

AbstractID: 1377 Title: Comparison of aSi/CsI flat-panel and slot scanning digital mammography systems for detection of simulated microcalcifications: an ROC study

Objective: To evaluate and compare an aSi/CsI flat-panel based digital mammography system and a slot scanning system for detection of simulated microcalcifications of various sizes in uniform background.

Method: Calcium carbonate grains of various sizes (125-160 μm) were used to simulate microcalcifications. 336 detection tasks, each consisting of a calcification or control negative, were generated and imaged with an aSi/CsI flat-panel based (GE) system and a slot scanning CCD-based (Fisher) system at two Mean Glandular Dose (MGD) levels: 0.87 and 1.74 mGy. A 5-cm thick slab of 50% adipose/50% glandular simulated breast tissue material was used to provide uniform background. All images were displayed on workstations and reviewed by three mammographers. A 5-point confidence level rating was given after each detection task was reviewed. The ratings were analyzed to form the Receiver Operating Characteristic (ROC) curves. Areas under the ROC curves were computed and compared. Statistical significance for the comparison was evaluated using the ANOVA.

Results:

At same dose levels, the Fisher system performed significantly ($p < 0.01$) better than the GE system. Furthermore, there was no statistically significant difference ($p = 0.79$) between Fisher images acquired at 0.87 mGy and GE images acquired at 1.74 mGy. These observations were found to be consistent among all readers. They were found to apply to each different size group of calcifications as well as all groups combined together.

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