

#0027: NOVEL MAGNETIC RESONANCE TECHNIQUE FOR FUNCTIONAL IMAGING OF CYSTIC FIBROSIS LUNG DISEASE

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Type

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Topic

Pediatric Radiology

Purpose

Cystic fibrosis (CF) is characterized by chronic respiratory infections and functional impairment of the lung. Lung function tests such as nitrogen multiple breath washout (N₂-MBW), are sensitive in detecting ventilation inhomogeneity, but cannot determine its exact origin. Novel magnetic resonance imaging (MRI) methods such as matrix pencil decomposition MRI can visualize functional changes in the lung without the administration of contrast agents and the need for breathing maneuvers.

Objectives: To examine the correlation between novel functional MRI and lung function tests in patients with CF.

Methods and Materials

Methods: Forty patients with CF (mean age 11.7 years, range 6–18) underwent MRI and lung function tests on the same day. Functional MRI provided semi-quantitative measures of the perfusion (R_O) and ventilation (R_{FV}) impairment as percentages of the affected lung volume. Morphological MRI was evaluated using a CF-specific score. N₂-MBW provided information about global (lung clearance index, LCI) ventilation inhomogeneity.

Results

Results: MRI detected functional impairment in all patients with CF: R_{FV} ranged from 19% to 38% and R_O ranged from 16% to 35%. R_{FV} and R_O were strongly correlated with LCI (r=0.76, p<0.001; r=0.85, p<0.001, respectively), as well as total morphology scores and sub-scores.

Conclusion

Conclusions: Non-invasive functional MRI is a promising method to detect and visualize perfusion and ventilation impairment in CF without the need of contrast agents or breath holding maneuvers.

Affirmations

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