AbstractID: 8517 Title: Distinguish Pulmonary Nodules by Quantitative Measurement of Dynamic Contrast Enhancement from CT and 18F-FDG Uptake from PET: a Feasibility Study

PURPOSE: To develop and demonstrate a novel technique in differentiating the malignant pulmonary nodule from benignity by quantitative measurements of dynamic contrast enhancement from CT and ^{18}F -FDG update from PET. **METHOD AND MATERIALS:** Three patients with pulmonary nodules (one benignity, two Malignancies) were examined in this study by a hybrid scanning protocol which integrated a DCE-CT and PET scans. The diagnostic truth was obtained by CT-guided biopsy. The dynamic CT images were acquired at 22 time points: baseline plus 21 post-contrast scans with high sampling rate within first blood circulation. The PET exam was performed after the CT dynamic scans. In 4DCT image data, both local feeding vessels and nodule were contoured by radiologists for all images on in-house analysis workstation. The Arterial Input Function (AIF) and the Time Attenuation Curve (TAC) were generated for each nodule based on mean ROI density. The dynamic CT protocol with high sampling rate provides the feasibility to quantify the perfusion parameters (wash-in & wash-out enhancement). The ^{18}F-FDG SUV was also quantified from PET images. Both CT and PET quantitative measurements were analyzed for further pulmonary nodule characterization. **RESULTS:** Good enhancement studies were observed in two malignant case, in which the malignant nodules showed higher wash-in and wash-out compared with benign nodule densitometry. The ^{18}F-FDG uptake extracted from PET also showed higher activities in two malignant cases than benign case. **CONCLUSIONS:** A feasible technique, combining both DCE-CT and ^{18}F-FDG PET scan, to quantify the nodule perfusion and PET activity features in the clinical setting has been achieved. The increased perfusion and activity related to tumor angiogenesis demonstrated the expected pattern for malignancy. With further study and more patients, these techniques might be applicable in lung nodule characterization and evaluation of lung cancer response after treatment