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Incidental detection of breast cancer during Tl-201 myocardial SPECT study

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A case of left breast cancer which was detected incidentally by Tl-201 SPECT performed to evaluate the status of myocardial perfusion, is reported. Both stress and redistribution Tl-201 SPECT clearly delineated the tumor. It was confirmed later as scirrhous carcinoma of the breast.

Key words: breast tumor, scirrhous cancer, Tl-201 SPECT

INTRODUCTION

UNTIL NOW various radionuclides and radiopharmaceuticals have been used to detect masses in the breast.[1-3] Mammography remains the most sensitive method for detecting breast masses, but it has some limitations in differentiating benign from malignant masses and in detecting scirrhous carcinoma.[4,5] Tl-201 scintigraphy is used as an alternative to differentiate benign from malignant masses, and varying degrees of sensitivity and specificity have been reported.[5,6] In this present case, tumor of the left breast was unsuspected and incidentally identified by Tl-201 SPECT scheduled for cardiac study, and later, it was confirmed as scirrhous carcinoma of the breast.

CASE PRESENTATION

A 67-year-old female, suffering from long standing diabetes mellitus, chronic renal failure, hypertension, and microangiopathy, was referred to our department for a routine Tl-201 myocardial SPECT study comprising both stress and redistribution images to evaluate myocardial perfusion. She complained of no pain or any symptoms related to a breast mass and it could be missed due to her obesity. Both dipyridamole stress and redistribution images were obtained 5–10 minutes and 4 hours, respectively, after intravenous injection of 111 MBq of Tl-201, with a Toshiba, Japan GCA-601 rotating gamma camera fitted with a LEAP collimator. A total of 36 images were acquired over 180° (from LAO 45° to RPO 45°) in a 128 × 128 matrix at the rate of 30 sec/step (5°/step). A Butterworth filter for smoothing and a Ramp filter were used for reconstruction. During reconstruction an abnormal focal uptake was noticed near the apex of the heart inside the body contour. The focal activity was included in the reconstruction images and found to be originating in the left breast. This activity was present in both stress and redistribution images (Fig. 1), and uptake ratios were calculated according to published data.[7] Uptake ratios were 2.63 (early image) and 3.90 (delayed image). Malignant breast tumor was suspected and further investigation regarding the tumor was recommended. On careful palpation a hard mass was detected below the left nipple. Her tumor markers (CA 15-3, BCA 225) were found to be within normal limits. CT scan showed a soft tissue density mass with an irregular margin in the left breast below the nipple (Fig. 2) and mammography showed a round to triangular microcalcification in the stellate mass. A needle biopsy as well as postoperative specimens confirmed a case of scirrhous carcinoma of the breast. At operation the tumor size was 3.5 × 2.8 × 2 cm and no lymph node involvement was found.

DISCUSSION

Many published papers[8,9] discussed the usefulness of Tl-201 in diagnosing malignant tumors. Some authors showed the usefulness of Tl-201 in differentiating benign from malignant breast tumors and as complementary to

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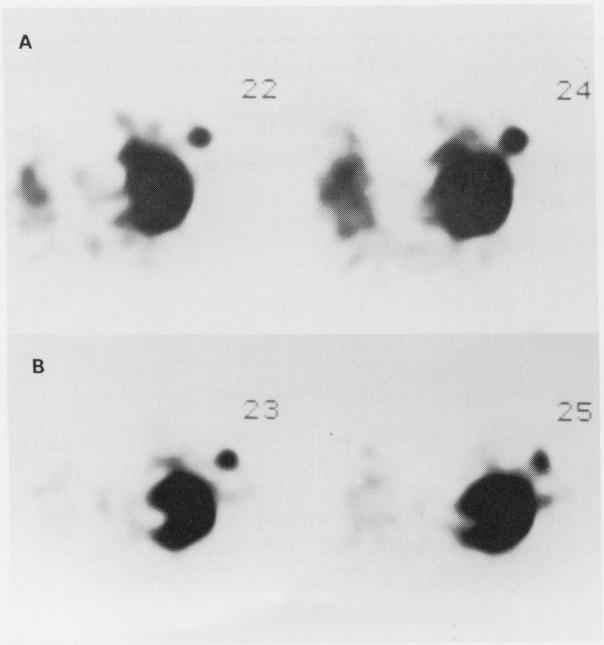

Fig. 1 Tl-201 SPECT shows intense focal uptake compared to normal surrounding tissue in front of apex of the heart. (A) Early SPECT, (B) Delayed SPECT.

mammography[5,6] It is well known that Tl-201 is taken up by the cells where Na,K ATPase activity is present[10] but is not clearly known why Tl-201 uptake and retention are greater in malignant tumor cells than in normal cells. The uptake could be due to high Na,K ATPase activity in malignant cells, but the mechanism of retention is uncertain. However, retention in a mass in delayed time increases the probability of malignancy.

In this present case, the mass inside the breast was detected incidentally and was clearly visualized both in early and delayed SPECT images. The marked retention (uptake ratio 3.9 in delayed images) compared to surrounding tissue revealed a high probability of malignancy and finally it was proved to be a scirrhous carcinoma. In this case the tumor was unnoticed and both CT and mammography were performed according to recommendation after Tl-201 SPECT. Though mammography showed a stellate shaped mass with round to triangular microcalcification, to make a diagnosis of malignancy might necessitate biopsy. However, the criteria for mammography in differentiating radial scar from scirrhous carcinoma of the breast are unreliable, and the findings of Tl-201 scintigraphy, especially SPECT in this situation, can play a role which is complementary to mammography.[5,6] If marked retention in delayed images is the criterion for malignancy in breast tumor, both early and delayed Tl-201 scintigraphy, including SPECT, would be helpful in differentiating benign from malignant breast

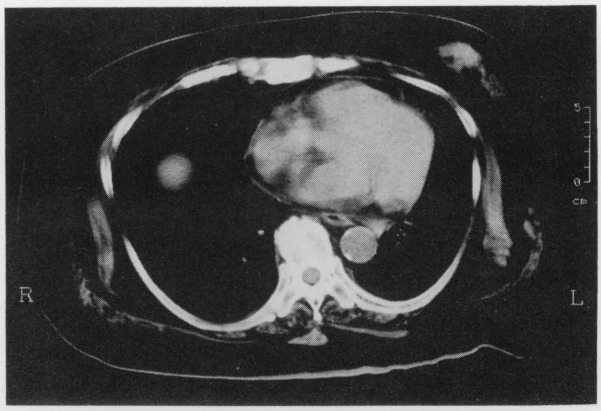

Fig. 2 CT scan shows a soft tissue density mass with irregular margin in the left breast.

tumor and may act as a complement to other established methods.

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