Metastatic Rhabdomyosarcoma to the Breast
SHYR-MING SHEEN-CHEN1, HOCK-LIEW ENG2 and SHEUNG-FAT KO3

Departments of 1Surgery, 2Pathology and 3Diagnostic Radiology, Chang Gung Memorial Hospital, Kaohsiung College of Medicine, Chang Gung University, Taiwan

Abstract. Secondary malignancy metastatic to the breast is uncommon, with an incidence of 0.5% to 3% of patients with extramammary malignancy. Although rhabdomyosarcoma is a common aggressive primary malignancy in the pediatric age group, metastatic deposits to the breast rarely occur and are mainly seen in adolescent girls. Here, we report an intriguing, rare adult case with metastasis to the breast from nasal rhabdomyosarcoma. A 31-year-old woman with the complaint of right neck mass noted recently came to this hospital for help. She had a history of nasal malignancy treated with radiotherapy in another hospital three months previously. Physical examination revealed multiple neck masses at bilateral neck areas. Bilateral neck dissection was performed and rhabdomyosarcoma, metastatic to lymph node, was the final diagnosis. One year after operation, the patient felt a large lump in her left breast. Surgical excision was performed and histological analysis was consistent with rhabdomyoblastic origin. Secondary malignancy metastatic to the breast is uncommon, yet this entity does exist. In view of the therapeutic implication, a metastatic breast lesion should not be mistaken as the primary breast carcinoma. Only with the awareness of such a possibility can prompt diagnosis and optimal treatment be achieved.

Secondary malignancy metastatic to the breast is uncommon, with an incidence of 0.5% to 3% of patients with extramammary malignancy (1,2). Most series report an association with lymphoma, leukemia and melanoma, followed by lung carcinoma(3). Other malignancies including ovary, prostate and stomach have been reported in several patients with breast metastasis (1,2). Although rhabdomyosarcoma is a common aggressive primary malignancy in the pediatric age group, metastatic deposits to the breast rarely occur and are mainly seen in adolescent girls (4,5). Here, we report an intriguing, rare adult case with metastasis to the breast from nasal rhabdomyosarcoma.

Case Report
A 31-year-old woman with the complaint of right neck mass noted recently came to our hospital. She had a history of nasal malignancy treated with radiotherapy by another hospital three months previously.

Physical examination revealed multiple neck masses in the bilateral neck areas, especially the right side. The masses were non-tender, firm with mild uneven surface, ranging from 0.8 cm to 4 cm in maximum diameter. Malignant metastases to the neck area was the initial impression. Bilateral neck dissection was performed. Histological examination of the neck lymph nodes showed solid sheets of small to medium-sized polygonal neoplastic cells bearing pleomorphic nuclei with prominent nucleoli, and scant pinkish cytoplasm. They were separated by thin fibrous septa. Mitotic figures were frequent. Additional immunohistochemical study showed strong positivity of the neoplastic cells for vimentin, sarcomeric actin and desmin. Hence, rhabdomyosarcoma, metastatic to the lymph nodes, was the final diagnosis. Chemotherapy and local radiotherapy were arranged and applied about one month postoperatively.

One year after operation, the patient felt a large lump in her left breast. Surgical excision was performed. Grossly, a tumor measuring 10x9x5.5 cm in size was noted. On cutting, a yellowish-white surface with pus-like substance was noted. Microscopically, sections revealed breast tissue with sheets of large cells with vesicular, pleomorphic nuclei and prominent nucleoli separated by fibrous band. Focal lymphocytic infiltration and frequent mitoses were noted (Figure 1). Immunohistochemical studies showed the tumor cells to be negative for cytokeratins and strongly positive for vimentin, sarcomeric actin and desmin (Figure 2) and desmin, consistent with a rhabdomyoblastic origin. The patient expired ten months after breast metastasis due to dissemination to the lung and peritoneal cavity, in spite of aggressive medical treatment.
Figure 1. Photograph showing sheets of neoplastic cells bearing hyperchromatic and pleomorphic nuclei separated by fibrous bands. Mammary ductules are present in the left lower corner (H&E x100).

Figure 2. Tumor cells immunostained with sarcomeric actin show strong reaction (x100).
Discussion

Breast metastases from rhabdomyosarcoma are rare with an incidence of 6% (4-6). They occur mainly in adolescent females, with the primary tumor originating from the extremities and extremely rarely from elsewhere (5). Metastasis to the breast has been claimed to happen frequently through hematogenous spread (1). Most metastatic breast lesions occur in younger females, probably owing to the abundant vascularity in their breasts. Such lesions usually present as solitary nodules in the upper, outer quadrant which has the most abundant glandular tissue with the best blood supply (3).

The frequency of metastases to the adolescent female breast observed in patients with rhabdomyosarcoma may suggest a preferential site for metastasis (5). The reason for such a phenomenon remains unknown, but potential contributory factors have been described. The rhabdomyosarcoma cells are claimed to have insulin-like growth factor (IGF) receptor and are responsive to insulin-like growth factor receptor-II (7,8). Importantly, the breast epithelium and stroma are known to express growth factors IGF-I and IGF-II (9,10) and this would, theoretically, provide a suitable environment for metastatic rhabdomyosarcoma cell growth in the growing adolescent breast.

Mammography may be useful in the differential diagnosis of primary and metastatic breast malignancy. The typical mammographic presentation of metastatic breast malignancy is a round and dense mass (11). Microcalcifications and spiculation are usually not present, except in the rare case of metastasis from ovarian carcinoma, and neither architectural distortion nor thickening of the skin is present (11,12). Because the metastatic breast lesion evokes minimal proliferation of fibrous tissue surrounding the lesion, it is about the same size on palpitation and mammography. In contrast, the palpable mass of primary breast carcinoma is frequently larger than the mammographic size (12).

Despite the existence of these basic differences between the presentations of primary breast carcinoma and metastatic breast malignancy as shown in mammography, there is an amazing similarity between the latter and benign breast lesions, especially fibroadenoma (3). Furthermore, the majority of patients with metastatic rhabdomyosarcoma in the breast are young and have dense breast for which mammography usually has low sensitivity (13). Ultrasound also provides little further information, however, MRI has been claimed to provide useful information in a sporadic reported case with metastatic breast rhabdomyosarcoma (13). Fine-needle aspiration cytology has been used to successfully identify both primary and metastatic rhabdomyosarcoma in the breast (14,15). Excisional biopsy is usually needed for final pathological confirmation and to provide local control. Immunohistochemical studies may be needed to further confirm the diagnosis, as in our case (Figure 2).

Secondary malignancy metastatic to the breast is uncommon, yet this entity does exist. In view of the therapeutic implications, a metastatic breast lesion should not be mistaken as the primary breast carcinoma. Only with the awareness of such a possibility can prompt diagnosis and optimal treatment be achieved.

References


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