

Presenter: Andrew Smith, MD PhD

Title of Abstract: **Development of post-processing software to diagnose and stage HCV-induced cirrhosis by quantification of liver surface nodularity on routine CT images.**

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Modality: CT

Organ System: GI

Intro: HCV-induced cirrhosis is associated with liver surface nodularity.

Purpose: To quantitatively measure liver surface nodularity on routine CT images to differentiate cirrhotic from non-cirrhotic livers.

Methods Used: For this IRB-approved HIPAA-compliant retrospective study, electronic medical records were used to identify patients with routine liver CT imaging that included nonenhanced and portal-venous-phase contrast-enhanced images with thin (0.6-2.0mm) and thick (2.5-5.0mm) slice axial images (NECT-thin, NECT-thick, CECT-thin, and CECT-thick imaging, respectively) between 1/1/2006 and 3/31/2011. Liver biopsy specimens obtained <1 year from CT imaging (N=31) were re-read for Metavir scoring by an expert hepatopathologist. Patients with normal livers but no biopsy (N=30) were assigned a score of F0. Patients clinically managed for cirrhosis but no biopsy (N=35) were assigned a score of F4. Child-Pugh scoring was used to group biopsy-proven and clinical cirrhosis (F4) severity as A, B, or C. Proprietary post-processing software was developed to provide a liver surface nodularity score as a continuous variable. Liver surface nodularity was measured 5 times by a single blinded reader for each imaging technique, and the median value was used for statistical analysis. The area under the ROC curve (AUC) was used to evaluate the accuracy of the nodularity score for differentiating cirrhotic from non-cirrhotic livers.

Results of Abstract: For CECT-thin imaging, the median nodularity scores were as follows: F0-F2=1.59 (N=33), F3=1.78

(N=7), F4A=4.71 (N=35), F4B=7.58 (N=16), F4C=8.65 (N=5). The AUC for nodularity score to differentiate cirrhotic (N=56) from non-cirrhotic (N=40) livers was 0.976, 0.977, 0.982, and 0.977 for NECT-thin, NECT-thick, CECT-thin, and CECT-thick imaging, respectively. CECT-thin imaging nodularity score was associated with MELD score (Spearman correlation=0.476, P=0.0002) and Child-Pugh score (Spearman correlation=0.563, P<0.0001).

Discussion: Liver surface nodularity measurement on routine CT images is highly accurate for differentiating cirrhotic from non-cirrhotic livers.

Scientific and/or Clinical Significance? Non-invasive quantification of liver surface nodularity by CT may be used to screen for cirrhosis, avoid biopsy, and monitor disease severity.

Relationship to existing work These methods are the first of their kind