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Aspartate aminotransferase platelet ratio index (APRI) and fibroscan in predicting early fibrosis in non-alcoholic fatty liver diseases cases

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Abstract

Nonalcoholic fatty liver disease (NAFLD) is emerging as an important cause of chronic liver disease in worldwide. Liver biopsy is a gold standard procedure in the diagnosis and staging of NAFLD, but there are several non-invasive diagnostic procedures have been emerged for the early diagnosis of liver fibrosis. The present study was designed to assess the efficacy of APRI to fibroscan as a marker for early fibrosis in cases with non-alcoholic fatty liver diseases. A total of 120 cases, which are newly diagnosed with non-alcoholic fatty liver disease attending OPD were recruited. Laboratory investigation results were obtained after overnight for evaluation of complete blood count, blood glucose levels, albumin, total bilirubin, platelet count, prothrombin time international normalized ratio, cholesterol, triglyceride (TG), serum urea, creatinine, HBsAg, HCV. Radiological evaluation was conducted by USG abdomen and fibroscan. The value of triglyceride was below 150mg/dl in 34.16% cases, between 150-200mg/dl in 45.83% cases and >200mg/dl in 20% cases. The fasting blood sugar was >100 in 40% cases and <100 in 60% cases. The aspartate aminotransferase levels was <30IU/L in 17.5% cases, 31-40 IU/L in 29.16%, 41-50 IU/L in 33.33%, and >50 IU/L in 20% cases. The platelets count was <100 in 29.16% cases, 101-150 in 53.33% cases, 151-200 in 12.5% cases and >200 in 5% cases. The fibroscan values was <7.0 in 45% cases, 7.1-8.9 in 35% cases and >9.0 in 20% cases. The APRI score was <0.7 in 33.3% cases, 0.7-1.0 in 26.66% cases and >1.0 in 40% cases. There is a significant correlation between fibroscan and APRI in cases with NAFLD. Fibroscan and APRI are uniformly efficient in predicting liver fibrosis. The use of APRI >0.7 would avoid the need for fibroscan.

Keywords: nonalcoholic fatty liver disease (NAFLD), aminotransferase platelet ratio index (APRI), liver fibrosis

Introduction

Liver disease represents a rapidly increasing health burden globally. The prevalence of NAFLD is around 9-32% of general population in India. Clinico-pathological studies show that NAFLD is an important cause of unexplained rise in hepatic transaminases, cryptogenic cirrhosis and cryptogenic hepatocellular carcinoma in Indian patients [1]. The invention of new diagnostic noninvasive markers of nonalcoholic fatty liver disease (NAFLD) is a major preference in clinical research. Analyses of liver parameters are now the third most common type of biochemical test [2, 3].

The transaminases, alanine aminotransferase (ALT) and aspartate aminotransferase (AST), which indicate the damage of hepatic cells and are most used liver test in clinical practice. Raise in ALT and AST levels has been used as indicators for further liver investigations. The recent guidelines of United Kingdom concluded that there is no evidence for this strategy [4]. Elevated transaminases are a common finding affecting around 10% of the general population, while only a minority of these persons will develop liver-related events [5-7]. Liver biopsy has been considered as gold standard technique in the diagnosis of liver fibrosis. Liver biopsy technique is non-invasive procedure with limitations and 0.05% mortality. With this there is immediate need of non-invasive procedure like aminotransferase platelet ratio index (APRI) and fibroscan in the early diagnosis of liver fibrosis. Fibroscan has good sensitivity, specificity and diagnostic accuracy. The present study was designed to assess the efficacy of APRI to fibroscan as a marker for early fibrosis in cases with non-alcoholic fatty liver diseases.

Material and Methods

The present prospective study was conducted in the Department of General Medicine at MNR Medical College and Hospital, Sangareddy and Bhaskara medical College, Moinabad from July 2020 to March 2021. A total of 120 cases, which are newly diagnosed with non-alcoholic fatty liver disease attending OPD were recruited. Cases above 21 years of age, newly diagnosed patients of USG defined non-alcoholic fatty liver disease and cases willing to participate in the study were included. Cases with cardiovascular diseases, chronic kidney disease, chronic liver disease, consuming alcohol more than 20gm/day, carcinoma liver and cases not willing to participate in the study were excluded. Informed consent was obtained from all the study participants and study protocol was approved by institutional ethics committee.

All the study participants were subjected to detailed clinical, laboratory and radiological examination. Height, weight and BMI were measured. Laboratory investigation results were obtained after overnight for evaluation of complete blood count, blood glucose levels, albumin, total bilirubin, platelet count, prothrombin time international normalized ratio, cholesterol, triglyceride (TG), serum urea, creatinine, HBsAg, HCV. Radiological evaluation was conducted by USG abdomen and fibroscan.

The SPSS version 23 was used to carry out statistical analysis relevant to the study. The frequency and percentages (%) were calculated. The Student 't' test and chi-square test was used to test the significance of raw data and qualitative data. P-value of <0.05 was considered as statistically significant.

Results

Table 1: Demographic variables in the study participants

Demographic variable	Cases		Controls	
	Frequency	Percentage	Frequency	Percentage
Age (In years)				
21-30	01	0.83%	01	0.83%
31-40	14	11.66%	15	12.5%
41-50	68	56.67%	80	66.67%
51-60	25	20.83%	14	11.67%
Above 60	12	10%	10	8.33%
Gender				
Male	72	60%	85	70.83%
Female	48	40%	35	29.16%
BMI				
Lean (<25)	11	9.16%	32	26.66%
Overweight (26-30)	58	48.33%	68	56.66%
Obese (>30)	51	42.5%	20	16.67%
Height (Mean ± SD)	159.8±10.6		158.5±10.8	
Weight (Mean ± SD)	68.3±11.24		70.6±12.5	

Table 2: Details of laboratory investigations in the study participants

Parameter	Frequency	Percentage
Triglyceride (mg/dl)		
Below 150	41	34.16%
150-200	55	45.83%
Above 200	24	20%
Fasting blood sugar (mg/dl)		
Above 100	48	40%
Below 100	72	60%
Aspartate aminotransferase (AST) (IU/L)		
<30	21	17.5%
31-40	35	29.16%
41-50	40	33.33%
>50	24	20%
Platelet count (10³/μL)		
<100	35	29.16%
101-150	64	53.33%
151-200	15	12.5%
>200	06	5%
APRI		
<0.7	40	33.3%
0.7-1.0	32	26.66%
>1.0	48	40%
Fibroscan		
<7.0	54	45%
7.1-8.9	42	35%
>9.0	24	20%

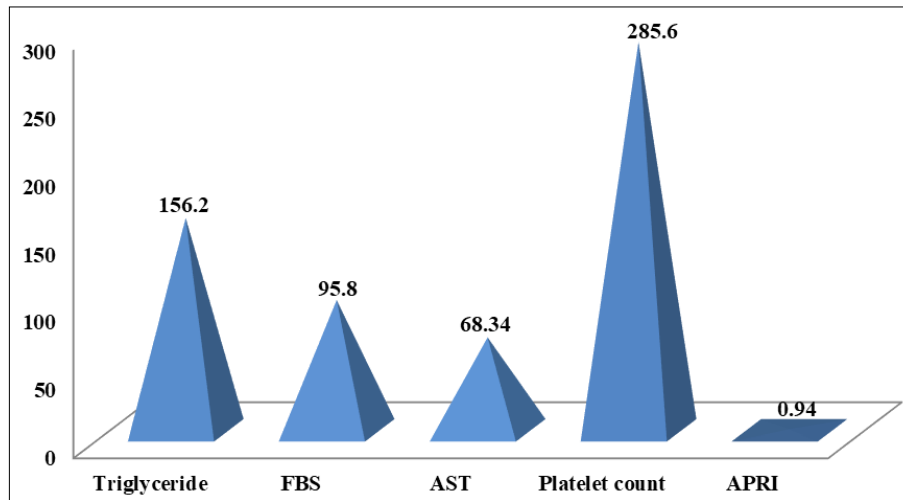


Fig 1: Mean values of laboratory investigations

Table 3: Correlation and association between fibroscan and APRI among study participants

APRI	Fibroscan		
	<7.0 (n=54)	7.0-8.9 (n=42)	>9 (n=24)
<0.7 (n=40)	39	01	00
0.7-1.0 (n=32)	14	18	00
>1.0 (n=48)	01	23	24
p-value	0.0264		
Chi square value	104.82		
Pearson correlation	0.854		

Discussion

A total of 120 cases, which are newly diagnosed with non-alcoholic fatty liver disease attending OPD were recruited. Among the cases majority were belong to 41-50 years (56.67%), followed by 51-60 years (20.83%), 31-40 years (11.66%) and above 60 years (10%). Male participants (60%) were more than female participants (40%). The levels of BMI was >30 in 42.5% cases, in between 26-30 in 48.33% cases and <25 in 9.16% cases. The mean height was 159.6cm and mean weight was 68.3 kgs (Table 1). A study by Habis YZ., noticed that an age of greater than 40 years was associated with significantly higher fibrosis compared with age 40 years or younger. There was a significant correlation between age and Fibroscan fibrosis score [8].

The value of triglyceride was below 150mg/dl in 34.16% cases, between 150-200mg/dl in 45.83% cases and >200mg/dl in 20% cases. The fasting blood sugar was >100 in 40% cases and <100 in 60% cases. The aspartate aminotransferase levels was <30IU/L in 17.5% cases, 31-40 IU/L in 29.16%, 41-50 IU/L in 33.33%, and >50 IU/L in 20% cases. The platelets count was <100 in 29.16% cases, 101-150 in 53.33% cases, 151-200 in 12.5% cases and >200 in 5% cases.

The fibroscan values was <7.0 in 45% cases, 7.1-8.9 in 35% cases and >9.0 in 20% cases. The APRI score was <0.7 in 33.3% cases, 0.7-1.0 in 26.66% cases and >1.0 in 40% cases. The association between APRI score and fibroscan was statistically significant (p=0.0264) and there was good correlation between fibroscan and APRI. A study by Habis YZ., noticed significant correlation between stiff ness score and APRI (r=0.6 and 0.65 for Pearson’s and Spearman’s correlation, respectively; P < 0.001 for both. This correlation was stronger for patients who had moderate or advanced fibrosis on fibroscan [8]. The APRI cutoff of ≥ 0.7 has a sensitivity of 77% and specificity of 72% to detect

significant hepatic fibrosis and a cutoff score of 1.0 has a sensitivity of 61 to 76% and specificity of 64 to 72% for detection of severe fibrosis/cirrhosis [9]. Jayanta Paul., Stated that APRI has a good negative predictive value to exclude advanced fibrosis but does not accurately differentiate intermediate fibrosis from mild or severe fibrosis [10]. Abd El Rihim *et al.* reported in a meta-analysis that fibroScan had a sensitivity of 83.4% and a specificity of 92.2 for the detection of F4 fibrosis, whereas APRI had a sensitivity of 66.6% and a specificity of 71.1%. However, APRI was not useful for the detection of early stages of fibrosis [11].

A study by Habis YZ., concluded that APRI could effectively distinguish mild fibrosis and was significantly correlated with fibroscan in the assessment of severe and moderate fibrosis. The combine used of APRI and fibroscan increases the diagnostic accuracy in assessment of the stages of liver fibrosis [8]. A meta-analysis by Lin ZH *et al.* concluded that APRI can identify hepatitis C-related fibrosis with a moderate degree of accuracy. Application of this index may decrease the need for staging liver biopsy specimens [9]. A study by Jayant paul stated that multiple non-invasive tests are available for diagnosis of NAFLD, and its different stages however gold standard test is liver biopsy [10]. A study by Pathik P *et al.* concluded that fibroscan, NFS and AAR are simple non-invasive markers of fibrosis that can be utilized as screening tools in patients with high risk for fibrosis to determine the need for biopsy. The cut off of Fibroscan for stage 3/4 fibrosis was 12 kPa [12].

Conclusion

Evaluation of the status of liver fibrosis is important in the early diagnosis and management of cirrhosis in cases with NAFLD and prevention of disease progression too. The

study results indicate that there is a significant correlation between fibroscan and APRI in cases with NAFLD. Fibroscan and APRI are uniformly efficient in predicting liver fibrosis. The use of APRI >0.7 would avoid the need for fibroscan.

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