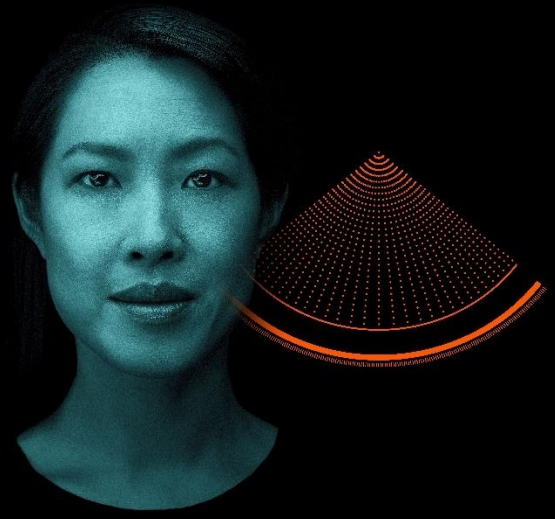
Assessment of emphysema on x-ray equivalent dose photon-counting detector CT

NAEOTOM Alpha
Publication Summary



Photon-counting is NAEOTOM

Key findings of the case study

"X-ray dose scans exhibited a significantly lower computed tomography dose index than low-dose scans […]."

"Inter-reader agreement between low- and x-ray dose for visual emphysema scoring was excellent (κ = 0.83). Visual emphysema scoring consensus showed good agreement between low-dose and x-ray dose scans (κ = 0.70),with significant and strong correlation (Spearman ρ = 0.79)."

"Further, deep learning emphysema severity estimations showed higher agreement (κ = 0.65) and correlation (Spearman ρ = 0.64) with visual scoring for low-dose scans than LAV predictions (κ = 0.48, Spearman ρ = 0.45)."

"The severity of emphysema can be reliably estimated using visual scoring on CT scans performed with x-ray equivalent doses on a PCD-CT. A deep learning algorithm demonstrated good agreement and strong correlation with the visual scoring method on low-dose scans. However, both the deep learning and LAV algorithms overestimated emphysema extent on x-ray dose scans. Nonetheless, x-ray equivalent radiation dose scans may revolutionize the ***detection and monitoring of disease in chronic obstructive pulmonary disease patients****."*

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https://doi.org/10.1097/RLI.0000000000001128

LAV: Low attenuation volume
PCD-CT: Photon-counting detector CT

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