HEPATOLOGY

Controlled attenuation parameter for the detection and quantification of hepatic steatosis in non-alcoholic fatty liver disease

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Abstract

Background and Aim: Controlled attenuation parameter (CAP) has been suggested as a noninvasive method for detection and quantification of hepatic steatosis. We aim to study the diagnostic performance of CAP in non-alcoholic fatty liver disease (NAFLD) patients.

Methods: Transient elastography was performed in consecutive NAFLD patients undergoing liver biopsy and non-NAFLD controls. The accuracy of CAP for the detection and quantification of hepatic steatosis was assessed based on histological findings according to the Nonalcoholic Steatohepatitis Clinical Research Network Scoring System.

Results: Data for 101 NAFLD patients (mean age 50.3 ± 11.3 years old, 51.5% male) and 60 non-NAFLD controls were analyzed. CAP was associated with steatosis grade (odds ratio [OR] = 29.16, P < 0.001), body mass index (BMI; OR = 4.34, P < 0.001) and serum triglyceride (OR = 13.59, P = 0.037) on multivariate analysis. The median CAP for steatosis grades S0, S1, S2, and S3 were 184 dB/m, 305 dB/m, 320 dB/m, and 324 dB/m, respectively. The areas under receiver operating characteristics curves (AUROC) for estimation of steatosis grades ≥ S1, S2, and S3 were 0.97, 0.86, and 0.75, respectively. The optimal CAP cutoffs for estimation of steatosis grades ≥ S1, S2, and S3 were 263 dB/m, 281 dB/m, and 283 dB/m, respectively. Among non-obese patients, the AUROC for estimation of steatosis grades ≥ S1 and S2 were 0.99 and 0.99, respectively. Among obese patients, the AUROC for estimation of steatosis grades ≥ S1, S2, and S3 were 0.92, 0.64, and 0.58, respectively.

Conclusions: CAP is excellent for the detection of significant hepatic steatosis. However, its accuracy is impaired by an increased BMI, and it is less accurate to distinguish between the different grades of hepatic steatosis.

Introduction

Non-alcoholic fatty liver disease (NAFLD) encompasses a spectrum of liver conditions, ranging from benign steatosis to non-alcoholic steatohepatitis (NASH) to fibrosis and cirrhosis. NASH has been recognized as an important cause of cryptogenic cirrhosis and is associated with an increased risk of hepatocellular carcinoma, even in patients without cirrhosis. In a study on etiology of cirrhosis and association with hepatocellular carcinoma in our center, cryptogenic cause, which is believed to be due to NASH, contributed to 15.4% of cases of cirrhosis and was an independent predictor of hepatocellular carcinoma. The prevalence of NAFLD has increased rapidly over the years parallel to the increase in metabolic syndrome, and it is recognized as one of the most common causes of chronic liver disease worldwide.

Ultrasoundography is by far the most common method used to diagnose fatty liver in clinical practice and in epidemiological studies. However, ultrasonography is accurate only when fatty liver is moderate to severe. Moreover, ultrasonography is not able to distinguish NASH from simple steatosis and to assess the severity of fibrosis. Both factors carry important prognostic implications in NAFLD patients. Histopathological examination of a liver biopsy specimen is the current best standard for assessment of NAFLD. It confirms the diagnosis and helps exclude other causes of liver disease in some cases. It also distinguishes NASH from simple steatosis and allows assessment of the severity of fibrosis. However, liver biopsy is invasive and associated with a small risk of complications. It may also be limited by sampling variability and intra- and interobserver variability.

Recently, a novel technology called transient elastography has been used to estimate liver stiffness, which has shown to correlate well with histopathological fibrosis stage. This has allowed non-invasive and accurate estimation of fibrosis stage in NAFLD patients. The decrease in amplitude of ultrasound as it is...