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Title: Quantitative ^{18}F FDG PET-CT for the assessment of pulmonary neutrophilic inflammation in COPD

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Body: Introduction: Neutrophilic inflammation is of pathogenetic importance in COPD but non-invasive clinical assessment is problematic. We assessed the utility of ^{18}F FDG PET-CT as a spatially-informative surrogate measure of pulmonary neutrophilic inflammation in COPD. Methods: ^{18}F FDG PET-CT imaging, CT densitometry, clinical and physiological assessment were performed in 10 patients with usual COPD. Regional pulmonary ^{18}F FDG uptake was estimated by 3-D Patlak graphical analysis as an indicator of pulmonary neutrophilic glycolytic activity and related to lung physiology and lung density. Results: ^{18}F FDG uptake in the upper lung was greater than in the middle and lower lung regions and correlated with physiological and CT densitometric measures of disease severity (FEV1% predicted, $r = -0.848$, $p = 0.001$; FEV1/FVC, $r = -0.918$, $p < 0.001$; Kco% predicted, $r = -0.624$, $p = 0.027$; 15th percentile point, $r = -0.709$, $p = 0.011$).

Conclusions: The ^{18}F FDG signal seen in patients with COPD likely relates to the presence of centrilobular emphysema. The method has a potential role as an imaging biomarker in mechanistic and interventional studies in patients with usual COPD.