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Original Research Article

Study of Blood Indices for Prediction of Oesophageal Varices in Hepatic Cirrhosis at a Tertiary Care Hospital

Venkatakrishna Bhat S.[1], Athmika[2], Riyaz Ahmed M.[3]

[1]Assistant Professor, Department of General medicine, Srinivas Institute of Medical Sciences And Research Centre, Mukka, Mangaluru, Karnataka, India

[2]Senior Resident, Department of Anaesthesiology, K S Hegde medical academy, Deralakatte, Mangaluru, Karnataka, India

[3] Assistant Professor, Department of General Medicine, Mysore Medical College And Research Institute, Mysore, Karnataka, India

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Corresponding author: Dr. Venkatakrishna Bhat S

Conflict of interest: Nil

Abstract

Background: Varices (Oesophageal or gastric) being one of the dreaded complication of portal hypertension seen in most of the cirrhotic patients. Eventually most of them develop this catastrophe and upper GI endoscopy is the only novel tool available for screening as well as for therapeutics. As it is a semi invasive procedure and universally not available everywhere. Hence there is immense need of non-invasive method to predict varices.

Objectives: Predicting clinically significant oesophageal varices using simple blood tests

Methods: During the cross sectional study duration, 107 patients from the hospital were considered using the inclusion and exclusion criteria.

Results: Study has predominantly male population with 44 years is being the median age. Ethanol induced cirrhosis is the common etiology.60 patients had large varices which is clinically significant and they are prone for variceal bleed. Majority of the subjects with cirrhosis had platelet count <1.5 lakhs. Clinically significant varices are better predicted by AAR and FIB-4.

Conclusion: AAR, FIB-4 and platelet counts were better predictor of clinically significant oesophageal varices and has modest accuracy. It identifies the group of patient needs prophylactic endoscopy and reduces the financial burden of managing oesophageal varices.

Keywords: Oesophageal varices; Portal hypertension; AAR; FIB-4; Endoscopy.

Introduction

Oesophageal varices is a dreaded and the major complication of cirrhosis and portal hypertension [1]. According to Baveno III consensus on portal hypertension, it is mandatory to screen for oesophageal varices in all cirrhotics [2]. Repeated endoscopy is unpleasant to many and has huge burden on health care insurance. Among cirrhotics, 50% have oesophageal varices and out of which up to 30% will have large varices.

There is dire need of noninvasive predictors to enhance patient compliance and restrict the unnecessary procedure. Hence these noninvasive predictors are used to promote selective endoscopy over universal in cirrhotics. Because of the non-availability of endoscopy everywhere in developing countries they benefit the most and prevents the cirrhotics from unnecessary semi invasive procedures which itself has some demerits.

Aims and Objectives

Prediction of oesophageal varices as well clinically significant oesophageal varices using simple blood investigations.

Methodology

A cross section study of 107cases, admitted or seen on outpatient basis in General medicine department in Srinivas institute of medical sciences and research centre, Mukka, Mangalore. The study period was between November 2024 to May 2025.Irrespective of the sex of the patients, all those aged more than 18years with Cirrhosis diagnosed based on clinical and ultrasonological basis. Patient with history or clinical evidence of enrolment for variceal bleed, liver transplant, hepatocellular carcinoma diagnosed based on ultrasonological basis, recent acute myocardial infarction, acute pancreatitis, acute febrile illness like dengue fever, malaria etc were

excluded. For every patient the following information was gathered: Age, gender, cause of cirrhosis, abdominal ultrasound discoveries, blood investigations like complete blood count, Prothrombin time (PT)International Normalized Ratio (INR),upper gastrointestinal endoscopic findings. Our investigation was meant to approve the meaning of scoring frameworks like AST to ALT ratio (AAR), AST to platelet ratio index (APRI), fibrosis index dependent on the four factors (FIB-4), Platelet Count.

For every individual, the score was determined utilizing the mentioned equation:

1. AAR=(AST/ALT)
2. APRI=[(AST/ULN AST) x 100]/Platelets (10^9/L)]
3. FIB-4=Age(years)×AST(U/L)/PLT(10^9/L) × √ALT(U/L)

The study was analyzed using IBM SPSS insights version 23 for Windows

Results:

A sum of 107 cirrhotic patients took an interest in cross-sectional experimental examination. The median age of presentation was 44years with predominantly male (90.65%) patients. Ethanol induced (86.92%) cirrhosis was the common etiology as shown in Fig.1. LEVs were seen in 56% of the patients as demonstrated in Fig. 2. The independent example Mann-Whitney U test presented an important association for AAR, FIB-4 and Platelet count whereas APRI score were unimportant as demonstrated in Table 1. Spearman's relationship shown good association in AAR, FIB-4 and Platelet count (Fig 6&7). ROC of all the scoring systems has appeared in Figs.3-5. Parameters like Sensitivity, Specificity, Positive & Negative predictive values (PPV, NPV) and area under the curve (AUC)are depicted in Table 1.

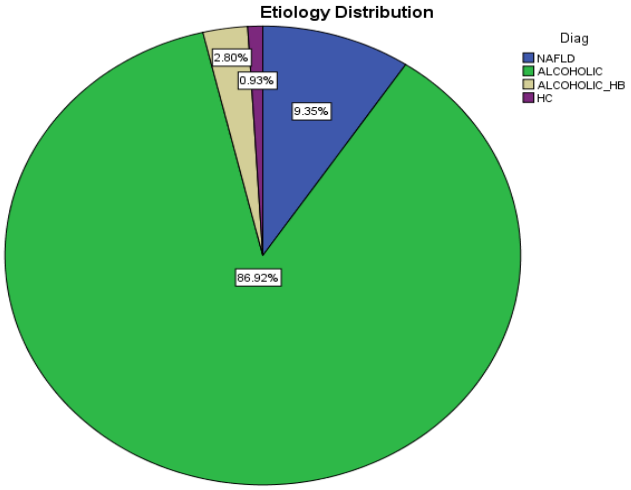

Figure 1: Etiology of cirrhosis

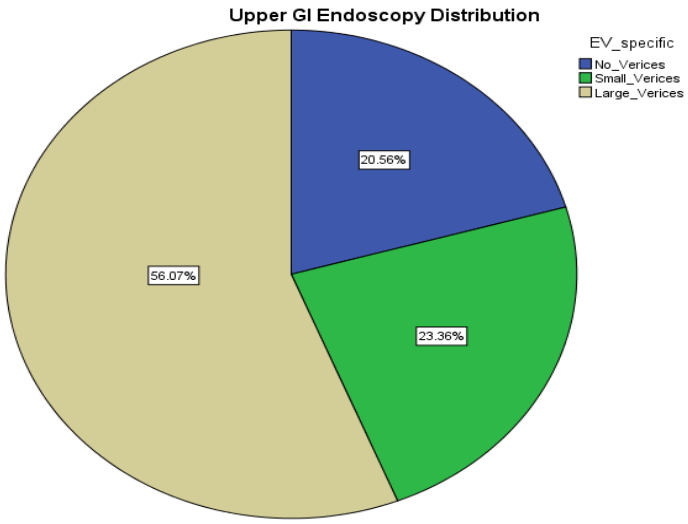

Figure 2: Upper GI endoscopy distribution

Table 1: Statistics of different variable

Variable	Sensitivity (%)	Specificity (%)	Positive predictive value	Negative predictive value	Area under curve(AUC)
AAR	**93.3**	**2.1**	**54.9**	**20**	**0.638**
APRI	**56.7**	**42.6**	**55.7**	**43.5**	**0.507**
FIB-4	**80**	**31.9**	**60**	**55.6**	**0.614**
Platelet count	**66.7**	**44.7**	**60.6**	**51.2**	**0.621**

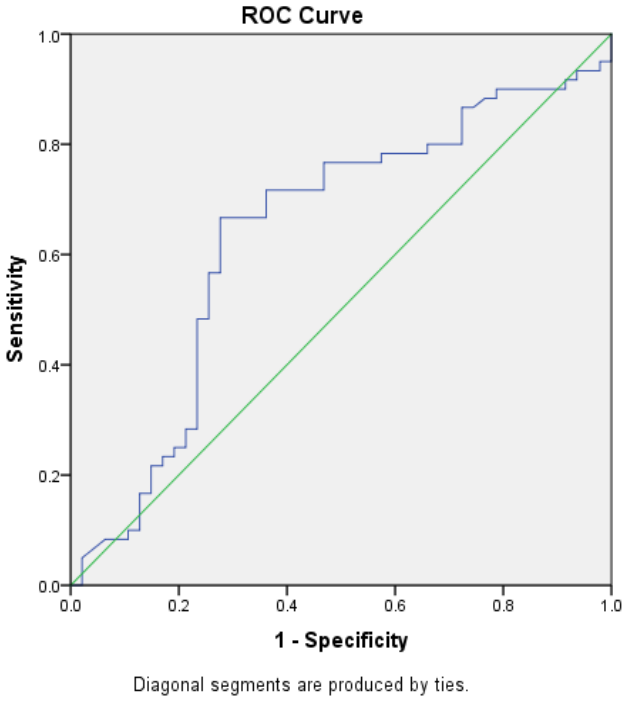

Figure 3: ROC of AAR

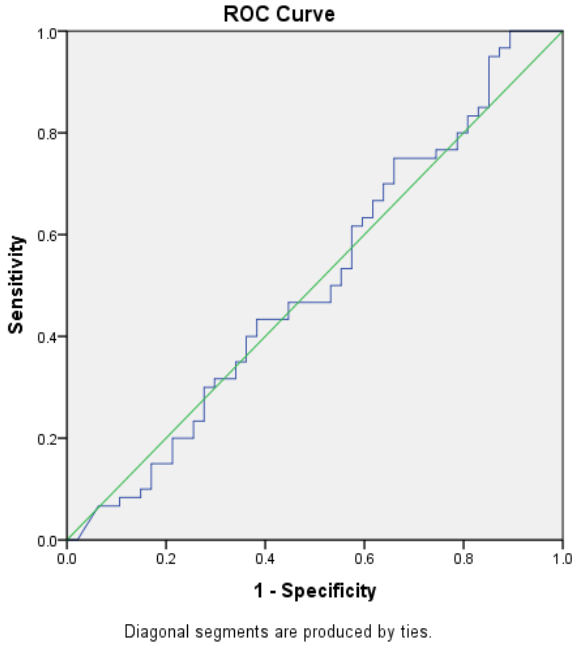

Figure 4: ROC of APRI

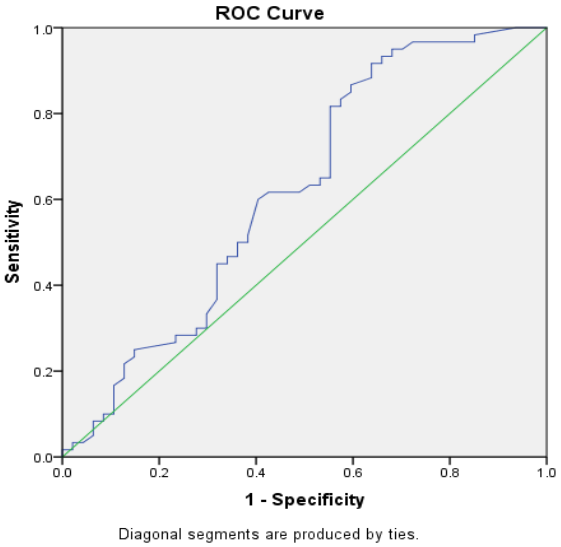

Figure 5: ROC of FIB-4

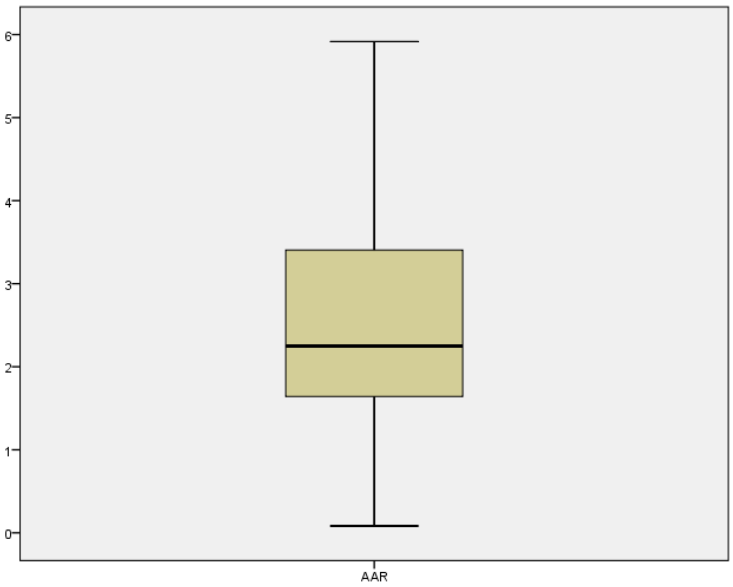

Figure 6: Spearman's correlation for AAR

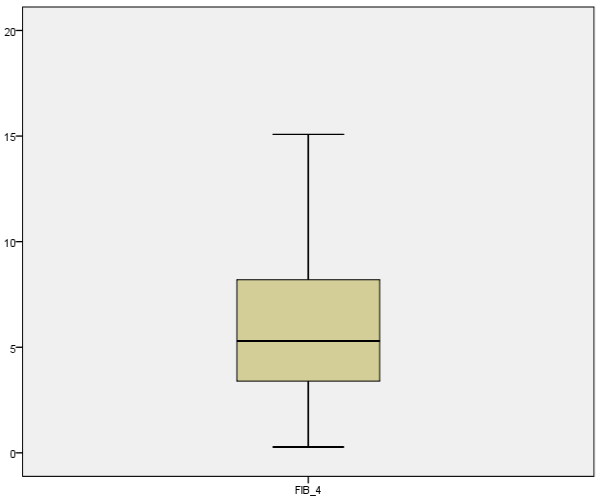

Figure 7: Spearman's correlation for FIB-4 score

Discussion

Upper Gastrointestinal (GI) bleed is a common and potential life-threatening problem. Substantial mortality and morbidity associated with the condition is very high since a long ago [14]. Many Indian studies which are published recently secondary to varices are increasing [3,15].Variceal bleeding is a major complication as well as life threatening in cirrhosis(Incidence around 35-80%)[4].17-57% is the risk of mortality associated with first episode of variceal bleeding [5]. Hence detection of varices as early and treating the patients medically or with variceal band ligation can minimize the complication.

According to BAVENO III consensus, EGD scopy is universally to be done in every case of cirrhosis[6].However, screening all patients with endoscopy is a costly, tedious procedure. Hence there is an absolute need of non-invasive methods for the detection of oesophageal varices and it reduces the socioeconomic, medical burden of disease over the society.

For non-invasive diagnostic evaluation of cirrhosis good number of studies based on laboratory and ultrasound have been developed. Such as Platelet count, splenomegaly, platelet count/splenic diameter, serum albumin, Right liver lobe diameter/albumin ratio and advanced child pugh class [7]. To predict esophageal varices many scoring systems also developed using simple blood tests.

We tried to validate the significance of scoring system like AAR, APRI and FIB-4 Score in our study. Most of the patients aged more than 18 years and belongs to the age group 40-59 years (56%). It is a male dominated study which constitutes 90.65%. Many had ethanol induced cirrhosis which accounts to 86.92% (n=93). Among non-alcoholic (13.08%) patients, NAFLD is the major cause of cirrhosis of liver (n=10).

Platelet Count Vs Large Oesophageal Varices: 64% of the patients had platelet count of < 1.5 lakhs and 40% of them with large varices had platelet count of lessthan1.5 lakhs. This is comparable with the study conducted by Madhotra et al. [8], where platelet count in patients with oesophageal varices ranged from 0.53-1.05 lakhs. Significant association between clinically significant varices and platelet count was found in our study (p – 0.032).

AAR Vs Clinically Significant Varices: 2.85±1.33 was the mean value of AAR with sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) was 93.3,2.1,54.9 and 20. Sebastiani et al [9] study had similar results. This score is clinically significant as p- value is 0.015.

APRI Vs Clinically Significant Varices: 2.28±1.76 was the mean. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value(NPV) as depicted in table.1 is comparable to the study by Sebastiani and Deng et al [9,10,11]. But correlation is clinically non-significant as p- value is 0.900

FIB – 4 Score Vs Clinically Significant Varices: 3.5 was considered as cutoff value. The mean distribution was 7.09±4.27.Kraja et al [12,13] and similar studies had close sensitivity, specificity, positive predictive value(PPV) and negative predictive value (NPV) which is clinically significant as p- value is 0.044.

Limitations of the study being Small sample size and predominantly male population and most common etiology is ethanol induced, hence the applicability of different scoring system on different etiologies cannot be ascertained. As study was conducted on Indian general population, this need to be conducted in different racial and ethnic groups.

Conclusion

From our study we conclude that AAR, FIB-4 and platelet counts were better predictor of clinically significant oesophageal varices and has modest accuracy. It can identify subset of patients who require prophylactic endoscopic management. Our study is a non-invasive study that can screen the patient for clinically significant oesophageal varices. This reduces the financial burden over the patients and reduces the cost of management of oesophageal varices. In a resource limited countries, we can apply this scoring system extensively. Enormous case-control research can be led for additional exploration analysis.

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