

Preoperative evaluation of the chemosensitivity of breast cancer by means of double phase ^{99m}Tc -MIBI scintimammography

Hirofumi FUJII,* Kayoko NAKAMURA,* Atsushi KUBO,* Kohji ENOMOTO,** Tadashi IKEDA,** Tetsuro KUBOTA,** Shinjiro Wilson MATSUZAKI** and Masaki KITAJIMA**

**Department of Radiology and **Department of Surgery, Keio University School of Medicine*

The chemosensitivity of breast cancer is important for its management, but it is difficult to evaluate preoperatively. Tc-99m hexakis-2-methoxyisobutylisonitrile (MIBI) scintimammography has been reported to indicate the expression of P-glycoprotein, which is one factor concerned with multidrug resistance. We developed a chemosensitivity assay by using surgical specimens to investigate whether ^{99m}Tc -MIBI scintimammography findings before the operation are related to chemosensitivity according to our assay. Fifteen patients with primary breast cancer were enrolled into the study. Early and delayed images were obtained at 10 and 120 minutes after intravenous injection of ^{99m}Tc -MIBI, respectively. Regions of interest were placed on the tumors and the contralateral healthy breasts in each patient to estimate ^{99m}Tc -MIBI uptake in the tumor, and retention indices were then calculated to assess the washout of ^{99m}Tc -MIBI. Chemosensitivity assay was performed by incubating surgical specimens with anticancer agents such as doxorubicin, epirubicin, pinorubicin, mitomycin C, cisplatin and 5-fluorouracil. ^{99m}Tc -MIBI washout on scintimammography was successfully related to inhibition ratios on chemosensitivity tests when compared with ^{99m}Tc -MIBI uptake by the tumor. In particular, high correlation coefficients were obtained between the retention index of ^{99m}Tc -MIBI and the inhibition ratios of doxorubicin ($r = 0.75$), epirubicin ($r = 0.60$) and pinorubicin ($r = 0.62$), but poor correlation was found for mitomycin C ($r = 0.44$) and cisplatin ($r = 0.31$). Our results indicate that the retention index of ^{99m}Tc -MIBI is closely correlated to chemosensitivity to anthracyclines, suggesting that double-phase scintimammography allows preoperative prediction of chemosensitivity of breast cancer.

Key words: breast cancer, technetium-99m methoxyisobutylisonitrile, scintimammography, anthracycline