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Correlation between APRI Index, MELD Sore and Child Pugh Score in Cirrhosis of Liver

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Abstract
Background: *Liver cirrhosis is one of the most common cause of mortality. Among the causes alcoholism leads the first. Several scoring are available for the severity in cirrhosis and hepatic fibrosis.*
Aims and Objectives: *1) To calculate APRI INDEX, child pugh score and MELD score in liver cirrhosis patients. 2) To find the correlation between APRI index, MELD score and Child pugh Score.*
Materials and Methods: *retrospective study among 50 patients with cirrhosis of liver. Cirrhosis of liver was confirmed by ultrasound and biochemical reports. Cirrhosis due to alcohol, Hepatitis B, Hepatitis C, NAFLD leading to cirrhosis were included in the study. APRI Index, Child Pugh Score, MELD Score were calculated and the correlation was obtained.*
Results and Conclusion: *The study found out the relationship of MELD Score and Child Pugh Score, and MELD Score and APRI index with significant p value. The study also showed significant p value between APRI Index and Child Pugh Score. The study also showed that raised APRI Index, higher Child Pugh classification and higher MELD score for patients who died in the hospital during the course of treatment. Among those who are dead, APRI index has a median value of 12.58 and Child Pugh score of median 15.Among the dead, had a MELD score of mean of 36.08 with standard deviation of 5.946.*
Keywords: *correlation, APRI Index, Child Pugh Score, MELD score.*

Introduction

Liver cirrhosis is the 14th most common cause of death all over the world. It causes around 1.03 million deaths per year in the world.1 Alcohol is the most common aetiology of cirrhosis, in developed countries.

In alcoholic liver disease Histological abnormalities can range from steatosis to hepatocellular carcinoma.

Alcohol consumption is measured by the count of "drinks". The National Institute on Alcohol Abuse and Alcoholism defines a standard drink as 11-14 g of alcohol, It is approximately one drink of 40% spirit, one glass of wine or one glass of wine or 0.33 l (12-oz) beer.

Many studies have shown that the amount of undiluted ("pure") alcohol consumed and the duration of that consumption are closely related to

cirrhosis. According to some reports, cirrhosis does not develop below a lifetime alcohol consumption of 100 kg of undiluted alcohol [3]. This amount corresponds to an average daily intake of 30 grams of undiluted alcohol for 10 years. Heavy alcoholics consuming at least 80 g of alcohol per day for more than 10 years will develop liver disease at a rate of nearly 100%. [3]

Data from the "Dionysos" study show, however, that consumption of more than 30 g of pure alcohol daily, regardless of sex, already increases the risk of liver disease[4]

8–20% of chronic alcoholics develop micronodular or Laennec's cirrhosis. Secondary factors that accelerate the progression to cirrhosis are: patterns of alcohol drinking (chronic daily heavy drinkers more than binge drinkers),[5] female gender (due to low levels of gastric alcohol dehydrogenase, and higher body fat proportion and oestrogen levels)

Various scores are available foe predicting the prognosis and mortality in liver cirrhosis. Most common are child pugh score and MELD score. Child pugh score was developed in 1973 as a modification of child turcotte score. But subjective variability of assessing ascites grades and hepatic encephalopathy stage makes its a less reliable.

Model for end-stage liver disease (MELD) score was initially created to predict the survival of patients undergoing transjugular intrahepatic portosystemic shunts (TIPS). MELD score has only 3 objective variables: total bilirubin, creatinine, and INR. [6]

Until now, a large number of studies compared their discriminative abilities. But the results remained controversial. Some studies favored the Child–Pugh score, but the others were on the opposite side.

APRI Index is aspartate aminotransferase to platelet ratio index. The APRI is simple to use and cheap. An 86% NPV and an 88% PPV were reported to predict the presence of significant fibrosis and a 98% NPV and a 57% PPV were reported to predict the presence of cirrhosis. [7]

Aims and Objectives

- To calculate APRI INDEX, child pugh score and MELD score in liver cirrhosis patients
- To find the correlation between APRI index, MELD score and Child pugh Score.

Method of Study

We conducted a retrospective study among the patients who were treated in the department of General Medicine, SSIMS& RC, Davangere, Karnataka. A total of 50 patients having liver cirrhosis were selected.

Inclusion Criteria

Patients with cirrhosis of liver

Patients between age 18-75 years

Exclusion Criteria

- Age less than 18 years
- Age more than 75 years
- Primary haematological disorders
- Acute infectious diseases

Cirrhosis of liver was confirmed by ultrasound and biochemical reports. Cirrhosis due to alcohol, Hepatitis B, Hepatitis C, NAFLD leading to cirrhosis were included in the study.

APRI was calculated using the formula:

APRI = (AST/PLATELET X 10^9)X 100

MELD SCORE is calculated using the formula 8

MELD = 3.78×ln[serum bilirubin (mg/dL)] + 11.2×ln[INR] + 9.57×ln[serum creatinine (mg/dL)] + 6.43

Child Pugh is calculated based on Table 1 [9]

Analysis was based on the score obtained and divided into 3 classes: A, B and C

Child pugh class A Score = 5 TO 6

Child Pugh class B Score = 7 to 9

Child Pugh class c score >10

Factor	Units	Points Toward Total Score 1	2	3
Serum bilirubin	µmol/L	<34	34–51	>51
	mg/dL	<2.0	2.0–3.0	>3.0
Serum albumin	g/L	>35	30–35	<30
	g/dL	>3.5	3.0–3.5	<3.0
Prothrombin time	seconds prolonged	<4	4–6	>6
	INR[a]	<1.7	1.7–2.3	>2.3
Ascites		None	Easily controlled	Poorly controlled
Hepatic encephalopathy		None	Minimal	Advanced

[a]International normalized ratio.

Note: The Child-Pugh score is calculated by adding the scores for the five factors and can range from 5 to 15. The resulting Child-Pugh class can be A (a score of 5–6), B (7–9), or C (≥10). Decompensation indicates cirrhosis, with a Child-Pugh score of ≥7 (class B). This level has been the accepted criterion for listing a patient for liver transplantation.

APRI SCORE, MELD SCORE, and Child Pugh score were compared and were analysed using spss statistical analysing software. Fischer test and chi square test were applied. And the results were obtained.

APRI	
A	<0.7
B	0.7-1.5
C	>1.5

CHILD PUGH	
A	5 TO 8
B	7 TO 9
C	10 TO 15

MELD	
1	<18
2	18 TO 36
3	>36

Observations and Results

Based on the observations, the data was divided into various classes as follow:

APRI CLASS AND CHILD PUGH CLASS Cross tabulation						
			CHILDPUGH CLASS			Total
			1	2	3	
APRI CLASS	1	Count	0	5	1	6
		% within APRI_class	0.0%	83.3%	16.7%	100.0%
		% within CHILDPUGHCLaSS	0.0%	33.3%	3.0%	12.0%
	2	Count	1	8	1	10
		% within APRI_class	10.0%	80.0%	10.0%	100.0%
		% within CHILDPUGHCLaSS	50.0%	53.3%	3.0%	20.0%
	3	Count	1	2	31	34
		% within APRI_class	2.9%	5.9%	91.2%	100.0%
		% within CHILDPUGHCLaSS	50.0%	13.3%	93.9%	68.0%
Total		Count	2	15	33	50
		% within APRI_class	4.0%	30.0%	66.0%	100.0%
		% within CHILDPUGHCLaSS	100.0%	100.0%	100.0%	100.0%

		MELD	APRI	CHILD PUGH
MELD	Correlation Coefficient	1.000	.632**	.840**
	p value		<0.001	<0.001
	N	50	50	50
APRI	Correlation Coefficient	.632**	1.000	.700**
	p value	0.000		<0.001
	N	50	50	50
CHILDPUGHGRADE	Correlation Coefficient	.840**	.700**	1.000
	p value	0.000	0.000	
	N	50	50	50

ALIVE(1) AND EXPIRED (2)		N	Mean	Std. Deviation	Std. Error Mean
MELD	1	38	23.16	6.954	1.128
	2	12	36.08	5.946	1.716

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
MELD	Equal variances assumed	0.710	0.404	-5.795	48	<0.001	-12.925	2.231	-17.410	-8.441
	Equal variances not assumed			-6.293	21.368	0.000	-12.925	2.054	-17.192	-8.658

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of CHILDPUGHGRADE is the same across categories of Alive_Expired.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.
2	The distribution of APRI is the same across categories of Alive_Expired.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

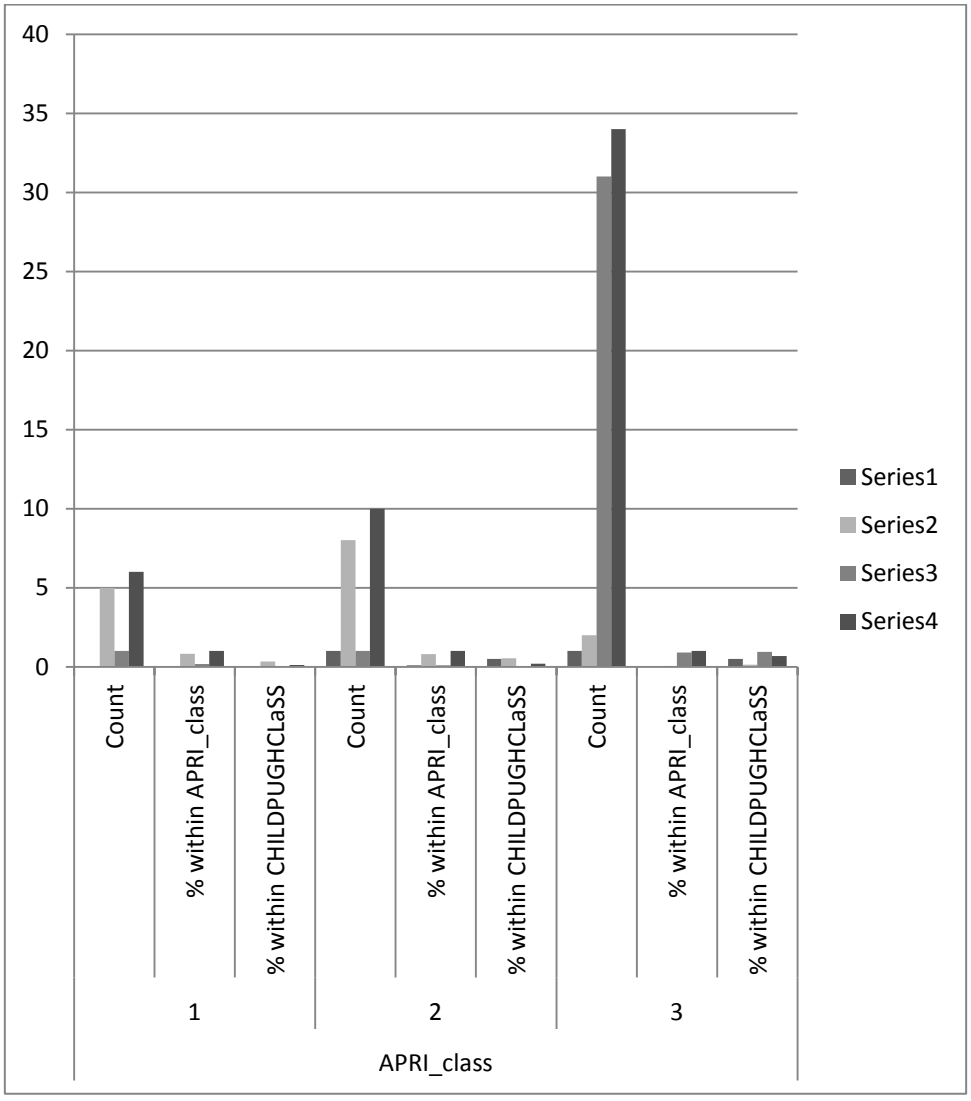
Asymptotic significances are displayed. The significance level is .05.

Alive (1) Expired (2)			APRI	CHILDPUGHGRADE
1	N	Valid	38	38
		Missing	0	0
	Median		2.02	10.50
	Minimum		0.29	5
	Maximum		11.87	15
	Percentiles	25	0.74	7.75
		50	2.02	10.50
		75	3.74	13.00
2	N	Valid	12	12
		Missing	0	0
	Median		12.58	15.00
	Minimum		1.55	13
	Maximum		55.28	15
	Percentiles	25	3.90	13.25
		50	12.58	15.00
		75	28.78	15.00

Out of 50 patients analysed, 47 were males and 3 were females. 10 had mild ascites, 18 had moderate ascites, 22 had severe ascites. 15 patients had no hepatic encephalopathy, 7 patients had grade 1 or 2 hepatic encephalopathy. 28 patients had grade 3 or 4 hepatic encephalopathy. 2 patients were in Child Pugh class A, 14 Patients were in Child Pugh class B, 26 patients were in Child Pugh class C.

The study found out the relationship of MELD Score and Child Pugh Score, and MELD Score and APRI index with significant p value. The study also showed significant p value between APRI Index and Child Pugh Score.

The study also showed that raised APRI Index, higher Child Pugh classification and higher MELD score for patients who died in the hospital during the course of treatment. Among those who are dead, APRI index has a median value of 12.58 and Child Pugh score of median 15. Among the dead, had a MELD score of mean of 36.08 with standard deviation of 5.946.



Conclusion

The study showed positive correlation between APRI INDEX, MELD SCORE and CHILD PUGH CLASS. Hence APRI INDEX can also be used for predicting the mortality of liver cirrhosis patients and to know the prognosis as like other parameters.

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