Original Article

The Largest American Study Comparing Transient Elastography and the Aminotransferase-to-platelet Ratio Index Score, Two Noninvasive Tests for Liver Fibrosis Staging in HIV/HCV Coinfected Patients

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Abstract

Objective: Elastography has become the standard of care of diagnostic approaches for liver disease, particularly when dealing with hepatitis C. There areno studies in the inner-city populations of Newark, New Jersey, that describe the comparison of noninvasive markers, such as FibroScan andaminotransferase-to-platelet ratio index (APRI) scoring. **Methods:** Using a chart review method, we used a case-control study method of gathering and analyzing the data, using $P <$ or $= 0.05$ as a significant variable. **Results:** The outcome of this study indicates that the FibroScan may be a better marker than the APRI score for the staging of liver disease when a patient has hepatitis B or C with or without HIV/AIDS. **Conclusions:** This may be a benchmark study to further enhance our understanging of the utility of the fibroscan.

Keywords: Aminotransferase-to-platelet ratio index, elastography, FibroScan, hepatitis C, HIV

Introduction

The FibroScan is a noninvasive modality which measures fibrosis of the liver by assessing parenchymal (tissue) stiffness. In April 2013, the Food and Drug Administration approved its use in the US, stating: "FibroScan is indicated for the measurement of shear wave velocity in the liver… [It] may be used as an aid to clinical management of patients with liver disease."[1]

Validation studies imply that chronic active hepatitis C infection and a liver stiffness >14 kPa have a 90% probability of having cirrhosis, patients with liver stiffness >7 kPa have an 85% probability of at least significant fibrosis. It is best performed with other clinical and/or biochemical parameters, by someone experienced with CAH C, having a strong clinical acumen.[2] Because fibrosis implies morphological damage, liver biopsy is still considered the best standard for the assessment of liver fibrosis.[3,4] During recent years, the natural history of HIV-related diseases has changed, and chronic liver disease and HCV coinfection have become an important and growing cause of morbidity and mortality in HIV-infected patients.[5] Many sources suggest that HIV infection modifies the natural history of chronic hepatitis C, thus promoting more rapid progression to cirrhosis.[6-8]

Aims

Our objective is to perform a chart review comparing FibroScan to the Aspartate aminotransferase (AST)-to-platelet ratio index (APRI) scoring using the liver biopsy as the gold standard for the staging of liver fibrosis in HIV and HCV coinfected patients. APRI is calculated in the following way: AST level/upper limit of normal/platelet count (109/L) if <0.5; if ≥0.5, it will be staged at F2 or greater.

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Materials and Methods

The charts of 623 patients who received elasticity scans were reviewed. Gross liver appearance was assessed and biopsy specimens were blindly evaluated by a pathologist. Elastography (FibroScan) was used to measure liver stiffness.

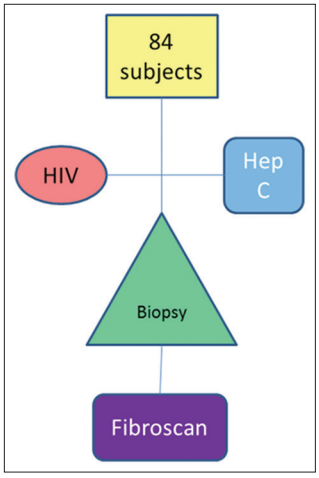

Figure 1: Flowchart of the study design

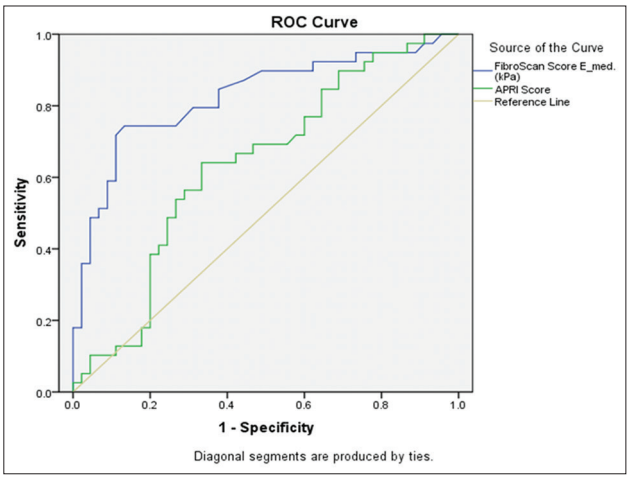

Figure 2: Receiver operator characteristic curves for significant fibrosis (≥F2)

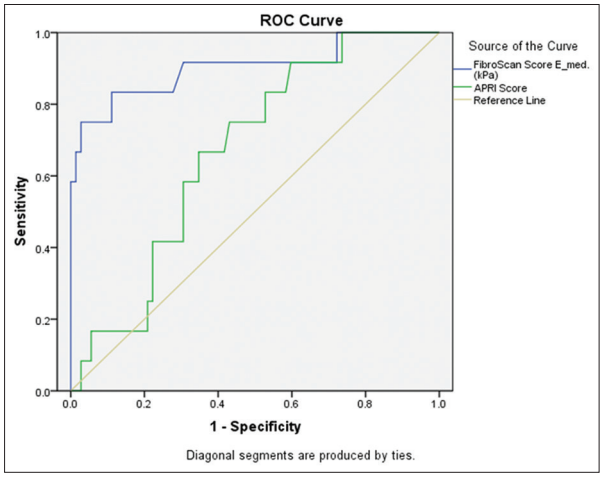

Figure 3: Receiver operator characteristic curves for severe fibrosis (≥F3)

Statistical analysis used

Area under the receiver operator characteristic (AUROC) curves analysis comparison of the two diagnostic tests was used, and a $P \leq 0.05$ was regarded as statistically significant.

Results

Eighty-four patients who had liver biopsies were included. The mean age is 58.2 ± 6.3 years. 49 (58.3%) were male. 61 (72.6%) were African–American and 78 (92.9%) had hepatitis C genotype 1 [Tables 1 and 2]. All patients were on antiretroviral therapy for HIV and had suppressed HIV viral load at the time of FibroScan and APRI score determination. ROC curves were determined for both significant fibrosis (Scheuer fibrosis stage F2 and above) and severe fibrosis (Scheuer fibrosis stage F3 and above) for FibroScan and APRI score..

For FibroScan, ROC curve is 0.826 (95% confidence interval [CI] 0.733–0.918) with a standard error (SE) of 0.047. The APRI score, on the other hand, has an AUROC of 0.635 (95% CI 0.515–0.755) with an SE of 0.061. There is a significant difference between the two AUROC's (*P* - 0.01), which means the FibroScan is more accurate in determining significant fibrosis [Figures 1-3]. At a cut-off value 7.75 kPa for FibroScan measurement, the sensitivity and specificity are 79.5% and 70%, respectively.

Results - severe fibrosis

For FibroScan, the AUROC is 0.903 (95% CI 0.00–1.00) with an SE of 0.061 while the APRI score has an AUROC of 0.669 (95% CI 0.531–0.807), with an SE of 0.071. The difference between the two AUROC's is also statistically significant (*P* - 0.03), meaning the FibroScan is more accurate for detecting liver fibrosis stage F3 and above. For a cut-off value 13.0 kPa, the sensitivity and specificity of FibroScan in determining severe fibrosis is 75.0% and 89.0%, respectively.

Table 1: Patient demographics

Parameters	% and mean
Age, years (%)	
58.2±6.3	49 (58.3)
Race African-American (%)	61 (72.6)
Hepatitis C genotype 1 (%)	78 (92.9)

Table 2: Comparison of sensitivity and specificity for the two modalities - severe fibrosis and cirrhosis

Test for comparison	% with severe fibrosis	% with cirrhosis
FibroScan (%)	79.5	70
Aminotransferase-to-platelet ratio index score (%)	56.3	65.8

For APRI, the sensitivity is 56.3% and the specificity is 75.8% in the prediction of severe fibrosis, and for cirrhosis, sensitivity is 76.4% and specificity is 65.8%.

Currently, we utilize FibroScan elastography as a point of contact test in the liver center. We recommend a baseline elastography in all patients at the initial visit. The key clinical parameter in patient management is the diagnosis or exclusion of advanced fibrosis (F3) and cirrhosis. The FibroScan is an adjunct to liver biopsy, radiographic imaging, other biological markers, and physical examination.[9]

We also utilize elastography to follow patients over time with a suggested frequency of scans at least every 2 years but not more than biannually. Increases in liver stiffness by more than 30% or up two stages will prompt a reevaluation of the patient for cirrhosis and biopsy.[10,11]

While our study focused on coinfected patients, there are studies describing mono-infected patients and the same comparison of transient elastography and APRI score, which also concurred that elastography is significantly more accurate and precise.[12]

FibroScan and APRI score continue to appear to be clinically useful tools for detecting cirrhosis. FibroScan may be more useful for detecting advanced stages of fibrosis when compared with the APRI score using a biopsy as the gold standard. We are aware that the number of 84 patients is a low number, for this reason, our hope is that this study may be a springboard for larger prospective, double-blinded, multi-centered studies performed with more diversity of patients to add clarity to this important objective.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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