

Non invasive prediction of esophageal varices using right lobe of liver to albumin ratio

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Abstract

Studies have shown that biochemical, clinical and ultrasonographic parameters alone or together have good predictive power for non-invasively assessing the presence of esophageal varices. Here we studied the correlation of right liver lobe diameter to albumin ratio as a predictor of esophageal varices in 50 patients of cirrhosis admitted to medicine wards of tertiary teaching hospital. Considering the right liver lobe/albumin ratio cut-of value of 4.425 as suggested by Tamara Alempijevic *et al.*, our study yielded a sensitivity of 83.3% and specificity of 29.5%

Key Word: esophageal varices, Albumin.

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Received Date: 01/05/2015 Revised Date: 13/06/2015 Accepted Date: 16/07/2015

Access this article online

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Volume 5
Issue 3

INTRODUCTION

Many studies have shown that biochemical, clinical and ultrasonographic parameters alone or together have good predictive power for non-invasively assessing the presence of esophageal varices. Predicting the presence of oesophageal varices by non-invasive means increases compliance and would permit to restrict the performance of endoscopy to those patients with a high probability of having varices. Thrombocytopenia, splenomegaly and ascites are independent predictors of large oesophageal varices in cirrhotic patients^{1, 2}. The study suggest that endoscopy could be avoided safely in cirrhotic patients with none of these predictive factors, as large varices are absent in this group of patients. The study used right liver lobe/albumin ratio as a parameter linking hypoalbuminemia to right liver lobe size in order to introduce a variable that takes into consideration the decrease in albumin production to fibrosis of liver^{1, 2, and 3}.

MATERIALS AND METHODS

Total of 50 patients from those attending Medicine OPD and getting admitted in Medicine ward, KIMS hospital, Hubli, during the period of December 1st 2012 to November 30th 2013 were taken for study, considering the inclusion and exclusion criteria. The study was a cross sectional hospital based time bound study. Data was collected in standard format from inpatients of KIMS, Hubli admitted in Medicine wards. For each patient the following data were collected: Age, Sex, Etiology of cirrhosis, Right liver lobe diameter as measured on ultrasound in the mid clavicular line, Prothrombin Time, International Normalized Ratio, Platelet Count, Serum Albumin, Total Bilirubin, Child-Pugh score, presence of ascites by clinical examination and radiography, endoscopic findings.

The presence of varices and their size were obtained from endoscopy reports. The right liver lobe to albumin ratio was calculated for every patient using the serum albumin (in mg/dl) and right liver lobe diameter (in centimeters).

Inclusion Criteria

All patients aged 18 years and above diagnosed to have cirrhosis of liver admitted in Medicine wards, KIMS, Hubli.

Exclusion Criteria

Previous history of portal hypertensive bleeding, hepatocellular carcinoma, portal vein thrombosis, previous or current treatment with β blockers, diuretics or other vasoactive drugs. Budd Chiari Syndrome and other causes of noncirrhotic portal hypertension

Statistical Analysis of data

The continuous variable such as age was expressed in terms of average ± standard deviation. The statistical significance of an observation was determined by calculation of p value using chi-square test or Fisher’s exact test as relevant. The statistical analysis was done using SPSS 17.0 software. A p value of <0.05 was taken as statistically significant.

RESULTS

1) Age and Sex distribution of patients

Above table shows distribution of cases according to age group. Incidence of cirrhosis was maximum between 40-49 years followed by 30-39 years.

Table 1: Sex distribution of patients

Sex	No. of Patients	%
Male	44	88
Female	6	12
Total	50	100

Among the study population male patients accounted for 88% of the cases while females were 12%.

Table 2: Age distribution of patients

Age	No. of patients	%
20-29	4	8
30-39	13	26
40-49	21	42
50-59	6	12
>60	6	12
Total	50	100

Table 3: Distribution of cases according to the causes of cirrhosis

Cause	No. of patients	%
Alcoholic	43	86
Non-alcoholic	7	14
Total	50	100

Among the 50 study population alcohol was the cause for cirrhosis in 86% of the patients.

Table 4: Distribution of cases based on serum albumin

Serum albumin	No. of patients	%
<2.8 mg/ dl	34	68
2.8-3.5 mg/ dl	13	26
>3.5 mg/ dl	3	6
Total	50	100

Among the study population serum albumin was < 2.8 mg/dl in 68% of the patients.

Table 5: Distribution of cases based on the grade of esophageal varices

Variceal Grade	No. of patients	%
0	6	12
1	6	12
2	20	40
3	17	34
4	1	2
Total	50	100

Out of 50 patients studied 40% of the patients had grade 2 esophageal varices followed by grade 3 esophageal varices constituting for 34%.

Table 6: Comparison of baseline characteristics of patients studied based on presence and absence of varices

	Varices Present	Varices Absent	P value
Age in years	44.14 ± 10.44	37.17± 3.86	0.114
Hemoglobin g/dl	8.62 ± 2.49	9.18 ± 1.71	0.535
Total count /mm ³	9553.18 ± 4663.62	9750± 4630.22	0.932
Platelet / mm ³	120252.27 ± 57746.88	190833.33 ± 151014.45	0.032
Total proteins g/dl	5.99 ± 1.12	6.20 ± 0.58	0.657
Albumin g/dl	2.61 ± 0.61	2.68 ± 0.29	0.805
Globulin g/dl	3.32 ± 1.01	3.51 ± 0.53	0.654
Total bilirubin mg/dl	4.67 ± 6.07	3.43 ± 3.81	0.630
Direct bilirubin mg/dl	1.94 ± 2.72	1.51 ± 1.81	0.709
Indirect bilirubin mg/dl	2.72 ± 3.44	1.91 ± 2.00	0.578
SGOT IU/L	61.68 ± 45.32	39.33 ± 22.31	0.244
SGPT IU/L	40.93 ± 45.85	24.16 ± 7.78	0.380
ALP IU/L	110.52 ± 116.74	110.50 ± 52.84	1.000
PT seconds	19.07 ± 3.45	16.18 ± 2.88	0.05
INR	1.45 ± 0.47	1.20 ± 0.31	0.210
Right liver lobe size	12.85 ± 2.34	11.20 ± 2.20	0.109
Right liver lobe/ albumin ratio	5.06 ± 1.02	4.17 ± 0.72	0.046

Relationship between non invasive parameters like age, hemoglobin, total count, platelet, LFT, PT, INR and right liver lobe albumin ratio to the presence of esophageal varices were studied. Of these platelet, PT and right liver lobe albumin ratio had statistical significance (p < 0.05).

Table 7: Correlation of right lobe/ albumin ratio with grades of varices

Varices	Right lobe/ Albumin ratio Mean ± SD	Range
Grade 0	4.17 ± 0.72	3.33 – 5.20
Grade 1	4.14 ± 0.45	3.61 – 4.93
Grade 2	4.71 ± 0.73	3.50 – 5.99
Grade 3	5.75 ± 1.05	3.13 – 7.94
Grade 4	5.82	5.82

Grades of varices increases as the right liver lobe / albumin ration increases.

DISCUSSION

Incidence of esophageal varices in patients with liver cirrhosis is approximately 90%. Portal hypertension is an essential element of survival in cirrhotic patients. Therefore, regular control and evaluation of esophageal varices with timely introduction of nonselective beta-blockers and variceal ligation play an important role in prevention of bleeding^{4,5}. Endoscopy is an invasive and

costly diagnostic procedure. Therefore, introduction of non-invasive parameters for assessment of presence and size of esophageal varices is a major goal of numerous studies^{6, 7}. Platelet count and spleen size were the most frequently explored non-invasive parameters in recent studies. Potential explanations for this phenomenon are presence of antithrombocytic antibodies and thrombocyte associated immunoglobulin, which can be found in the sera of patients with liver diseases^{8, 9, 10, 14}. In this study we integrated two non-invasive parameters, right lobe of liver size and albumin into one ratio. We used serum albumin concentration as a parameter of liver function in combination with right liver lobe size. Our study sample consisted of 50 patients of whom 44 were males constituting 88% and 6 were females constituting 12%. The majority of the cirrhosis was noted among age group between 40 and 49 years constituting for 42% followed by 30 to 39 years. 68% of the patients had serum albumin <2.8 g/dl. Overall 94% of the patients had a serum albumin less than 3.5g/dl. The varices were graded according to the endoscopy findings. 88% of the patients had esophageal varices where 40% of them had grade 2 and 34% had grade 3 esophageal varices. The grades of varices increases as the right liver lobe/ albumin ratio increases. Considering the right liver lobe/albumin ratio cut-off value of 4.425 as suggested by Tamara Alempijevic *et al.*, our study yielded a sensitivity of 83.3% and specificity of 29.5%^{12,13,15}.

Comparison of studies of right liver lobe/albumin ratio

Study	Right liver lobe/albumin ratio cut off value	Sensitivity	Specificity
Tamara Present Study	4.425	83.1%	73.9%
Present Study	4.425	83.3%	29.5%

LIMITATIONS OF THE STUDY

Small sample size, Prospective studies could not be done to validate the role of predictive parameters, Inter-observer variation in the measurement of size of right lobe of liver.

CONCLUSION

In our study there was inverse relationship between esophageal varices and platelet count. Higher grades of esophageal varices was noted with lower platelet count and higher right liver lobe to albumin ratio. Right liver lobe albumin ratio can be used as a screening tool to diagnose the presence of esophageal varices. From our study we conclude that low platelet count and higher right liver lobe - albumin ratio predict higher grades of esophageal varices and hence, can identify subset of

patients who require prophylactic endoscopic management. Therefore, this reduces the economic burden on the patients and reduces the cost of management of esophageal varices.

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Source of Support: None Declared
Conflict of Interest: None Declared