Fatty Liver Disease, More Than Obesity, Linked to Severe COVID-19

People with both obesity and liver steatosis were at greater risk for hospitalization with COVID-19.

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People with both obesity and fatty liver disease were more likely to be hospitalized with COVID-19, but this was not the case for those with obesity or high liver fat alone, according to a study published in Frontiers in Medicine-Gastroenterology.

Non-alcoholic fatty liver disease (NAFLD) and its more severe form, non-alcoholic steatohepatitis (NASH), are leading causes of advanced liver disease worldwide. Linked to obesity and diabetes, NAFLD is increasingly recognized as a manifestation of metabolic syndrome. The buildup of fat in the liver (steatosis) triggers inflammation, which over time can lead to fibrosis (scarring), cirrhosis and liver cancer.

It is well known that overweight and obesity are linked to increased risk of severe COVID-19. Although the reasons for this are not fully understood, obesity can lead to impaired immune function and reduced lung capacity. Likewise, previous studies have shown that liver cirrhosis is associated with worse COVID-19 outcomes, including higher mortality.

Adriana Roca-Fernandez, of Perspectum Diagnostics and the University of Oxford in the United Kingdom, and colleagues aimed to determine whether pre-existing liver steatosis affects the risk of contracting the SARS-CoV-2 coronavirus and the severity of COVID-19 illness.

The researchers looked at data from more than 500,000 people in the UK Biobank database. A subgroup of 41,791 people ages 50 or older old underwent MRI scans using Perspectum's LiverMultiScan software to assess liver fat, fibrosis and inflammation and iron levels. Earlier results from the study were previously presented at the virtual AASLD Liver Meeting last November.

Liver steatosis was defined as a liver fat fraction of 5% or higher and advanced steatosis as 10% or higher (a common cutoff in NASH trials). Obesity was defined as a body mass index (BMI) of 30 or high. COVID-19 test results were obtained from U.K. testing data from March 2020 through January 2021. The research team devised a classification for "hepato-metabolic risk" to explore the relationship between BMI and liver fat.

Within the MRI subgroup, 4,458 people had been tested for COVID-19 and 1,043 (2.5%) tested positive. People with COVID-19 were younger on average, more likely to be male, less likely to be white and had a lower socioeconomic level. Within the positive group, 32 people (3.1%) were hospitalized, eight were admitted to an intensive care unit (ICU) and 14 died.

Based on MRI data collected before the pandemic, the median liver fat fraction and BMI were higher for people who later tested positive, but these differences did not reach statistical significance. However, individuals with advanced fatty liver disease were 35% more likely to test positive for COVID-19.

Participants with a liver fat fraction of at least 5% were about twice as likely to be hospitalized with COVID-19, and those with a liver fat fraction of at least 10% were about three times more likely, compared to people without liver steatosis. Hospitalized patients were also older, more likely to be male, had a lower socioeconomic level and were more likely to have a high BMI.

Taking both factors into consideration, people with both obesity and advanced fatty liver disease were over five times more likely to be hospitalized. But people with a high BMI and a normal liver fat fraction—or a non-obese BMI and a high liver fat fraction—were not at significantly increased risk.

What's more, people who were admitted to the ICU or died had a higher liver fat percentage, more liver inflammation and a higher BMI than COVID-positive people who did not require ICU admission and survived.

The potential causal relationship between liver steatosis and severe COVID-19 highlights the importance of people at higher risk taking precautions to avoid infection as well as "de-fatting" the liver to reduce susceptibility, the study authors suggested. Although there are currently no effective approved medications for NAFLD, the condition can be managed with lifestyle changes such as weight loss and exercise.

"Determining all risk factors for increased severity of COVID-19 is crucial to help shape public policy measures to protect these high-risk individuals, such as social distancing, prioritization of people for vaccinations and access to personalized medicine to guide clinical and lifestyle interventions," Roca-Fernandez said in a Perspectum press release.

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