Title: Ultrafast MRI Breast: The way forward? - a preliminary result in a single centre study

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Objective
The purpose of this study was to evaluate the usage of ultrafast breast MRI sequence as a screening tool for breast cancer in Malaysian setting.

Patients and method
Patients diagnosed with BIRADS 4b, 4c, 5 or 6 from mammogram and ultrasound, awaiting biopsy for histopathology diagnosis were approached to be recruited. MRI scan with ultrafast protocol were performed. 2 readers evaluated the images with ROI (3 x 3mm) drawn on the enhancing part of the lesion. Maximum slope (evaluation of the upslope of the time–intensity curve), time to enhancement (enhancement of the lesion compared to thoracic aorta), arterial venous index (time interval between visualisation of artery and venous) and maximum relative enhancement data were collected. Values were compared between histopathology proven malignant and benign lesions using Wilcoxon Sum rank test. The performance of MS, TTE, AVI in discriminating between malignant and benign lesions was examined through receiver operating characteristic (ROC) analysis.

Results
There were 29 patients with 47 biopsy proven lesions recruited. Mean age was 54.29 (age range: 29 – 78). Ethnicity distribution were as follows: 51.6% Chinese, 25.8% Malay, and 22.6% Indian. 80.6 % scans were indicated for diagnostic, whilst 19.6% for screening. The women were premenopausal in 41.9% and postmenopausal in 58.1%. There were 61.3% of the study population in high risk category and 31.6% with no risk factor. The histopathology results were benign 19, pre-malignant 3 and malignant 25. The MRI scans were performed from June to December 2020. There were 3% (n=1), 10.3%(n=13), 34.5% (n=10) and 55.6% (n=5) patients in fatty, scattered, heterogenous and extremely dense fibroglandular density group respectively. The background parenchymal enhancement were 62.1% (n=18) minimal, 20.7%(n=6) mild and 17.2%(n=5) moderate. There were 85.1% (n=40) lesions consists of masses and 14.9% (n=7) non mass enhancement. The average mass size were 2.02cm.

There was significant difference in maximum slope (MS), arterial venous index (AVI) and maximum relative enhancement (MRE) between benign and malignant lesion using ultrafast protocol. No significant difference in time to enhancement (TTE).

The AUC for MS, AVI and MRE were 0.849, 0.766 and 0.733 respectively with sensitivity of 86.4%, 72.0% and 72.7% and specificity of 90.9%, 86.4 and 54.5% respectively.

Conclusion
Early results of ultrafast protocol usage in our centre shows potential application in discriminating malignant and benign lesions with high sensitivity and specificity by using maximum slope, arteriovenous index and maximum relative enhancement as indices. More data are needed, and study is still ongoing to support this findings.
Reference:


