**ORIGINAL RESEARCH**

# To Study the Clinical Factors Predicting The Presence Of Esophageal Varices In CLD patients Admitted To A Tertiary Care Medical College Hospital In South India

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**ABSTRACT**

**Introduction:**Cirrhosis is defined anatomically as a diffuse process with fibrosis and nodule formation. It is the result of fibrogenesis that occurs in chronic liver injury. Diffuse fibrosis causes architecture distortion with regenerative nodule formation resulting in decreased liver cell mass and reduced blood flow to the liver.In India,the most common cause of cirrhosis is alcohol abuse and viral hepatitis. Reversible fibrosis with ongoing injury over timedevelops a decompensated condition (DCLD) that is associated with one or more complications like ascites, jaundice, and hepatic encephalopathy & the major being the development of esophageal varices with the associated risk of variceal bleeding.The Baveno consensus on portal hypertension in its first five editions has recommended surveillance with periodic upper endoscopies in these patients to identify in a timely fashion the development of esophageal varices and initiate a primary prophylaxis strategy in those at a high risk of bleeding.

**Aim:**

- To study the clinical factors predicting the presence of esophageal varices in patients with liver cirrhosis.

**Objectives:**

1. To study the various factors such as pallor, pedal oedema, jaundice, Child Pugh's score, MELD score, and spleen size to predict the presence of esophageal varices in patients with liver cirrhosis.To avoid unnecessary endoscopy for varices screening.To determine the sensitivity and specificity of predictive factor score for the development ofvarices.

**Methods:**It is a descriptive study conducted at Amala Institute of Medical Sciences from January 2022 to June 2023 (18 months), evaluating 165 patients with liver cirrhosis.After obtaining informed consent from patients for inclusion in the study, proper history to identify the initial presentation and find out the cause of cirrhosis was taken. Pallor, icterus, splenomegaly with USG, and pedal edema were looked for in every patient. CHILD score and MELD score were also calculated. Screening endoscopy was performed in all patients.All the above data were analyzed and the parameters that correlated with varices were selected. The predictability of varices from these indices was calculated.From this study, we wanted to eliminate patients who can avoid unnecessary endoscopy.The data was collected and entered in MS Excel and worksheet. The analysis was done using SPSS software (Version 23.0).The difference of incidence and severity of selected factors were analysed using logistic regression and sensitivity and specificity of various factors were obtained. **Results:**In our study group of 165 patients with cirrhosis, 68.5% were males and the rest were females. 44.2 % of patients presented with pedal edema and it was the most common initial presentation. This was the most common clinical finding 52.7% of the patients had pedal edema on examination.The most common etiology of cirrhosis was alcohol which was 53.3%.It was observed that jaundice, hemoglobin, and albumin levels could predict the chances of developing varices which was statistically significant, and they were independent risk factors for developing varices.The cut off for each variable was obtained above and below which chances of varices was more. The values obtained were bilirubin>0.959, Hb<10.05, MELD>9.50, usg spleen size>9.9cm, and albumin <3.45 had a significant risk of varices.**Conclusion:**Our study concluded that patients with bilirubin less than 0.959, albumin more than 3.45 and can avoid screening endoscopy after initial detection of cirrhosis.

**Key words:** Varices, endoscopy, cirrhosis, fibroscan, portal hypertension, Baveno.

## INTRODUCTION

Cirrhosis is defined anatomically as a diffuse process with fibrosis and nodule formation. It is the result of fibrogenesis that occurs in chronic liver injury. Diffuse fibrosis causes architecture distortion with regenerative nodule formation resulting in decreased liver cell mass and reduced blood flow to the liver.In India, the most common cause of cirrhosis is alcohol abuse and viral hepatitis. Reversible fibrosis with ongoing injury over time develops a decompensated condition (DCLD) that is associated with one or more complications like ascites, jaundice, and hepatic encephalopathy & the major being the development of esophageal varices with the associated risk of variceal bleeding.Variceal bleeding is one of the most dreaded and feared complications of cirrhosis which has a high mortality. Identifyingit and appropriate treatment with beta-blockers or other methods to reduce portal hypertension can delay this complication. Hence initial screening endoscopy for early identification of varices in newly detected cirrhotics had come into practice.Cirrhosis is being identified at a higher rate, especially with lifestyle diseases liver pathologies are on the rise. With the invention of ultrasound abdomen, more cases of cirrhosis have been diagnosed. It is cumbersome to perform a screening endoscopy for all patients and patients who require endoscopy may be missed in this process.Endoscopy is a safe procedure; however, it can have potential complications which may include perforation of the gut wall, introducing infection, bleeding, and reaction to sedation.The American Association for the Study of Liver Disease recommends that if no varices are detected initially then this should be repeated at 2-3 years in compensated and annually in decompensated cirrhosis.For the first time, the Sixth Baveno Consensus on portal hypertension (Baveno VI) recommended using non-invasive tools to rule out the presence of varices with a high risk of bleeding. Baveno 6 recommendation states that endoscopy is not recommended in patients with platelet >1.5 lakhs

## EPIDEMIOLOGY

The exact prevalence of cirrhosis is not known; however, it is accounted that it is underestimated in undiagnosed cases of NASH. In the USA it is around 0.15% and higher in Asia and Africa where chronic hepatitis B and C are frequent. (2)(3) (4)Compensated cirrhosis often goes undetected and 1% of the population may have histological cirrhosis Chronic liver disease and cirrhosis cause around 30,000 to 4,50,000 deaths each year in India. (5) Many patients die around the fourth to fifth decade of life. Most of the deaths are due to complications ofDCLD.

## CLINICAL FEATURES

Many cases of cirrhosis are incidentally found without symptoms or signs during routine examination and evidence of the presence of cirrhosis and its etiology usually comes after a complete history.

## SYMPTOMS

- Jaundice is a symptom usually absent in cirrhosis. If jaundice is present that suggests either the causative agent is still active, that ongoing injury is the reason for decompensation, or a drug toxicity might have caused further impairment in liver function that causes elevation of bilirubin levels. (2)(6)
- Easy fatiguability, tiredness weakness or breathing difficulty are common symptoms. Anorexia is an important symptom as far as cirrhosis is concerned. When present it is an alarming feature of liver failure. Weight loss is usually seen in end-stageliver disease. (7)
- Nausea and vomiting are very common. A remedial cause should come first. Vomiting may be in the form of an upper GI bleed; content should be examined to rule out hematemesis.
- Abdominal pain or discomfort is common, pain is present in the right upper quadrant or right lower ribs. Ill-defined vague pain and generalized abdominal discomfort may occur due to ascites.
- Constipation or loose stools may occur in cirrhotic patients, and both can precipitate the complication of cirrhosis.
- Ascites, water, and salt retention lead volume overload state can occur as edema of ankles and legs.
- Pruritis is an important diagnostic clue for primary biliary cirrhosis.
- Difficulty in breathing may be associated with massive ascites.
- In some patients of cirrhosis, dyspnoea may be associated with fibrosing alveolitis, pulmonary shunting, pulmonary hypertension, and hepatic pulmonary syndrome.
- Patients of liver cirrhosis develop spontaneous bleeding from the gums or nose. Upper GI bleeding present in
- form of hematemesis and malena. Coagulopathy is usually seen in severe liver failure.

## PHYSICAL SIGN(8)

- Most patients with cirrhosis look thin-built, with late-stage liver disease, muscle wasting, and loss of adipose tissue,commonly from the face and neck, and is called sarcopenia. (9) There is a loss of muscle mass and function. Muscle wasting contributes to fragility which is associated with poor prognosis.
- Steatorrhea is frequent even in the absence of pancreatitis or alcoholism. This can be related to reduced hepatic bile salt secretion.
- Anemia due to bleeding from the UGI tract or iron deficiency due to prolonged loss of blood. Jaundice suggests liver decompensation and is usually an alarming sign of fulminant liver failure in CLD patients.

**SKIN CHANGES**

- Skin changes like spider naevi, paper money skin, erythema of palms, and excessive bruising are usually seen during later stages. (10)(11)
- Spider naevi are found in superior vena cava territory and upper thoracic region.
- Liver palms or palmar erythema means warm and bright red palms, especially thenar and hypothenar area. The soles of feet may also be involved. (12)(1)
- Hyperpigmentation is noted in patients with hemochromatosis.
- Vitiligo appears in autoimmune liver disease.
- Dupuytren contracture is a thickening of palmar fascia in hands and is seen in alcoholic cirrhosis but may be idiopathicalso. (13)
- Leuconychia or white nails are related to hypoalbuminemia and indicate severity and chronicity.

**INVESTIGATIONS COMPLETE BLOOD COUNT**

Cirrhotic patients can have normal hematological parameters initially. However low hemoglobin is common.Anemia is usually normocytic normochromic. Peripheral smear may show acanthocytes and hemolysis in alcoholic liver disease.White blood cell count tends to drop as a part of hypersplenism. An elevated white blood cell count indicates underlying infection in most cases.Platelet counts are low once cirrhosis sets in due to hypersplenism. (14)Liver injury causes decreased production of coagulation factors especially vitamin K dependent factors 2, 7, 9, and 10. Factor 7 is the earliest affected.The prothrombin time is prolonged in decompensated cirrhosis.

**LIVER FUNCTION TEST**

The liver function test can be normal. Liver enzymes like SGOT and SGPT can be normal or high in cirrhosis.In alcoholic cirrhosis enzymes are elevated, SGOT/SGPT ratio is greater than 2.Serum total bilirubin is normal initially but raised in decompensated stages. Indirect bilirubin gets elevated in hemolysis. Lowproteins, mainly low albumin level is a usual feature of chronic liver pathology since albumin synthesis is reduced. However, hypoalbuminemia also occurs due to extracellular fluid expansion, poor food intake, or malnutrition. (12)

**ENDOSCOPY**

Varices are identified by endoscopy.

- OGD gastroesophageal varices
- Sigmoidoscopy  rectal varices

**AIM**

To study the clinical factors predicting the presence of esophageal varices in patients with liver cirrhosis.

**OBJECTIVES**

To study the various factors such as pallor, pedal oedema, jaundice, Child Pugh's score, MELD score, and spleen size to predict the presence of esophageal varices in patients with liver cirrhosis.

1. To avoid unnecessary endoscopy for varices screening.
2. To determine the sensitivity and specificity of predictive factor score for the development ofvarices.

**METHODOLOGY**

One hundred and sixty-five patients with cirrhosis diagnosed by ultrasound abdomen scan, who attended the Medicine department from January 2022 to June 2023 were studied.

**Study Design:** Descriptive study (Diagnostic Accuracy Study)

**Study setting:** Amala Institute of Medical Sciences, Thrissur

**Study subjects:** Patients with cirrhosis attending the medicine department as outpatients and inpatients.

**Inclusion criteria:** All cirrhotic patients age between 18-80 years, both male and female of Amala Institute of Medical Sciences

**Exclusion criteria**

1. Patients with alcoholic hepatitis
2. Patients with acute viral hepatitis
3. Patients with known liver metastasis

**DATA COLLECTION**

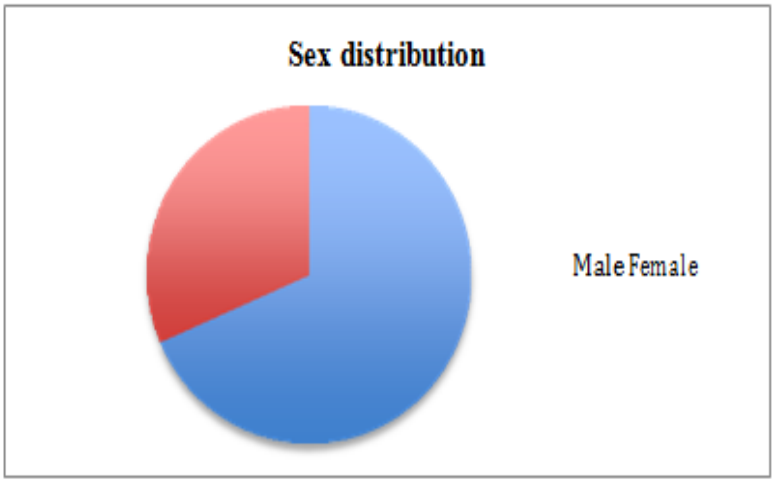
After obtaining informed consent from patients for inclusion in the study, proper history to identify the initial presentation and find out the cause of cirrhosis was taken.Pallor, icterus, splenomegaly with USG, and pedal edema were looked for in every patient.CHILD score and MELD score were calculated. Screening endoscopy was performed in all patients.

**STATISTICAL ANALYSIS:**

The Data was entered in MS Excel and worksheet and analysis was performed using SPSS software (Version 23.0).The difference of incidence and severity of selected factors was analyzed using logistic regression and sensitivity and specificity of various factors was obtained.

**1. Sex**

Males were more affected than females. 68.5% were males and 31.5 % were females




**Sex Distribution**

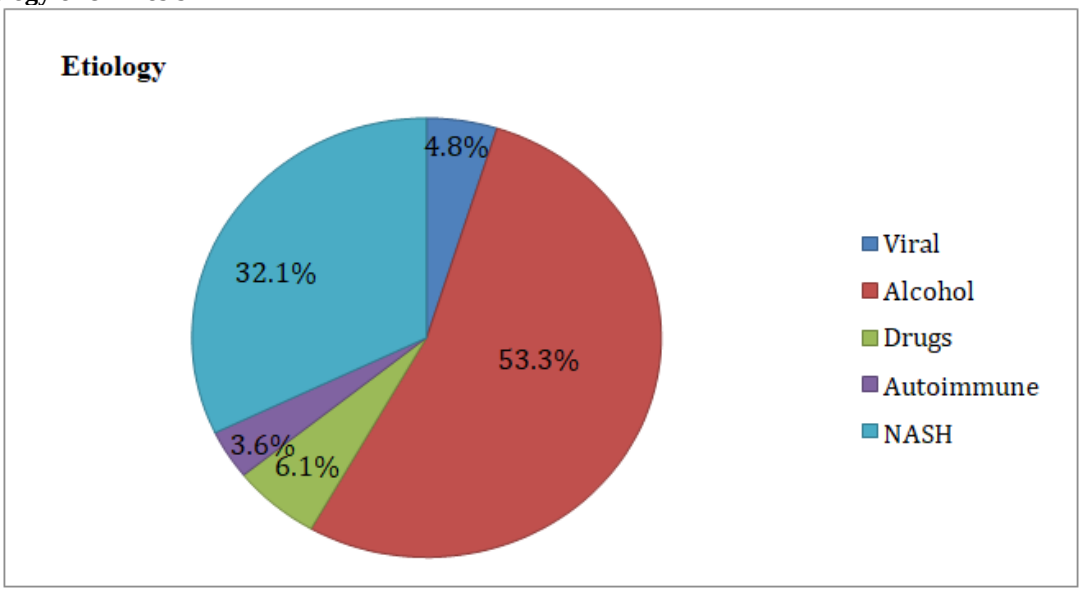
**2. Clinical profile of patients with cirrhosis**

The various presentations in patients with cirrhosis have been highlighted. From our study of 165 patients, the most common initial presentation was pedal edema in 73 patients (44.2%) followed by abdominal distension which was 67 patients (40.6%)From the study 58 (35.2%) patients had history of preexisting liver disease and 77(46.7%) of them had history of alcohol consumption. Clinically, the most common finding was pedal edema {87 (52.7%) patients} and ascites was present among 48 (29.1%) patients. Jaundice/icterus was present in 39 (23.6%) and 18 (10.9%) of them had features of hepatic encephalopathy. Stigmata of liver disease was present in 37 patients (22.4%). Splenomegaly was present in 53 (32.1%) patients clinically.

| | Yes | | No | |
|---|---|---|---|---|
| | **Frequency** | **Percent** | **Frequency** | **Percent** |
| Gastrointestinal bleed | 33 | 20.0 | 132 | 80.0 |
| Abdomen distension | 67 | 40.6 | 98 | 59.4 |
| Leg edema | 73 | 44.2 | 92 | 55.8 |
| Liver disease | 58 | 35.2 | 107 | 64.8 |
| Alcohol | 77 | 46.7 | 88 | 53.3 |

Initial presentation of cirrhotic patients

**Etiology of cirrhosis**



**CHILD and MELD score**

From the above investigations and clinical findings, CHILD and MELD score was calculated for each of them. The majority of the patients in this study belonged to CHILD A group - 91 patients (55.2%), 41 (24.8%) belonged to CHILD B and 33 (20%) belonged to CHILD C.

The mean MELD score was 12.064 (SD – 5.2269)

| CHILD | Frequency | Percent(%) |
|---|---|---|
| A | 91 | 55.2 |
| B | 41 | 24.8 |
| C | 33 | 20 |
| Total | 165 | 100.0 |

| | Mean | Std. Deviation |
|---|---|---|
| MELD | 12.064 | 5.2269 |

**USG spleen size:** The mean size of spleen in USG was 10.456 cms

**Varices and splenomegaly:** Among 53 patients who presented with splenomegaly, 45 had varices and it was found to be statistically significant. (p-value = 0.0001)

| Varices | Splenomegaly | | Total |
|---|---|---|---|
| | Yes | No | |
| No | 59 | 8 | 67 |
| Small | 30 | 11 | 41 |
| Large | 23 | 34 | 57 |
| Total | 112 | 53 | 165 |

Varices and splenomegaly correlation

| | Varices | | | P value (Kruskal Wallis Test) |
|---|---|---|---|---|
| | No | Small | Large | |
| MELD | 8.44±3.25 | 12.90±4.74 | 15.71±4.65 | 0.0001[@] |

MELD and varices relation

**Varices and CHILD score**

Among the patients of cirrhosis, out of 33 CHILD C patients, 32 of them had varices (24 had large varices and 8 patients had small varices). The details are summarized below.

| Child | Varices | | | Total |
|---|---|---|---|---|
| | No | Small | Large | |
| A | 59 | 22 | 10 | 91 |
| B | 7 | 11 | 23 | 41 |
| C | 1 | 8 | 24 | 33 |
| Total | 67 | 41 | 57 | 165 |

**Varices and spleen size in USG**

From the study, it was found that as spleen size increased more than 10.58cms+/-1.68,the chances of varices increased and was statistically significant with p-value = 0.0001. This is summarized below.

**USG spleen size and varices relation**

| | Varices | | | P value(Kruskal Wallis Test) |
|---|---|---|---|---|
| | No | Small | Large | |
| USG spleen size | 9.20±1.79 | 10.58±1.68 | 11.83±2.25 | 0.0001[@] |

**3. Independent indices as predictive factors of varices**

From the study, indices were tested independently to assess their predictability towards varices, and it was found that-

a) **Bilirubin** since the odds ratio is 20.758, lower limit 4.631, and upper limit 93.047 is a risk factor for varices and is statistically significant. (p-value =0.0001)
b) **Hemoglobin** with an odds ratio of 1.46 with a lower limit of 0.996 and upper limit of 2.138 indicates that low hemoglobin is a risk factor for varices (pvalue=0.052)
c) **MELD** score with odds ratio 1.096, lower limit

0.769, and upper limit 1.563 is a risk factor for varices but is not statistically significant (pvalue=0.613)

d) **USG spleen size** with an odds ratio of 1.202 with a lower limit of 0.674 and upper limit of 2.145 is a risk factor for varices but not statistically significant(p value=0.533)
e) Low **albumin** levels, with an odds ratio of 2.752 with a lower limit of 1.457 and upper limit of 5.200 a risk factor for varices and statistically significant (p value= 0.007)

## DISCUSSION

This study titled–TO STUDY THE CLINICAL FACTORS PREDICTING THE PRESENCE OF ESOPHAGEAL VARICES IN CLD PATIENTS was conducted for 18 months. A total of 165 patients were studied. Relevant history and clinical examination findings were taken. Their blood parameters were collected. Each of them underwent USG abdomen and endoscopy. Among the 165 patients, the majority were from the age group 51-60 years and the mean age group was 57.48 with a standard deviation of 10.664. Males 113(68.5%) were more than females 52(31.5%). In a study done by Xing et al, the mean age was 50.7 years.The various presentations in patients with cirrhosis were looked into and from our study out of 165 patients, the most common initial presentation was pedal edema in 73 patients (44.2%) followed by abdominal distension which was 67patients (40.6
%) and gastrointestinal bleeding as 33 patients (20.0%).Clinically the most common finding was pedal edema in 87 (52.7%) patients and ascites was present among 48 (29.1%) patients. Jaundice/icterus was present in 39 (23.6%) and 18 (10.9%) of them had features of hepatic encephalopathy. Stigmata of liver disease was present in 37 patients (22.4%). Splenomegaly was present in 53 (32.1%) patients clinically. The mean liver span of cirrhotic patients was 13.628. (SD 1.6683)From the above investigations and clinical findings, CHILD and MELD scoreswere calculated for each of them. The majority of the patients in this study belonged to CHILD A group - 91 patients (55.2%), 41 (24.8%) belonged to CHILD B and 33 (20%) belonged to CHILD C. The mean MELD score was 12.064 (SD – 5.2269). It was observed that the mean size of the spleen in USG was 10.456 cm.

Among all the 165 cirrhotic patients that were taken into the study, 67 patients (40.6%) had no varices, 41 patients (24.8%) had small varices (<5mm), and 57 patients (34.5%) had large varices. All the above parameters were correlated with the risk of development of varices. Itwas observed that among 53 patients who presented with splenomegaly, 45 had varices and it was found to be statistically significant. (p value = 0.0001). The liver parameters were correlated with patients with cirrhosis, and it was found that serum bilirubin above 1.85+/- 1.26 and patients with serum albumin less than 3.5+/- 0.634 had varices.

There was no statistical significance from data on hemoglobin and varices from our study (p value=0.295). Patients with MELD score more than 12.90 +/- 4.74 had varices. Among the patients with cirrhosis, out of 33 CHILD C patients, 32 of them had varices (24 had large varices and 8 patients had small varices).

From the study, it was found that as spleen size increased more than 10.58 cm+/-1.68, the chances of varices increased and were statistically significant.

## STUDY LIMITATIONS

This study has a few limitations, and the main ones are, that this study was not done on an etiological basis. The study has taken cirrhosis patients in general. Each etiology probably has a different and more specific value which was not looked into much.This study was conducted to find out the predictive factors of esophageal varices in cirrhotic patients but to implement these as risk factors and use these factors to avoid endoscopy, a larger group study is required.

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