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Original Research Article

Non endoscopic predictor of esophageal varices in patients with cirrhosis of liver from tertiary care hospital

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ABSTRACT

Background: With the rising mortality rate, worldwide liver cirrhosis has been ranked as the 13th leading cause of mortality. Portal hypertension is one of the common consequences of liver cirrhosis. Further, portal hypertension has its own complications and the most serious among them is the risk of development of esophageal varices (EV) caused by increased hepatic vascular resistance related to hepatic fibrosis and regenerative nodules.

Aim: To identify the non-endoscopic predictor of esophageal varices in patients with liver cirrhosis in a tertiary care hospital

Materials and Methods: A prospective study was carried out at the tertiary care hospital of Dr. PDMMC, Amravati between the period September 2018 to March 2020. One hundred patients diagnosed with liver cirrhosis were taken for the study. The patients were selected based on the clinical, the radiological and historical data.

Results: The patients were divided into two groups, namely the small size of varices group where n=71 and large size of varices group where n=29. Factors such as platelet count, serum albumin, spleen (cm), PV (mm), platelet count and child-pugh classification were considered important as their p values were less than 0.05.

Conclusion: The platelet count and the spleen size showed the difference among the patients belonging to small varices and larger varices group, respectively. Ascites was noted in 90% of the cases. 65% of the patients suffered from portal gastropathy and esophageal varices.

1. Introduction

With the rising mortality rate, worldwide liver cirrhosis has been ranked as the 13^{th} leading cause of mortality around the globe.[1] Portal hypertension is one of the common consequences showing the progression of liver cirrhosis. Further, portal hypertension has its own complications and the most serious among them is the risk of development of esophageal varices (EV) caused by increased hepatic vascular resistance related to hepatic fibrosis and regenerative nodules. Additionally, variceal bleeding resulting due to the rupture of varices is also an alarming complication arising due to liver cirrhosis.[2] Other complications indicating the development of liver cirrhosis are ascites, hepatic encephalopathy, and oesophagogastric varices etc. It has been observed that almost 80% of the patients suffering from cirrhosis suffer from esophageal varices (EV).[3] In the recent years various non-invasive methods such as end-stage liver disease (MELD), aspartate aminotransferase (AST) to alanine aminotransferase (ALT) ratio (AST/ALT), AST to platelet ratio index (APRI), platelet count to spleen diameter (PC/SD), fibrosis-4-index (FIB-4), fibrosis index (FI) and King's score, have been invented as the easier practical alternative to predict the

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presence of EV in cirrhotic patients.[4] Furthermore, in addition to these methods, various factors are also taken into consideration for the identification of esophageal varices or for suggesting the risk of variceal bleeding in patients with cirrhosis. The factors include spleen length, portal vein diameter, Child-Pugh score, platelet count, prothrombin time, or a combination of multiple indexes, as well as ultrasonographic (US) elastography.[5] Therefore, the focus of the study is to find out various techniques other than endoscopy to identify esophageal varices in the patients suffering from liver cirrhosis.

2. Aim

To identify the non-endoscopic predictor of esophageal varices in patients with liver cirrhosis in a tertiary care hospital.

3. Materials and Methods

A prospective study was carried out at the tertiary care hospital of Dr. PDMMC, Amravati between the period September 2018 to March 2020. Institutional ethical committee permission was taken before the start of study. One hundred patients diagnosed with liver cirrhosis were taken for the course of the study. The patients were selected based on the clinical data, the radiological profile and historical data of all the patients. Written consent was taken from the patients. The patients having previous history of upper gastrointestinal hemorrhage, undergoing beta-blockers or nitrates therapy, current or past history of treatment for chronic B or C hepatitis, previous portosystemic shunt, presence of gastric varices at endoscopy, history of gastrointestinal surgery and/or gastrointestinal malignancies including hepatocellular carcinoma, thrombosis of portal or splenic vein, current or previous history of lympho-proliferative diseases and severe diseases of other organs or infections that could affect liver or spleen size were exclude from the study. There is a risk that these factors might alter the haematological and biochemical parameters. All patient were subjected to the following tests: Hemogram with thin peripheral smear and ESR, RBC indices, prothrombin time and INR, serum bilirubin, alkaline phosphate (ALKP), alanine transaminase (ALT), aspartate transaminase (AST), total serum proteins, albumin and globulin levels, serum electrolytes and blood urea, serum creatinine, random blood sugar, ascitic fluid analysis, HbsAg, chest X-ray and abdominal ultrasonography and portal vein Doppler and barium swallow, upper gastrointestinal endoscopic examination and percutaneous liver biopsy. Esophageal varices are graded as follows:

1. Grade 0: No varices
2. Grade 1: Varices small and straight
3. Grade 2: Varices obliterating less than one-third of esophageal lumen
4. Grade 3: Varices obliterating more than one-third of the esophageal lumen.

4. Results

In the present study we have studied total 100 patients of liver cirrhosis, ascites was noted in 90% of the cases, 65% of the patients suffered from portal gastropathy along with the presence of esophageal varices. 98% of the patients were classified under either Child-pugh class A or B, the following results were obtained during the course of the study.

These 100 cirrhosis patients were divided into two groups, i.e. the size of varices small group and size of varices large group. There were 71 patients in size of varices small group and 29 patients in size of varices large group. Important observations and results are presented in table 1. The mean age of the study participants was found to be 46.89±10.80 years in the size of varices small group while it was 44.76±10.23 years in size of varices large group and there was no significant difference between the two groups for mean age. Spleen was non palpable in 30 (42.25%) patients in small varices group and it was non palpable in 4 (13.79%) patients from large varices group and this difference was found to be significant (p=0.006). So in significant proportion of small varices group patient's spleen was nonpalpable as compared to large varices group. There was grade I splenomegaly in 18 (25.35%) patients from small varices group and 7 (24.14%) patients from large varices group but there was no significant difference between the two (p=0.90). We have also noted grade II splenomegaly among 23 (32.39%) patients of small varices group and among 18 (62.07%) patients of large varices group with significant difference between the two (p=0.006). So grade II splenomegaly was significantly more among large varices group as compared to small varices group. Mean platelet count was significantly decreased i.e. large varices group in which it was 114.76±42.96 X 10^3cells per ul of blood as compared to small varices group i.e. 153.89±100.78 X 10^3cells per ul of blood (p=0.04). Mean serum albumin level was significantly reduced in large varices group i.e. 2.50±0.48 mg/dl as compared to small varices group i.e. 3.28±0.70 mg/dl (p=0.002). We observed that average spleen size (15.18±1.57 cm) was significantly more in large varices group than the small varices group (14.10±1.30 cm). Mean portal vein diameter was 12.88±1.80 and 14.80±1.68 mm respectively in small and large varices group which differed significantly. Also mean splenic diameter was 14.10±1.30 and 15.18±1.57 mm respectively in small and large varices group which differed significantly. Child-pugh classification differed significantly between size of varices small group and size of varices large group as their p values were less than 0.05. This showed

Table 1: Characteristics of study participants according to size of varices groups.

Characteristics	Size of varices small (n=71)	Size of varices large (n=29)	P value
Mean age	46.89±10.80 years	44.76±10.23 years	0.06
Spleen			
• Non-palpable	30 (42.25%)	4 (13.79%)	**0.006**
• Grade I	18 (25.35%)	7 (24.14%)	0.90
• Grade II	23 (32.39%)	18 (62.07%)	**0.006**
Platelet count (cells*10^3/ul)	153.89±100.78	114.76±42.96	**0.040**
Serum albumin (mg/dl)	3.28±0.70	2.50±0.48	**0.002**
Spleen size (cm)	14.10±1.30	15.18±1.57	**0.005**
Portal Vein diameter (mm)	12.88±1.80	14.80±1.68	**0.000**
spleen diameter (mm)	760.78±290.5	1070.15±598.68	**0.005**
Child-Pugh classification			
• A	4	1	
• B	36	8	**0.004**
• C	31	20	

that these factors were statistically significant predictors of esophageal varices and could differentiate between the small and large varices.

5. Discussion

The mean age of the study participants was found to be 46.89±10.80 years in the size of varices small group while it was 44.76±10.23 years in size of varices large group and there was no significant difference between the two groups for mean age. This finding is in line with Akande KO et al.[6] In the current study, USG parameters like spleen size, portal vein diameter (mm) and platelet count are important predictors of esophageal varicess. In majority of the small varices cases spleen was non palpable while in most of the large varices cases there was grade II splenomegaly. In large varices group platelet count and serum albumin level were markedly reduced. Mean portal vein diameter was 12.88±1.80 and 14.80±1.68 mm respectively in small and large varices group. The results are in accordance with that of Hong et al. (2009),[7] Sarwar S et al[8] and Gentile I et al[9] who reported that Serum albumin less than 2.95 g/dl, platelet count less than 88 x 103/muL and portal vein diameter more than 11 mm were associated with presence of varices. Thomopoulos KC et al[10] aslo reported that factors independently associated with the presence of large oesophageal varices on multivariate analysis were thrombocytopenia, splenomegaly and presence of ascites by ultrasound. The spleen size was the most significant predictor and non-endoscopic method for identifying the size of varices. Also platelet count differences were significant on univariate analysis. Similar observations were made by Giannini et al. (2006)[11] that suggested the role of platelet count and spleen size ratio as a major predictor of varices. Akande KO et al[6] in their study concluded that platelet count has the best sensitivity for predicting the size of varices. Cherian JV et al[12] concluded that for the presence of large esophageal varices, low platelet count, Child Pugh class B/C and spleen diameter were the independent risk factors. Chang MH et al[13] reported that variables associated with the presence of large esophageal varices on univariate analysis were the presence of ascites, splenomegaly, alcoholism, Child-Pugh class, platelet count, prothrombin time, and albumin. On multivariate analysis, alcohol, splenomegaly, and ascites were significantly associated with the presence of large esophageal varices. According to Alam R et al[14] thrombocytopenia and splenomegaly were the two most important non endoscopic predictors of presence of varices. Similar results were found in the study conducted by Manohar et al. (2014)[15] where it was concluded that a combination of two or more non-endoscopic parameters might provide better diagnostic accuracy.

6. Conclusion

It was observed that non-endoscopic factors like splenomegaly, decreased platelet count, hypoalbunemia, mean portal vein diameter and mean splenic diameter, Child-Pugh score or a combination of multiple indexes, as well as ultrasonographic (US) elastography proved to be the more accurate non-endoscopic predictors of esophageal varices and can also differentiate between the variceal size.

7. Source of Funding

None.

8. Conflict of Interest

None.

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