

ABSTRACT

This study aimed to evaluate the quality of thoracic CT images as an approach to assessing the potential application of Photon Counting Computed Tomography (PCCT) for pulmonary monitoring in patients with bronchiectasis. The study employed a retrospective observational approach using secondary thoracic CT image datasets obtained from 20 patients with bronchiectasis. Quantitative image quality analysis was performed by measuring mean attenuation values, standard deviation (SD), Signal-to-Noise Ratio (SNR), and Contrast-to-Noise-Ratio (CNR) in regions of interest (ROI) of the lung parenchyma, mediastinum, and background using 3D Slicer software. The results demonstrated that the mean attenuation values of the lung ROI ranged from $-922,56$ to $-814,76$ HU, mediastinal ROI ranged from 30 to 57 HU, and background ROI was close to -1000 HU. The lung SNR values ranged from $-53,76$ to $-12,93$, while mediastinal SNR values ranged from 1.56 to 6.99. The CNR values ranged from 13.08 to 48.76, indicating that the contrast between lung and mediastinal tissues could still be adequately visualized despite inter-patient noise variations. These findings suggest that PCCT has the potential to produce adequate thoracic CT image quality through improved spatial resolution and noise reduction, thereby supporting long-term monitoring of bronchiectasis patients with lower radiation doses.

Keywords : Bronchiectasis, CNR, Image Quality, PCCT, SNR.