International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 1, January 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI:10.69605/ijlbpr_24.1.25.84

ORIGINAL RESEARCH

Correlation of APRI index with Child Pugh score in patients with liver cirrhosis

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Received: 16 January, 2025 Accepted: 24 January, 2025

Abstract

Background: Liver Cirrhosis is defined as a diffuse process with fibrosis and nodule formation. The recent additions to the list are aspartate aminotransferase to-platelet ratio index (APRI) and gamma-glutamyltranspeptidase to platelet ratio index. Hence; the present study was conducted for assessing correlation of APRI index with Child Pugh score in patients with liver cirrhosis

Materials & methods: An observational cross-sectional study was conducted at L.N. Medical College and Research Centre & J.K. Hospital, Bhopal, among 94 patients with liver cirrhosis. The study aimed to assess liver fibrosis using the APRI index and classify patients according to the WHO classification and Child-Pugh score. Data was analyzed statistically, and results were represented in tables, charts, and graphs. The study provides insights into the relationship between APRI scores, liver fibrosis, and Child-Pugh classification in patients with liver cirrhosis.

Results:36.2% had an APRI index ≤1.49, 16.0% had an APRI index between 1.5-1.99 and 47.9% had an APRI index ≥2.8.5% had a Child Pugh score of 5-6, 45.7% had a score of 7-9 and 45.7% had a score of 10-15.Correlation of APRI index with Child Pugh score in patients with cirrhosis of liver results revealed significant correlations with a p value of 0.000 for APRI 2 and 0.014 for APRI 1.5-1.99.

Conclusion: This study shows the significant correlation between the APRI index and Child-Pugh scores highlighting that higher APRI scores are indicative of more severe liver disease. The APRI index ease of calculation, relying solely on AST levels and platelet counts, makes it a practical and economical choice for assessing liver cirrhosis severity compared to the more complex Child-Pugh score, which require multiple variables and detailed clinical assessments.

Key words: Cirrhosis, Child Pugh score

Introduction

Liver Cirrhosis is defined as a diffuse process with fibrosis and nodule formation. It is the end result of the fibrogenesis that occurs with chronic liver injury.[1] It is the final pathway of chronic liver disease (CLD) which is the fifth leading cause of mortality globally and the third most common cause of death in the medical wards regardless of the etiology.[2] Liver cirrhosis leads to approximately 1.03 million deaths worldwide yearly.[3] The data from India also indicates cirrhosis of liver as a major health problem. According to the WHO data published in 2017, liver disease deaths in India reached 259,749 or 2.95% of total deaths, accounting for one-fifth (18.3%) of all cirrhosis deaths globally.[4] According to the latest WHO data published in 2020 liver disease deaths in India reached 268,580 or 3.17% of total deaths.[5] The causes of cirrhosis are multiple and include metabolic, inflammatory, congenital, and toxic liver diseases.[6] The most common causes of cirrhosis are chronic alcoholism and chronic hepatitis B and C, followed by biliary diseases and hemochromatosis.[7] The rate of progression varies in different patients depending on the etiology. It may take weeks in patients with complete biliary obstruction or decades in patients with chronic hepatitis C infection.[2] A scoring system is used to best predict the clinical outcome of patients with cirrhosis.[2] The most widely used bed-side scores are Child Pugh score and model for end stage liver disease (MELD) score. The recent additions to the list

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are aspartate aminotransferase to-platelet ratio index (APRI) and gamma-glutamyltranspeptidase to platelet ratio index.[3] Various other scores available for assessing the prognosis and mortality in liver cirrhosis that includes Model for End-stage Liver Disease score (MELD)-Na, MELD to Serum Sodium ratio (MESO).[8] APRI Index is aspartate aminotransferase to platelet ratio index score that uses simple lab-based parameters such as serum AST and platelet count to predict and detect fibrosis in cirrhosis patients.[5, 6] Hence; the present study was conducted for assessing correlation of APRI index with Child Pugh score in patients with liver cirrhosis.

Materials & methods

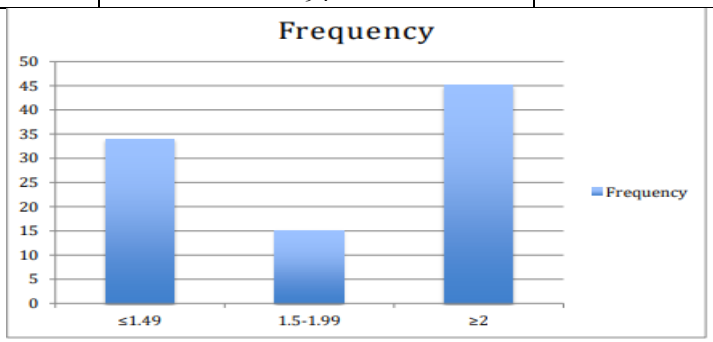
An observational cross-sectional study was conducted in L.N. Medical College and Research Centre & J.K. Hospital, Bhopal Study population: The study was carried out among 94 patients of liver cirrhosis who were admitted in the department of General Medicine, at L.N. Medical College & associated J. K. Hospital, Kolar Road, Bhopal. All patients aged above 18 years with liver cirrhosis and Cirrhosis of liver as evidenced by abdominal ultrasound and liver profile derangement were included in the study and patiets *a*ge less than 18 years, Primary hematological disorders, Acute infectious diseases, Chronic kidney disease and Any other disorders those can affect AST and platelet counts were exluded from the study. Patients fulfilling the inclusion criteria were selected for study. Relevant clinical data was recorded. Venous blood sample were taken and was sent for laboratory investigations. Laboratory investigations included CBC (hemoglobin, TLC, DLC, platelet), Liver function test (total bilirubin, direct bilirubin, indirect bilirubin, SGOT, SGPT, ALP, albumin), renal function test (urea, creatinine), serum electrolyte (Na+, K+), random blood sugar (RBS) prothrombin time (PT),activated partial thromboplastin clotting time (aPTT) and INR (international normalized ratio), Ultrasound abdomen with pelvis and Upper gastrointestinal endoscopy was done. APRI, and Child Pugh score were calculated using above investigations. Assessment of severity of liver cirrhosis: The APRI scores were calculated using the following formula:
APRI Score = [AST level (IU/L) /AST normal upper limit (IU/L)] ⁄ Platelet Count (109/L) × 100 The APRI scores were then stratified according to WHO classification, which defines significant fibrosis (METAVIR ≥F2) as having APRI score ≥1.5 and cirrhosis (METAVIR F4) to APRI score >2.Child Pugh Class was divided into 3 classes according to the value of albumin, bilirubin, PT, ascites, and hepatic encephalopathy. Each lab value that corresponds to a specific score, which was calculated to yield a certain child's category: Child Pugh class A, B and C. Data was analysed statistically. Analysis was done in the form of percentages, proportions and represented as tables, charts, graphs wherever necessary.

Results

In the ≤39 age group 35% were female and 28.37% were male, In the 40-50 age group 10% were female and 39.18% were male, In the 51-60 age group 20% were female and 17.56% were male, In the 61-70 age group 35% were female and 10.81% were male and in the >70 age group 0% were female and 4.05% were male.36.2% had an APRI score ≤1.49, 16.0% had an APRI score between 1.5-1.99 and 47.9% had an APRI score ≥2.8.5% had a Child Pugh score of 5-6, 45.7% had a score of 7-9 and 45.7% had a score of 10-15.Correlation of APRI score with Child Pugh score in patients with cirrhosis of liver results revealed significant correlations with a p value of 0.000 for APRI 2 and 0.014 for APRI 1.5-1.99.

Table1:Percentageofpatientswithcirrhosisofliverindifferentcategoryof APRI score

APRI	Frequency	Percent
≤1.49	34	36.2
1.5-1.99	15	16.0
≥2	45	47.9
Total	94	100.00



Graph 1: Percentage of patients with cirrhosis of liver in different category of APRI score

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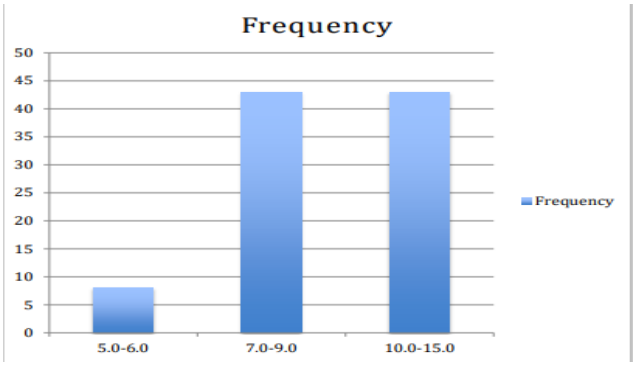
Table2:Percentageofpatientswithcirrhosisofliverindifferentcategoryof Child Pugh score

Child Pugh Score	Frequency	Percent
5-6	8	8.5
7-9	43	45.7
10-15	43	45.7
Total	94	100.00

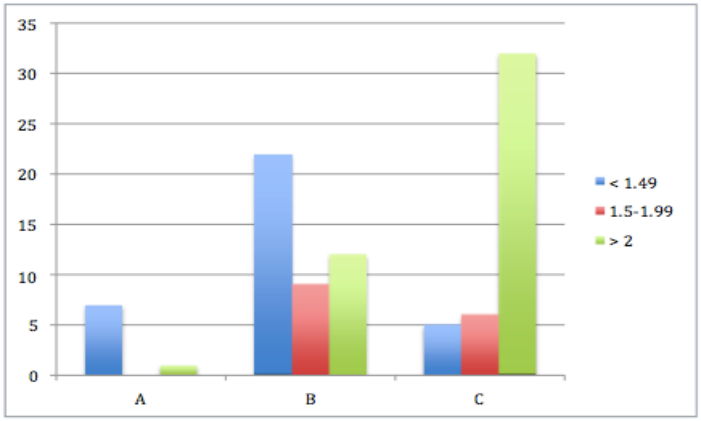


Graph 2: Percentage of patients with cirrhosis of liver in different category of Child Pugh score

Table 3: Correlation of APRI score with Child Pugh score in patients with cirrhosis of liver

APRI	Child Pugh Score						p-value
	A		B		C		
	Number	Percentage	Number	Percentage	Number	Percentage	
≤1.49	7	20.6	22	64.7	5	14.7	0.000*
1.5 to 1.99	0	0	9	60	6	40	0.014*
≥2	1	2.2	12	26.7	32	71.1	0.000*

*: Significant



Graph 3:CorrelationofAPRIscorewithChildPughscoreinpatientswith cirrhosis of liver

Discussion

Liver cirrhosis is a dynamic condition where patient can progress from compensated to decompensated stage. Approximate prevalence of clinical cirrhosis in adults is 1 in 1000 and histological cirrhosis 1% in an adult population. Median survival of patients with compensated cirrhosis is 12 years while that of decompensated patients is reduced to less than 2 years. Cirrhosis is accounting for 200,000 deaths per year in India. Liver transplantation is the only treatment which improves both longevity and quality of life in patients with decompensated liver cirrhosis.However, every patient with decompensated liver cirrhosis is not eligible for transplantation and it is not available for majority of the patients. Our current understanding of natural history, pathophysiology and treatment of

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complication has resulted in improved management, quality of life and life expectancy in patients with decompensated liver cirrhosis.[8- 10]

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Prakash BC et al calculated APRI index, MELD score and child Pugh score in cirrhosis patients and to find the correlation between them. 100 patients confirmed with cirrhosis of liver were evaluated. Cirrhosis due to alcohol, Hepatitis B and C, autoimmune, Cryptogenic, NAFLD, were included in the study. APRI Index, MELD Score and Child Pugh Score were calculated, and the correlation was obtained. This study found out the relationship between APRI index, MELD Score and Child Pugh Score with significant p value. The study also showed that all the three scores were raised with patients who had complication of cirrhosis like encephalopathy, refractory ascites. Among those who had complication like grade 3 or 4 encephalopathy, APRI index had a mean value of 3.4, Child Pugh had a mean score of 13.2, and MELD had a mean score of 36.08 with standard deviation of 2.0, 1.5, 6.0 respectively. APRI index is an independent predictor of morbidity and mortality. The prognostic performance of all 3 was comparable, Hence APRI index can be used as an alternative scoring which is cost effective and objective method in predicting the severity and prognosis in cirrhosis of liver.[12] Mahur H et al calculated APRI index, Child Pugh score and MELD score in liver cirrhosis patients and to find the correlation between them. A total of 100 patients having liver cirrhosis were selected. All the patients personally subjected to detailed history and systemic examination. Blood investigations was done, APRI index, Child Pugh score and MELD calculated. 100 cirrhotic patients were divided into 3 groups for further analysis based on APRI levels: group A (APRI <1.0)30, group B (>1.0, but <2.0)46 and group C (>=2)24. Highly elevated APRI was associated with higher frequencies of clinical complications such as ascites, variceal bleeding, esophageal varices encephalopathy and mortality. Mean MELD score was higher in patients in group C than in groups A and B. Mean Child Pugh score was higher in patients in group C than in groups A and B. Mean AST was higher in patients in group C than in groups A and B. Platelet count was lower in patients in group C than in groups A and B. Positive correlations between APRI and Child Pugh score and MELD scores were detected in cirrhotic patient. APRI was identified as an independent predictor for mortality in patients with cirrhosis. A positive correlation between the MELD score, Child Pugh score and APRI was identified.[13]

Conclusion

This study shows the significant correlation between the APRI score and Child-Pugh scores highlighting that higher APRI scores are indicative of more severe liver disease. The APRI score's ease of calculation, relying solely on AST levels and platelet counts, makes it a practical and economical choice for assessing liver cirrhosis severity compared to the more complex Child-Pugh score, which require multiple variables and detailed clinical assessments.

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