jjogastroenterology.org

Japanese Journal of Gastroenterology

ISSN 2832-4870

DIRECTIVE PUBLICATIONS

Research Article

Fibroscan Correlation with Varices in Cirrhotic Patients.

Parveen Malhotra, Chitrakshi Bhardwaj, Shivanshu Kaushik, Himanshu, Rajasvi Khuranna, Bibin CF, Rahul Siwach, Pranav Malhotra, Anuj Sharma.

Department of Medical Gastroenterology, PGIMS, Rohtak, Haryana, VMMC & Safdarjung Hospital, New Delhi, India.

Abstract

Introduction: Chronic liver disease is characterized by gradual destruction of hepatic tissue over time. The most common complication of chronic liver diseases is portal hypertension. Gastro esophageal varices, ascites, hepatic encephalopathy, hepatorenal syndrome, hepatopulmonary syndrome and hypersplenism develop as a consequence of portal hypertension. As a novel noninvasive assessment method, transient elastography has become highly useful because of its accuracy, simplicity and rapid results. In particular, transient elastography can accurately predict liver cirrhosis.

Aim of Study: To correlate the liver stiffness measurement by fibroscan with presence of esophageal varices in patients of liver cirrhosis.

Materials and Methods: The present descriptive observational study was carried out at department of medical gastroenterology at PGIMS, Rohtak, Haryana India during 1st November 2024 to 31st October 2025 involving 100 patients who were newly diagnosed as liver cirrhosis. Statistical analysis was carried out using SPSS 24.0 version.

Results: Out of total study pool of one hundred cirrhotic patients, majority were males (70%) and belonged to 41-70 years of age group i.e. 84 % and with lesser representation from extreme of ages. Mean age of the study population was 51.16±11.62 years. There was no patient below 20 years of age. In our study, in males, alcoholic liver disease (37.14%) was the main aetiological factor for causing cirrhosis, followed by HCV (28.57%), HBV (21.42%) and MASH related CLD (12.85%) was least common. In contrast, in females, MASH related CLD (60%) was most common, followed by HCV, HBV and none was in alcohol related CLD group. The maximum number of patients (34%) were having fibroscan score between 21-30 Kpa, followed by 31-40 Kpa, then 41-50 Kpa, with lesser representation having readings at extremity. As a general trend, it was appreciated that, as Fibroscan score increased, chances of prescence of varices and of higher-grade varices increased. At lower fibroscan score between 12-30, many patients had no varices or just beginning of formation of varices, as evidenced by early portal hypertension findings. All patients with Fibroscan score of 16 Kpa or below had normal endoscopy.

Conclusion: Fibroscan is a non-invasive method which can predict prescence of esophageal varices in cirrhotic patients. It cannot tell with exact accuracy with exact grade of varices but it can predict with good accuracy that high grade esophageal varices are present or not. In males, ALD is most common etiology for CLD whereas MASH is most common in females. ALD patients develop oesophageal varices at lower fibroscan scores and moreover, they are more aggressive. This predicts that chances of bleeding oesophageal varices are more in ALD, thereby increasing morbidity and mortality.

Keywords: Liver stiffness, fibroscan, Alcohol, Hepatitis B, Hepatitis C, MASLD, esophageal varices, liver cirrhosis.

INTRODUCTION

Chronic liver disease is characterized by gradual destruction of hepatic tissue over time. The most common complication of chronic liver diseases is portal hypertension. Gastro esophageal varices, ascites, hepatic encephalopathy, hepatorenal syndrome, hepatopulmonary syndrome and hypersplenism develop as a consequence of portal hypertension. The frequency of esophageal varices is 30-70% in cirrhotic patients and 9- 36% of patients present with "high-risk" varices. About 4-30% of cirrhotic patients presenting with small varices would develop large varices every year and will be at risk of bleeding. Variceal bleeding is one of the leading causes of morbidity and mortality in cirrhotic patients [1]. The early detection of esophageal varices and initiation of primary prophylactic measures corresponds with better disease prognosis and prolongs patient survival. Upper gastrointestinal endoscopy is the gold standard method for the detection of varices [2-4]. However, endoscopy is an invasive method [5-6]. This prompted the need of noninvasive modalities to predict the presence of esophageal varices. Several studies have evaluated the detection of esophageal

***Corresponding Author: Parveen Malhotra**, Department of Medical Gastroenterology, PGIMS, Rohtak & 128/19, Civil Hospital Road, Rohtak, Haryana, India.
Email: drparveenmalhotra@yahoo.com.
Received: 28-Nov-2025, Manuscript No. JJOGASTRO - 5282 **; Editor Assigned:** 29-Nov-2025 **; Reviewed:** 18-Dec-2025, QC No. JJOGASTRO - 5282 **;**
Published: 29-Dec-2025. **DOI:** 10.52338/jjogastro.2025.5282.
Citation: Parveen Malhotra. Fibroscan Correlation with Varices in Cirrhotic Patients. Japanese Journal of Gastroenterology. 2025 December; 14 (1). doi: 10.52338/jjogastro.2025.5282.

varices using noninvasive methods to replace the need for invasive endoscopy [7-9]. As a novel noninvasive assessment method, transient elastography has become highly useful because of its accuracy, simplicity and rapid results [10-12]. In particular, transient elastography can accurately predict liver cirrhosis. Moreover, recent studies have suggested that transient elastography combined with platelet count could distinguish the absence of esophageal varices [11]. The Baveno VI criteria proposed that cirrhotic patients with a liver stiffness measurement (LSM) of less than 20 kPa and a platelet count of greater than 150,000/μL can avoid screening endoscopy; Maurice et al, [13] further conformed these criteria. In addition, recent studies reported that LSM in patients with liver cirrhosis can predict the presence of large esophageal varices [13].

AIM OF STUDY

To correlate the liver stiffness measurement by fibroscan with presence of esophageal varices in patients of liver cirrhosis.

MATERIAL AND METHODS

The present descriptive observational study was carried out at department of medical gastroenterology at PGIMS, Rohtak, Haryana India during 1st November 2024 to 31st October 2025 involving 100 patients who were newly diagnosed as liver cirrhosis. Statistical analysis was carried out using SPSS 24.0 version. The inclusion criteria were adult patients ≥ 18 years and patients with newly diagnosed chronic liver disease without ascites irrespective of the aetiology, as ascites leads to fallacious fibroscan readings, in view of prescence of fluid in abdomen. The exclusion criteria were patients who have undergone endoscopy previously for variceal bleeding, hepatocellular carcinoma, surgical intervention for portal hypertension and post hepatic causes of cirrhosis. After fulfilling inclusion and exclusion criterion, patients were included in the study with proper informed consent. All patients of CLD underwent UGIE and fibroscan as per the routine standard protocol. Fibroscan was done to assess the stiffness of liver by 502 Touch model (Fibroscan; Echosens). Measurements were performed on the right lobe of the liver through intercostals spaces on patient lying in the dorsal decubitus position with right arm in maximal abduction. The tip of the probe transducer was placed on skin between the ribs at the level of right lobe of the liver. The tip of the transducer probe was covered with coupling gel and placed on the skin, between the rib bones at the level of the right lobe of the liver. The operator, assisted by an ultrasonic time motion image, located a liver portion of at least 6 cm thick, free of large vascular structures. Once the measurement area had been located, the operator pressed the probe button to start an acquisition. Measurement depth was between 25 mm and 65 mm below the skin surface. Measurements which did not had a correct vibration shape or a correct follow up of the vibration propagation were automatically rejected by the software. Ten successful measurements were taken on each patient and average / mean of them was taken for final scoring. Success rate was calculated as the ratio of number of successful measurements over the total number of acquisitions of which 60% is considered as best.

Statistical Analysis

Data was collected by using a structure proforma. Data entered in MS excel sheet and analyzed by using SPSS 24.0 version IBM USA.

OBSERVATIONS AND RESULTS

Out of total study pool of one hundred cirrhotic patients, majority were males (70%) and belonged to 41-70 years of age group i.e. 84 % and with lesser representation from extreme of ages. Mean age of the study population was 51.16±11.62 years. There was no patient below 20 years of age. In our study, in males, alcoholic liver disease (37.14%) was the main aetiological factor for causing cirrhosis, followed by HCV (28.57%), HBV (21.42%) and MASH related CLD (12.85%) was least common. In contrast, in females, MASH related CLD (60%) was most common, followed by HCV, HBV and none was in alcohol related CLD group. The maximum number of patients (34%) were having fibroscan score between 21-30 Kpa, followed by 31-40 Kpa, then 41-50 Kpa, with lesser representation having readings at extremity. As a general trend, it was appreciated that, as Fibroscan score increased, chances of prescence of varices and of higher-grade varices increased. At lower fibroscan score between 12-30, many patients had no varices or just beginning of formation of varices, as evidenced by early portal hypertension findings. All patients with Fibroscan score of 16 Kpa or below had normal endoscopy without any varices and majority of patients with Fibroscan score below 20 Kpa had no varices but only early PHT. Majority of patients till 25 Kpa had low grade esophageal varices and only few patients had high grade esophageal varices. Once Fibroscan score crossed 50 Kpa, then majority of patients had high grade esophageal varices and none had normal endoscopy and minimal had early PHT findings.

Table 1. Showing Age and Sex Distribution in Study Group of one hundred patients

Total Patients (100)	20-30 yrs Age	31-40 yrs Age	41-50 yrs Age	51-60 yrs Age	61-70 yrs Age	71-80 yrs Age
Male 70(70%)	3(4.2%)	4 (5.71%)	30(42.85%)	15(21.42%)	14(20%)	4(5.71%)
Female 30(30%)	0 (0%)	4(13.33%)	5(16.66%)	12 (40%)	5(16.66%)	4(13.33%)

Table 2. Showing Aetiological Distribution in Different Sexes in Study Group

Total Patients (100)	ALD	HBV	HCV	MASH
Male 70 (70%)	26 (37.14%)	15 (21.42%)	20 (28.57%)	9 (12.85%)
Female 30 (30%)	0 (0%)	4 (13.33%)	8 (26.66%)	18 (60%)

Table 3. Showing Distribution of Patients in Study Group on Basis of Fibroscan Score

Total Patients	Fibroscan Score (12-20)	Fibroscan Score (21-30)	Fibroscan Score (31-40)	Fibroscan Score (41-50)	Fibroscan Score (51-60)	Fibroscan Score (61-70)	Fibroscan Score (71-75)
100	16(16%)	34(34%)	14(14%)	12(12%)	11(11%)	6 (6%)	7 (7%)

Table 4. Showing Endoscopic Varices Findings in Relation of Fibroscan Score

Total Patients	Fibroscan Score (12-20)	Fibroscan Score (21-30)	Fibroscan Score (31-40)	Fibroscan Score (41-50)	Fibroscan Score (51-60)	Fibroscan Score (61-70)	Fibroscan Score (71-75)
100	16(16%)	34(34%)	14(14%)	12(12%)	11(11%)	6 (6%)	7 (7%)
Normal	8 (50%)	6(17.5)	3(21.4)	0 (0%)	0 (0%)	0 (0%)	0(0%)
Early PHT	4 (25%)	6(17.5)	2(14.2)	2(16.7)	0 (0%)	1(16.7)	0(0%)
Low Grade Vx	3(18.7)	17(50%)	2(14.2)	5(41.7)	5(45.5)	2(33.3)	3(42.3)
High Grade Vx	1(6.3%)	5(15%)	7 (50%)	5(41.7)	6(54.5)	3(50%)	4(57.7)

DISCUSSION

In our study, 84% of the total patients had fibroscan score > 21 kPa, which suggests Clinically Significant Portal Hypertension (CSPH) according to Baveno 7 consensus 2022. 31 % of our patients had high risk varices i.e. grade 3 esophageal varices. Thus, in our study group, grades of esophageal varices increased significantly with increase in Fibroscan. It is comparable to a study by Elbasiony et al [14] and Fofiu R et al [15] Bleeding from esophago-gastric varices is the most important complication of cirrhosis [16]. The first crucial step in prevention is to identify the patients at risk for bleeding by endoscopic screening, in order to select them for prophylactic treatment [17]. Since a variable proportion of patients will not have varices; thus, screening all cirrhotic patients with upper GI endoscopy implies a number of unnecessary endoscopies, which increase the workload of endoscopy units. In addition, compliance with endoscopic screening recommendations may be limited [18]. Sporea et al [19] studied 1000 patients with Fibroscan and showed cut-off was 31 kPa for significant oesophageal varices and for bleeding cut-off was 50.7 Kpa. Our study showed Fibroscan score of 25 Kpa to be significant for formation of oesophageal varices and 52 Kpa for bleeding from varices in majority of cases. In our study group, one characteristic feature noted were with alcoholic liver disease, in these patients, varices were formed at lower Fibroscan score than other etiologies like HBV, HCV and MASH related CLD. Moreover, ALD patient had more bleeding chances, thereby proving them to be more aggressive than other sub-group. Females have nil contribution in ALD group in view of minimal intake of alcohol in them in our geographical location. Females in majority had MASH related CLD, as HB, HCV and ALD more commonly seen in males. Lebrec [20] showed that larger the size of varices, the higher is the risk of bleeding and according to Sporea [19] study cut off value for Fibroscan to predict risk of bleeding could be considered as cut off value for prediction of large varices. Moreover, studies carried out by Vizzutti et al [21] showed cut-off value for prediction of varices was 17.6 kPa. Our study is almost in alignment with the same, as all patients with Fibroscan score of 16 Kpa or below had normal endoscopy without any varices and majority of patients with Fibroscan score below 20 Kpa had no varices but only early PHT. Castera L et al [22] showed that Transient elastography could be a valuable tool in diagnosis of cirrhosis but cannot replace endoscopy for variceal screening. Hence, wherever facility for endoscopy exists and patient consent is there than one baseline endoscopy at the time of diagnosis, should be done in every cirrhotic.

CONCLUSION

Liver stiffness measurement by Fibroscan which is non-invasive, is a good method for the diagnosis of fibrosis and cirrhosis, irrespective of the cause of liver disease. Liver stiffness measurement by fibroscan is valuable in predicting the presence of esophageal varices in patients with liver

cirrhosis. It may help to select patients for endoscopic screening and start portal hypertension prophylactic therapy in them. It cannot tell with exact accuracy about prescence of exact grade of varices but it can predict with good accuracy that high grade esophageal varices are present or not.

Limitation Of Our Study

Our present study was on total 100 cirrhotic patients but a large-scale study with a greater number of patients will give more accurate and better results.

Conflict Of Interest

No conflict of interest and prior permission from patient and relatives was taken before publishing the case report.

REFERENCES

1. Fallatah HI, al Nahdi H, al Khatabi M, Akbar HO, Qari YA, Sibiani AR. Variceal hemorrhage: Saudi tertiary center experience of clinical presentations, complications and mortality. World J Hepatol 2012; 4: 268-273

2. Garcia-Tsao G, Sanyal AJ, Grace ND, Carey W. Prevention and management of gastroesophageal varices and variceal hemorrhage in cirrhosis. Hepatology 2007; 46: 922-938

3. Kim DH, Park JY. Prevention and management of variceal hemorrhage. Int J Hepatol 2013; 2013: 6

4. De Franchis R. Expanding consensus in portal hypertension: Report of the baveno VI consensus workshop: stratifying risk and individualizing care for portal hypertension. J Hepatol 2015; 63: 743-752

5. Palmer KR. Complications of gastrointestinal endoscopy. Gut. 2007; 56 (4): 456- 457.

6. Krystallis C, Masterton GS, Hayes PC, Plevris JN. Update of endoscopy in liver disease: More than just treating varices, World J Gastroenterol. Feb 7, 2012; 18(5): 401-411

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

8. Thomopoulos KC. Non-invasive prediction of esophageal varices: is it possible? Saudi J Gastroenterol 2011; 17: 1-3

9. Stefanescu H, Grigorescu M, Lupsor M, Maniu A, Crisan D, Procopet B. A new and simple algorithm for the noninvasive assessment of esophageal varices in cirrhotic patients using serum fibrosis markers and transient elastography. J Gastrointestin Liver Dis2011; 20: 57-64

10. Myers RP, ElkashabM, MaM, etal. Transient elastography for the noninvasive assessment of liver fibrosis: a multicentre Canadian study. Can JGastroenterol.2010;24:661–670.

11. HukkinenM, KivisaariR, LohiJ. Transient elastography and aspartate amino transferase to platelet t ratio predict liver injury in paediatric intestinal failure. Liver Int.2016; 36:361– 369.

12. XuX, SuY, SongR. Performance of transient elastography assessing fibrosis of single hepatitis B virus infection: a systematic review and meta-analysis of a diagnostic test. HepatolInt.2015;9:558–566.

13. Maurice JB, Brodkin E, Arnold F. Validation of the Baveno VI criteria to identify low risk cirrhotic patients not requiring endoscopic surveillance for varices. JHepatol.2016;65:899– 905.

14. Elbasiony M, Abed H, Alaskalany HM, Saleh A. Transient elastography and platelet count as noninvasive predictors of gastroesophageal varices in patients with compensated hepatitis C virus–related liver cirrhosis. Medical Journal Armed Forces India; 2021.

15. Fofiu R, Bende F, Popescu A, Şirli R, Lupușoru R, Ghiuchici AM, Sporea I. Spleen and liver stiffness for predicting high- risk varices in patients with compensated liver cirrhosis. Ultrasound in Medicine & Biology. 2021;47(1):76–83

16. D'Amico G, Garcia-Pagan JC, Luca A, Bosch J. Hepatic vein pressure gradient reduction and prevention of variceal bleeding in cirrhosis: a systematic review. Gastroenterology. 2006;131(5):1611–24.

17. Garcia-Tsao G, Sanyal AJ, Grace ND, Carey WD. Practice Guidelines Committee of American Association for Study of Liver Diseases; Practice Parameters Committee of American College of Gastroenterology. Prevention and management of gastro-esophageal varices and variceal hemorrhage in cirrhosis. Am J Gastroenterol. 2007; 102:2086–2102.

18. Berzigotti A, Gilabert R, Abraldes JG, Nicolau C, Bosch J, Garcia-Pagàn JC. Non-invasive prediction of clinically

significant portal hypertension and oesophageal varices in patients with compensated cirrhosis. Am J Gastroenterol. 2008; 103:1159–67.

19. Sporea I, Ratiu I, Sirli R, Popescu A, Bota S. Value of transient elastography for the prediction of variceal bleeding. World J Gastroenterol. 2011 May 7;17(17):2206–10.

20. Lebrec D, De Fleury P, Rueff B, Nahum H, Benhamou JP. Portal hypertension, size of esophageal varices and risk of gastrointestinal bleeding in alcoholic cirrhosis. Gastroenterology. 1980; 79:1139–44.

21. Vizzutti F, Arena U, Rega L. Performance of Doppler ultrasound in the prediction of severe portal hypertension in hepatitis C virus-related chronic liver disease. Liver Int. 2007; 27:1379–88.

22. Castera L, Vergniol J, Foucher J, Le Bail B, Chanteloup E, Haaser M. Early detection in routine clinical practice of cirrhosis and oesophageal varices in chronic hepatitis C: comparison of transient elastography (FibroScan) with standard laboratory tests and non-invasive scores. J Hepato. 2009; 50:59–68.