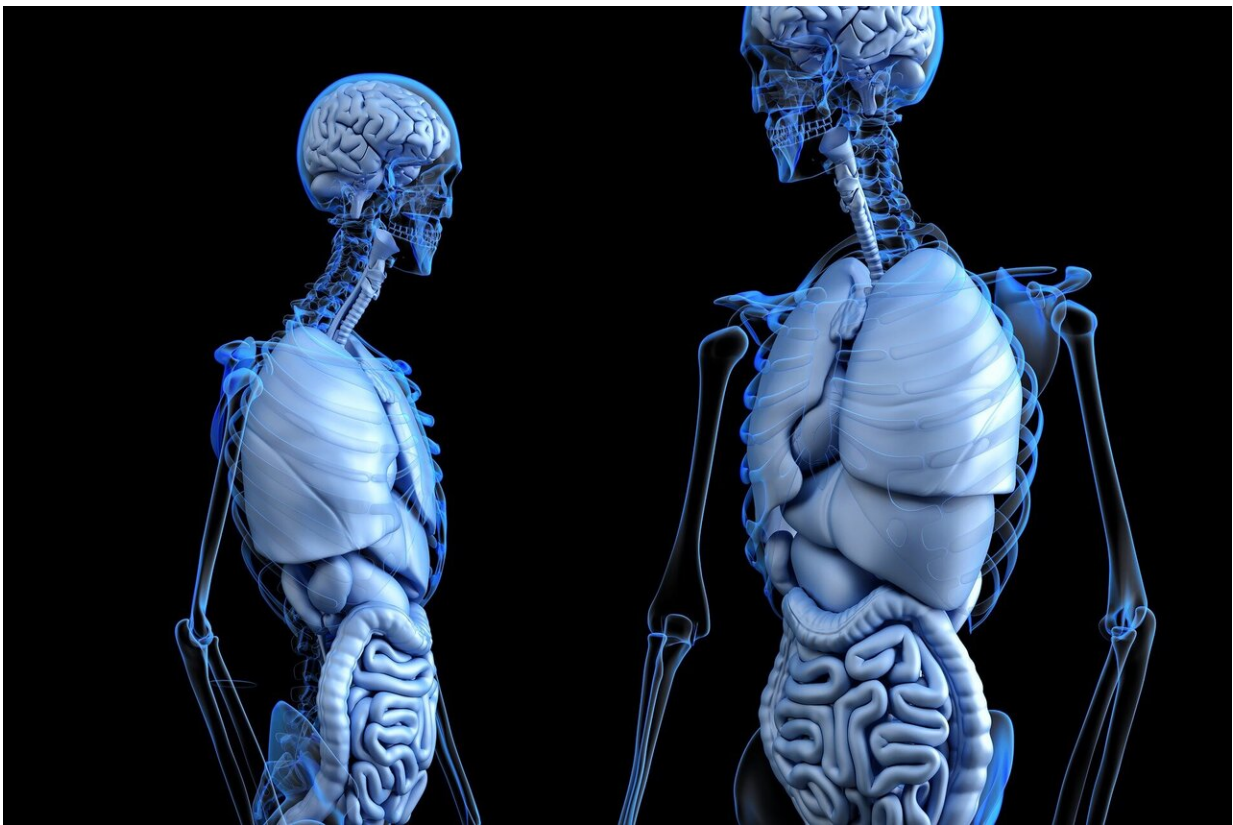


A novel, non-invasive MRI-based functional liver imaging score (FLIS) for investigating chronic liver disease

November 20 2019, by Johannes Angerer



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An interdisciplinary MedUni Vienna team has shown that important information about the stage and prognosis of chronic liver diseases can

be gotten by functional magnetic resonance imaging (fMRI). Lying in a tube-like machine, contrast agent is injected into a patient's arm vein. Within an hour, images of the liver are generated, all without any radiation. This is much simpler and safer than the current method of sticking a large needle in the liver to take a tissue sample or measure portal vein pressure to diagnose portal vein hypertension.

"We showed that fMRI using a special liver-specific contrast agent is able to non-invasively investigate liver function, enabling us to predict the development of liver-related complications such as ascites, internal bleeding and/or hepatic encephalopathy, as well as to estimate the risk for mortality" says the senior author of this study, Ahmed Ba-Ssalamah from MedUni Vienna's Department of Biomedical Imaging and Image-guided Therapy.

Magnetic resonance tracks the dynamics of the contrast agent in the liver

The contrast agent, gadoxetic acid, is injected via a peripheral vein. It is absorbed by the [liver cells](#) (hepatocytes) and eliminated via the bile ducts. Chronic inflammation of the liver tissue, for example due to [viral hepatitis](#) or [fatty liver disease](#) may lead to scarring (fibrosis/cirrhosis) of the organ, resulting in a reduction in the number of functioning hepatocytes and/or a decrease in cellular transporters responsible for the uptake of the contrast agent into hepatocytes. This ultimately leads to decreased contrast agent elimination from the liver. Radiation-free fMRI shows this liver cell damage as reduced brightness of the liver and delayed excretion of contrast agent in the bile ducts on serial imaging.

The functional liver imaging score determines severity and mortality risk

Based on three specific fMRI parameters, a Functional Liver Imaging Score (FLIS), ranging from zero (worst liver function) to six (best liver function) points, is calculated. The study found that patients with more severe liver disease had a lower FLIS (0-3 points), and a 3.7 times higher risk to develop liver-related complications than patients with a high FLIS (4-6 points). Furthermore, patients with advanced chronic liver disease and a low FLIS (0-3 points) had a significantly higher risk for mortality.

These results, published in the top journal "Radiology," will now be verified in a multi-centre study. This follow-up study will also investigate the extent to which fMRI can replace invasive methods of assessing the severity of liver disease. "However, the FLIS, based on functional Magnetic Resonance Imaging using liver-specific [contrast agents](#), may be already used for non-invasive assessment of [liver function](#) in daily clinical practice," says Ba-Ssalamah.

More information: Does the Functional Liver Imaging Score Derived from Gadoteric Acid-enhanced MRI Predict Outcomes in Chronic Liver Disease pubs.rsna.org/doi/10.1148/radiol.2019190734

Provided by Vienna University of Technology

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