

Estimation of reference values for liver elasticity in biopsy-proven normal liver using supersonic shear wave elastography: measurement reliability and effect of steatosis

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PURPOSE: To determine the reference values of liver elasticity in the biopsy-proven normal liver with Supersonic shear wave elastography and to evaluate the measurement reliability and effect of steatosis.

MATERIALS AND METHODS: We retrospectively identified 238 patients who underwent Supersonic shear wave elastography (Supersonic Imagine, Aix Provence, France) and subsequent ultrasound-guided liver biopsy on the same day. After the exclusion of patients with any abnormal hepatic pathology (n = 42) except for simple hepatic steatosis, the 196 subjects (123 with normal nonsteatotic liver and 73 with simple hepatic steatosis; 130 men, 66 women; mean age, 29.2 years) were included in the study. Three consecutive liver elasticity measurements were obtained in each patient. Median value expressed as kPa was used as a representative measurement of the liver elasticity. The reference range of elasticity was determined according to Clinical and Laboratory Standards Institute guideline C28 – A3 for determining reference intervals for quantitative clinical laboratory tests. The mean values of the liver elasticity were compared between the nonsteatotic and steatotic livers using the student t-test. Measurement reliability was evaluated by using intra-class correlation coefficient (ICC).

RESULTS: The mean elasticity values in the subjects with the biopsy-proven normal (nonsteatotic and steatotic) liver were 4.37 kPa with the estimated reference range of elasticity of 2.58 – 6.16 kPa. There was no significant difference in the mean elasticity between the nonsteatotic (4.39 kPa) and steatotic liver (4.33 kPa) ($p = .69$). The overall ICC value of the elasticity measurements (nonsteatotic and steatotic) was 0.92. Measurement reliability of the steatotic liver (ICC, 0.89) was not significantly different from those for the nonsteatotic liver (ICC, 0.94) ($p = .34$).

CONCLUSION: Hepatic elasticity values measured with Supersonic shear wave elastography in histologically proven normal liver ranged from 2.58 to 6.16 kPa with a high measurement reliability. Simple steatosis in the liver did not significantly affect either elasticity values or measurement reliability.