ABSTRACT
Objective: To determine efficacy of Doppler Sonography in diagnosis of breast tumours on the basis of Resistive Index (RI), and Pulsatility Index (PI) values using histopathology as gold standard.
Duration: The study was completed over a period of six months, from 27-03-2007 to 26-09-2007.
Methods: Fifty consecutive patients with breast mass suspected clinically were included. These cases were subjected to clinical examination. Gray scale ultrasound was performed to evaluate margins of the lesion, surrounding halo, echogenecity and calcification. Doppler ultrasound was done to see blood flow in the lesion calculate RI and PI.
Results: Mean age of the patients was 38.8±12.7 years. Sensitivity, specificity, and diagnostic accuracy of colour Doppler Sonography was observed 91.6%, 84.6% and 88.0%, respectively. Positive predictive value of colour Doppler Sonography was found to be 84.6% and Negative predictive value of colour Doppler Sonography was found to be 91.6%.
Key words: Solid mass, Malignant, Benign, Pulsatility index, Resistive index

INTRODUCTION
Breast ultrasound is a noninvasive (the skin is not pierced) procedure used to assess the breasts. Ultrasound technology allows quick visualization of the breast tissue. Ultrasound may also be used to assess blood flow to areas inside the breast. The examination is often used along with mammography. Breast sonography is a well accepted diagnostic method. For differentiation between benign and malignant lesions, quantified sonography is gaining increased importance. Malignancies usually show increasing vascularity, which is extremely disordered. The peripheral resistance is low due to numerous AV-shunts in malignant tissue. With high frequency CW Doppler ultrasound (8-10MHz), these anatomical and physiological features can be outlined objectively. Frequency analysis of Doppler signals in breast malignancies shows high intensities corresponding to increased blood flow. The different blood flow directions of the vessels recorded by the ultrasonic Doppler beam also causes broadening of the frequency range. In combination with B-mode ultrasound this method provides information essential for the differentiation of malignancies.

The results, already reported in literature, all indicate that more vessels are displayed on Doppler ultrasound and higher flow velocities are measured in malignant tumors than benign conditions. The potential role of Doppler sonography remains to be definitely determined. It appears that high measured flow and markedly elevated number of detectable vessel density indicates malignancy.

Research has also shown that breast cancer vascularity as revealed by power Doppler sonography, correlates with lymph node involvement and lymphatic vascular invasion. Since tumor vessels are structurally and functionally abnormal, therefore the degree of vascularity also determines tumor’s aggressiveness, as well as its radiosensitivity and chemosensitivity.

Assessing tumor vascularity may help in differential diagnosis and therapy monitoring. Patients with locally advanced breast cancer showed dramatic changes on repeated optical/Doppler examinations in concordance with response to chemotherapy.

PATIENTS AND METHODS
Inclusion criteria: Female patients between the age of 15-70 years. 2) Patients with history of breast mass, pain, nipple or palpable axillaries lymph nodes.
Exclusion criteria: 1) Patients diagnosed to have breast cancer and operated upon 2) Patients receiving chemotherapy / radiotherapy 3). Patients with some other primary cancer suspected to have secondary deposits in breast.

First consecutive 50 patients referred from OPD of medicine/surgery having a breast mass/nipple discharge/ pain breast/palpable axillary lymph nodes were included in this study.

An informed consent, with promise of confidentiality, was obtained from them for using their data in research. The demographic information (age,
DISCUSSION

The incidence of breast cancer in Pakistan has gradually increased over the last three decades. Tumor angiogenesis plays an important role in the growth and extension of malignant neoplasms, including those of the breast[8,9].

The detection of vascularization in the lesion was the first Doppler feature used to differentiate between benign and malignant tumors, and this sign has shown a significant association with malignancy of lesions[10,13].

Yang et al[14] reported 98.4% sensitivity, 67.8% specificity, 38% PPV, 99.5% NPV, and 72.9% accuracy. In their study, the PPV was considerably lower, probably in relation to the different prevalence of breast cancer and to the different patient selection criteria. Predictive values were highly influenced by the sensitivity, specificity, and prevalence; particularly, the prevalence increase led to a PPV increase. In another study conducted by Tariq et al[15], the sonographic accuracy (RI=92% and PI=93%) in differentiating benign from malignant lesions was consistent to the results of Yang et al[14].

In the current study, we wanted to see the efficacy of Doppler sonography in diagnosis of breast tumors on the basis of Resistive Index (RI) and Pulsatility Index (PI) values.

Our study confirms that Doppler sonography had high sensitivity 91.6%. Specificity was found to be 84.6% and diagnostic accuracy was found to be 88%.

CONCLUSION

This study proves the efficacy of Doppler Sonography as a method of choice to evaluate breast masses in patients avoiding the need for biopsy.

The data confirms that certain Doppler Sonography features can help differentiate benign from malignant breast tumours. However, practice and interpreter variability should be further explored before these criteria are generally applied to defer biopsy of solid masses.

REFERENCES