

Digital tomosynthesis of chest: serial assessment of drug-sensitive and multidrug-resistant tuberculosis

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PURPOSE: Digital tomosynthesis (DT) is an emerging modality which has superior sensitivity to radiography, in the detection of pulmonary mycobacterial disease. The purpose of this study was to analyze the imaging findings of DT between drug-sensitive tuberculosis (DSTB) and multidrug-resistant tuberculosis (MDRTB) pulmonary diseases at presentation and serial changes after antibiotic therapy administration.

MATERIALS AND METHODS: Two board certified chest radiologists reviewed with consensus retrospectively the serial DT scans of 56 patients with DSTB (n = 31) and MDRTB (n = 25). DT scans at presentation were examined for the presence of lung abnormalities including bronchiolitis, airspace consolidation, nodules, bronchiectasis, atelectasis or volume loss, and cavities. Serial DTs were examined for change in the size of cavities and overall assessment of improvement or aggravation at intervals of 1, 2, 3 and 6 months after initiation of treatment. Overall morphologic changes were scored with use of a 9-point response scale (range -4 to 4) on the basis of comparison with the initial scan. A negative score of -4 to -1 meant improvement, while a positive score of 1-4 meant aggravation, and 0 was defined as stable disease.

RESULTS: In both DSTB and MDRTB, the most frequently observed patterns of parenchymal abnormalities on initial DT scans were bronchiolitis (83.9, 48%), nodules (48.4, 64%), and cavities (45.2, 52%), respectively. Average response scores of both DSTB and MDRTB did not show a statistical difference at 1 (0.3 vs. 0.2, p = .057) and 2 months (-0.7 vs. -0.1, p = .049). At 3 months, a significant (p < .001) difference was observed in the semiquantitative grade of response between the two groups. In respect of cavity size, DSTB demonstrated a significant decrease at 3 months (p = .046), while MDRTB did not show a significant decrease in cavity size until 6 months (p = .033). The results of change in cavity size were analogous to those of response grade.

CONCLUSION: At 3 months after initiation of antibiotic therapy, a statistically significant trend of disease improvement was observed on DT images, allowing an earlier perception of the course of disease between DSTB and MDRTB.