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Association between transient elastography (TE) scores and AST to platelet ratio index (APRI) among HIV/HCV co-infected patients

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Background

Evaluation of hepatic fibrosis stage is critical in the management of HIV/ hepatitis C (HCV) co-infected patients, and can be done non-invasively using transient elastography (TE) or serum biomarkers [1,2].
TE is the most accurate non-invasive method for distinguishing cirrhosis (F4) from non-cirrhosis (F0/1/2/3) [3,4], but the necessary equipment (FibroScan®) is costly and not available everywhere.
Aspartate aminotransferase (AST)-to platelet ratio index (APRI) is easily calculated from readily available laboratory test results performed in the course of standard patient care [5].

Objective

To examine agreement between APRI and TE scores in an HIV/HCV co-infected outpatient clinic population.

Methods

Study participants
Sequential HIV/HCV co-infected adults (age ≥19 years) seen in an HIV/HCV outpatient clinic were recruited between October 2013 and December 2014.

Transient elastography (TE) (FibroScan®) and APRI
TE was performed on an Echosens™ FibroScan® 502 device according to the manufacturer's guidelines by a certified operator [6]. Participants were requested to fast for at least 2 hours prior to the examination. [7]

Table 1: TE score interpretation

Metavir equivalent	Interpretation	TE score (kPa)
F0/1	Normal/mild fibrosis	<7.6
F2	Moderate fibrosis	7.6-8.9
F3	Advanced fibrosis	9.0-12.3
F4	Severe fibrosis/cirrhosis	>12.3

Ref. Friedrich-Rust et al., *Gastroenterol* 2008 [8].

The analysis was repeated using cutoffs of 7.1 for significant fibrosis (F≥2) and 12.5 for cirrhosis (F4) [9].

AST-to platelet ratio index (APRI) = $\frac{\text{AST/Upper limit of normal}}{\text{Platelet count } (10^9/L)} \times 100$

APRI was calculated from laboratory results of blood drawn ≤90 days of TE.
APRI cutoffs of >1.5 [10] and >1.0 [5] were evaluated as potential indicators of significant fibrosis (≥F2) or cirrhosis (F4).

Statistical methods
McNemar's tests were conducted to measure the agreement between TE scores and APRI. Sensitivity/specificity calculations were conducted using the assumption that the TE results represent the "truth".

Results

Table 2: Demographics and clinical characteristics of study participants*

Total N	101
Male, N (%)	90 (89%)
Age, years	51 (46, 58)
Time since HIV diagnosis, years	14.2 (7.6,17.9)
Time since HCV diagnosis, years	10.0 (2.8, 17.5)
Hepatitis B coinfection, N (%)	12 (12%)
Current CD4 cell count, cells/mm3	540 (360, 760)
Nadir CD4 cell count, cells/mm3	130 (50, 205)
On antiretroviral therapy, N (%)	99 (98%)
HIV plasma viral load <40 copies/mL, N (%)	86 (85%)

*Data shown as median (lower quartile [Q1], upper quartile [Q4]) unless otherwise specified

Results

Table 3: TE results

Fibrosis stage	N (%)
F0/1	56 (55%)
F2	10 (10%)
F3	12 (12%)
F4	23 (23%)

Table 4: APRI results

APRI, median (Q1, Q4)	0.54 (0.39, 0.87)
APRI > 1.5, N (%)	11 (11%)
APRI > 1.0, N (%)	23 (23%)

Comparison of TE and APRI

	TE score low (F0/1)	TE score high (F2-4)
APRI low (≤1.5)	54	36
APRI high (>1.5)	2	9
	Specificity = 54/56 = 96%	Sensitivity = 9/45 = 20%

McNemar's test P<0.001 (the % identified as "high" is different by the two methods)

	TE score low (F<4)	TE score high (F4)
APRI low (≤1.5)	75	15
APRI high (>1.5)	3	8
	Specificity = 75/78 = 96%	Sensitivity = 8/23 = 35%

McNemar's test P=0.005 (the % identified as "high" is different by the two methods)

	TE score low (F0/1)	TE score high (F2-4)
APRI low (≤1.0)	52	26
APRI high (>1.0)	4	19
	Specificity = 52/56 = 93%	Sensitivity = 19/45 = 42%

McNemar's test P<0.001 (the % identified as "high" is different by the two methods)

	TE score low (F<4)	TE score high (F4)
APRI low (≤1.0)	70	8
APRI high (>1.0)	8	15
	Specificity = 70/78 = 90%	Sensitivity = 15/23 = 65%

McNemar's test P=0.999 (the % identified as "high" is NOT different by the two methods)

Discussion

The proportion of patients having "high" APRI (>1.5) is different from the proportions with either ≥F2 or F4 on TE (P<0.001 and 0.005, respectively).
For the APRI cutoff of 1.0, the proportion having "high" APRI is different from the proportion with ≥F2 on TE (P<0.001); however, the proportion having "high" APRI is not significantly different from the proportion with F4 on TE (P=0.999). APRI >1.0 predicted F4 on TE with a sensitivity of 65% and a specificity of 90%.
Results were unchanged using cutoffs of 7.1 for significant fibrosis (F≥2) and 12.5 for cirrhosis (F4).

Conclusion

Where TE is not available, an APRI of >1.0 could be considered suggestive of cirrhosis in HIV/HCV co-infected patients.

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