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General Medicine

A STUDY ON FIBROSCAN COMPARED TO AST TO PLATELET RATIO INDEX(APRI) FOR ASSESSMENT OF LIVER FIBROSIS WITH NONALCOHOLIC FATTY LIVER DISEASE(NAFLD)

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ABSTRACT **Background :** Nonalcoholic fatty liver disease (NAFLD) is increasingly recognized as a cause of chronic liver disease, and often results in the devastating outcomes of decompensated liver cirrhosis and hepatocellular carcinoma and is an important feature of metabolic syndromes and insulin resistance. The assessment of liver fibrosis is essential for predicting the prognosis and outcome of all forms of chronic liver disease. A liver biopsy is the gold standard for the assessment of liver fibrosis, but it has its limitations, which include life-threatening complications. Alternative methods of non-invasive laboratory and radiological testing for the assessment of liver fibrosis in NAFLD have evolved during the past decade, and these methods may be able to overcome the limitations of liver biopsy. These methods include the AST/ALT ratio, the AST platelet ratio index (APRI), and the Fibrosis 4 (FIB-4) score. This study was conducted in order to assess liver fibrosis using Fibroscan, and to compare these results to the use of AST platelet ratio index (APRI scores), and the AST/ALT ratios on NAFLD patients. METHODS: This was a cross sectional study conducted in King George Hospital Visakhapatnam,A total 122 patients were studied of which 65 were males and 57 were females.all the patients were subjected to relevant investigations including ultrasound abdomen,serum liver enzymes,fibroscan. The (SPSS) version 20 was used for the analysis.A Student's t-test was used to compare the AST/ALT ratio to the APRI scores between patients with advanced fibrosis higher than F2 and patients with mild to moderate fibrosis of F2 or less. **RESULTS :**The data showed that a high percentage of the NAFLD patients exhibited advanced stages of liver fibrosis based on the Fibroscan examinations. These results were supported by the strong correlation between the Fibroscan results and the AST/ALT ratio and APRI scores. Correlation analysis showed a significant positive correlation between age and fibrosis scores ($r = 0.27$ with $P = 0.004$ for Pearson correlations). On the other hand, a significant negative correlation between platelet count and stiffness scores was obtained ($r = -0.315$ with $P = 0.001$ for Pearson correlations). Serum ALT level was determined to be significantly negatively correlated with age by using Spearman correlations ($r = -0.232$, and $P = 0.022$). A significant positive correlation was observed between serum ALT and hepatic stiffness measurements using Spearman correlations ($r = 0.284$, and $P = 0.005$).**CONCLUSION:**This study has shown that the combination of Fibroscan and AST/ALT and APRI methods provides a valuable approach for assessing liver fibrosis in NAFLD patients. This can eliminate the need for liver biopsy in patients without clear indication

KEYWORDS : NAFLD, liver biopsy, liver fibrosis, AST/ALT ratio, fibroscan.

INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is increasingly recognized as a cause of chronic liver disease, and often results in the devastating outcomes of decompensated liver cirrhosis and hepatocellular carcinoma and is an important feature of metabolic syndromes and insulin resistance . The spectrum of NAFLD severity is variable, ranging from mild symptoms to differing degrees of inflammation, nonalcoholic steatohepatitis (NASH), or a severe form of decompensated liver cirrhosis which occurs in a minority of patients.

BACKGROUND:

The assessment of liver fibrosis is essential for predicting the prognosis and outcome of all forms of chronic liver disease. A liver biopsy is the gold standard for the assessment of liver fibrosis, but it has its limitations, which include life-threatening complications. Alternative methods of non-invasive laboratory and radiological testing for the assessment of liver fibrosis in NAFLD have evolved during the past decade, and these methods may be able to overcome the limitations of liver biopsy. These methods include the AST/ALT ratio, the AST platelet ratio index (APRI), and the Fibrosis 4 (FIB-4) score. Transient elastography (Fibroscan), an ultrasound-based technique, is one of the most extensively used and well-validated non-invasive methods for the assessment of liver fibrosis.

AIMS AND OBJECTIVES:

This study was conducted in order to assess liver fibrosis using Fibroscan, and to compare these results to the use of AST platelet ratio index (APRI scores), and the AST/ALT ratios on NAFLD patients.

METHODOLOGY:

This was a cross-sectional study conducted from September 2020 through June 2021 in KGH, Visakhapatnam.A total 122 patients were studied out of which 65 were males and 57 were females.INCLUSION CRITERIA: The study population included patients who were diagnosed with NAFLD or nonalcoholic steatohepatitis (NASH) based on abdominal ultrasound examination and serum liver enzyme testing performed at the King George Hospital, Visakhapatnam. Patients who were included had undergone ultrasound and blood tests and the reports were collected and then they were made to undergo Fibroscan examinations within the study period.EXCLUSION CRITERIA: Those patients with incomplete data were excluded from analysis. Patients were also excluded if they had evidence of other chronic liver diseases, including hepatitis B or C, or autoimmune hepatitis (AIH) (as indicated by testing positive for autoimmune antibodies or demonstrating a favorable response to steroids), or alcoholic liver disease. Patients on hepatotoxic medications, such as chronic methotrexate, were also excluded, as well as those with advanced liver disease, cardiac failure, and hepatic congestion. In addition, those who could not undergo Fibroscan examinations because of very high BMIs or for other reasons, and those with clinical or ultrasound evidence of decompensated cirrhosis, were also prevented from participating in the study.

For each patient, the AST/ALT ratio was measured, and the APRI score was determined by using the following equation:

APRI=AST LEVEL/AST (upper limit of normal) divided by platelet count(109/L)

STATISTICAL ANALYSIS:

The (SPSS) version 20 was used for the analysis.Descriptive data was generated and a Student's t-test was used to compare the differences in the mean ages and serum ALT values between the males and the females.Correlation analysis was used to compare the degree of hepatic fibrosis with age, platelet count, and serum ALT level.A simple dots graph was used to determine the correlation between the Fibroscan results and the AST/ALT ratios and the APRI scores.A Student's t-test was used to compare the AST/ALT ratio to the APRI scores between patients with advanced fibrosis higher than F2 and patients with mild to moderate fibrosis of F2 or less.

RESULTS:

Distribution according to age and sex:

SEX	Number of patients
Females	57(46.7%)
Males	65(55.3%)
Mean Age	50.2

122 patients were included in the final analysis, including 65 (53.3%) males and 57 (46.7%) females. The mean age was 50.2 years (SD: 13.7, range: 18 - 86).

Distribution of Patients According to the Stage of Liver Fibrosis:

Stage of fibrosis	No.(%)
F0 (0-5.9)	52 (42.6)
F1 (6-6.9)	15 (12.3)
F2 (7-9)	11 (9.0)
F3 (9.1-10.3)	4 (3.3)
F4 (>10.4)	40 (32.8)
Total	122 (100.0)

The mean stiffness score was 12.02 (SD: 12.7) kPa.
Mean Platelet Counts, Serum AST and ALT:

Lab test	Mean± SD	Normal
Platelets, k/ul	239.85 ± 88.8	15-400
Serum ALT,U/L	58.4 ± 49.8	30-65
Serum AST,U/L	42.2 ± 47.6	15-37

The male patients were significantly younger than the female patients P = 0.002.

sex	Mean age (years)
male	48.7 (SD: 16.3)
female	51.8 (SD:10.3)

The male patients exhibited significantly higher mean serum ALT levels compared with the female patients.P = 0.039

sex	Mean ALT (U/L)
male	73.5 (SD: 58)
female	44.7 (SD: 36)

Male patients exhibited higher stiffness scores than female patients but this difference was not significant. P = 0.061

sex	Stiffness score
male	13.6 (SD: 14.5)
female	10.2 (SD: 10.02)

Correlation analysis showed a significant positive correlation between age and fibrosis scores (r = 0.27 with P = 0.004 for Pearson correlations). On the other hand, a significant negative correlation between platelet count and stiffness scores was obtained (r = - 0.315 with P= 0.001 for Pearson correlations).

Serum ALT level was determined to be significantly negatively correlated with age by using Spearman correlations (r = -0.232, and P = 0.022). A significant positive correlation was observed between serum ALT and hepatic stiffness measurements using Spearman correlations (r = 0.284, and P = 0.005). There was a significant difference in the results of the stiffness scores for APRI and the FIB-4 calculations between patients with advanced fibrosis of more than F2 at 44 (36%) and those with mild to moderate fibrosis of F2 or under at 78 (64%).

Differences in Stiffness Scores, Aspartate Aminotransferase/Alanine Transaminase Ratio, Aspartate Aminotransferase to Platelet Ratio Index(APRI) Scores Between Patients With Mild to Moderate Fibrosis and Those With Advanced Fibrosis:

	>F2(N=44)	≤F2(N=78)	P value
Stiffness score	23.7 ± 15	5.33 ± 1.6	<0.001
AST/ALT	0.87 ± 0.36	0.72 ± 0.57	0.67
APRI	1.1 ± 1.04	0.314 ± 0.3	<0.001

The fibrosis scores on the Fibroscan were significantly correlated with the AST/ALT and APRI scores:

Correlation Between Fibrosis Scores on Fibroscan and APRI Scores (r = 0.51, P > 0.001).

Correlation Between Fibrosis Scores on Fibroscan and AST/ALT Ratios (r = 0.23, P = 0.022).

DISCUSSION:

The data showed that a high percentage of the NAFLD patients exhibited advanced stages of liver fibrosis based on the Fibroscan examinations. These results were supported by the strong correlation between the Fibroscan results and the AST/ALT ratio and APRI scores. Moreover, there was a strong negative correlation between platelet count and stiffness, as thrombocytopenia in liver disease is associated with advanced fibrosis . The addition of serum markers to ultrasound examinations can help in categorizing NAFLD patients into mild against moderate or severe categories of NAFLD.

This determination could also support the use of simple biomarkers in addition to ultrasound of the abdomen in the assessment of NAFLD when more advanced methods such as transient elastography or MRI elastography are not available, or when liver biopsy is not indicated. The AST/ALT ratio was the least likely among the four non-invasive methods in this study to indicate a difference between mild to moderate and advanced fibrosis.

Therefore, Fibroscan examinations, APRI scores, and FIB-4 scores can be used in the follow-up on early-stage NAFLD patients when liver biopsy has no clear indication. In addition, these non-invasive testing methods can be used for followup on patients who have had bariatric surgery or other treatment for NAFLD.

CONCLUSION:

This study has shown that the combination of Fibroscan and AST/ALT and APRI methods provides a valuable approach for assessing liver fibrosis in NAFLD patients. This can eliminate the need for liver biopsy in patients without clear indication. In addition, several recent studies have also validated the used of non-invasive markers in the diagnosis of NAFLD. The establishment of a national program for the recognition of NAFLD is therefore essential to reduce the risk of liver disease progression.

REFERENCES:

1. Chalasani N, Younossi Z, Lavine JE, Diehl AM, Brunt EM, Cusi K, et al. The diagnosis and management of nonalcoholic fatty liver disease: practice Guideline by the American Association for the Study of Liver Diseases, American College of Gastroenterology, and the American Gastroenterological Association. Hepatology. 2012;55(6):2005–23. doi: 10.1002/hep.25762.
2. Soderberg C, Stal P, Askling J, Glaumann H, Lindberg G, Marmur J, et al. Decreased survival of subjects with elevated liver function tests during a 28-year follow-up. Hepatology. 2010;51(2):595–602. doi: 10.1002/hep.23314.
3. Musso G, Gambino R, Cassader M, Pagano G. Meta-analysis: natural history of non-alcoholic fatty liver disease (NAFLD) and diagnostic accuracy of non-invasive tests for liver disease severity. Ann Med. 2011;43(8):617–49. doi: 10.3109/07853890.2010.518623.
4. Vernon G, Baranova A, Younossi ZM. Systematic review: the epidemiology and natural history of non-alcoholic fatty liver disease and non-alcoholic steatohepatitis in adults. Aliment Pharmacol Ther. 2011;34(3):274–85. doi: 10.1111/j.1365- 2036.2011.04724.x.
5. Chen ZW, Chen LY, Dai HL, Chen JH, Fang LZ. Relationship between alanine aminotransferase levels and metabolic syndrome in nonalcoholic fatty liver disease. J Zhejiang Univ Sci B. 2008;9(8):616–22. doi: 10.1631/jzus.B0720016.
6. Adams LA, Lymp JF, St Sauver J, Sanderson SO, Lindor KD, Feldstein A, et al. The natural history of nonalcoholic fatty liver disease: a population-based cohort study. Gastroenterology. 2005;129(1):113–21.
7. Ong JP, Pitts A, Younossi ZM. Increased overall mortality and liver-related mortality in non-alcoholic fatty liver disease. J Hepatol. 2008;49(4):60812.doi:10.1016/j.jhep.2008.06.018.