

Comparison of Computer-Aided Detection to Double Reading of Screening Mammograms: Review of 231,221 Mammograms

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Objective

This study compares the efficacy of single reading with computer-aided detection (CAD) to double reading and also to the first reader (without CAD) in a doublereading program.

Materials and Methods

A review was performed of 231,221 screening mammograms interpreted by experienced mammographers from 2001 through 2005 in a community-based mammography program. In 112,413 (48.6%), mammographers performed the first of two readings. In 118,808 (51.4%), they performed a single reading aided by CAD.

Results

For double reading, the first reader's recall rate was 10.2%; sensitivity, 81.4%; positive predictive value, as a percentage of positive screening mammograms resulting in a tissue diagnosis of cancer within 1 year (PPV₁), 4.1%; and cancer detection rate, 4.12 per 1,000.

After the double-reading process, the final recall rate was 11.9%; sensitivity, 88.0%; PPV₁, 3.7%; and cancer detection rate, 4.46 per 1,000. For single-reading with CAD, the recall rate was 10.6%; sensitivity, 90.4%; PPV₁, 3.9%; and cancer detection rate, 4.20 per 1,000. Statistically significant results included a lower recall rate with CAD compared with double reading (10.6% vs 11.9%, respectively; $p < 0.0001$); increased sensitivity with CAD compared with the first reader (90.4% vs 81.4%, $p < 0.0001$); and increased recall rate with CAD compared with the first reader (10.6% vs 10.2%, $p < 0.0001$).

Conclusion

Double reading increased sensitivity with a modest increase in the recall rate compared with single reading. Single reading with CAD, compared with double reading, resulted in a small, but not statistically significant, increase in sensitivity with a lower recall rate. Our results indicate that CAD enhances performance of a single reader, yielding increased sensitivity with only a small increase in recall rate.

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