Dokumenttyp: journal article

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Abstract: AIM: To evaluate prospectively the influence of pulmonary nodule characteristics on detection performances of a computer-aided diagnosis (CAD) tool and experienced chest radiologists using multislice CT (MSCT). MATERIALS AND METHODS: MSCT scans of 20 consecutive patients were evaluated by a CAD system and two independent chest radiologists for presence of pulmonary nodules. Nodule size, position, margin, matrix characteristics, vascular and pleural attachments and reader confidence were recorded and data compared with an independent standard of reference. Statistical analysis for predictors influencing nodule detection or reader performance included chi-squared, retrograde stepwise conditional logistic regression with odds ratios and nodule detection proportion estimates (DPE), and ROC analysis. RESULTS: For 135 nodules, detection rates for CAD and readers were 76.3, 52.6 and 52.6%, respectively; false-positive rates were 0.55, 0.25 and 0.15 per examination, respectively. In consensus with CAD the reader detection rate increased to 93.3%, and the false-positive rate dropped to 0.1/scan. DPEs for nodules < or = 5 mm were significantly higher for ICAD than for the readers (p<0.05). Absence of vascular attachment was the only significant predictor of nodule detection by CAD (p = 0.0006-0.008). There were no
predictors of nodule detection for reader consensus with CAD. In contrast, vascular attachment predicted nodule detection by the readers (p = 0.0001-0.003). Reader sensitivity was higher for nodules with vascular attachment than for unattached nodules (sensitivities 0.768 and 0.369; 95% confidence intervals = 0.651-0.861 and 0.253-0.498, respectively). CONCLUSION: CAD increases nodule detection rates, decreases false-positive rates and compensates for deficient reader performance in detection of smallest lesions and of nodules without vascular attachment.