

Lasting Liver Injury Following COVID-19 Infection Measured by Ultrasound Shear Wave Elastography

PURPOSE

Elevated transaminases in patients with COVID-19 infection suggest the presence liver injury during acute infection. It is unknown if this liver injury leads to lasting liver damage. We compare ultrasound shear wave elastography (SWE) liver stiffness, a marker of fibrosis, between patients with a history of COVID-19 infection and healthy controls to identify lasting hepatic injury.

METHODS AND MATERIALS

In this retrospective cohort study, patients with SWE exams between January 2019 and January 2022 were categorized into one of three study groups: 1) 31 post-COVID-19 subjects with a positive COVID-19 PCR assay at least 12 weeks prior to SWE, 2) random sample of 50 contemporaneous controls with a history of only negative COVID-19 PCR tests prior to SWE, and 3) random sample of 50 pre-pandemic controls with SWE exams from 2019 to address the possibility of undiagnosed COVID-19 infection in the contemporaneous controls. Median SWE values were converted to kPa as needed. The primary endpoint was average difference in median Young's modulus between post-COVID-19 patients and controls after controlling for age, sex, and time period in a linear regression model. Exploratory pairwise Wilcoxon rank sum tests compared each study group.

RESULTS

Mean age was 53.1, 55.2, and 58.2 years for COVID-19 subjects, contemporaneous controls, and pre-pandemic controls, respectively. 67 subjects were women. 131 scans were performed on either a General Electric (Wauwatosa, WI) LOGIQ E9 (44) or E10 (87) device. Subject scans occurred an average of 44 weeks after COVID-19 infection (12-81 weeks). COVID-19 infection was associated with an average increase in median Young's modulus of 1.71 kPa (95% CI [0.67,2.75], $p=0.002$) after controlling for age, sex, and time period. Post-COVID-19 subjects had higher median liver stiffness compared to contemporaneous controls (median = 7.68 vs 5.99 kPa, $p<0.001$) but not pre-pandemic controls (median = 7.01 kPa, $p=0.56$). Pre-pandemic controls had higher median stiffness compared to post-pandemic controls ($p=0.004$).

CONCLUSIONS

COVID-19 infection is associated with increased liver stiffness which may reflect lasting liver injury following infection. The trend of declining liver stiffness among controls is not completely understood, but may be a consequence of changing referral patterns.

CLINICAL RELEVANCE/APPLICATIONS

COVID-19 infection, which has infected more than 80 million Americans, may lead to lasting liver injury.