

Primary Breast Lymphoma Detected with SPECT Using Gallium-67-Citrate

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Breast involvement by malignant lymphoma either as a primary site or as a secondary site from lymphoma elsewhere is rare. Primary breast lymphoma (PBL) accounts for only a small percentage of total malignant lymphoma involving the breast. The incidence of PBL varies from 0.004% to 0.5%. We present a case of PBL which was well demonstrated on total-body imaging as well as SPECT using ^{67}Ga -citrate.

Key Words: breast lymphoma; SPECT; gallium-67-citrate

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CASE REPORT

A 56-yr-old female had a right breast cyst and had follow-up with yearly mammography over 4 yr. The mammograms had remained stable. However, in January 1994, she noticed that her right breast was increasing in size. Her primary physician felt a large mass with ill-defined borders in the right breast. There were inflammatory changes in the overlying skin with nipple retraction as well as hardening in the entire right breast. The left breast was normal in appearance without palpable mass. The patient denied weight loss, fever and night sweats. Repeated mammography was performed and demonstrated an enlarged right breast with glandular content. On the mammogram, there were ill-defined areas of diffuse density involving much of the upper portion of the breast with numerous partially obscured dense ill-defined masses.

Computed tomography showed an extensive soft-tissue mass involving the right breast. A low-attenuation area was also visualized at the center of the mass. There was extensive adenopathy in the right axillary region extending from the highest axillary nodes down along thoracic nodes as well as mammary node on the same side (Fig. 1).

Fine-needle aspiration was initially negative and subsequent excisional biopsy demonstrated a Stage II-EA bulky diffuse large-cell lymphoma involving the right breast and right axillary lymph center.

Gallium-67 total-body and SPECT scans were obtained prior to treatment. Gallium-67 studies demonstrated marked activity by increased radioactivity in the right breast lesion with involvement of the right axilla and right internal mammary lymphatic chains (Figs. 2, 3).

DISCUSSION

Primary breast lymphoma (PBL) is very rare. Most studies define PBL as a tumor limited to the breast, eliminating those that may have disseminated from elsewhere. The majority of reported cases occur in females in their sixties (1,3). There is an increased prevalence of PBL on the right side in the superior outer quadrant (3). Bilateral and left-sided disease have rarely been described (2,3). Most of the reported cases are low-grade lymphoma (1,3).

Clinical presentation usually includes a rapidly enlarging palpable mass, absence of nipple discharge and retraction, multiple lesions, violaceous skin color over the lesion and lymph adenopathy in the axillary (1,3). The presentations are not specific and the diagnosis of PBL is often missed. The diagnostic procedure is aspiration or excisional biopsy.

Radiographic examinations, including mammography, sonography and CT, are nonspecific. The reported findings include homogeneous or heterogeneous round or oval masses with either well- or poorly-defined margins (4,7). Skin thickening is common (5). There usually is significant intra- and extrathoracic nodal involvement, swelling of breast with chest wall extension and loss of soft-tissue planes on CT (4). On ultrasound studies, the lesion may appear as hypo- or hyperechoic, focal or diffuse with or without skin thickening. There may be shadowing or enhancement (5).

Gallium-67 is a cyclotron-produced radiopharmaceutical that has been successfully used as a tumor localization agent (8) and as an adjuvantive tool in the investigation of selected neoplasm, including lymphoma, Hodgkin's disease, bronchogenic carcinoma, hepatoma and other neoplasms (8). Tumor uptake has been extensively studied in lymphoma. The sensitivity of gallium in detecting lymphoma is greatly dependent upon the size, location and histological characteristic of the lesion (8). It is well known that gallium is very sensitive for histiocytic subtype and less sensitive for lymphocytic subtype of lymphoma. Most breast carcinomas are not gallium-avid, and this is the main reason that gallium scans are not routinely performed for patients with suspicious breast cancer. SPECT imaging with better localization of tumors has improved the diagnosis with increased sensitivity and specificity. Initial baseline investigation is important to determine changes in tu-

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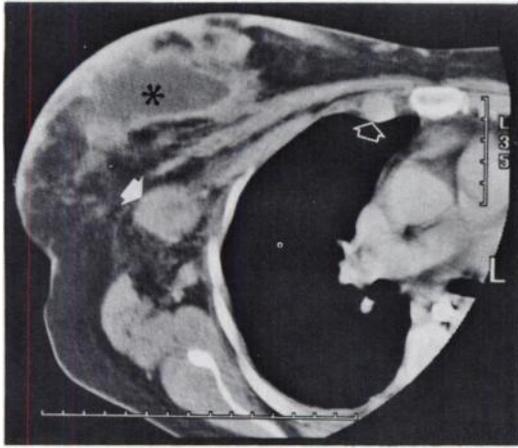


FIGURE 1. Transaxial CT image of right low chest shows a large mass with low attenuation center (*). Note enlarged right axillary (closed arrow) and internal mammary lymph nodes (open arrow).

mor uptake, and it is used to stage patients in some centers. Its major value is in follow-up evaluation after treatment to detect dissemination or recurrence of active lymphoma, especially when there is no residual or questionable anatomic abnormality with conventional radiographic modalities. Tumor masses frequently shrink dramatically with radiation or chemotherapy; however, residual mass lesions remain and are identifiable on CT scans. This is frequently related to the presence of fibrosis within treated tumors producing a problem in differentiation from viable residual or recurrent tumors.

In general, the signal intensity of breast tissue is dependent on the relative amounts of fat, water and collagen that the tissue contains. Because of the histologic variation of carcinomas, there is a wide range in the signal intensities of breast cancers and considerable overlap with the signal intensity of benign lesions, particularly fibroadenomas. Contrast enhancement did not aid in the differentiation of

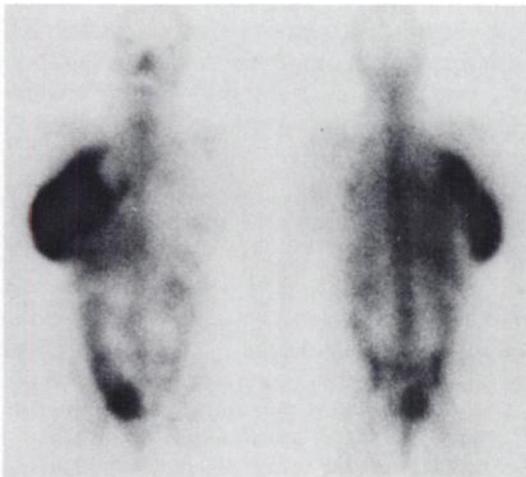


FIGURE 2. Anterior (left) and posterior (right) whole-body images at 48 hr following the injection of ^{67}Ga -citrate show markedly increased activity in the right breast, right axillary and internal mammary (arrow) nodes.

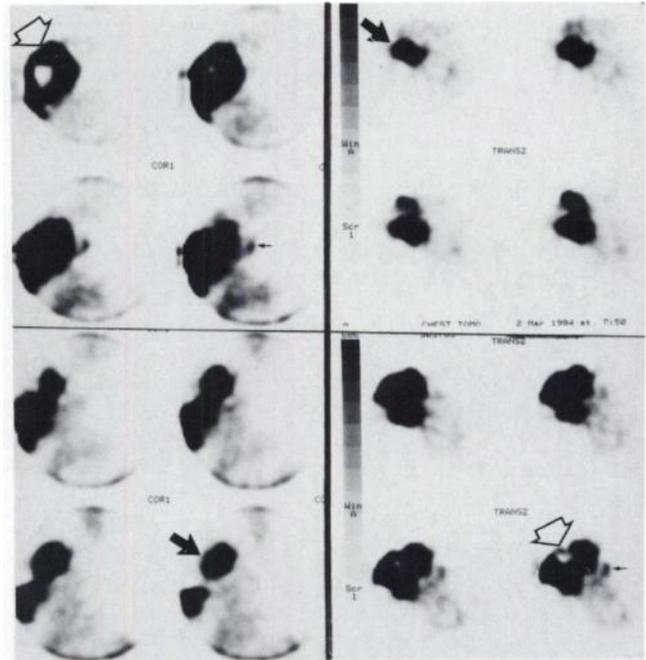


FIGURE 3. Selected coronal (left) and axial (right) chest SPECT images show a large active lymphoma in right breast (open arrows) with central necrosis and metastases to right axillary (closed large arrows) and internal mammary nodes (small closed arrows).

cancer from fibroadenoma, inflammation, parenchymal proliferation and recent scanning. Although MRI is highly sensitive and specific for cyst detection and characterization, its relatively high cost and the length of the procedure prohibits routine use for the detection of benign breast cysts.

The finding of gallium uptake in the breast is not unique to the diagnosis of primary lymphoma. Extensive uptake is present in the breast on the total-body scan. The SPECT study clearly localizes the mammary and axillary nodal dissemination of lymphoma in addition to the active disease in the breast. This study will be useful for future follow-up in detecting relapse and progression, as well as in predicting various responses to therapy.

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