

## Can SARS-CoV-2 infection induced liver damage be assessed and quantified using advanced ultrasound methods?

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**Background.** Since the start of the Covid-19 pandemic, multiple studies focused on examining the long-term health effects that the disease had on different organ systems, however, to the authors' knowledge, no such investigations had been carried out regarding the use of advanced ultrasound methods in the assessment and quantification of liver damage in Covid-19 patients post-infection.

**Aim.** The study aimed to assess and quantify liver damage in patients who had SARS-CoV-2 by using advanced ultrasound (US) methods.

**Methods.** 90 patients were enrolled in a prospective cross-sectional study. 56 patients had proven SARS-CoV-19 infection in the 3–9 months preceding the study and 34 were randomly selected as a control group. An ultrasound exam using advanced liver assessment programmes (2D shear-wave elastography measurements, attenuation and dispersion imaging to quantify fibrosis, steatosis and viscosity respectively) was performed for all patients. Ultrasound findings were then correlated with biochemical markers of liver damage (LDH, GGT, AlAT) and inflammation (CRP, ESR), and compared between the groups. Disease severity and progression in the study group were in correlation to the ultrasound findings.

**Results.** Measurements of liver fibrosis differed significantly between the Covid-19 and control group, with especially higher fibrosis scores (F2, F3) in the study group ( $p < 0.001$ ), also observed in patients with no previous history of liver damage. Although no correlation between infection status and viscosity and attenuation scores was observed, altered biochemical markers of liver damage and inflammation had a statistically significant correlation with changes in all ultrasound findings ( $p < 0.05$ ). Almost a third of study group patients with Covid-19 had been hospitalised (59%,  $n = 33$ ), and steatosis grades in patients with a more severe disease course were found to have been significantly higher ( $F = 9.1$ ,  $p < 0.01$ ).

**Conclusion.** Biochemically proven liver damage was found to be more common among patients post-SARS-CoV-2 infection than a randomised control group, and these changes were mirrored by altered ultrasound findings using advanced ultrasound liver imaging techniques. Covid-19 patients with a more severe disease course had higher steatosis grades.

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