

Even early forms of liver disease affect heart health, new study finds

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Investigators from the Smidt Heart Institute at Cedars-Sinai have found that even subtle forms of liver disease directly impact heart health. The findings, recently published in the journal *Frontiers in Cardiovascular Medicine*, help further clarify the relationship between liver disease and

heart disease beyond their shared risk factors.

In the retrospective study, investigators compared patients' FIB-4 scores—a marker for [liver fibrosis](#) that can indicate risk of developing severe liver disease—with [heart abnormalities](#) visible through cardiac MRI scans. They found that elevated FIB-4 scores were associated with abnormalities in heart function and vascular dimension.

Alan Kwan, MD, a cardiologist and cardiac imaging researcher in the Smidt Heart Institute as well as lead and corresponding author of the study, said it had been known that nonalcoholic fatty liver disease was associated with cardiovascular death, but the relationship was poorly understood and possibly obscured by risk factors the two have in common, such as diabetes.

Previous similar studies had been limited in scope, looking only at how cirrhosis and nonalcoholic fatty liver disease affect the heart.

Earlier this year, the American Heart Association (AHA) [released a statement](#) that nonalcoholic fatty liver disease—an increasingly common liver condition that affects more than one in four adult Americans—is a risk factor for atherosclerotic cardiovascular disease.

And surprisingly, [heart disease](#)—not progression of liver disease—is the leading cause of death in people with nonalcoholic fatty liver disease, according to the AHA.

"If 25% of the population has this potential risk factor for cardiac disease, we knew we needed to understand it more fully," Kwan said. "So, our overall aim with this study was to examine the connections between the heart and the liver—a newer area of study, but one that made sense to explore further. The liver processes cholesterol and produces factors involved in [blood clotting](#) and inflammation—all of which can affect the heart—so we wanted to take a closer look at these

associations."

To conduct the study, investigators reviewed electronic medical records from the past 11 years of 1,668 patients who had low, moderate or high FIB-4 scores within one year of having a cardiac MRI, adjusting for standard cardiovascular risk factors. They found that nearly 86% of patients had at least one heart abnormality.

Cardiac MRI provides a unique view of the heart, using detailed imaging that can identify subtle changes in heart structure, function, blood vessel size and structure, heart muscle composition, and more.

"The abnormalities we saw were vascular changes—enlargement of the blood vessels coming out of heart as well as an increase in how much blood was moving," Kwan said.

"Typically, when physicians examine the heart, we aren't thinking about the liver, and vice versa. We tend to be very specialized in our own organ categories. But this study's findings indicate that we can and should screen for liver conditions when looking at heart conditions—we can't view the heart and the liver as completely separate organs functioning on their own islands."

The next step in the research, Kwan said, is to further explore the impact that liver disease can have on heart health.

"Also, other questions come to light," he said, "such as, when treating people with nonalcoholic fatty liver disease, could medications to treat this also help the heart? Or, when you see your cardiologist or primary care physician and risk factors such as high cholesterol, blood pressure, diabetes and [family history](#) are discussed, should nonalcoholic fatty liver disease also be a standard risk factor to consider?"

Susan Cheng, MD, MPH, director of the Institute for Research on

Healthy Aging in the Department of Cardiology at the Smidt Heart Institute and senior and co-corresponding author of the study, agreed that there are multiple reasons to continue research in this area.

"If we can understand the basic science of how the liver affects the heart, we can likely better understand other heart and organ interactions," said Cheng, who also holds the Erika J. Glazer Chair in Women's Cardiovascular Health and Population Science. "This could also shed light on directions for potential future targeted therapies to prevent cardiovascular disease in patients with [liver disease](#)."

Other Cedars-Sinai investigators who worked on this study include Nancy Sun, MPS; Matthew Driver, MPH; Patrick Botting, MSPH; Jesse Navarrette, MPA; David Ouyang, MD; Mazen Nouredin, MD; Debiao Li, Ph.D.; Joseph Ebinger, MD; and Daniel Berman, MD.

More information: Alan C. Kwan et al, Cardiovascular and hepatic disease associations by magnetic resonance imaging: A retrospective cohort study, *Frontiers in Cardiovascular Medicine* (2022). [DOI: 10.3389/fcvm.2022.1009474](#)

Provided by Cedars-Sinai Medical Center

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