Cancer Imaging

POSTER PRESENTATION

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Relative time-intensity curve: a new method to differentiate benign and malignant lesions on breast MRI

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From International Cancer Imaging Society (ICIS) 14th Annual Teaching Course
Heidelberg, Germany. 9-11 October 2014

Purpose

Benign/malignant overlap exists on time-intensity curve (TIC) of dynamic gadolinium-enhanced breast MRI. This study presents a new method for TIC generation to decrease overlap and improve accuracy.

Material and methods

MR images of 100 patients with enhancing breast lesions (64 malignant, 36 benign) obtained before and repeatedly after intravenous injection of Gd-DOTA were evaluated. Signal intensity of lesions (SIlesion) and breast (SIbreast) were measured and TIC obtained. Relative signal intensity of the lesion was calculated as (SIlesion-SIbreast)/SIbreast and plotted versus time to obtain relative TIC. Four parameters were evaluated for diagnosis of carcinoma: peak enhancement (PE), initial enhancement slope (S), time-to-peak (TTP), and washout ratio (WO). Comparison of parameter performance on TIC and relative TIC has been done by the Student's T test and the Receiver-Operator Curve (ROC) analysis.

Results

On TIC, TTP has been the only discriminating factor. When threshold for carcinoma has been set at TTP≤2 min, sensitivity, specificity, positive predictive value, negative predictive value, and accuracy have been 36, 100, 100, 43, and 57% respectively. On relative TIC, accuracy of TTP has increased to 89%. Area under the ROC curve for TTP has improved from 0.77 for TIC to 0.86 for relative TIC (p<0.05). WO ratio has become a second discriminating factor on relative TIC with more washout in malignant lesions (WO=41±32) than benign

lesions (WO= 11±19) (p <0.05). PE and S were not statistically significant on TIC or relative TIC.

Conclusion

The use of relative TIC improves the discrimination of benign and malignant breast lesions.

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