



Scientific Papers

CODE: SSJ01-04**SESSION: Breast (MR Imaging)**

**Evaluation of Prototype Computer-aided
Diagnosis System to Assist Radiologists in
Distinguishing Benign from Malignant Breast
Lesions on MR: Preliminary Results of
Multicenter Study**

PARTICIPANTS**Presenter**Alan [Penn](#) PhD**Abstract Co-Author**Scott [Thompson](#) PhDEtta [Pisano](#) MD ★Constance [Lehman](#) MD ★Paul [Weatherall](#) MD ★Gillian [Newstead](#) MD ★[et al](#)★ - Author stated no
financial disclosure▲ - Disclosure information
unavailable**DATE:** Tuesday, November 30 2004**START
TIME:** 03:30 PM**END TIME:** 03:40 PM**LOCATION:** Arie Crown Theater**PURPOSE**

To evaluate effectiveness of a prototype computer-aided-diagnosis (CAD) system on radiologists' discrimination of benign from malignant breast lesions on MR

METHOD AND MATERIALS

A prototype breast MRI CAD systems was evaluated by radiologists at 8 institutions. Readers were shown pre- and post-contrast T1 images of a single spatial slice through a biopsied lesion. In each of two sessions, readers interpreted 60 cases and assessed likelihood of malignancy. In session 1, readers used only tools found on MR systems; in session 2, CAD support was provided. Two measures of CAD effectiveness were evaluated: change in ROC area (Az) of reader assessment from session 1 to 2, and computer-reader 2nd opinion based on 3 CAD features (intensity, kinetics, adjacent heterogeneity) plus reader interpretation of border shape.

RESULTS

29 radiologists have enrolled in the study using 166 cases from 6 imaging systems. Preliminary results are based on 12 readers who have completed both sessions. Recruited readers (9/12) are radiologists with a range of clinical experience in breast MRI; site PIs (3/12) have extensive experience in breast MRI. Mean Az for reader assessment increased from .756 to .808 (PIs: .785 to .815; Recruited: .747 to .806). Mean Az for 2nd opinion was .811 (PIs: .833; Recruited: .804). Readers who said they would be more confident interpreting breast MRI with this CAD system (8/12) showed Az increase from .756 to .825; readers who did not have increased confidence from CAD (4/12) showed Az increase from .757 to .774. Mean sensitivity increased from .802 to .866; mean specificity from .472 to .475.

CONCLUSIONS

Preliminary results showed statistically significant ($p < .01$) improvements in ROC area when CAD was provided. Greatest improvement was for less experienced readers who believe that CAD may be beneficial. These findings are consistent with the aim of the CAD project -- to improve diagnostic accuracy of non-expert up to the level of expert. Virtually all reader improvement was due to increased sensitivity, with specificity remaining constant. The combination of reader interpretation of border and CAD analysis produces a likelihood-of-malignancy measure that may be useful as a 2nd opinion.

DISCLOSURE

A.I.P.,S.T.: Authors own stock or stock options in the company.