EVALUATION OF ACCURACY OF AST TO PLATELET RATIO INDEX (APRI) IN VARIOUS AGE GROUPS WITH BIOPSY-PROVEN NAFLD OR NASH: A TERTIARY HEALTH CARE NETWORK RETROSPECTIVE STUDY

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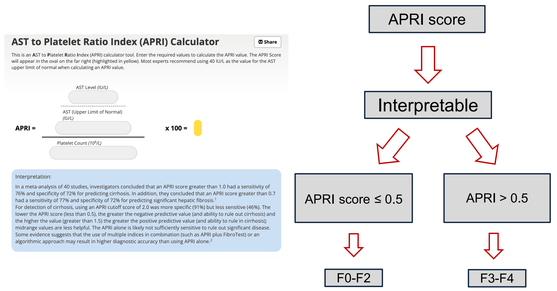
INTRODUCTION

- Non-alcoholic fatty liver disease (NAFLD) can involve advanced fibrosis and has implications with cardiovascular and liver disease related mortality.
- The definitive diagnosis of NAFLD and non-alcoholic steatohepatitis (NASH) is liver biopsy.
- Although liver biopsy is gold standard for assessment of fibrosis, it is an invasive procedure with risk of complications.
- Non-invasive modalities to assess fibrosis (US or MR elastography, biomarkers, scoring systems) have variable accuracy.

AIM

- Compare the accuracy of the APRI with liver biopsy fibrosis scores among patients with biopsy proven NAFLD or NASH.

APRI



STATISTICAL ANALYSIS

- APRI was calculated based on recorded values for patient's lab values of aspartate aminotransferase (AST) and platelet counts.
- Statistical analysis was done to compute means and frequencies of demographics, metabolic syndrome factors, LFTs, and APRI.
- Accuracy (sensitivity, specificity, AUROC) of APRI was evaluated in assessment of fibrosis when compared to that seen on liver biopsy.

METHODS

Patients aged 18 years of age and older with steatosis or steatohepatitis on liver biopsy between 2020 and 2023.

254 patients met inclusion criteria:
1. Patient with age between 18-44 and 45 years and above.
2. Biopsy proven NAFLD or NASH
3. Lab testing prior to the biopsy to calculate APRI.

Excluded from study:
1. History of alcohol abuse
2. Evidence of another or coexisting cause of chronic liver disease based on their laboratory or pathology findings.

1. Retrospective review of charts.

2. Data regarding demographics, metabolic syndrome factors, LFTs and platelet counts close to the date of liver biopsy, and liver fibrosis values found on liver biopsy, were recorded.

RESULTS

Table 1. Demographics and Risk factors.

Characteristics	Results (N = 254)
Mean age of patients (SD)	53.1 (13.9)
Males (%)/Females (%)	37.8/62.2
Ethnicity (%)	
Hispanics	12.2
Caucasians	80.3
Others (African American, Asians)	7.5
Risk Factors (%)	
Metabolic syndrome	50.8
Obesity	75.2
Impaired Fasting Glucose or DM	46.8
Hypertension	
Dyslipidemia	62.6
	64.9

Metabolic syndrome: At least 3 of 5 positive from Obesity (BMI≥25 for Asians/BMI ≥30 for all others), Triglycerides > 150, HDL < 40 in men or <50 in women, Impaired Fasting glucose (Hba1c 5.7-6.4) or Diabetes (Hba1c ≥ 6.5), Hypertension (BP ≥ 130/85).

Table 2. Lab values & APRI score

Characteristics	Study population (N=254)	Young adults (18-44 years, N = 62)	Older adults (45 years and older, N=192)
BMI, mean (SD)	35 +/- 7	37 +/- 8	34 +/- 6
AST, median (IQR)	42 (28, 76)	53 (35, 112)	51 (26, 81)
ALT, median (IQR)	56 (37, 101)	99 (48, 145)	59 (31, 99)
Platelet, median (IQR)	224 (176, 270)	244 (209, 314)	220 (162, 267)
Albumin, median (IQR)	3.8 (3.5, 4.1)	3.9 (3.6, 4.3)	3.8 (3.4, 4.2)
APRI score, median (IQR)	0.6 (0.3, 1.0)	0.6 (0.3, 0.9)	0.6 (0.3, 1.0)

Normal range: BMI 20-25 kg/m², AST 1-40 U/L, ALT 1-35 U/L, Platelets 150-350 x 10^9/µL , Albumin 3.5-5.5 g/dL

Table 3: AST to Platelet Ratio (APRI) Index scores in patients with biopsy proven NAFLD or NASH.

Characteristics	All NAFLD or NASH patients (n=254) n (%)	Age 18-44 years (n=62) n (%)	Age 45 years and above (n=192) n (%)
F0-F2 (APRI ≤ 0.5)	125 (49.2)	29 (46.8)	96 (50)
F0-F2 on APRI and liver biopsy	122 (48)	26 (41.9)	96 (50)
F0-F2 on APRI but F3-F4 on liver biopsy	3 (1.2)	3 (4.8)	0 (0)
F3-F4 (APRI > 0.5)	129 (50.8)	33 (53.2)	96 (50)
F3-F4 on APRI and liver biopsy	8 (3.1)	1 (1.6)	7 (3.6)
F3-F4 on APRI but F0-F2 on liver biopsy	121 (47.6)	32 (51.6)	89 (46.3)
Sensitivity/NPV, (%)	72.7/97.6	25/89.7	100/100
Specificity/PPV, (%)	50.2/6.2	44.8/3	51.9/7.3
AUROC (95% CI)	51.2 (44.9, 57.5)	43.5 (30.9, 56.7)	53.7 (46.3, 60.9)

PPV- positive predictive value; NPV- negative predictive value, AUROC - area under the receiver operating characteristic curve; CI - confidence interval.
* Metavir fibrosis staging classification

DISCUSSION

- The study is unique in that it focused on a population of patients with increasing number of younger patients who had undergone liver biopsy for work-up of NAFLD or alternative liver pathology.
- Interpretable APRI was found to have good NPV for advanced fibrosis, but particularly excellent in the older adult subgroup (45 years and older).
- Overall, APRI had good sensitivity (72.7%) and lower specificity (50.2%) in predicting advanced fibrosis among all patients (Table 3).
- APRI remains an important risk stratification modality for fibrosis but should not be used as the only score as its indication was reserved for those with hepatitis B or C or NAFLD.

CONCLUSION

- Our results suggest that APRI has good sensitivity for predicting fibrosis and even stronger predictability for non-advanced fibrosis (F0-F2) based on the NPV among all patients.
- It is reasonable to avoid liver biopsy based on the sensitivity and NPV of the APRI, however the results can be affected by what score cut offs are utilized.
- The results in the young adult age group can be further improved with a larger sample size.

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