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Evaluation of the diagnostic performance of infrared imaging of the breast: a preliminary study.

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Abstract

BACKGROUND:

The study was conducted to investigate the diagnostic performance of infrared (IR) imaging of the breast using an interpretive model derived from a scoring system.

METHODS:

The study was approved by the Institutional Review Board of our hospital. A total of 276 women (mean age = 50.8 years, SD 11.8) with suspicious findings on mammograms or ultrasound received IR imaging of the breast before excisional biopsy. The interpreting radiologists scored the lesions using a scoring system that combines five IR signs. The ROC (receiver operating characteristic) curve and AUC (area under the ROC curve) were analyzed by the univariate logistic regression model for each IR sign and an age-adjusted multivariate logistic regression model including 5 IR signs. The cut-off values and corresponding sensitivity, specificity, Youden's Index (Index = sensitivity+specificity-1), positive predictive value (PPV), negative predictive value (NPV) were estimated from the age-adjusted multivariate model. The most optimal cut-off value was determined by the one with highest Youden's Index.

RESULTS:

For the univariate model, the AUC of the ROC curve from five IR signs ranged from 0.557 to 0.701, and the AUC of the ROC from the age-adjusted multivariate model was 0.828. From the ROC derived from the multivariate model, the sensitivity of the most optimal cut-off value would be 72.4% with the corresponding specificity 76.6% (Youden's Index = 0.49), PPV 81.3% and NPV 66.4%.

CONCLUSIONS:

We established an interpretive age-adjusted multivariate model for IR imaging of the breast. The cut-off values and the corresponding sensitivity and specificity can be inferred from the model in a subpopulation for diagnostic purpose.

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