

Cystic Fibrosis Research News

Title:

Magnetic Resonance Imaging of Cystic Fibrosis: Multi-Organ Imaging in the Age of CFTR Modulator Therapies

Lay Title:

Multi-Organ MRI in Cystic Fibrosis

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What was your research question?

Identifying safe and accurate medical imaging methods to assess disease progression and the impact of therapies is critical. Herein, we review state-of-the-art human magnetic resonance imaging (MRI) technologies that can be used to assess CF disease in the lung, liver, kidney, heart, and pancreas.

Why is this important?

A broader understanding of the diverse MRI capabilities within the CF clinical care community has the potential to improve patient care. It will also help to design effective clinical trials by selecting specific MRI techniques that can be used as outcome measures to indicate the health status of participants. The use of sensitive MRI outcome measures in clinical trials may become more important in the future, especially for patients with rare *CFTR* gene mutations where large-scale clinical trials are not be possible.

What did you do?

MRI provides high resolution, 3D image sets with selectable soft tissue contrast and no ionizing radiation. Through numerous technological and engineering advancements, modern MRI scanners are now capable of providing both anatomic and functional imaging assessments of the lungs and other organs in people with CF. In this review article, we summarize the MRI methods-

What did you find?

MRI has been used to provide MRI images of the lungs, liver, heart, kidney, and pancreas that can be used to assess disease progression in both pediatric and adult patients with CF. Importantly, MRI methods can be used to visualize disease in these organs without exposing patients to ionizing radiation. In some cases, the MRI methods used are also capable of detecting organ-level disease earlier than conventional clinical measures of organ function (e.g., spirometry, blood tests). Some of the modern MRI techniques available are also significantly faster than conventional MRI methods, reducing the need for sedation during MRI scans for children with CF.

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What does this mean and reasons for caution?

Modern MRI methods provide an opportunity to safely and sensitively monitor progression of multi-organ disease in people with CF. Considerations for selecting the best MRI methods for use in both patient care and clinical trials will include widespread availability on clinical MRI scanners, and standardization of the MRI methods across MRI magnetic field strengths and scanner manufacturers.

What's next?

An active area of research in MRI is to develop rapid and quantitative MRI (qMRI) assessments of disease progression. Integrating this ongoing qMRI effort with the evolving clinical and research needs of the CF health care community can provide significant benefits for people with CF.

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