PREDICTORS OF ESOPHAGEAL VARICES IN PATIENTS OF LIVER CIRRHOSIS

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ABSTRACT

Objective: *To identify non-endoscopic predictors of esophageal varices in patients with liver cirrhosis.*

Material and Methods: *This observational and analytical study was carried at GI and Liver Clinic, Saeed Anwar Medical Center, Dabgari Gardens, Peshawar from January 2006 to August 2006. Seventy-three patients with established cirrhosis and no history of variceal bleeding were evaluated for predetermined variables and underwent endoscopy to look for esophageal varices.*

Results: *Out of 73 patients, 51 (69.9%) were males and 22 (30.1%) were females. Forty-four (60.3%) patients were having esophageal varices on endoscopy and 29 (39.7%) patients were having no varices. Out of 44 patients, small varices were found in 28 (63.6%) patients while large varices were found in 16 (36.4%) patients. Platelet count < 65 x 103/µL, serum albumin < 2.2 g/dl and portal vein diameter > 13 mm on ultrasound were found to have significant predictive value for large varices.*

Conclusion: *Platelet count less than 65 x 103/µL, serum albumin less than 2.2 g/dl and portal vein diameter more than 13 mm on ultrasound are independent and significant predictors of esophageal varices on endoscopy. Therefore screening endoscopy must be done in all patients with liver cirrhosis who have no history of GI bleeding but any of these predictors.*

Key words: *Cirrhosis, Esophageal varices, Platelet count, Serum albumin, Portal vein diameter.*

INTRODUCTION

Gastroesophageal variceal bleeding is a major complication of portal hypertension resulting from cirrhosis. It occurs in 25 to 35 percent of patients with cirrhosis and accounts for 80 to 90 percent bleeding episodes in these patients.[1-3] Variceal bleeding is associated with more substantial morbidity and mortality than other causes of gastrointestinal bleeding, as well as higher economical burden.[4-6] Up to 30 percent of initial bleeding episodes are fatal and as many as 70 percent of survivors have recurrent bleeding within one year.[1,7] Therefore, one-year survival rate after variceal bleeding is poor ranging from 32 to 80 percent.[7,8]

Once esophageal varices have been identified in a patient with cirrhosis, the risk of variceal bleeding is 25 to 35 percent.[1,9-11] Because of the poor outcome of variceal bleeding, the identification of those at high risk and prevention of a first bleeding episode are of critical importance. Screening endoscopy is generally recommended for patients with cirrhosis to determine whether large varices are present[12] The use of clinical features, such as increased INR, low serum albumin, a low platelet count, increased portal vein diameter, may help physicians to predict which patients are likely to have large varices.[13-15]

Our healthcare system lacks endoscopic facilities in all hospitals, even including most of the tertiary care hospitals; therefore, the approach that all cirrhotic patients should be screened for the presence of esophageal varices when liver cirrhosis is diagnosed[12], has this limitation of lack of facility of upper GI endoscopy. Shahid et al[15] concluded in their study that patients with serum albumin < 2.95 g/dl, platelet count < 88 x 10^3 /µL and portal vein diameter > 11 mm are more likely to have high grade varices and are the candidates for surveillance endoscopy. We wanted to look for similar non-invasive predictors of esophageal varices in our patients of liver cirrhosis, so that we

COMPARISON OF TWO GROUPS OF PATIENTS

Variable	Group-I (n=44)	Group-II (n=29)	P-value
Age (years)	55.46 ± 8.66	50.22 ± 10.23	> 0.05
Child score	09.34 ± 2.10	05.12 ± 3.46	< 0.05
Serum Albumin (g/dl)	01.98 ± 1.02	02.64 ± 1.07	< 0.05
Platelet count (x 10^3/µL)	68 ± 55.02	98 ± 80.08	< 0.05
Prothrombin time (Sec)	22 ± 5.2	16 ± 6.6	< 0.05
Portal vein diameter (mm)	13.29 ± 2.13	10.17 ± 3.44	< 0.05
Size of spleen (cm)	15.33 ± 1.33	14.79 ± 2.11	> 0.05

Mean ± SD

Table 1

can select the patients for upper GI endoscopy with confidence of not missing those at risk of bleeding.

MATERIAL AND METHODS

This study was carried at GI and Liver Clinic, Saeed Anwar Medical Center, Dabgari Gardens, Peshawar from January 2006 to August 2006. Patients with liver cirrhosis with no history of upper or lower GI bleeding in past were included in the study. Diagnosis of liver cirrhosis was based on combination of:

1) physical findings when present i.e. clubbing, palmar erythema, spider nevi, gynaecomastia, splenomegaly or ascites,
2) impaired liver function tests i.e. deranged clotting profile and low serum albumin, and
3) irregular liver surface detected on ultrasound and ratio of transverse caudate lobe to transverse right lobe width > 0.65.[16]

Following patients were excluded from the study:

i) unstable patients,
ii) patients on treatment for primary prophylaxis,
iii) patients who had already undergone sclerotherapy or band ligation.

The parameters looked for in each patient along with upper GI endoscopy were;

Age, Child score, Serum albumin, Platelet count,

Prothrombin time, Portal vein diameter, Size of spleen,

All patients were classified according to Child-Pugh's criteria.[17,18] Upper GI endoscopy was done in each patient to look for the presence and degree of esophageal varices by a single endoscopist i.e. the principal author. Esophageal varices were classified as follows:

- **Small esophageal varices** those which minimally protrude into esophageal lumen and flatten with air insufflation
- **Large esophageal varices** those which protrude into esophageal lumen and touch each other (presence of confluence) or fill at least 50% of the esophageal lumen

Statistical Analysis: Results were expressed as mean ± SD. Data was analyzed using student's t-test and chi-square (?^{2}) test. P-value of less than 0.05 was considered significant.

RESULTS

Seventy-three patients were evaluated in the study, out of whom 51 (69.9%) were males and 22 (30.1%) were females with male to female ratio 2.3:1. Forty-four (60.3%) patients were having esophageal varices on endoscopy (group-I) and 29 (39.7%) patients were having no varices (group-II). Out of 44 patients, *small varices* were found in 28 (63.6%) while *large varices* were found in 16 (36.4%). Mean values of different variables as compared between two groups are given in Table-1. Linear correlation revealed significant correlation between the presence of varices and Child score, serum albumin, platelet count, and

COMPARISON OF OUT COME MEASURES BETWEEN TWO GROUPS

Variables	Group-I (n=44)	Group-II (n=29)	Sensitivity (%)	Sensitivity (%)	PPV (%)	NPV (%)	OR
Platelet count < 65 x 10^3/µL	32	5	72.72	82.79	86.49	88.89	12.80
Serum albumin < 2.2 g/dl	30	6	68.18	79.31	83.33	81.08	8.21
Portal vein diameter > 13 mm	34	4	77.27	86.21	89.47	97.14	21.25

PPV= positive predictive value, NPV=negative predictive value, OR=odds ratio

Table 2

portal vein diameter. Threshold of different variables for the best comprise sensitivity-specificity was determined using ROC (Receiver Operating Characteristics) curve.[19] Cutoff values of 65 x 10^3/µL for platelet count, 2.2 g/dl for serum albumin and 13 mm for portal vein diameter were identified as significant predictors of esophageal varices on endoscopy, as shown in Table-2.

DISCUSSION

Non-endoscopic prediction of esophageal varices in patients with liver cirrhosis is of great significance. Many studies have evaluated different clinical, laboratory and imaging factors that may predict the presence of varices. We found platelet count, serum albumin and diameter of portal vein to be reliable predictors of the presence of esophageal varices. Child score and prothrombin time were also associated with likelihood of presence of esophageal varices. Cutoff values of 65 x 10^3/µL for platelet count, 2.2 g/dl for serum albumin and 13 mm for portal vein diameter were identified as significant predictors of esophageal varices on endoscopy. Low platelet count has been found in many studies to be associated with the presence of esophageal varices.[15,20-25] Sarwar et al[15], Chalasani et al[20] and Zaman et al[21] found cutoff value of < 88 x 10^3/µL for platelets to be independent risk factors for the presence of large esophageal varices. Schepis et al[24] found platelets < 88 x 10^3/µL to be a significant predictor whereas Gill et al[26] reported platelets < 140 x 10^3/µL and Zein et al[25] platelets < 150 x 10^3/µL to be associated with esophageal varices. Splenic sequestration and antibody-mediated destruction of platelets has been thought to be the cause of thrombocytopenia in patients with cirrhosis.[27] Platelets < 88 x 10^3/µL is the lowest and mostly reported as cutoff value.[15,20,21] In our series the cutoff value for platelets was less than 65 x 10^3/µL. The reason for this may be that splenomegaly (Table-1) was a consistent finding in our patients and hypersplenism may be a contributing factor for this low cutoff value in our series.

Low serum albumin is another predictor that has been found to be associated with the presence of esophageal varices.[15, 24] Sarwar et al[15] and Schepis et al[24] found cutoff value of < 2.95 g/dl to be independent risk factors for the presence of esophageal varices. Low serum albumin is indicator of deranged hepatic function. The degree of hepatic dysfunction is likely to affects the development of portal hypertension via humoral factors and thus the development of varices. In our series the cutoff value for albumin was less than 2.2 g/dl. The reason for this may be that most of our patients were in Child class C (Table-1).

Portal vein diameter is a consistent and significant another predictor of esophageal varices.[15,20-28] Most of the studies have reported portal vein diameter of > 11 mm to be a significant cutoff value. Schepis et al[24] and Gill et al[26] reported 13 mm to be significant cutoff value for the portal vein as in our series. Width of portal vein on ultrasound is an indirect indicator of portal pressure which is responsible for development of varices.

In view of the fact that variceal bleeding occurs in 25 to 35 percent of patients with cirrhosis and accounts for 80 to 90 percent bleeding episodes in these patients.[1-3] Variceal bleeding is associated with more substantial morbidity and mortality than other causes of gastrointestinal bleeding, as well as higher economical burden.[4-6] Up to 30 percent of initial bleeding episodes are fatal and as many as 70 percent of survivors have recurrent bleeding within one year.[1,7] Therefore, screening endoscopy is of significant importance to detect the patients with varices and give them treatment for primary prophylaxis of variceal bleeding. Repeat endoscopy is recommended at 2-3 years interval in patients without varices and at 1-2 years interval in patients with small varices to evaluate the development of progression of varices.[29]

CONCLUSION

Platelet count less than 65 x 10^3/µL, serum albumin less than 2.2 g/dl and portal vein diameter more than 13 mm on ultrasound are independent and significant predictors of esophageal varices on endoscopy. Therefore screening endoscopy must be done in all the patients with liver cirrhosis who have no history of GI bleeding but any of these predictors.

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