

中文題目：超音波肝纖維化掃描測得的肝臟硬度作為中老年人死亡風險的預測因子：以人群為基礎之世代研究

英文題目：Liver stiffness by ultrasound transient elastography as a predictor of mortality risk in middle-aged and older adults: a population-based cohort study

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Background

Chronic liver disease is a significant cause of mortality and disability-adjusted life-years worldwide. While chronic hepatitis B virus, hepatitis C virus, and alcohol-related liver diseases are important causes of chronic liver disease, nonalcoholic fatty-liver disease is rapidly growing contributor to liver-associated mortality and morbidity in the general population. Fatty liver disease is usually asymptomatic until complications develop. Liver ultrasound transient elastography is a non-invasive point-of-care test for the assessment of hepatic fibrosis. Studies have shown that liver stiffness estimated by transient elastography can predict morbidity and mortality in patients with known chronic liver disease. However, there is a paucity of study assessing ultrasound-based transient elastography as a prognostic tool in general population. Therefore, we conducted a population-based study to evaluate the capability of single time-point ultrasound-based transient elastography to predict mortality.

Method

The study population was participants of 2017-2018 National Health and Nutrition Examination Survey (NHANES) in the United States. Liver stiffness is measured by FibroScan® using ultrasound and the vibration controlled transient elastography. A total of 3375 adults aged 40 years and older completed the liver stiffness measurements and were included in our analysis. We categorized the participants by median stiffness of ≤ 7.0 kilopascals (kPa) (group 1, n=2731), 7.1 to 14.0 kPa (group 2, n=512), and ≥ 14.1 kPa (group 3, n=132). The survival status was ascertained by linking NHANES data to death records from the National Death Index through probabilistic matching and death certificate review. The follow-up period for each participant is the period between the NHANES baseline interview date and the participant's death date or last date of follow-up (December 31, 2019), whichever came first.

Results

The average age of the study population was 60.5 ± 11.6 years old and 49.4% of them was male, with race/ethnicity distribution of 35.3% Whites, 23.6% Blacks, and 22.0% Hispanics. We observed that individuals with higher stiffness levels tended to be males, smokers, higher in prevalence of congestive heart failure (CHF), diabetes, hypertension, chronic viral hepatitis (B or C) infection, higher in body mass index (BMI), lower in plasma albumin and total cholesterol, and higher in plasma triglyceride. There was no difference in prevalence of excessive alcohol intake, coronary artery disease (CAD) or previous stroke. By multiple linear regression, our results showed that males, older age, higher BMI, diabetes, chronic viral hepatitis infection, and CHF positively correlated to higher level of stiffness, while race/ethnicity, hypertension, CAD, previous stroke, excessive alcohol intake, smoking status and plasma triglyceride were not significantly associated with stiffness level. During a median follow-up of 25.0 months (interquartile range: 18.0-31.0 months), a total of 90 participants died (11.0 per 10000 person-months). Our crude analysis showed that liver stiffness positively correlated to greater all-cause mortality risk. By Cox regression analysis with adjustment for age, sex, race/ethnicity, BMI, diabetes,

CHF, chronic viral hepatitis (B or C) infection, excessive alcohol intake, triglyceride level, and smoking status, we showed that group 2 (HR: 1.96, 95% CI 1.10-3.48, $p < 0.05$) and group 3 (HR: 2.69, 95% CI 1.13-6.39, $p < 0.05$) had higher all-cause mortality risk compared with group 1. In addition, among individuals without chronic viral hepatitis (B or C) infection or excessive alcohol intake, we showed that mortality risk was 65% higher for one grade increment of liver stiffness (HR 1.65, 95% CI 1.06-2.59, $p < 0.05$) after adjusting for age, sex, race/ethnicity, BMI, diabetes, CHF, triglyceride level, and smoking status.

Conclusion

Liver stiffness by transient elastography was independently associated with mortality risk in middle-aged and older adults; the results remained significant in those without chronic viral hepatitis infection or excessive alcohol intake. Ultrasound transient elastography can serve as a useful tool for screening and risk stratification of chronic liver disease in general population.