Quantitative Assessment For Fibrosis In NAFLD Using Collagen String Features In Specific Regions For Liver

Christopher J. Middel, MD, Zachery Goldman, MD, PhD, Mariam Borse, MD, Matthew F. Roman, MD, Katherine M. Cohn, MD

BACKGROUND
- Digital image analysis on stained liver biopsies reveals significant correlation of collagen proportionate area (CPA) with traditional semi-quantitative staging system.
- Histological staining may introduce operator-dependent variations and collagen progression dynamics has not been considered.
- New SHG/TPEF microscopy can be used to observe collagen and hepatocyte morphology without staining.
- Morphological features of collagen can be extracted by sophisticated image analysis algorithms.

DESIGN
- Biopsies from 101 patients with NAFLD and NASH were staged according to NASH CRN and with the seven category block staging system modified to be appropriate for NASH.
- Quantitative analysis was done on the unstrained biopsy samples using SHG/TPEF microscopy to generate 100 quantitative collagen features including overall, portal, septal and fibrillar collagen in liver tissue.
- For comparison, digitized images of Sirius red stained sections were also acquired to calculate the collagen proportionate area (CPA).
- The SHG collagen features were compared with CPA on the correlation with both staging systems and clinical data of the patients.

RESULTS
- Biopsies from 101 patients with NAFLD and NASH were staged according to NASH CRN and with the seven category block staging system modified to be appropriate for NASH.
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CONCLUSIONS
Compared with traditional stained image analysis, quantitative assessment using SHG collagen features recorded by SHG/TPEF microscopy is more robust for evaluating fibrosis in NAFLD.