*Cancer Imaging* (2002) **2,** 145
DOI: 10.1102/1470-7330.2002.0039

CI

e-med
www.e-med.org.uk

# EDITORIAL

# Radiological assessment of neoadjuvant chemotherapy in breast cancer

**Liliane Ollivier**

*Department of Radiology, Institut Curie, Paris, France*

Neoadjuvant chemotherapy has become the standard of treatment for patients with locally advanced breast cancer and is now a potential treatment for patients with earlier stage operable disease. Preoperative chemotherapy allows more patients to be treated with breast-conserving surgery and enables direct in vivo assessment of response, which correlates with outcome. The role of imaging is to evaluate the therapeutic response in term of shrinkage of the tumour in order to safely perform breast-conservation surgery. Neoadjuvant chemotherapy is also a good model to determine which radiological procedure is the most effective to predict histopathological response.

Although controversial, several articles reported that physical examination correlates best with pathologic findings in the measurement of the primary tumour. Mammography allows monitoring changes in size and density of the tumour, but cannot identify changes in the inner structure. Ultrasound is the most accurate predictor of size for axillary lymph nodes.

Physical examination associated with mammography and ultrasound is a valuable non-invasive combination for assessing tumour dimension. MRI is the best modality for assessment of response in term of tumour size and in the detection of multifocal or multicentric disease. The study of residual tumour vascularity is interesting as the diagnosis is based on the early contrast enhancement. The disappearance of this early contrast enhancement allows correct identification of the response to chemotherapy, even if several studies have reported false negative and false positive cases. Conversely, the detection of a persistent wash out phenomenon in residual tumour permits detection of non-responders. Breast helical CT can be an alternative to breast MRI for the measurement of residual tumour volume and correlation with pathologic findings. Colour Doppler ultrasound and the use of ultrasound contrast agents have given conflicting results because of their operator-dependence.

Other functional imaging modalities have been proposed for the assessment of response to neoadjuvant chemotherapy. Mammoscintigraphy using $^{99}$mTc sestamibi, shows that a rapid clearance of the tracer can predict the lack of tumour response to chemotherapy, however a slower tracer clearance cannot certify an objective response. Positron emission tomography using $^{18}$FDG shows significant difference in tracer uptake between responding and non-responding tumours early in the course of therapy. After the second chemotherapeutic cycle, both techniques are able to distinguish between complete, partial or no response. The disadvantage of the $^{18}$FDG PET is the cost of the technique and the problem of access to the machines. It has also a limited spatial resolution. Combined $^{18}$FDG PET and MRI provide useful information because of the high spatial resolution of MR imaging.

In conclusion, studying the effect of neoadjuvant chemotherapy will demonstrate the accuracy of these complementary functional imaging techniques.

This paper is available online at http://www.cancerimaging.org. In the event of a change in the URL address, please use the DOI provided to locate the paper.

1470-7330/02/000145 + 01