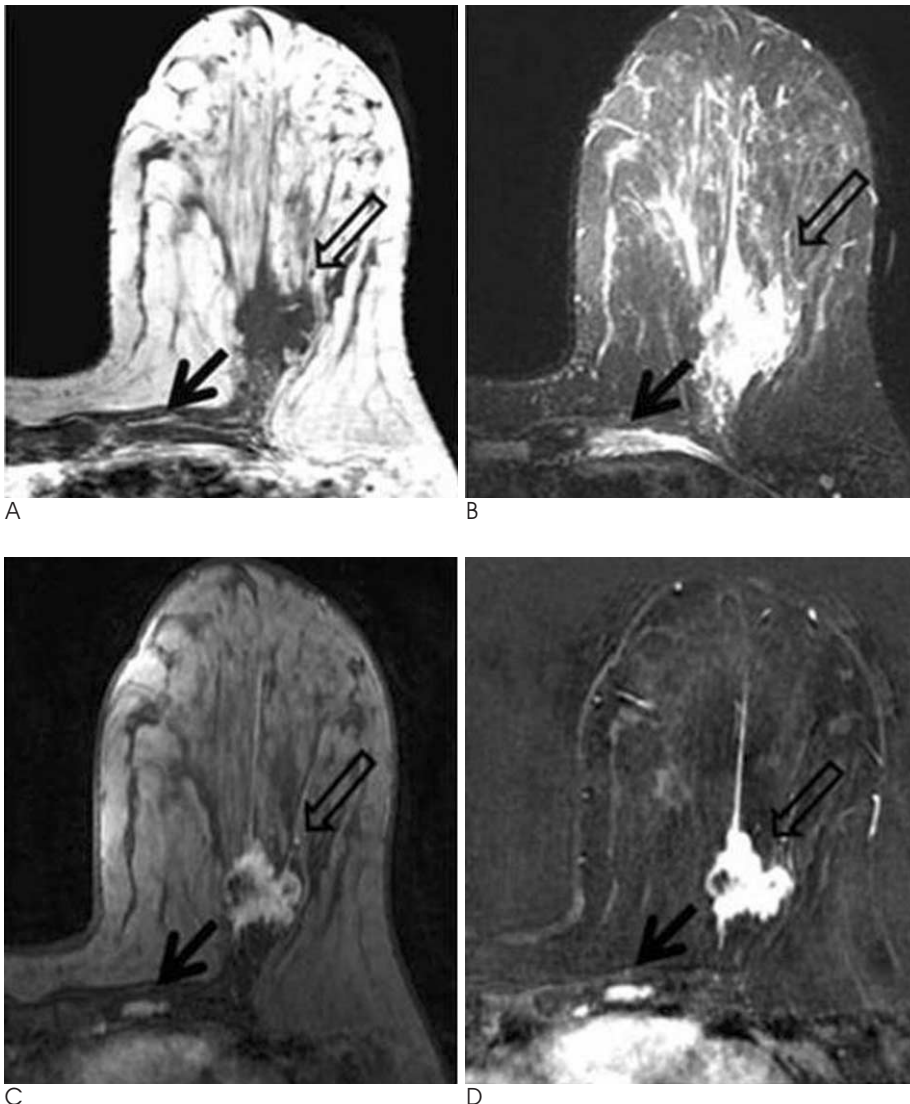


Fig. 1. A 45-year-old woman with Lt. intercostal muscle metastasis from breast cancer.

A. Non-enhanced T1-weighted axial image shows a low signal intensity lesion in the Lt. 7th intercostal muscle (solid arrow) and primary left breast cancer (open arrow).

B. High signal intensity lesion at the Lt. 7th intercostal muscle (solid arrow) and primary left breast cancer (open arrow) on fat saturated T2-weighted axial image.

C, D. Gd-DTPA enhanced T1-weighted axial image and subtraction axial MR image show an enhancing lesion measuring about 2.0×0.6 cm in the Lt. 7th intercostal muscle (solid arrow) and primary left breast cancer (open arrow).

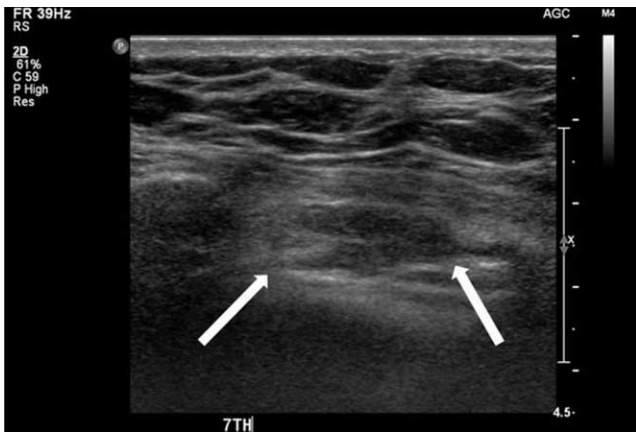


Fig. 3. Ultrasonography shows an oval shaped, low echoic mass measuring about 1.8×0.6 cm in the left intercostal muscle. On color Doppler study, increased blood flow is not seen within the mass (not shown).



Fig. 4. Contrast enhanced axial CT image shows an enhancing lesion measuring about 2.0×0.6 cm in the left 7th intercostal muscle (arrow) and primary Lt. breast cancer (open arrow)

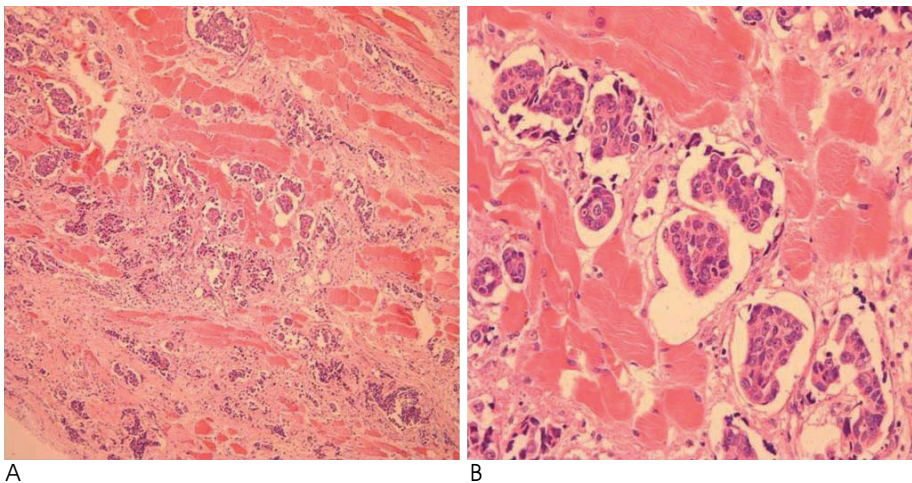


Fig. 5. A, B. Photomicrograph (Hematoxylin & Eosin staining, $\times 100$ & $\times 400$) of the left 7th intercostal mass specimen shows tumor cell nests dissecting the fascicles of the skeletal muscle and surrounding soft tissue with some tumor cells located in the lymphovascular spaces. The diagnosis is metastatic ductal carcinoma from the breast.

(SUV = 4.5 and 2.4 in each lesions) (Fig. 2). For the differential diagnosis with primary or metastatic lesion, a 2nd look ultrasound was performed, which revealed an oval-shaped, relatively well-defined hypoechoic mass at the 7th intercostal muscle measuring about 1.8×0.6 cm (Fig. 3). A chest CT scan detected an enhancing lesion measuring about 2.0×0.6 cm in the left 7th intercostal muscle near the costochondral junction (Fig. 4). Preoperative US-guided percutaneous needle aspiration biopsy of the left intercostal lesion showed the histopathologic diagnosis of metastatic ductal carcinoma of the breast.

A partial mastectomy for left breast cancer was performed and the 2.8-cm tumor was histologically diagnosed as an invasive ductal carcinoma. The left intercostal mass was excised en bloc and the pathology revealed metastatic breast cancer with all margins of resection free of carcinoma cells (Fig. 5).

Discussion

Theoretically, breast cancer can metastasize to any organ by contiguous, lymphatic, and hematogenous spread. Lung, bone, lymph nodes, liver, and pleura are the five most common sites of breast cancer metastasis (4). However, skeletal muscle metastasis is extremely rare (7). There are several hypotheses that the lactic acid produced by skeletal muscles, variable blood flow, high tissue pressure, muscle pH, and protease inhibitors in the muscle extracellular matrix may prevent tumor implantation and metastasis (8). The primary malignancies, most likely to metastasize to skeletal muscle, are lung cancer, renal cell cancer, and colon carcinoma (8). With respect to breast cancer, there are only a few reports about skeletal muscle metastasis. To the best of my knowledge, there has been no report of intercostal

muscle involvement, making this the first such report. Due to the late manifestation in the disease progress of skeletal muscle metastasis, it is relatively uncommon to detect skeletal metastasis at the time as primary cancer diagnosis. Clinically, skeletal muscle metastasis presents as a mass with or without pain. A solitary intramuscular mass with extramuscular metastasis is a usual manifestation, but multiple or extensive muscular metastases can occur (9). The differential diagnosis with primary sarcoma is important because the treatment is different (7). However, the image findings of skeletal muscle metastasis are non-specific and similar to sarcoma (7, 8). So, a pathologic confirmation is crucial for differentiation. Treatment for skeletal metastasis should be planned out considering each individual situation including the symptoms, disease spread, and prognosis, because most skeletal metastases are an end-stage disease with a poor-prognosis (6). The present case is the first metastatic tumor of intercostal muscle from breast carcinoma presenting as a discrete soft tissue mass mimicking a soft tissue sarcoma. Awareness of this occurrence is of extreme importance because its prognostic and therapeutic implications are quite different.

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유방 자기공명 영상으로 발견한 유방암의 갈비사이근 전이: 증례 보고¹

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조경은 · 손은주 · 김정아 · 육지현 · 김은경 · 광진영 · 정 준²

유방암은 어느 장기로도 전이 할 수 있지만 진단 시 원격전이가 있는 경우는 흔하지 않다. 그 뿐만 아니라, 유방암의 골격근 전이는 매우 드물다. 이에, 저자들은 좌측 유방의 악성 종양이 동측 갈비사이근으로 전이된, 45세 여성에 대해 증례보고를 하고자 한다. 현재까지 저자들이 아는 바로는 유방암의 갈비사이근 전이는 보고된 적이 없다.