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Imaging technique detects pediatric liver disease without need for needle biopsy

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A new, non-invasive imaging technique, magnetic resonance elastography (MRE), can now help physicians accurately detect fibrosis (scarring) in children with chronic liver disease – a growing problem due in part to increasing obesity rates.

A new study shows that MRE detects such chronic diseases as non-alcoholic fatty liver disease (NAFLD), which is increasingly common in children and teens, affecting an estimated 13 percent of adolescents. NAFLD can lead to progressive liver disease and liver failure. Obesity is a major risk factor.

"Because many pediatrics patients in the United States with NAFLD are severely obese, MRE is likely to be superior to ultrasound-based elastography in this population, as ultrasound-based methods are less reliable in severely obese patients," says Stavra Xanthakos, MD, a gastroenterologist at Cincinnati Children's Hospital Medical Center and lead author of the study.

The study is published online in the *Journal of Pediatrics*. If the findings are validated in larger studies, MRE could reduce dependence on costly and invasive liver biopsies to detect fibrosis.

In 2011 and 2012, the researchers evaluated 35 children and teens between the ages of 4 and 20 for chronic liver disease using both MRE and liver biopsy. The study demonstrated that MRE was highly accurate in detecting more advanced fibrosis in children with chronic liver

disease, including severely obese patients.

A needle biopsy is standard practice for evaluating liver fibrosis. This not only has risks for the patient and high expense, but it is often frightening for children and teens. MRE is a way to measure tissue stiffness that uses low frequency sound waves in combination with magnetic resonance, which involves the combination of magnetic fields and radio frequency waves to produce diagnostic images. MRE can be accomplished in just a few minutes using the MR scanner.

"Having the ability to easily and non-invasively assess the degree of fibrosis in a child's liver could help us identify the issue early and being the right course of treatment in a timely and effective manner," says Daniel Podberesky, MD, chief of thoracoabdominal imaging at Cincinnati Children's and a co-author of the study. "An added strength of magnetic resonance technology is the ability to more precisely measure liver fat, which allows us to non-invasively determine changes in liver fat quantity after clinical interventions."

"Our results show the exciting potential of MRE to improve clinical care and reduce dependence on liver biopsies, but it is not yet ready for primetime clinical use," adds Dr. Xanthakos. "In addition to validation in larger pediatric cohorts, we still need to determine whether MRE can predict changes in liver disease over time. We hope to study MRE in patients to test how well changes in imaging correlate with changes in liver stiffness after treatment or lifestyle changes."

Dr. Xanthakos co-directs the Cincinnati Children's Steatohepatitis Center. Steatohepatitis is an advanced stage of fatty liver disease.

In all, physicians at Cincinnati Children's have successfully evaluated more than 200 children using liver MRE with no adverse events.

Provided by Cincinnati Children's Hospital Medical Center