AbstractID: 7339 Title: Slot scan imaging versus anti-scatter grid method in digital chest imaging- a 4-AFC study

Purpose: To investigate and compare the anti-scatter grid and slot scanning methods for their effects on the observers' performance in digital chest imaging.

Materials and Methods: Anthropomorphic chest phantom was imaged with an a-Si/a-Se flat-panel based digital radiography system. The system was operated in both the slot scanning and full-field modes. An anti-scatter grid was used. Imaging technique was 120 kVp and 0.15 to 16 mAs for both modes. After that, the grid was removed and same imaging technique was applied to acquire phantom images for both modes. 1-cm diameter computer-simulated nodule with a nominal peak contrast ratio of 5% was used to generate simulated nodules at hilum and sub-diaphragm locations by applying SPR values for all images. 4-AFC experiment was conducted to measure the ratio of correct observations as a function of the exposure level for various imaging conditions and locations. 24 sets of four-512×512 images were generated for each exposure level, resulting in generating 192 sets for each imaging condition and location. These images were displayed randomly on a review workstation. The ratios of correct observations versus exposure levels were computed for various imaging conditions and locations.

Result: With low exposure, the observers' performance improved with the exposure level but reached the maximum at ~4 mAs for all techniques. At the hilum location, slot scan imaging without grid performed the best, followed by full-field imaging without grid. The use of an anti-scatter grid in both full-field and slot scan modes seemed to degrade the performance significantly.

Conclusion: Improvement with the exposure level has been observed for all imaging techniques. However, the observers' performance reached the maximum at different rates depending on the nodule location and techniques.
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