Original Article

Comparison of various non invasive parameters for early prediction of esophageal varices

Uday Bande[1], Sanjay Raj[2*], Chandrashekar[3]

[1]Associate Professor, [2,3]PG Student, Department of Medicine, KIMS, Hubli, Karnataka, INDIA.
Email: sanjay.raj05@yahoo.in

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. Predicting the presence of oesophageal varices by non-invasive means might increase compliance and would permit to restrict the performance of endoscopy to those patients with a high probability of having varices10. Thrombocytopenia, splenomegaly and ascites are independent predictors of large oesophageal varices in cirrhotic patients1,2. The study suggests 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.
Keywords: esophageal varices.

[*]**Address for Correspondence:**
Dr. Sanjay Raj, PG Student, Department of Medicine, KIMS, Hubli, Karnataka, INDIA.
Email: sanjay.raj05@yahoo.in
Received Date: 12/03/2016 Revised Date: 20/04/2016 Accepted Date: 14/05/2016

Access this article online	
Quick Response Code:	Website: www.statperson.com
	DOI: 01 July 2016

INTRODUCTION

Incidence of esophageal varices in patients with liver cirrhosis is approximately 90%. 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. Platelet count is the most frequently explored non-invasive parameter studied[11]. Zaman[4] reported that patients with platelet counts of less than 88000/mm^3 have five times greater likelihood of having large esophageal or gastric varices as compared with the patients with higher platelet counts. Wong *et al*[5] identified correlation between presence of ascites, thrombocytopenia, hyperbilirubinemia and larger varices in the Chinese population. Similarly, Chalasani [6]. concluded that large esophageal varices are predictable in thrombocytopenic patients who have enlarged spleen, while platelet count of less than 88000/mm^3 indicates a higher risk for esophageal bleeding. The same study also demonstrated that endoscopy is incrementally cost-effective. Madthora[7] reported that platelet count less than 68000/mm^3 have a larger discriminatory value.

MATERIALS AND METHODS

This cross sectional hospital based time bound study was done on a total of 50 patients attending Medicine dept at a tertiary teaching hospital Hubli, during the period of December 2012 to November 2013. Patients were selected according to inclusion and exclusion criteria mentioned below. 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. The presence of varices and their size were obtained from endoscopy reports. Statistical significance was done 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.

Inclusion Criteria

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

How to site this article: Uday Bande, Sanjay Raj, Chandrashekar. Comparison of various non invasive parameters for early prediction of esophageal varices. *International Journal of Recent Trends in Science and Technology*. July 2016; 19(3): 340-342. http://www.statperson.com (accessed 02 July 2016).

Exclusion Criteria

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

RESULTS

Table 1: 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 2: Comparison of baseline characteristics of patients studied based on presence and absence of varices

	Varices Present	Varices Absent	pValue
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
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 count, PT and right liver lobe albumin ratio had statistical significance ($p < 0.05$).

Table 3: Correlation of platelet count with grade of varices

Platelet count	Grades of Varices					Total
	Nil	I	II	III	IV	
<=50000	0	0	1	1	0	2
50000-100000	3	1	8	11	1	24
100000-150000	0	2	5	4	0	11
>150000	3	3	6	1	0	13
Total	**6**	**6**	**20**	**17**	**1**	**50**

Platelet count had good predictive value in early detection of varices ($p = 0.032$)

Table 4: Correlation of ascites with grades of varices

ASCITES	Grades of Varices					Total
	Nil	I	II	III	IV	
None	1	0	6	2	1	10
Minimal	5	6	10	11	0	32
Severe	0	0	4	4	0	8
Total	**6**	**6**	**20**	**17**	**1**	**50**

Grades of varices are not significantly associated with ascites ($p= 0.466$)

Table 5: Correlation of serum albumin with grades of varices

Serum albumin	Grades of Varices					Total
	Nil	I	II	III	IV	
<2.8 mg/dl	5	4	13	12	0	34
2.8-3.5 mg/dl	1	2	4	5	1	13
>3.5 mg/dl	0	0	3	0	0	3
Total	**6**	**6**	**20**	**17**	**1**	**50**

Grades of varices are not statistically associated with serum albumin ($p =0.413$)

Table 6: 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

Splenomegaly and hypersplenism are prevalent in patients with liver cirrhosis and portal hypertension. Thrombocytopenia is a common and highly specific manifestation of hypersplenism, but with low sensitivity for presence of portal hypertension. It is suggested that the main mechanism of thrombocytopenia is splenic sequestration and pooling. Madthora[7] and co-authors reported that 32% of patients had platelet count less than 68000/mm^3 without detectable splenomegaly, which might be explained by insufficient synthesis of thrombopoietin. It is also indicated that platelet count and thrombopoietin level are returning to reference values following liver transplantation. Other 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. 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. The youngest in the study group was 25 years and the oldest was 64 years. In our study majority of the patients presented with hematemesis constituting for 42% followed by abdominal distension 36%. Other symptoms were easy fatiguability, jaundice and altered sensorium. The majority of the cirrhosis was due to alcoholism in 86% of the patients while non- alcoholism constituted only 14 %. The clinical findings noted in the study population were pallor in 82%, ascites in 80%, icterus in 60% and pedal edema in 56%. Ascites was determined clinically and radiologically and it was graded into minmal and severe. While minimal ascites was noted in 64% of the patients, no ascites was seen in 20% and severe ascites in 16%.

Hepatic encephalopathy was noted in 8% of the patients while 92% had no features of hepatic encephalopathy.

The majority of patients belonged to the platelet group of 50000 to 100000/ cu mm constituting 48%. Overall 74% of the patients had a platelet count less than 150000/ cu mm. 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. On comparison of baseline characteristics of patients studied based on the presence or absence of varices, the 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. Out of all parameters studied -- Platelet count, Prothrombin Time and Right liver lobe albumin ratio had statistical significance ($p< 0.05$). Of the expected parameters -- Serum Albumin, Ascitis, Bilirubin levels failed to show statistical significance ($p>0.05$).

CONCLUSION

In our study there was inverse relationship between esophageal varices and platelet count. A higher grade of esophageal varices was noted in patients with lower platelet count and higher right liver lobe to albumin ratio. Considering the right liver lobe/albumin ratio cut-of value of 4.425 as suggested by Tamara *et al* [8, 9], our study yielded a sensitivity of 83.3% and specificity of 29.5%. From our study we conclude that low platelet count, prothrombin time 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[3, 8].

LIMITATIONS 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.

REFERENCES

1. De Francis R, Primignani M. Natural history of portal hypertension in patients with cirrhosis. Clin. Liver Disease 2001; 5: 645-63.
2. M. Merli, G. Nicolini, S. Angeloni et al., "Incidence and natural history of small esophageal varices in cirrhotic patients," Journal of Hepatology. 2003; 38(3): 266-272.
3. J. Bosch and J.C. Garcia-Pagan, "Prevention of variceal rebleeding," The Lancet. 2003; 361: 9361: 952-954.
4. Zaman A, Hapke R, Flora K et al. Factors predicting the presence of esophageal or gastric varices in patients with advanced liver disease. Am J. Gastroenterol 1999; 94:3292-3296.
5. Wong SY, Loo CK et al. Prediction of esophagogastricvarices in patients with liver cirrhosis. J GastroenterolHepatol 1999:14:785-790.
6. Chalasani N, Imperiale TF, Ismail A, et al. Predictors of large esophageal varices in patients with cirrhosis. Am. J. Gastroenterol. 1999:94:3285-91.69.
7. Madhotra R, Mulcahy HE, Willner I et al. Prediction of esophageal varices in patients with cirrhosis. J ClinGastroenterol 2002:34:81-85.
8. Alempijevic T, Bulat V, Djuranovic S, Kovacevic N, Jesic R, Tomic D, Krstic S, Krstic M. Right liver lobe/albumin ratio: contribution to non-invasive assessment of portal hypertension. World J Gastroenterol. 2007 Oct 28; 13 (40):5331-5.
9. Alepijevic T and Kovacevic N.Right liver lobe diameter:albumin ratio: a new non-invasive parameter for prediction of oesophageal varices in patients with liver cirrhosis (preliminary report).Gut. 2007 August; 56 (8): 1166–1167.
10. Kara Rye, Robert Scott, Gerri Mortimore, Adam Lawson, Andrew Austin, and Jan Freeman. Towards noninvasive detection of oesophageal varices. International Journal of Hepatology Volume 2012, Article ID 343591, 9 pages doi:10.1155/2012/343591.
11. Dr. Hala Abd Et al. Cytopenia as A Predictor Of Oesophageal Varices In Patients With Liver Cirrhosis.Report and Opinion 2010 2 (7).

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