



Lung cancer: differentiating metastatic from nonmetastatic lymph nodes



New research demonstrates that dynamic first-pass contrast-enhanced (CE) perfusion area-detector CT (ADCT) is as useful as FDG PET/CT for the differentiation of metastatic from nonmetastatic lymph nodes and assessment of N stage in patients with non-small cell lung carcinoma (NSCLC). In addition, researchers found that using mathematic methods and calculated perfusion indexes significantly enhanced prediction capability. The findings are reported in the American Journal of Roentgenology.

The researchers hypothesised that dynamic first-pass CE-perfusion ADCT has better potential than FDG PET/CT for differentiating metastatic from nonmetastatic lymph nodes and can more accurately assess N stage in patients with NSCLC who are considered to be candidates for surgical treatment provided that the appropriate mathematic models are used. The current study therefore aimed to directly compare the capability of the two modalities for differentiation of metastatic from nonmetastatic lymph nodes and assessment of N stage in patients with NSCLC.

For this study, 77 consecutive patients, 45 men (mean age \pm SD, 70.4 ± 5.9 years) and 32 women (71.2 ± 7.7 years), underwent dynamic first-pass CE-perfusion ADCT at two or three different positions for covering the entire thorax, FDG PET/CT, surgical treatment, and pathologic examination. From all ADCT data for each of the subjects, a whole-chest perfusion map was computationally generated using the dual- and single-input maximum slope and Patlak plot methods. For quantitative N stage assessment, perfusion parameters and the maximum standardised uptake value (SUVmax) for each lymph node were determined by measuring the relevant ROI. ROC curve analyses were performed for comparing the diagnostic capability of each of the methods on a per-node basis. N stages evaluated by each of the indexes were then statistically compared with the final pathologic diagnosis by means of chi-square and kappa statistics.

According to the results, the area under the ROC curve (Az) values of systemic arterial perfusion (Az = 0.89), permeability surface (Az = 0.78), and SUVmax (Az = 0.85) were significantly larger than the Az values of total perfusion (Az = 0.70, $p < 0.05$) and distribution volume (Az = 0.55, $p < 0.05$). For each of the threshold values, agreement for systemic arterial perfusion calculated using the dual-input maximum slope model was substantial ($\kappa = 0.70$, $p < 0.0001$), and agreement for SUVmax was moderate ($\kappa = 0.60$, $p < 0.0001$).

"Our results show that dynamic first-pass CE-perfusion ADCT has potential similar to that of FDG PET/CT for differentiating metastatic from nonmetastatic lymph nodes and evaluating the N stage of disease in patients with NSCLC," the authors write. "Our comparison of intraobserver agreements for the assessment of each index showed that each intraobserver agreement was sufficient for clinical purposes, as established in previously published studies."

Source: [American Journal of Roentgenology](#)

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