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Research Article

Aspartate Aminotransferase/ Platelets Ratio Index in Detection of Liver Cirrhosis in Patients with Chronic Hepatitis B Virus

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ABSTRACT

Background: Liver cirrhosis is one of most horrible difficulty of incessant hepatitis B infection (HBV) disease. Biopsy is viewed as the highest quality level for conclusion of liver cirrhosis. In any case, this strategy has numerous restrictions.

Aims: to assess the productivity of APRI in discovery of liver cirrhosis in patients with HBV disease.

Subjects and Methods: This case control study included 68 patients with liver cirrhosis just as 50 age and sex-coordinated clearly solid subjects. Serum aspartate aminotransferase and platelets tally were performed for every member, and the aspartate aminotransferase: platelet proportion file: platelet proportion file (APRI) was determined. Beneficiary working trademark (ROC) bend was used to discover the region under-the-bend (AUC) just as the particularity and affectability of APRI in discovery of liver cirrhosis.

Results: The mean APRI score of the patients and control were 1.6±0.62 and 0.25±0.18 separately with a profoundly huge contrast. The AUC was 0.842, p<0.001, CI=0.732-0.953. At cut off an incentive for APRI= 0.65, the affectability and explicitness of the test were 89% and 87% separately demonstrating generally excellent discriminative worth.

Conclusions: APRI can be a solid, straightforward, non-obtrusive, plausible examine for discovery of cirrhosis in patients with HBV, and live biopsy should never again be viewed as mandatory.

Keywords: Liver cirrhosis**,** aspartate aminotransferase: platelet ratio index

INTRODUCTION

It is anticipated that around 400 million people all around have incessant HBV [1], while in excess of 200,000 interminable HBV transporters bite the dust every year from cirrhosis [2]. Studies in the US and some different nations exhibited that about 20%-30% of transporters are available with stubbornly standard alanine aminotransferase (ALT) statures and HBV DNA levels >104 duplicates/mL in truth experience the ill effects of stage ≥2 irritation and stage ≥2 fibrosis as well as cirrhosis as per the aftereffects of liver biopsy [3].

Liver cirrhosis can be characterized as a dynamic phase of liver fibrosis with distortion of the hepatic vessels and its design. As high as 12% of patients with HBV-related cirrhosis die from liver disappointment, while about 10% bite the dust from liver malignancies. The yearly frequency of cirrhosis in patients with incessant HBV contamination was accounted for to be about 1.0–2.4% [4].

Early recognition of cirrhosis in patients having HBV disease is a basic issue not just in light of the fact that it convinces screening for hepatocellular carcinoma (HCC), yet in addition it is a key factor in treatment inception in those patients. As of now, liver biopsies are imagined as the highest quality level for recognition and organizing of liver fibrosis or cirrhosis [5]. Be that as it may, this method has a few downsides the most significant of which are obtrusiveness, inspecting blunder, potential intricacies, (for example, draining pneumothorax and irresistible peritonitis), inconstancy in understanding of the outcomes [6]. Besides, the dynamic improvement of the liver cirrhosis brought about by movement and relapse didn't permit simple evaluation through liver biopsy [7]. Along these lines, it is imperative to explore other potential choices for this method.

A few non-intrusive biochemical tests are presently being used. Of these transient electrography, Fibro test hepascore [8], forns file, fibrospect, aspartate aminotransferase and alanine aminotransferase proportion (AAR), improved liver fibrosis (Mythical being) and numerous others are by and by being used [9,10]. In any case, in the majority of these

techniques, an unpredictable estimations and costly biochemical measures are required [11].

Along these lines, it is of principal significance to discover straightforward, modest and non-obtrusive options for early recognition of liver cirrhosis. Numerous examinations have assessed the proficiently of aspartate aminotransferase: platelet proportion file (APRI) in conclusion of liver cirrhosis among western patients [12,13] and some Asian patients [14]. In any case, such examinations among Iraqi patients are scant or even missing. As needs be, the current investigation expected to assess the job of APRI in discovery of liver cirrhosis in an example of Iraqi patients.

SUBJECTS AND METHODS

The study population

This case control study comprises a total of 68 patients having liver cirrhosis who were attending outpatient's clinic at Al-Imamain Al-Kadhumain Medical City during the period from September 2017 to August 2019. Other age and sex match 50 apparently heathy individuals who were accompanying the patients were recruited to represent the control group. Patients with liver disorders other than cirrhosis, comorbidities such as malignancy, hematological disorders, cardiac diseases, diabetes, renal failure, hypertension, any surgical history were excluded from the study. Liver cirrhosis was primarily diagnosed according to ultrasound findings. Ultrasonography was performed using a real time 3.5 MHz probe while all patients were in fasting status. Liver extent, echo consistency, echogenicity and the diameter of portal vein were evaluated. Liver biopsy was used in some non-conclusive cases.

Sampling and Calculation of APRI

From each participant, about 4 ml of venous blood were collected, of which 2 ml were placed in EDTA tubes, while the other 2 ml in plain tube. Complete blood count was performed for the whole blood sample using automated blood cell counter (Beckman coulter counter/USA). A ready commercial kit (Bioelisa HBsAg/ Biokit/Spain) was used for detection of HBsAg according to the manufacturer's protocol. Individual who gave positive result for this test were excluded from control group. Liver function tests including serum concentration of aspartate aminotransferase (AST) was measured based on Dinitrophenylhydrozol colorimetric method using commercially ready kits (Roche/Germany) following the manufacturer's instructions.

The calculation of APRI Score was adopted from the following formula [15]

APRI= {(AST/upper limit of normal)/platelet count ($\times 10^3$/ml)} $\times$ 10^2.

Statistical analysis

All data were analyzed using the statistical package SPSS 24.0 (Chicago/ USA). Quantitative variables were subjected to normality test using Shapiro Wilk test. Numerical data were introduced as mean value ± standard deviation (SD). Comparison between patients and controls was achieved using the t test or Mann–Whitney test for data with normal and non-normal distribution data, respectively. Chi-squared test was used to analyze categorical data. Receiver operating characteristic (ROC) curve was utilized to evaluate the efficiency of APRI in detection of liver cirrhosis. A two-tailed P value less than 0.05 was considered statistically important.

Results

Baseline characteristics of the study population

The baseline characteristics of controls and patients are presented in table 1. Mean age of patients and controls was 52.17±9.12 years and 49.86±11.2 years respectively with no significant difference. Likewise, a very small difference can be observed between the two group in gender distribution. However, patients showed meaningfully higher mean AST, ALT and total bilirubin (78.42±31.65 IU/L, 49.18±8.71 IU/L and 3.82±1.84 mg/dl, respectively) than controls (34.71±12.91 IU/L, 33.29±6.33 IU/L and 0.82±0.16 mg/dl, respectively). In contrast controls had higher platelets count than patients (2.57±0.94 $\times 10^3$/ml versus 0.89±0.17$\times 10^3$/ml) with a highly significant difference.

Table 1: Baseline characteristics of controls and patients

Variables	Patients (n=68)	Controls (n=50)	p-value
Age, years	52.17±9.12	49.86±11.2	0.461
Gender Male Female	 51(75%) 17(25%)	 36(72%) 14(28%)	0.714
AST (IU/L)	78.42±31.65	34.71±12.91	<0.001
ALT (IU/L)	49.18±8.71	33.29±6.33	0.007
Platelets count ($\times 10^3$/ml)	0.89±0.17	2.57±0.94	<0.001

Total bilirubin (mg/dl)	3.82±1.84	0.82±0.16	<0.001
APRI score	1.6±0.62	0.25±0.18	<0.001

Comparisons between quantitative variables were by t-test unless otherwise indicated.

The mean APRI score of the patients and control were 1.6±0.62 and 0.25±0.18 respectively with a highly significant difference.

Diagnostic value of APRI

The curve of receiver operating characteristic was adopted to asses the diagnostic value of APRI in detection of liver cirrhosis. The area under the curve (AUC) was 0.842, p<0.001, CI=0.732-0.953. At cut off value for APRI= 0.65, the specificity and sensitivity of the test were 87% and 89% respectively indicating very good discriminative value (figure 1).

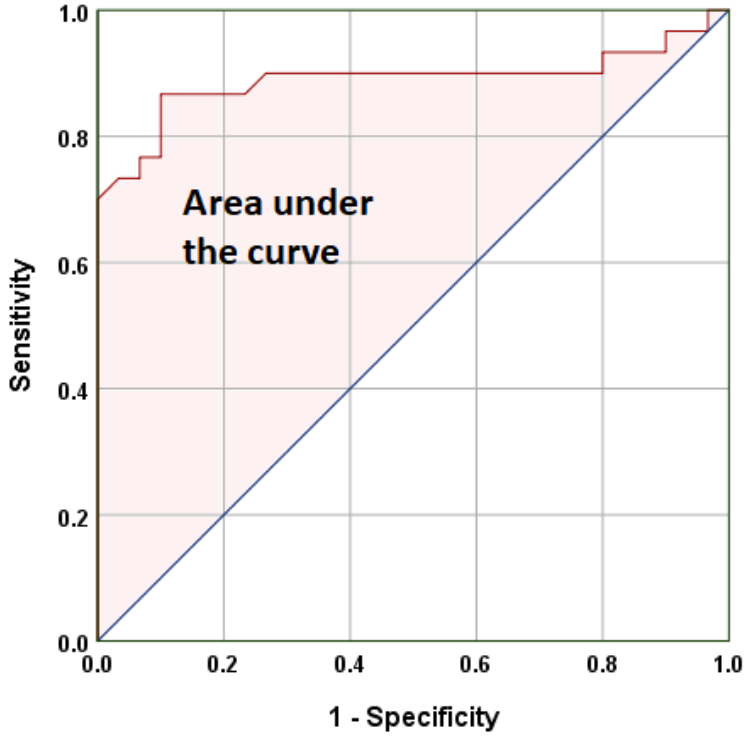

Fig.1: Receiver operating characteristic curve for APRI in the context of diagnosis of liver cirrhosis compared with a healthy control.

DISCUSSION

The most important finding in the present study was APRI score had a very good sensitivity and specificity for diagnosis of liver fibrosis as a complication for HBV infection. These results are in accordance with many previous studies in this regards. In a similar study, Jain et al. [11] recruited 51 Indian patients with cirrhosis and 50 apparently heathy subjects. The specificity and sensitivity of APRI at cut of value of 0.65 was found to be 96.1% and 96% respectively. Slightly less diagnostic value was reported by a meta-analysis conducted by Lin et al. [16]. This study included 40 studies with a total number of 58,739 patients. The AUC of the APRI for the diagnosis of significant fibrosis was 0.77, severe fibrosis was 0.80, and cirrhosis was 0.83. For cirrhosis, the cut of value was 1.0 with 76% sensitivity and 72% specificity. Almost similar results were obtained by [17]. Furthermore, APRI can be also used for predication of potential fibrosis in patients with hepatitis C and human deficiency virus (HIV) co-infection [12].

In contrast another meta-analysis performed by Jin et al. [14], included 9 studies with a total of 1,798 patients revealed a specificity of 78% and a sensitivity of 54% for APRI at cut value of 1.0-1.5 in detection of liver cirrhosis. At the cutoff of 2.0, the test revealed a sensitivity of 28% and a specificity of 87%.

Several factors are responsible for this discrepancy between different studies. Among these factors are ethnic variation, differences in the histological stage of the fibrosis, the presence of comorbidities, and the ongoing process of the liver cirrhosis caused by from progression and regression.

alanine aminotransferase/ platelets ratio index depends on a couple of routine laboratory assessments and is, accordingly, a hopeful assay

with relatively low cost and widespread availability [18]. It was well documented that platelet counts declines and AST levels rises with the development of liver cirrhosis. The reduction in platelets count in patients with cirrhosis can be attributed to several factors. These include accelerated destruction by enlarged spleen due to secondary portal hypertension caused by cirrhosis and the decline in thrombopoietin production by affected hepatocytes [19]. On the other hand, the increased production of AST is mainly attributed to mitochondrial injury accompanying liver injury in cirrhosis. Thus, there is more AST releasing from these mitochondria. Furthermore, liver cirrhosis can reduce the clearance of AST which is associated with increased retention of AST in the blood [20].

Collectively, these data suggested that APRI can be considered as a simple, reliable, non-invasive, feasible method for diagnosis of cirrhosis in patients with HBV, and live biopsy should no longer be considered obligatory.

Conflict of interest

The authors declare that they don't have any conflict of interest

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