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Evaluation of Aspartate Aminotransferaseto-Platelet Ratio Index as a Non-Invasive Marker for Liver Cirrhosis

V.Siva Kesava Reddy[1], Sachin Agrawal[2], Sunil Kumar[3], Sourya Acharya[4], Shilpa Bawankule[5]

[1]Resident Medicine Department, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha;
[2]Professor, Medicine Department, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha;
[3]Professor, Medicine Department, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha;
[4]Professor, Medicine Department, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha;
[5]Professor, Medicine Department, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Wardha;
Email-sime4648@gmail.com, dragrawal82@gmail.com, sunilkumarmed@gmail.com, souryaacharya74@gmail.com,drshilpagaidhane@gmail.com,

Corresponding author's name and address: V.SIVA KESAVA REDDY
Corresponding author's email id-sime4648@gmail.com
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Abstract :

Background : For Cirrhosis of liver the gold standard diagnosis is liver biopsy .Till now no non-invasive marker has been invented to replace liver biopsy.

Objectives :

To correlate APRI with the rigorousness of cirrhosis with meld and child PUGH score.

To correlate APRI with various etiologies of cirrhosis.

To corelate APRI with various outcome of cirrhosis in terms of mortality and morbidity.

Method : The Prospective cross-sectional study will be conducted at Department of Medicine, in AVBRH, situated at Wardha District. We will prospectively enroll all consecutive patients > 18 years of age apart from gender or ethnicity who undergo irrefutable, biochemical and radio diagnostic testing for cirrhosis

Expected results : The study estimates the APRI in patients of cirrhotic liver disease and as previous studies which is been conducted outside India, have observed that APRI can be used to identify cirrhosis in different patient who undergone study.

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Keywords :ASPARTATE AMINOTRANSFERASE TO PLATELETRATIO INDEX, cirrhosis of liver, phases of disease.

INTRODUCTION:

Alcohol liver disease is that last-stage consequence of pathology of the cells of liver which affects formation of nodule and altered function of liver (1). For the prognosis of liver disease, liver diagnostic test is presently the best general for analysis of liver necrosis and inflammatory activity and pathology. this can be associate degree invasive system issue to interobserver differences and error in the sampling of biopsy; diagnostic test duration and segmentation influences its reliableness and outcome of histopathologyl. There are a variety of alternative problems like trauma, abnormal condition, bleeding that restricts the utilization of liver biopsy(2). Scoring systems involvingaspartate aminotrasferase to platelet ratio index(APRI) and fibrotest utilize the biochemical markers that do not have any direct association with fibrosis and predicts the stage of fibrosis by using stastical approach.Moreover several liver imaging methods have proved to be useful in diagniosing and staging the liver fibrosis.However methods such as Fibro check (3),transient electrography (4), fibrospect, etc. which were recently in use (5-7), However,methods such as perfusion MR imaging,diffusion MR imaging, are used to diagnose advanced fibrosis.Non invasive methods like APRI arefound to be an exceptional non invasive marker for detecting advanced liver fibrosis.Very few studies are done in entire world to evaluate the rigorousness and prognosis of fibrosis of liver by a non invasive methods in patients of cirrhosis. Aspartate aminotransferase: thrombocyte magnitude relation Index (APRI) wont to be instructed as a unique indication for prognostication of cirrhosis(8,9). APRI is an economically convenient alternative to liver biopsy and other non invasive methods for patients with cirrhosis and has been expeditiously assessed in foreign population (10,11)and a few indian populations (12). however not several thesis are dispensed in Asian population. For evaluating liver fibrosis the gold standard method isLiver biops,however its invasive nature leads to in pain and major potential complications

Wai et al. developed 'AST to platelet ratio index' (APRI). APRI more than 1.5 has area under receiver's operating curve (AUROC) of 80% and 89% for advanced fibrosis F3– F4 and cirrhosis, respectively.(13).Alcoholic liver disease,hepatitis C virus,human immunodeficiency virus,and HCV –coinfection have intercorrelation with APRI score. Various studies had proved correlation of APRI with above mentioned viruses.(14,15.)APRI is also useful in people with NAFLD. In a retrospective study (n=320) by Angelo et al., it was found that the ability of the APRI to predict outcomes in patients with NAFLD like liver-related adverse outcomes was 80% and for predicting death or liver transplantation was 63%.(16). Hence, within the current find out about we have a tendency to tried to judge. By analyzing APRI as a best non-invasive diagnostic tool of liver disease in a very set of Indian population and various studies analyzed APRI to be sensitivity and specificity as a diagnostic tool. In 2018, World Health Organization (WHO) came up with Global status report on alcohol and health for India and it states that amongst adults, approximately 30% consume alcohol and spirit is the most common form of alcohol (i.e., 93%) consumed whereas, beer and wine constitutes 7% and ≤1%, respectively. The frequency of cirrhosis is 10-15% in those who consume 4 oz of 100-proof whiskey, 15 oz of wine or four 12 oz cans of bear daily

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for 10 years. The frequency of cirrhosis is comparatively lower with intake of wine than that spirits or beer. According to the WHO database, more than 40% of liver deaths are noted due to alcohol.Various complications of cirrhosis includes, major complications includes ascites, coagulation disorders, hepatorenal syndrome, varices, hepatopulmonary hypertension, hepatic encephalopathy (HE), spontaneous bacterial peritonitis, and hepatocellular carcinoma. These complications are because of abnormal synthetic function, secondary to portal hypertension, or combination of both. Liver fibrosis is associated with sustained liver injury often from multiple, and simultaneous factors.

Aim: To study the importance of Aspartate aminotransferase-to-platelet ratio index (APRI) as a non-invasive marker for alcohol liver disease.

OBJECTIVES:

♦ To correlate APRI with the severity of cirrhosis with meld and child PUGH score

♦ To correlate APRI with various etiologies OF CIRRHOSIS

♦ TO CORELATE APRI with various outcome of cirrhosis in terms of mortality and morbidity

MATERIALS AND METHODS:

The present study protocol will be approved by the Institutional Ethics Committee (IEC).

1. STUDY DESIGN A CASE CONTROL STUDY CASES =150 CONTROL =150

2. PERIOD OF STUDY

The study will be performed over a period of 2 years i.e., from 2020 to 2022.

3. STUDY SETTING The study will be performed in the medicine department, AVBRH, a tertiary care teaching hospital located in the rural region of Wardha District.

4. STUDY POPULATION CASES : Cirrhosis patients attending medicine department AVBRH CONTROLS: Age and sex matched healthy controls

5. SELECTION OF PATIENTS

5.1. INCLUSION CRITERIA

1 People with HbsAg/HCV positive status

2 People of *alcoholic liver disease (ALD)

3 Age: 18-70 years, and

4 Either gender.

5.2. EXCLUSION CRITERIA:

1. Obese II patients ,and/or patients with more quantity of fat in chest wall,

2. Patients with hepatocellular carcinoma,

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3. Patients on invasive mechanical ventilation, and

4. Patients with congestive cardiac failure

5. Patient on antiplatelet and pt with febrile illness affecting platelets

History taking: Including age, gender, comorbidities like type1DM and type2DM, High blood pressure, ischemic heart disease, CKD. (serum creatinine levels more then 1).

H/O alcohol intake/ Drug abuse/ Blood transfusions/ Dialysis will be asked in subjects.

Biochemical testing for LFT, KFT and RBS,FBS, HBA1C will be done and clinical examination as per format given below will be done.

Laboratory investigations: Peripheral venous blood specimens Will be collected on admission for measuring of: Complete blood count (CBC) and differential leucocytic count.

Sample collection: Adequate venous blood samples will be withdrawn and collected into the plain bulb and centrifuged immediately for serum specimen that will be stored frozen at a temperature -20 °C under complete aseptic technique

USG Abdomen Pelvis: Findings for liver and kidney diseases will be looked for in the scan and on basis of that patients will be confirmed to enroll for cases or controls or whether to be excluded

Group I will include 150 diagnosed cases with liver cirrhosis. The subjects will be in the age group of more then 18 years male and female. Group II will include 150 healthy control subjects. The age limits of this group will also be more then 18 years in both male and female.

In the inclusion criteria patients will be further divided into 3 classes:

- According to etiology
- According to complications
- According to severity

For the severity patients will be classified with the CHILD PUGH Scoring:

Bilirubin (Total)	Less than 2 mg/dL (<34.2 µ mol/L	+one
	2-3 mg/dL (34.2-51.3 µmol/L)	+two
	Greater than 3 mg/dL (>51.3 µmol/L)	+three
Albumin	Greater than 3.5 g/dL (>35 g/L)	+one
	2.8-3.5 g/dL (28-35 g/L)	+two
	Less than 2.8 g/dL (<28 g/L)	+three
INR	Less than 1.7	+one
	1.7-2.2	+two
	Greater than 2.2	+three

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Ascites	Absent	+one
	Slight	+two
	Moderate	+three
Encephalopathy	Absent+one	
	Grade 1-2	+two
	Grade 3-4	+three

Classification: of Child-Pugh:

PATIENTS WITH MILD DISEASE SCORE HAS GIVEN AS 5 to 6 points

PATIENTS WITH MODERATE DISEASE SCORE HAS GIVEN AS 7-9 points

PATIENTS WITH SEVERE DISEASE SCORE HAS GIVEN AS 10-15 points

Study will be followed with the patient and healthy individuals for a period of there hospital stay and till the day of discharge. The first reading of serum magnesium levels will be put in case and control and will be taken up for study.

After the end of 1.5 years total numbers of cases and controls will be analysed using the formula of p value.

SAMPLE SIZE:

Sample size $=Z\alpha^{2*(p)*(1-p)}$

Where:

Reference Study: Sample Size =150

Cases = 150

Controls = 150 (healthy without cirrhosis)

Expected Outcomes/Results:

The lower the Aspartate transamino platelet ratio index that is < 0.5the greater the negative predictive value (and ability to rule out cirrhosis).

The higher the aspartate transamino platelet ratio index that > 0.5 the greater the positive predictive value and ability to rule in cirrhosis.Midrange standards are less useful.

DISCUSSION

The present study entitled "NON-INVASIVE ASSESSMENT OF LIVER" pathology in diseases of liver was administrated within the Department of medicine, AVBRH, Sawangi (Meghe) Wardha, in two years duration. This is cross-sectional type of study which is conducted when getting approved of the organization commission and written agreement of

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study subjects. Thecurrent study is for estimate the efficacy of APRI as a side marker which is non invasive for liver disease in various studies in India and other various studies showed that Aspartate amino platelet ratio index may be a truthful and exact marker which is non invasive for liver disease with very high sensitivity and specificity. The low value and straightforward accessibility of its 2 markers(AST and platelets) are 2 things because of which APRI is a helpful and straightforward side check.

Study done by Verma et al. revealed that there is an, important and vital relation between Aspartate transferase platelet ratio index and viscus blood pressure gradient (HVPG) with the median score of one. The APRI of ≥1.09 was sixty six percent sensitive and seventy three percentprecise with positive and negative predictive value of eighty fifth and forty seventh severally (17). Manystudies have beenanalyzed totally different kind of non-invasive biomarkers accessible for identification of liver disease(4,6,17–19).

Study done by Sebastini et al., revealed that Aspartate transferase platelet ratio index is more accurate than the fibrotest whereas other studies done by Lackner et al., study showed that Aspartate transferase platelet ratio index is more accurate than AST: angular position quantitative relation (5,20). Ucar et. al., study has advised that body fluid markers have lesser diagnostic values than APRI in people with viral pathology as analyzed to alternative body fluid markers (18).

As compared to APRI , Fibroscan may be a better predictor of liver disease according to Xia Zhu al., (19). Jin et al., Meta-analysis advised restricted price of serum amino aspartate platelet ratio indexin characteristic serum hepatitis connected vital pathology and liver disease (12). On the other hand other studies have shown APRI to be more accurate marker than other diagnostic tool for diagnosing viral pathology in chronic serum hepatitis (6,21). In cirrhotic patients HPVG can be fairly correlates with APRI (17)Viral pathologies like hepatitis c and HIV-coinfection are also better predicted by APRI (10), whereas, meta-analysis study by carver et al., recommended ordinary level of accuracy in characteristic hepatitis C connected viral pathology. Similar studies were reported by Taksande (22) and Kirnake et. al. (23). Related studies on various chronic liver diseases were reviewed (24-27).

CONCLUSION :

An easy index like APRI, consists of two important laboratory results (AST level and protoplasm count), will determine liver disease with high degree of accuracy. It is mainly used in places where equipment for liver diagnostic tests and highly sophisticated visualising techniques aren't accessible. Anyways,, additional possible studies square measure required to evaluate the Aspertate platelet ratio index in a huge no of patients in different hospitals.We conclude that alcoholic liver disease is more common in males. In the present study the important Laboratory tests done for cirrhotic patients are complete blood picture, renal function test and liver function test (LFT), prothombin time – PTINR and APtt, and most importantly viral markers for HBV and HCV.

Age group mainly included in the study is forty to sixty years, nextfollowed by <40 years.Majority of the patients enrolled in the study hadBleeding varices, splenomegaly, mild to moderate ascites In the enrolled patients, the median APRI score was raised with a value of 1.60. In cirrhotic patients, CTP score was elevated and had a values of 9.

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