

## Three patients with bilateral breast tumors examined by technetium-99m-sestamibi scintimammography

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We presented three patients with bilateral breast tumors (one with breast cancers, one with breast cancer and fibroadenoma, and one with fibroadenomas) examined by  $^{99m}\text{Tc}$ -hexakis 2-methoxyisobutylisonitrile (MIBI) scintimammography. In all cases  $^{99m}\text{Tc}$ -MIBI uptake was recognized only in the breast cancers.  $^{99m}\text{Tc}$ -MIBI scintimammography was useful in evaluating bilateral breast tumors since preoperative diagnosis is valuable in determining correct surgical treatment.

**Key words:**  $^{99m}\text{Tc}$ -MIBI, scintimammography, breast neoplasms, bilaterality

### INTRODUCTION

BREAST CANCER is a common malignancy and shares with stomach cancer the highest morbidity rate of all women's cancers in Japan. Physical examinations, mammography and ultrasonography (US) are useful screening procedures for breast cancer diagnosis, but their sensitivity and discriminatory power are limited. Recently developed  $^{99m}\text{Tc}$ -hexakis 2-methoxyisobutylisonitrile (MIBI) scintimammography offers new hope in breast imaging.<sup>1,2</sup> We have presented three cases with bilateral breast tumors examined correctly by  $^{99m}\text{Tc}$ -MIBI scintimammography and discussed the usefulness of  $^{99m}\text{Tc}$ -MIBI scintimammography in the evaluation of bilateral breast tumors.

### CASE REPORT

Scintimammography was performed at 15 minutes and 3 hours (early and delayed image) after 600 MBq of  $^{99m}\text{Tc}$ -MIBI intravenous injection. The anterior and both lateral planar views including breast and axillary regions in the supine position were obtained with a Toshiba GCA 7200-A gamma camera equipped with a low-energy, high resolution parallel hole collimator. 2,000 K counts were

acquired with a  $512 \times 512$  matrix.

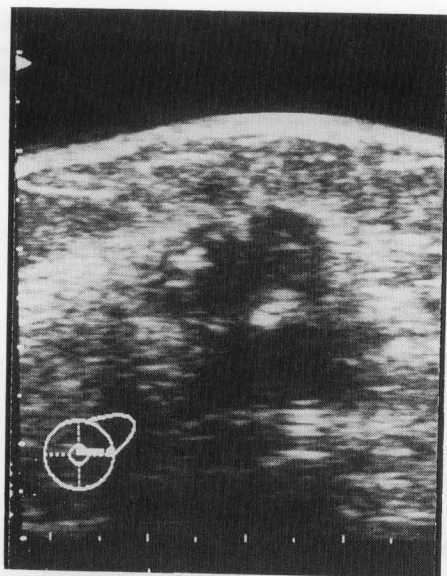
**Case 1** A 61-year-old female found three small tumors in her breasts. These tumors were situated in the upper outer sector and in the lower outer sector of the left breast and in the central sector of the right breast. Mammography and US (Fig. 1) suggested that these tumors were breast cancers. Aspiration biopsy cytology of the right tumor was, however, negative for malignant cells.  $^{99m}\text{Tc}$ -MIBI uptake in these tumors (arrow) and left axillary region (arrow head) was recognized on both early (Fig. 2) and delayed images. Bilateral modified radical mastectomy revealed that these tumors were all invasive ductal carcinomas. Metastatic involvement was found in three of fourteen left axillary lymph nodes. The lymph nodes involved measured 1.5 cm, 0.5 cm, 0.5 cm in maximum diameter, respectively.

**Case 2** A 49-year-old female noticed bilateral breast tumors. The left tumor was situated in the upper inner sector and the right tumor was situated in the upper outer sector. US suggested that these tumors were breast cancers (Fig. 3). Aspiration biopsy cytology of the left tumor was suspicious and that of the right tumor was negative for malignant cells.  $^{99m}\text{Tc}$ -MIBI uptake in only the left tumor was recognized on both early (Fig. 4) and delayed images. Left modified radical mastectomy and extirpation of the right tumor revealed that the left tumor was invasive ductal carcinoma and the right tumor was fibroadenoma.

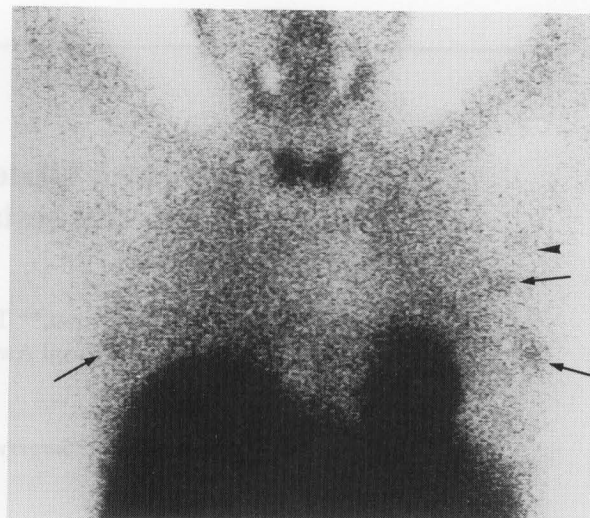
**Case 3** A 20-year-old female was seen because of bilateral enlarging breast tumors. Three years previously she had noticed the tumors. A diagnosis of fibroadenoma

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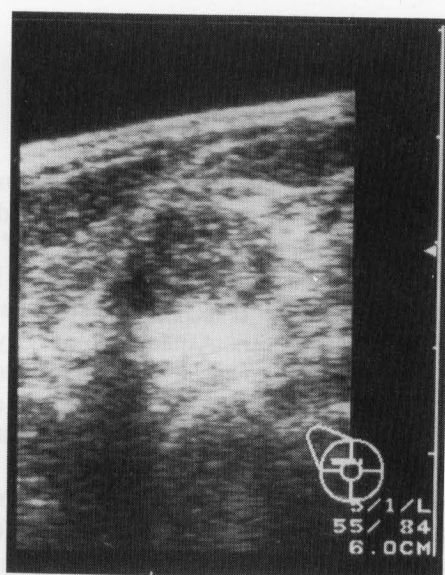
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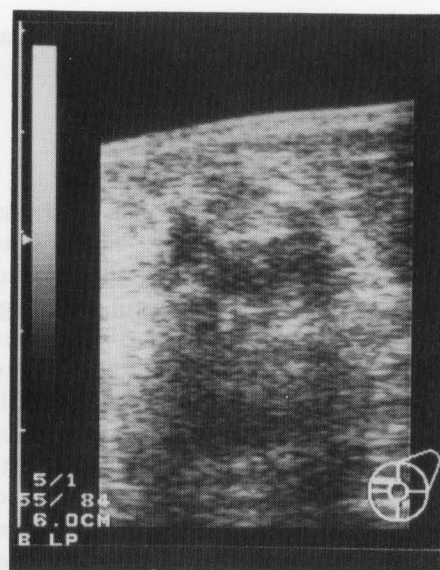
**Fig. 1** (Case 1) US suggested that these three tumors were breast cancers. The left larger tumor was shown in figure.



**Fig. 2** (Case 1)  $^{99m}\text{Tc}$ -MIBI uptake in these tumors (arrow) and left axillary region (arrowhead) was recognized. Surgery revealed that these tumors were all invasive ductal carcinomas and left axillary lymph nodes metastases.



A



B

**Fig. 3** (Case 2) US suggested that these tumors were breast cancers. (A: right tumor, B: left tumor)

was made and she was observed. The tumors were situated in the central sectors of the breasts. US suggested the tumors were fibroadenomas (Fig. 5). No  $^{99m}\text{Tc}$ -MIBI uptake in the tumors was recognized on both early and delayed (Fig. 6) images. The tumors were excised and were histopathologically fibroadenomas.

The cases are summarized in the Table 1.

### DISCUSSION

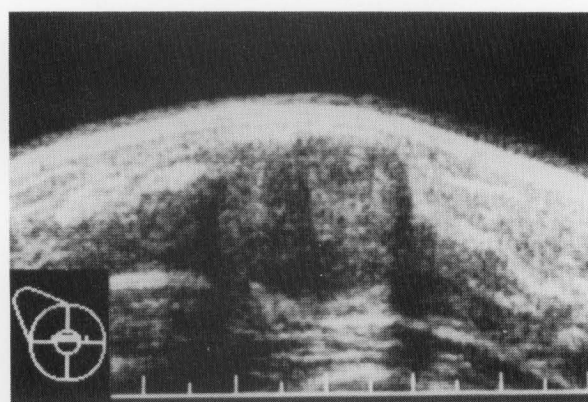
Fibroadenoma is the most common benign breast tumor. It usually occurs between the ages of 20 and 35 years. It

is usually single, but in 20% of cases, there are multiple lesions in the same breast or bilaterally.<sup>3</sup> Multicentricity is a frequent property of breast cancer histologically. Anastassiades et al. reported that 187 samples (49.1%) were multicentric in a total of 366 consecutive modified radical mastectomy specimens.<sup>4</sup> Hutler et al. found that the bilaterality rate followed the incidence pattern of multicentricity and considered that bilaterality was an expression of multicentricity.<sup>5</sup> Clinically, however, the incidence of bilateral breast cancers is not high. In Japan, the incidence is thought to be about 3% (synchronous 1%, metachronous 2%).<sup>6</sup>

Currently, the most successful screening procedures for breast cancer diagnosis are physical examinations, mammography and US. Recently scintimammography with  $^{99m}\text{Tc}$ -MIBI has been developed and offers high



**Fig. 4** (Case 2)  $^{99m}\text{Tc}$ -MIBI uptake in only the left tumor was recognized. Surgery revealed that the left tumor was invasive ductal carcinoma and the right tumor was fibroadenoma.

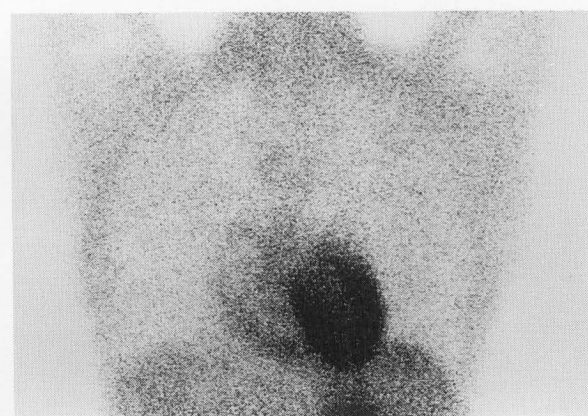


**Fig. 5** (Case 3) US suggested that these tumors were fibroadenomas. The right tumor was shown in figure.

diagnostic accuracy.<sup>1,2</sup> This procedure is thought to be a technique complementary to mammography,<sup>2</sup> but to have some advantages.

First, scintigraphic findings are not difficult to interpret. Second, it can evaluate both breasts simultaneously and it can detect axillary lymph node involvement as concomitant information.<sup>1</sup> The disadvantages are thought to be high cost and radiation exposure. In the present cases, in case 1,  $^{99m}\text{Tc}$ -MIBI scintimammography could suggest that the right breast tumor was malignant, although aspiration biopsy cytology was negative. In addition,  $^{99m}\text{Tc}$ -MIBI scintimammography could detect left axillary lymph nodes metastases, although whether  $^{99m}\text{Tc}$ -MIBI accumulated in one of the metastases or these combined lesions was uncertain. In case 2, although US suggested that the right breast tumor was malignant,  $^{99m}\text{Tc}$ -MIBI scintimammography could show the benignity of the tumor correctly. In case 3,  $^{99m}\text{Tc}$ -MIBI scintimammography could support the benignity of the tumors.

In the present cases, SPECT was not performed, since it is reported that the sensitivity of SPECT is lower than that of planar imaging in the diagnosis of breast cancer. In the diagnosis of axillary lymph nodes involvement, however, SPECT is thought to be better.<sup>7</sup>



**Fig. 6** (Case 3) No  $^{99m}\text{Tc}$ -MIBI uptake in the tumors was recognized. Surgery revealed that these tumors were fibroadenomas.

**Table 1**

Case	Age	Side	Size (cm)	$^{99m}\text{Tc}$ -MIBI uptake		Cytology	Histology
				early	delayed		
1	61	left	1.5 × 1.5 × 1.0	+	+	—	carcinoma
			3.0 × 3.0 × 2.0	+	+		carcinoma
		right	1.5 × 1.0 × 1.0	+	+		carcinoma
2	49	left	4.0 × 3.5 × 2.0	+	+	±	carcinoma
		right	2.0 × 1.8 × 1.6*	—	—	—	fibroadenoma
3	20	left	3.3 × 2.4 × 2.3	—	—		fibroadenoma
		right	2.0 × 2.0 × 1.8	—	—		fibroadenoma

\* on ultrasonography  
(the others surgical specimen)

In conclusion, we presented three cases with bilateral breast tumors in which  $^{99m}\text{Tc}$ -MIBI scintimammography was useful in the evaluation of the tumors.

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