

# Metastatic Breast Cancer From Rhabdomyosarcoma Mimicking Normal Breast Parenchyma on Sonography

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**R**habdomyosarcoma is a common childhood malignancy. In breast tissue, it is rarely primary and most often metastatic from another site.<sup>1</sup> To our knowledge, there have been few reports detailing sonographic findings of rhabdomyosarcoma in the breast,<sup>2</sup> and the reports that do exist describe various appearances. Here we report a case of metastatic rhabdomyosarcoma in the breast for which the sonographic features were not well differentiated from the normal breast parenchymal structure.

## Abbreviations

CNB, core needle biopsy; CT, computed tomographic; FDG, fluorodeoxyglucose; PET, positron emission sonography

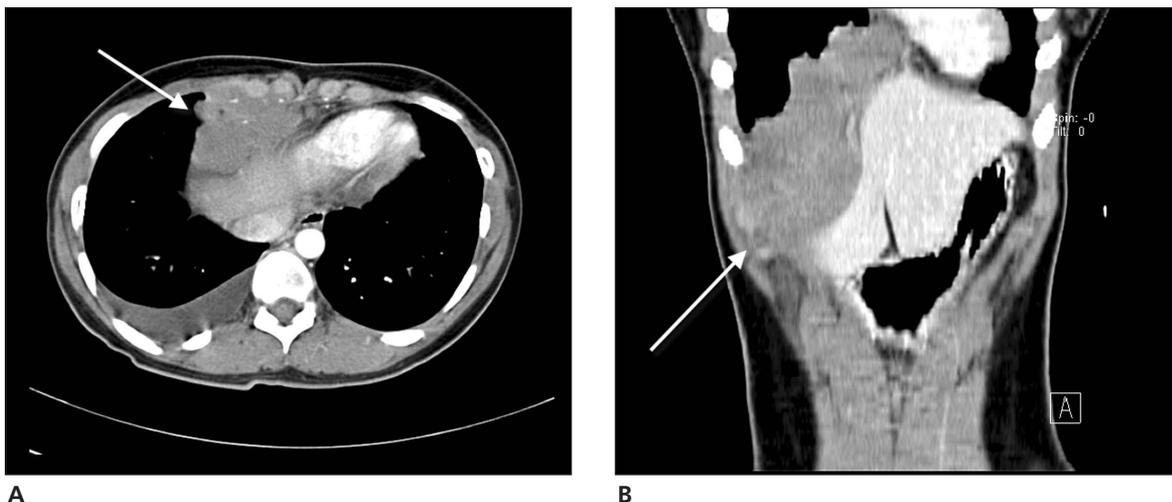
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## Case Report

A 16-year-old female patient was referred to our hospital for evaluation of an anterior mediastinal mass. Computed tomographic (CT) results showed a poorly defined anterior mediastinal mass extending from the right parasternal area into the abdomen (Figure 1). A sonographically guided core needle biopsy (CNB) was performed on the mass, and it was pathologically confirmed to be embryonic rhabdomyosarcoma (Figure 2). Axial fused positron emission sonography (PET)-CT showed marked hypermetabolism in the right breast as well as in the anterior mediastinal mass (Figure 3). On physical examination, a hard and firm nodule, approximately 2 cm in size, was palpated in the upper inner quadrant of the right breast. No axillary lymph nodes were palpable. On sonography, an approximately 3-cm heterogeneous echoic mass with poor vascularity was detected in the palpable area. The mass seemed to be



**Figure 1.** Initial abdominal CT performed at the outpatient clinic. **A**, Axial enhanced image showing a poorly defined anterior mediastinal mass (arrow). **B**, Coronal view showing the mass extending into the abdomen (arrow).

prominent parenchymal tissue and was not well delineated from the surrounding parenchyma (Figure 4). Sonographically guided CNB of the palpable breast mass was performed, and the mass proved to be metastatic rhabdomyosarcoma, which was identical to the pathologic finding of the anterior mediastinal mass. (Figure 5). The patient underwent 4 cycles of chemotherapy with ifosfamide, cisplatin, and etoposide; nevertheless, she died of the disease.

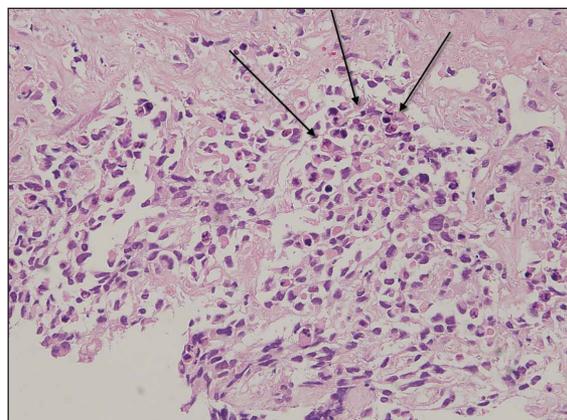
**Discussion**

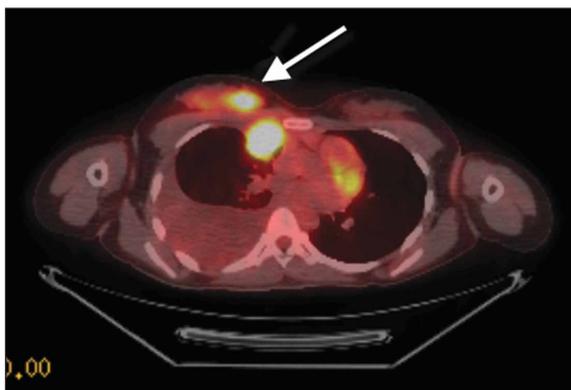
Although rhabdomyosarcoma is a common aggressive primary malignancy in pediatric patients, primary involvement of the breast is very rare. Although metastasis to the breast is more common than primary involvement, it is still uncommon, constituting 6% of all rhabdomyosarcoma metastases.<sup>3</sup> Breast metastasis occurs primarily in adolescent girls with a primary tumor that is most often located in another part of the body, such as the extremities, head, neck, or genitourinary tract. There is a strong association between alveolar tissue and breast involvement.<sup>4</sup> In our case, however, the subtype was embryonal, and the anterior mediastinum was suspected to be the primary site.

Sonography is the most appropriate initial imaging tool for suspected metastatic rhabdomyosarcoma to the breast because of the pre-

dominantly fibroglandular composition of adolescent breast tissue.<sup>3</sup> Mammography, in contrast, has low sensitivity and is of limited value.<sup>5</sup> Although sonography is useful in this setting, very few reports have described the sonographic appearance of rhabdomyosarcoma breast metastases.<sup>2,6</sup> In addition, metastasis to the breast can be an initial clinical manifestation of rhabdomyosarcoma in most cases.<sup>4</sup> For these reasons, the sonographic findings of rhabdomyosarcoma in the breast need to be emphasized.

**Figure 2.** Microscopic section of the anterior mediastinal mass (hematoxylin-eosin, original magnification  $\times 200$ ). There are numerous large round rhabdomyoblasts, which have abundant eosinophilic cytoplasm (arrows).

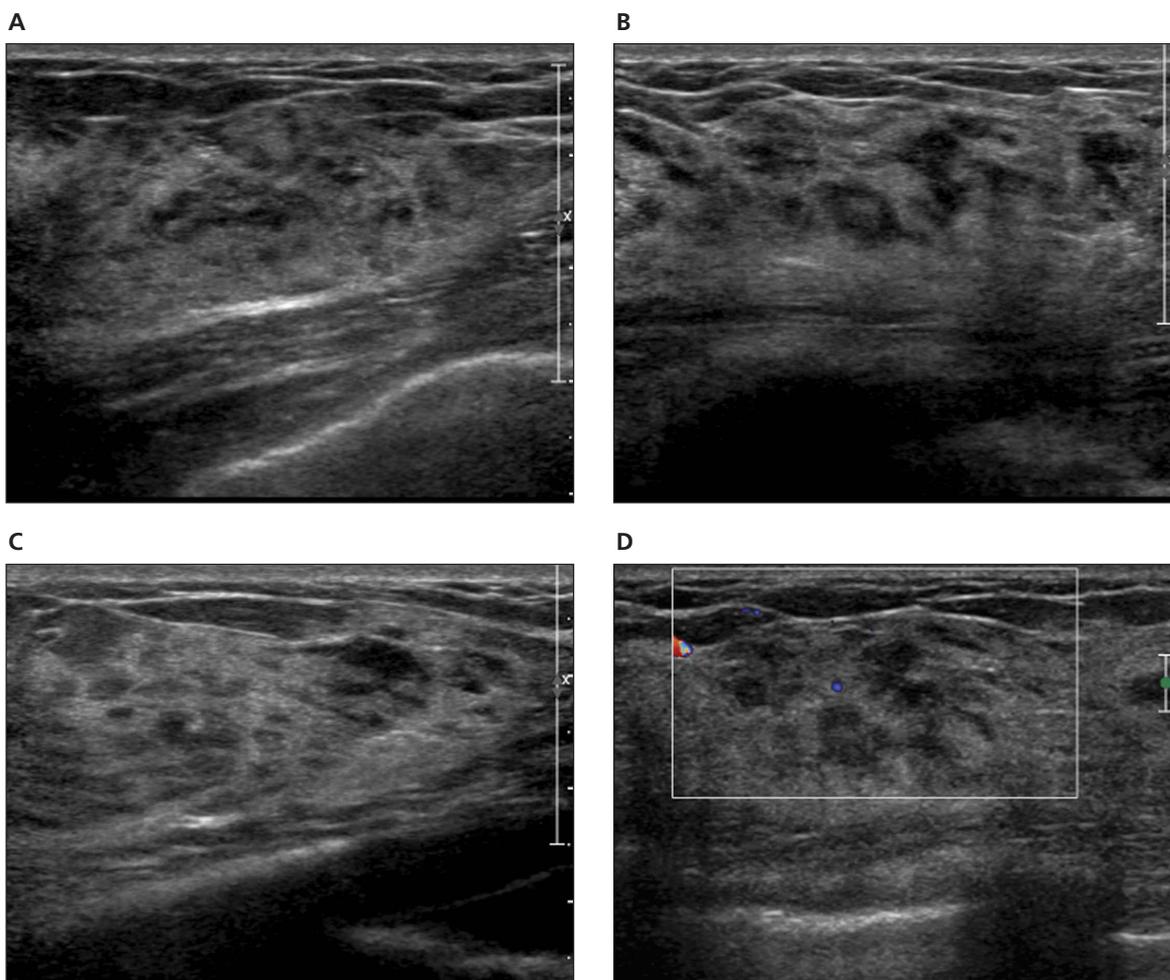


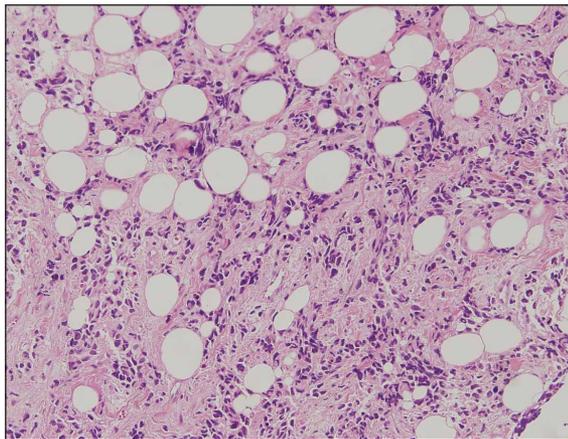


**Figure 3.** Axial fused PET-CT performed for further evaluation showing not only an anterior mediastinal mass but also a right breast mass with FDG uptake (arrow).

A previous report<sup>2</sup> suggested that important diagnostic sonographic features could include heterogeneity, absence of posterior enhancement, and a long axis perpendicular to the skin, although breast metastases of rhabdomyosarcoma are variable in appearance. Although our case showed heterogeneity on sonography, other features were not clearly presented. Moreover, the suspicious lesion is not well differentiated from the normal breast structure by a heterogeneous echo pattern and poor vascularity. It is difficult to detect breast lesions if they are not found with PET-CT. Several recent studies<sup>7-9</sup> reported 97.4% to 100% negative prediction when both sonographic and mammographic findings were

**Figure 4.** Sonography of the breast lesion. **A**, Transverse scan showing a heterogeneous echoic lesion at the 1-o'clock position of the right breast. **B**, Longitudinal scan also showing a heterogeneous echo pattern without a circumferential margin. **C**, Normal breast structure in the left upper inner quadrant also showing heterogeneous echogenicity of granular tissue (hyperechoic) and fatty infiltration (hypoechoic). **D**, On color Doppler imaging, the tumor shows poor vascularity.





**Figure 5.** Microscopic specimen of the breast lesion (hematoxylin-eosin, original magnification  $\times 100$ ). There are various cell populations constituting small round tumor cells with hyperchromatic nuclei and abundant eosinophilic cytoplasm, morphologically identical to the primary anterior mediastinal tumor.

normal in the setting of a breast lump. Among them, Dennis et al<sup>7</sup> introduced 7 types of commonly encountered normal sonographic findings, of which type 1 was hyperechoic tissue that contained thin branching hypoechoic or anechoic structures. Interestingly, our case seemed to be a prominent type 1 pattern. However, they also warned that a biopsy should not be delayed if there is clinical suspicion, regardless of the imaging findings. Because our patient was young, breast sonography was performed without mammography. Despite the negative sonographic findings, tissue samples were obtained by CNB based on the abnormal PET-CT and clinical findings, which allowed an accurate diagnosis. Interestingly, Kyoung Jung et al<sup>10</sup> reported lymphoma involving the breast, which was detected only by fluorodeoxyglucose (FDG) PET despite negative findings on mammography, sonography, and physical examination.

In summary, breast metastasis from rhabdomyosarcoma can mimic prominent fibroglandular tissue on breast sonography. Therefore, sonographically guided CNB should be considered when either a patient with rhabdomyosarcoma has a palpable breast lesion or a focal area of FDG uptake in the breast is observed on PET.

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