Interesting Dynamic Contrast-Enhanced Magnetic Resonance Imaging Findings of Metaplastic Breast Carcinoma with Skeletal Muscle Metastasis

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To the Editor: A 76-year-old woman presented with palpable masses in her right breast and right forearm. Physical examination revealed a 5-cm-sized mass in the lower outer quadrant of the right breast and a hard, fixed mass, measuring 4 cm in the right forearm. Mammography revealed a round, obscured, hyperdense mass without microcalcifications. Ultrasonography revealed an oval, circumscribed, complex cystic, and solid mass with a predominant cystic component in the lower outer quadrant of the right breast. On dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI), the mass showed rim enhancement in part of the thick, irregular wall with an eccentric solid portion and a rapid rate of enhancement in the initial period and washout in the delayed period of enhancement [Figure 1a and 1b]. There were additional findings such as adjacent vessel sign and a prominent increase in ipsilateral whole-breast vascularity compared to the contralateral breast [Figure 1c].

The kinetic curve in the enhancing solid portion of the mass was a pattern of fast and washout. Time to peak enhancement (TTP) was 70 s, and the signal enhancement ratio (SER) was 1.34.

MRI of the right forearm mass showed a well-defined, lobulated, heterogeneous mass with high signal intensity on T2WI and a strong heterogeneous enhanced mass at the brachioradialis muscle. To address suspicion of systemic metastasis, the patient underwent positron emission tomography-computed tomography, which showed no other metastatic sites except the right forearm. The patient underwent total mastectomy with dissection of ipsilateral axillary lymph nodes and complete surgical excision of the right forearm mass. The masses revealed cells polygonal to spindle in shape with cytologic atypia and numerous mitoses including atypical mitosis [Figure 1d]. Furthermore, the mass showed immunoreactivity for cytokeratin [Figure 1e]. On the other hand, most masses exhibited sarcomatous components with immunoreactivity for vimentin and smooth muscle actin [Figure 1f]. Therefore, the masses of breast and forearm were diagnosed as metaplastic breast carcinoma with skeletal muscle metastasis.

Metaplastic breast carcinoma is a rare type of breast carcinoma, and its distal skeletal muscle metastasis is an even rarer clinical entity.[1,2] Therefore, it is difficult to distinguish between skeletal muscle metastasis of metaplastic breast carcinoma and primary soft-tissue tumors.

DCE-MRI is a good imaging modality for depicting tumor characteristics and tumor angiogenesis because the contrast enhancement pattern of the tumor correlates with the microvessel density of tumor angiogenesis.[3] In this case, the DCE-MRI of metaplastic breast carcinoma revealed rim enhancement, which was significantly associated with high histologic grade and tumor angiogenesis, and might represent a noninvasive method for preoperative prediction of the biologic aggressiveness of breast cancer. In terms of quantitative DCE-MRI, this case showed adjacent vessel sign and prominently increased ipsilateral whole-breast vascularity compared with the contralateral breast, which were factors significantly associated with histologic grade and distant metastasis.[4] Furthermore, this case exhibited relatively short TTP and high SER. Quantitative kinetic parameters such as TTP and SER on DCE-MRI provide functional lesion characterization of features such as microvessel density and high histologic grade.[5]

In conclusion, although metaplastic breast carcinoma with skeletal muscle metastasis is rare, the possibility of skeletal muscle metastasis should be considered if there are DCE-MRI findings suspicious for an aggressive form of this disease. This highlights the need for preoperative evaluation of the breast using DCE-MRI before complete surgical resection in order to evaluate skeletal muscle metastasis of metaplastic breast carcinoma.

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Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES
1. Liu CH, Chang C, Sy E, Lai HW, Kuo YL. Metaplastic breast carcinoma with multiple muscle metastasis: A case report. Medicine (Baltimore) 2015;94:e662. doi: 10.1097/MD.0000000000000662.
2. Salemis NS. Skeletal muscle metastasis from breast cancer: Management and literature review. Breast Dis 2015;35:37-40. doi: 10.3233/BD-140384.
3. Teifke A, Behr O, Schmidt M, Victor A, Vomweg TW, Thelen M, et al. Dynamic MR imaging of breast lesions: Correlation with microvessel distribution pattern and histologic characteristics of prognosis. Radiology 2006;239:351-60. doi: 10.1148/radiol.2392050205.
4. Han M, Kim TH, Kang DK, Kim KS, Yim H. Prognostic role of MRI enhancement features in patients with breast cancer: Value of adjacent vessel sign and increased ipsilateral whole-breast vascularity. AJR Am J Roentgenol 2012;199:921-8. doi: 10.2214/AJR.11.7895.
5. Tuncbilek N, Karakas HM, Okten OO. Dynamic magnetic resonance imaging in determining histopathological prognostic factors of invasive breast cancers. Eur J Radiol 2005;53:199-205. doi: 10.1016/j.ejrad.2003.11.004.