Evaluation of Non-endoscopic Parameters for the Detection of Esophageal Varices in Patients of Liver Cirrhosis, Confirmed by Endoscopy

Kuldeep Barnwal¹, Suryakiran Kartikeyan Malik², Mukti Bhatnagar³, Rishabh Kapoor⁴, Akshita Gupta⁵, Arpit Saini⁶

ABSTRACT

Introduction: Esophageal varices are generally the most common clinical manifestation of portal hypertension in Patients of liver cirrhosis. Most common causes of death in liver cirrhosis are hemorrhage from esophageal varices. The present study has been carried out to identify clinical, biochemical and ultrasonographic parameters which might non-invasively predict the existence and the risk of variceal bleed.

Material and Methods: The present prospective observational study was conducted in 2 years among 100 patients suffering from liver cirrhosis above 18 years of age. Detailed history, clinical examination, investigations to fulfill the inclusion and exclusion criteria of all patients was taken. Different non endoscopic parameters were taken Platelet count, Coagulation profile, Ultrasonography whole abdomen, Child-Pugh-Torccote (CPT) Score, AST to platelet ratio index (APRI) for the detection of esophageal varices and its grading in liver cirrhosis patients which was confirmed by endoscopy.

Results: There was significant association of presence of esophageal varices in liver cirrhosis patients with presence of icterus, presence of ascites, presence of splenomegaly, grade of Child Pugh Score, AST to Platelet rationdex (APRI score) Prothrombin Time and International Normalized Ratio(PT/INR), mean TB (mg/dl), mean spleen size.

Conclusions: The result of present study concluded that some parameters are strongly associated with grades of varices and could be useful for early detection and subsequent management of varices.

Keywords: Esophageal Varices, Liver Cirrhosis, Non Endoscopic Parameters, Child Pugh Score

INTRODUCTION

Cirrhosis is the end stage of every chronic liver disease, resulting in formation of fibrous tissue, disorganization of liver architecture, and nodule formation, which interferes with liver function and results in portal hypertension. Portal hypertension is associated with development of a hyperdynamic circulation and complications such as ascites, hepatic encephalopathy, and oesophago-gastric varices.¹ Despite improvement in diagnosis and therapy, mortality from acute variceal bleeding may still reach up to 20%.²-⁵ The grade of esophageal varices often correlates with the severity of liver disease. While approximately 85% of individuals with Child Pugh C cirrhosis have varices, they are present in only 45% those with Child-Pugh A cirrhosis.⁶ The rate of development of new varices and increase in grades of varices is 8% per year; the former is largely predicted by a hepatic venous pressure gradient (HVPG) exceeding 10 mm Hg and the latter by the presence of decompensated cirrhosis, alcohol etiology and red flag signs.⁷,⁸,¹⁰ Large size varices, the presence of red flag signs, severe liver disease and portal pressure greater than 12 mm Hg predict greater risk of bleeding.⁹,¹⁰ Mortality rate of an episode of esophageal varical bleeding is approximately 20% at six weeks.¹¹ The most reliable and accurate method to detect the presence of large esophageal varices is an upper gastrointestinal endoscopy.²,⁸,¹⁰,¹¹ It is now recommended that all patients with established cirrhosis should be screened by upper gastrointestinal endoscopy for the presence of varices at the time of diagnosis.¹⁰,¹² Certain clinical, biochemical and ultrasonographic parameters either singly or in combination have good predictive power for non-invasively assessing the risk of bleeding from varices.¹¹,¹³ However, the factors that predict the presence of varices are not as well defined. Hence the present study was conducted to assess non-endoscopic parameters for the detection of esophageal varices in patients of liver cirrhosis, confirmed by endoscopy.

MATERIAL AND METHODS

A study of 100 patients suffering from liver cirrhosis admitted

¹Post Graduate Student, PG Department of Medicine, Subharti Medical College, Swami Vivekanand Subharti University, Meerut, ²Assistant Professor, Department of Medicine, Subharti Medical College, Swami Vivekanand Subharti University, Meerut, ³Professor, Department of Medicine, Subharti Medical College, Meerut, ⁴Post Graduate Student, PG Department of Medicine, Subharti Medical College, Swami Vivekanand Subharti University, Meerut, ⁵Post Graduate Student, PG Department of Medicine, Subharti Medical College, Swami Vivekanand Subharti University, Meerut, ⁶Post Graduate Student, PG Department of Medicine, Subharti Medical College, Swami Vivekanand Subharti University, Meerut, India

Corresponding author: Dr. Kuldeep Barnwal, Gohain Boys Hostel, Room No. 304, Subhartipuram, Meerut, India

How to cite this article: Kuldeep Barnwal, Suryakiran Kartikeyan Malik, Mukti Bhatnagar, Rishabh Kapoor, Akshita Gupta, Arpit Saini. Evaluation of non-endoscopic parameters for the detection of esophageal varices in patients of liver cirrhosis, confirmed by endoscopy. International Journal of Contemporary Medical Research 2020;7(2):B1-B4.

DOI: http://dx.doi.org/10.21276/ijcmr.2020.7.2.2
in Chhatrapati Shivaji Subharti hospital after obtaining written informed consent from parents and approval from Institutional Ethical Committee. Detailed history, clinical examination, investigations to fulfill the inclusion and exclusion criteria of all patients were taken.

**Inclusion criteria**
- All patients above 18yrs of age.
- All patients suffering from liver cirrhosis.

**Exclusion criteria**
- Hepatocellular carcinoma patients
- Thrombocytosis or thrombocytpenia due to other cause
- Chronic kidney disease
- Any other disorder deranging the coagulation profile
- Myocardial infarction
- Septicemia
- Previous sclerotherapy /banding for oesophageal varices
- Patients below 18years
- Patient not giving consent

History included details and duration of jaundice, ascites, pedal oedema, gastrointestinal bleed, presence or absence of splenomegaly and hepatic encephalopathy. Non-invasive parameters for oesophageal varices included platelet count, coagulation profile and ultrasonography of whole abdomen.

**STATISTICAL ANALYSIS**
Data entry, data cleaning & data analyses was done by Statistical Package for Social Sciences (version 20.0; SPSS). Output indicators were analysed through the software and results were subsequently presented in form of tables & graph. The p-value of <0.05 was considered statistically significant.

**RESULTS**
Out of the total study participants, in majority disorientation due to hepatic encephalopathy was present (65%) and in the remaining, it was absent (35%) (graph 1). Out of the total study participants, majority had a CPS grade C (55.0%); 34% had grade A and only a small proportion had grade B (11.0%) as shown in table 1.

Out of the total study participants, grade 0 varices was present in 28%; grade 1 in 10%; grade 2 in 7% and grade 3 in more than half (55%) of the study participants (table 2).

There was no significant association between presence of disorientation due to hepatic encephalopathy and the

| Grade of CPS | N (%) |
|--------------|-------|
| A            | 34 (34.0) |
| B            | 11 (11.0) |
| C            | 55 (55.0) |

**Table-1:** Distribution of the study participants by grade of CPS

| Grade of esophageal varices | N (%) |
|-----------------------------|-------|
| 0                           | 28 (28.0) |
| 1                           | 10 (10.0) |
| 2                           | 7 (7.0) |
| 3                           | 55 (55.0) |

**Table-2:** Distribution of the study participants by grade of esophageal varices on endoscopy

| Parameters                             | Grade of varices N (%) | P-value |
|----------------------------------------|------------------------|---------|
| Hepatic encephalopathy                  |                        |         |
| Present                                | 22 (34.4)               | 7 (10.9) | 6 (9.4) | 29 (45.3) | 0.082 |
| Absent                                 | 6 (16.7)                | 3 (8.3)  | 2 (5.5) | 25 (69.4) |
| Ascites                                |                        |         |         |           |       |
| Present                                | 7 (10.9)                | 4 (6.3)  | 2 (3.1) | 51 (79.7) | 0.0001* |
| Absent                                 | 21 (58.3)               | 6 (16.7) | 5 (13.9) | 4 (11.1)  |

*: Statistically significant

**Table-3:** Association between presence of hepatic encephalopathy and grade of esophageal varices

| Grade of CPS | Grade of varices N (%) | P-value |
|--------------|------------------------|---------|
| A            |                        |         |
| B            |                        |         |
| C            |                        |         |

| Grade | Mean APRI | P-value |
|-------|-----------|---------|
| Grade 0 | 0.23     |         |
| Grade 1 | 0.47     |         |
| Grade 2 | 1.39     |         |
| Grade 3 | 2.12     | 0.03*   |

*: Statistically significant

**Table-5:** Association between mean APRI score and grade of esophageal varices
Esophageal varices are extremely dilated sub-mucosal veins in the lower third of the esophagus.\textsuperscript{14,15} They are most often a consequence of portal hypertension, commonly due to cirrhosis; people with esophageal varices have a strong tendency to develop severe bleeding which left untreated can be fatal.\textsuperscript{15,16} Esophageal varices are typically diagnosed through an esophagogastroduodenoscopy.

**Key findings of the current study**
1. There was significant association between presence of ascites and the grades of oesophageal varices (P=0.0001).
2. There was significant association between presence of splenomegaly and the grades of oesophageal varices (P=0.001).
3. There was significant association between grade of CPS and the grades of oesophageal varices (P=0.001).
4. There was significant association between APRI score and the grades of oesophageal varices (P=0.03).
5. There was significant association between Prothrombin time and international normalized ratio (INR) and the grades of oesophageal varices (P=0.001).
6. There was significant association between mean spleen size and the grades of oesophageal varices (P<0.0001).

Cherain JV et al\textsuperscript{17} found low platelet count, Child Pugh class B/C, spleen diameter and portal vein diameter as independent predictors for the presence of varices. Chang MH et al\textsuperscript{18} reported that the variables associated with the presence of large esophageal varices were the presence of ascites, splenomegaly, Child-Pugh class, platelet count, prothrombin time, and albumin. Singh M et al\textsuperscript{19} revealed that patients in varices group had a lower mean platelet count, higher mean bilirubin levels, higher mean spleen diameter and higher mean portal vein diameter.

Nashaat EH et al\textsuperscript{20} showed that OV grade had a significant inverse correlation with WBCs count, Platelets count as well as Platelet count/Splenic diameter ratio and a positive significant correlation with Mean splenic bipolar diameter (MSBD), Child Pugh’s classification grade. Prihatini J et al\textsuperscript{21} found that platelet count, portal vein diameter and spleen size were predictive factors for esophageal varices in liver cirrhosis. Thomopoulos KC et al\textsuperscript{22} reported that variables associated with the presence of large oesophageal varices were the presence of ascites and splenomegaly either by clinical examination or by ultrasound, the presence of spiders, platelet count and bilirubin.

**CONCLUSION**

The most accurate method for evaluating the presence and severity of esophageal varices is endoscopy which is an invasive procedure and is costly and not available in all centers. Several alternative noninvasive techniques have been proposed to assess portal hypertension and varices, including serum biomarkers and imaging techniques. We found that some parameters are strongly associated with grades of varices and could be useful for early detection and subsequent management of varices. There was significant association with presence of icterus, presence of ascites, presence of splenomegaly, grade of Child Pugh Score, AST to Platelet ratio index (APRI score) Prothrombin Time and International Normalized Ratio (PT/INR), mean TB (mg/dl), mean spleen size which were further confirmed by endoscopy.

**REFERENCES**

1. Friedman SL. Molecular regulation of hepatic fibrosis, an integrated cellular response to tissue injury. J Biol Chem 2000;275: 2247-50.
2. Hytiroglou P, Snover DC, Alves V, Balabaud C, Bhathal PS, Bioulac- Sage P, et al. Beyond “cirrhosis”: a proposal from the International Liver Pathology Study...
3. Lozano R, Naghavi M, Foreman K. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380:2095–2128.

4. D’Amico G, Garcia-Tsao G, Pagliaro L. Natural history and prognostic indicators of survival in cirrhosis: a systematic review of 118 studies. J Hepatol 2006; 44:217–231.

5. Qazi SA. Transabdominal gastro-esophageal devascularization and esophageal transection for bleeding esophageal varices after failed injection sclerotherapy: long-term follow-up report. World J Surg. 2006;30:1329-37.

6. Pugh RN, Murray-Lyon IM, Dawson JL. Transection of the oesophagus for bleeding oesophageal varices. Br J Surg 1973; 60:646–649.

7. Malinchoc M, Kamath PS, Gordon FD. A model to predict poor survival in patients undergoing transjugular intrahepatic portosystemic shunts. Hepatology (Baltimore, MD) 2000; 31:864–871.

8. Kamath PS, Kim WR, Advanced Liver Disease Study G. The model for end-stage liver disease (MELD). Hepatology (Baltimore, MD) 2007; 45:797–805.

9. Bedreli S, Sowa JP, Gerken G. Management of acute-on-chronic liver failure: rotational thromboelastometry may reduce substitution of coagulation factors in liver cirrhosis. Gut 2016; 65:357–358.

10. Trotter JF, Olson J, Lefkowitz J, et al. Changes in international normalized ratio (INR) and model for endstage liver disease (MELD) based on selection of clinical laboratory. Am J Transplant 2007; 7:1624–1628.

11. Child CG, Turcotte JG. Surgery and portal hypertension. In: Child CG, editor. The liver and portal hypertension. Philadelphia: W. B. Saunders Co., 1964; 50.

12. Christensen E, Schlichting P, Andersen PK, Fauerholdt L, Schou G, Pedersen BV, et al. Updating prognosis and therapeutic effect evaluation in cirrhosis with Cox’s multiple regression model for time-dependent variables. Scand J Gastroenterol 1986;21:163–174.

13. Gines P, Quintero E, Arroyo V, Teres J, Bruguera M, Rimola A, et al. Compensated cirrhosis: natural history and prognostic factors. Hepatology 1987;7:122–128.

14. de Franchis R. Evolving consensus in portal hypertension report of the Baveno IV consensus workshop on methodology of diagnosis and therapy in portal hypertension. J Hepatol 2005;43: 167–176

15. Merli M, Nicolini G, Angeloni S, Rinaldi V, De Santis A, Merkel C, et al. Incidence and natural history of small esophageal varices in cirrhotic patients. J Hepatol 2003;38:266-272.

16. Negi S. Management of gastric variceal hemorrhage. Indian journal of gastroenterology 2006; 25:S25-28.

17. Cherian JV, Deepak N, Ponnusamy RP, Somasundaram A, Jayanthi V. Non-invasive predictors of esophageal varices. Saudi J Gastroenterol. 2011;17:64–68.

18. Chang MH, Sohn JH, Kim TY, Son BK, Kim JP, Jeon YC et al. Non-endoscopic predictors of large esophageal varices in patients with liver cirrhosis. The Korean journal of gastroenterology Taehan Sohwagi Hakho