Breast imaging

Evaluation of breast nodules with echo colour Doppler sonography: preliminary findings

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Abstract. The authors report the results of using colour Doppler sonography in the evaluation of breast pathology. In particular, 65 solid breast masses were examined by mammography, sonography and colour Doppler. Thirty-eight lesions were proved histologically and 27 cytologically. The lesions had an average diameter of 17 mm (range 6–40 mm). Colour Doppler sonography demonstrated the presence of vascularisation in 94.4% of breast cancers while this finding was noted in only 61.4% of benign lesions. Bidirectional blood flow was present in 94.1% of carcinomas compared with 50% of fibroadenomas, and irregular blood flow figured in 61.8% of malignant lesions compared with 8.3% of the benign lesions. In 60% of cancers in which neovascularisation was present, the colour Doppler signals occupied more than 10% of the area of the lesion; in contrast, benign masses were characterised by a low colour dot-nodular area ratio. These preliminary results using colour Doppler did not allow sensitivity and specificity values to be quantified and compared with those for traditional breast imaging techniques; however, we think colour Doppler may be very useful in adding dynamic information to the mammographic and sonographic morphological examinations.

Key words: Breast – Cancer – Colour Doppler sonography

Introduction

Ultrasonography (US) is a well-established diagnostic procedure in the study of breast diseases, being considered the best complement to mammography for evaluating the radiographically dense breast and for determining the cystic versus solid nature of breast nodules [1–4].

Even if US shows a higher diagnostic accuracy than any other imaging method, its value in differentiating benign from malignant solid nodules is somewhat limited [1–4]. In fact breast cancers do not always follow well-established sonographic diagnostic criteria for malignancy such as the presence of irregular margins, infiltration of surrounding structures and posterior acoustic shadow. In a significant proportion of cases they present as well-circumscribed, homogeneous, non-attenuating nodules, suggesting a benign lesion [1–3]. In many such cases imaging methods do not allow a confident diagnosis and a biopsy is needed for guiding the correct therapeutic approach to the patient.

Recently, colour Doppler sonography has been suggested as a useful complement to US of the breast for increasing the accuracy of differentiating benign from malignant solid breast masses [5–8]. We describe here the results of using colour Doppler sonography in a group of 65 patients with breast nodules. The aim of this study was to establish the colour Doppler signs useful in differentiating benign from malignant solid breast masses.

Methods

From May to September 1992, 65 selected patients aged between 34 and 76 years old (average 47 years) with proved solid breast nodules were examined by mammography, sonographic imaging and colour Doppler sonography. Patients were entered into the study if they had a lesion which was visible at both mammography and US as a solid nodule, well differentiated from surrounding tissues. Conversely, patients with nodular lesions which were not well differentiated from adjacent tissues were not included.

A final diagnosis was obtained by histology in 38 cases and by US-guided cytology in the remaining 27 cases. There were 29 fibroadenomas and 36 carcinomas; the latter comprised 29 infiltrating ductal carcinomas, 4 lobular carcinomas, 2 mucoid cancers and 1 non-infiltrating ductal carcinoma. The diameter of fibroadenomas ranged

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Fig. 1. Colour Doppler sonography of the breast: multiple bidirectional inhomogeneous and irregular flow signals are present in a hypoechoic area with irregular edges. Histological diagnosis: ductal infiltrating breast cancer.

Fig. 2. a Craniocaudal mammographic view: rounded mass with regular margins. b Colour Doppler sonography: hypoechoic area without flow signals. Histological diagnosis: mucoid carcinoma.

Fig. 3. a, b Sonogram demonstrates a solid, regular mass which had rapidly increased in volume 4 months later. c Colour Doppler sonography: several, inhomogeneous, bidirectional flow signals are demonstrated inside the solid mass. Histological diagnosis: fibroadenoma with intense proliferative activity.