

Reproducibility of liver stiffness measurement by supersonic shear wave elastography in patients with long-term use of methotrexate

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PURPOSE: To evaluate reproducibility of liver stiffness (LS) measurement by Supersonic shear wave elastography (SSWE) in patients with long-term use of methotrexate (MTX) for treatment of rheumatoid arthritis.

MATERIALS AND METHODS: This prospective study was approved by our institutional review board. After obtaining written informed consent, 148 consecutive patients were enrolled in the study. All subjects who had taken MTX (duration of taking MTX) underwent SSWE along with liver ultrasonography. SSWE was performed twice by two of three different radiologists each of whom had at least 100 cases of clinical experience with SSWE. The measurement was repeated 5 times by each examiner and each examiner was blinded to the results of other examiners. The median value (considered as LS) and interquartile range divided by the median value (IQR/M; representing intraobserver variability) were calculated from 5 measurements. Body mass indexes (BMI) of the patients (n = 139) were also investigated. Intraclass correlation coefficient (ICC) was used for statistical analysis, and z-test for comparison of correlation coefficient.

RESULTS: Mean values of LS and IQR/M in the overall subject were 5.82 kPa (range, 3.96–9.31 kPa) and 0.12 (range, 0.02–0.32). ICC (2,1) of overall LS was 0.593 (95% confidence interval (CI), 0.477–0.688; p < .001), and ICC (2,1) of overall IQR/M was -0.041 (95% CI, -0.197–0.118; p = .695). In the obese group (BMI > 25; n = 34), ICC (2,1) of LS and IQR/M was 0.669 (95% CI, 0.430–0.820; p < .001) and -0.106 (95% CI, -0.437–0.243; p = .723), respectively. In the lower BMI group (BMI ≤ 25; n = 105), ICC(2,1) of LS and IQR/M was 0.441 (95% CI, 0.273–0.583; p < .001) and -0.014 (95% CI, -0.197–0.173; p = .558), respectively. The difference between two correlation coefficients of obese and lower BMI groups was not statistically significant (p = .102).

CONCLUSION: LS measurement by SSWE may be reproducible moderately for measurement of liver stiffness irrespective of BMI. Intraobserver variability did not show any significant difference between examiners.

CLINICAL RELEVANCE: This preliminary result shows SSWE to be moderately reproducible among different examiners in patients with liver stiffness of ≤ 10 kPa even with little clinical experience.