Comparison of Liver Stiffness with MRE and Fibrosis Quantification with Fibro-C Index in Chronic Hepatitis B Patients.

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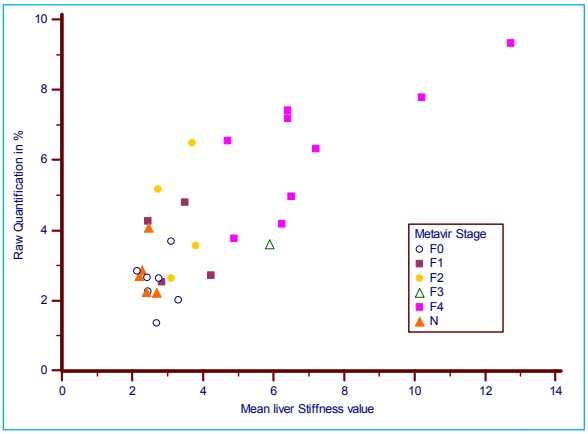
Purpose: To compare the liver stiffness estimation with MR Elastography (MRE) and the quantification of fibrous content in the liver biopsy samples using Fibro-C index.
Methods: Thirty patients with chronic hepatitis B infection and clinical suspicion of liver fibrosis underwent MRE and Percutaneous liver biopsy. The MRE study and Percutaneous liver biopsies were performed within 8-12 weeks duration and patients did not receive any treatment of fibrosis. MRE was performed on a 1.5T machine using a standard MRE sequence and four slices through the largest cross-section of the liver was obtained. Stiffness of the liver was estimated by placing regions of interest on the elastograms and a mean value in kilopascals (kPa) obtained. The liver biopsy samples were processed with standard histology technique and an experienced hepatopathologist graded for fibrosis using METAVIR score. On the same biopsy sample, quantification of the amount of collagen with Fibro-C index was performed with Gaussian mixture model segmentation method and quantification index representing total aggregated collagen amount was obtained. The stiffness values, METAVIR scores and quantification index scores were correlated. Receiver operator curve (ROC) analysis was performed for accuracy of MRE and Fibro-C index for detection of fibrosis.
Results: According to histology, liver was normal in 5, METAVIR stage F0 in 7, F1 in 4, F2 in 4, F3 in1 and F4 in 9 patients. Stiffness values and total aggregated collagen content showed good correlation (R= 0.80, p<0.01) (fig.1). There was no significant difference between the accuracies of MRE and Fibro-C index for detection of fibrosis (0.94 vs. 0.90, P=0.5), significant fibrosis (0.95 vs. 0.90, P=0.41) and cirrhosis (0.99 vs. 0.94, P=0.2). However, MRE performed better than Fibro-C index in differentiating the different grades of fibrosis from normal liver (fig 1), especially grades of severe fibrosis from mild fibrosis and normal liver.



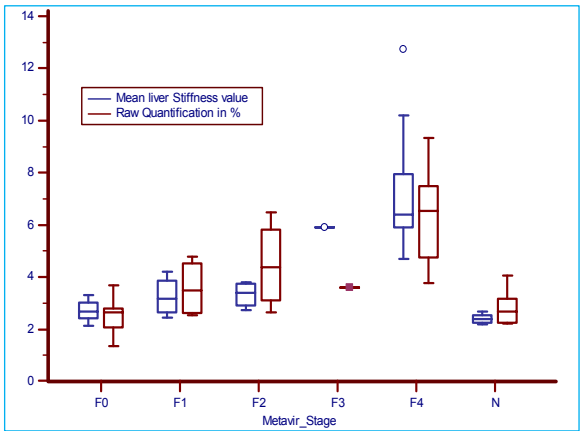


Fig.1. Graphs showing correlation between mean liver stiffness values with MRE and raw collagen content quantification (top) and box-plot graph (bottom) grouped according METAVIR stage of fibrosis.

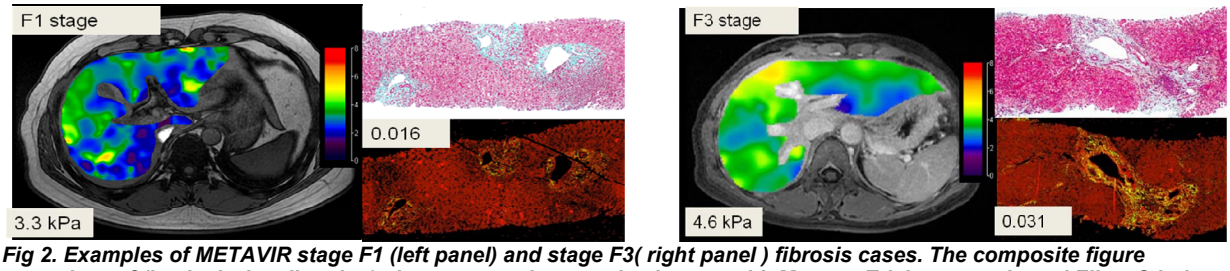


Fig 2. Examples of METAVIR stage F1 (left panel) and stage F3(right panel) fibrosis cases. The composite figure comprises of (in clockwise direction) elastogram, microscopic pictures with Masson-Trichrome stain and Fibro-C index images for the biopsy samples. The collagen content of the biopsy samples were 1.6% for F1 stage and 3.1% for F3 stage liver biopsy samples.

Conclusion: MRE derived stiffness of liver correlates well with fibrous content of liver biopsy and differentiates fibrotic liver and normal liver. The different grades of liver fibrosis were better differentiated with MRE than by quantification of the fibrous content of the liver, therefore MRE may be suitable alternative for non-invasive assessment of liver fibrosis burden in chronic hepatitis B patients.