

Report

Vascularity demonstrated by doppler ultrasound and immunohistochemistry in invasive ductal carcinoma of the breast

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Abstract

Background: Vascularity is an important determinant of a tumour's ability to grow and disseminate. Breast tumour vascularity can be determined with doppler ultrasound (US) and by counting the vessels microscopically (microvascular density – MVD). The biologic characteristics of tumours based on their vascularity have not been extensively studied.

Method: Preoperative US was performed on 207 patients with invasive ductal breast carcinomas (IDC). MVD was assessed immunohistochemically using polyclonal antisera against factor VIII and the proliferation rate was measured with Ki-67 polyclonal antisera. Histologic tumour characteristics and oestrogen receptor (ER) status were determined. Thermography was performed on 174 of the patients.

Results: Twenty-five percent of IDC demonstrated US-vascularity. US-vascular tumours were more likely to be node positive, and had a higher mitotic rate than avascular cancers. US-vascularity was more common in tumours with MVD greater than 80 vessels/250x field than those with fewer vessels. The proliferation rate, histologic grade III, and nuclear grade III were higher and ER positivity lower, but the differences were not statistically significant. US-vascular cancers were associated with significantly more thermographic abnormalities. The cancer recurrence rate at three years was higher in patients with vascular cancers although the difference was not statistically significant.

Conclusion: US appears to be a simple, non-invasive method of identifying vascular cancers associated with factors indicating a poor prognosis.

Introduction

Because tumour growth is dependent on neovascularization factors, promoting and inhibiting angiogenesis have received considerable attention [1,2]. Clinical assessment of tumour vascularity is limited but two methods are available for its study, doppler ultrasound (US) [3–6] and immunohistochemical

staining of endothelial antigens to enhance microscopic identification and counting of tumour vessels (microvessel density – MVD). Both methods have been described in breast tumours. Interest in the immunohistochemical approach has increased since Weidner [7] reported an association between MVD and outcome in patients with breast cancer.

We investigated vascularity with both US and