

## The Spectrum of Oesophageal Varices, Portal Hypertensive Gastropathy and Child Pugh's Class in Cirrhotic Patients at Tertiary Care Hospital

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### ABSTRACT

**Objective:** To find the association of Child-Pugh's Class with oesophageal varices and portal hypertensive gastropathy in cirrhotic patients at CMH Lahore.

**Study Design:** Cross sectional study

**Place and Duration of Study:** Department of Gastroenterology and Department of Pathology, Combined Military Hospital Lahore Pakistan, from Feb to May 2021.

**Methodology:** All patients with cirrhosis of the liver, irrespective of aetiology, who underwent upper gastrointestinal endoscopy, were included in the study. Lab data was retrieved from the Pathology Department to calculate Child Pugh's score. Endoscopic findings of oesophageal varices and portal gastropathy were recorded and their correlation/association with Child-Pugh's Class was calculated separately by using Pearson's coefficient.

**Results:** A total of 148 patients were included in the study. Male patients were 90(60.8%) and female were 58(39.2%). The age range was 27-85 years, with the mean of patients being 55.93±13.19 years. Association of Child Pugh's Class with oesophageal varices and portal hypertensive gastropathy revealed that higher grades of oesophageal varices (Grade-III) and severe portal hypertensive gastropathy were found in Child Pugh's Class-B (13.51%, 14.18%) and C (15.54%, 16.2%) as compared to Class- A (4.72 %, 1.35%). Child-Pugh's Class positively correlates with both oesophageal varices and portal hypertensive gastropathy by Pearson's coefficient  $r=0.594$  and  $0.035$ , respectively; both have significant  $p$  values ( $p < 0.05$ ).

**Conclusion:** Child-Pugh's Class has a positive correlation with both oesophageal varices and portal hypertensive gastropathy in patients with cirrhosis

**Keywords:** Cirrhosis, Child-pugh's class, Esophageal varices, Portal hypertensive gastropathy.

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### INTRODUCTION

Liver cirrhosis is a chronic condition characterized by inflammation, scarring, fibrosis and the formation of regenerative nodules.<sup>1</sup> Common causes of death in patients with liver cirrhosis are upper gastrointestinal bleeding due to oesophageal/fundal varices, septicaemia, hepatic encephalopathy, liver failure, renal failure or hepatocellular carcinoma.<sup>2</sup>

Portal hypertension results from progressive liver damage in cirrhosis. The hallmarks of portal hypertension are oesophageal/gastric varices and portal hypertensive gastropathy. International data suggest that as many as 50% of patients with liver cirrhosis develop oesophageal varices.<sup>3</sup> Regional data reports that up to 60% of liver cirrhosis patients already have varices at the time of diagnosis.<sup>4</sup> While local data shows that up to 80 % of patients with upper gastrointestinal bleeding in a tertiary care hospital either have

oesophageal varices (70%) or fundal varices (10%).<sup>5</sup>

Child-Pugh Class is an important prognostic score to assess liver disease status and divide it into prognostic groups. However, the data is conflicting, some studies have suggested a strong association with risk increasing to as much as 13% of patients with child class A to have gastropathy/varices versus as many as 87% in Child-Pugh class C.<sup>6,7</sup> On the contrary, other studies have found no such association.<sup>7-9</sup> While cirrhosis imposes a major health burden in our country, the data from our population is limited.<sup>10</sup>

Although international guidelines recommend getting an endoscopy in every patient with cirrhosis, logistic issues, both at the end of the patients and the end of the health care system, mostly make it impossible for every patient to get this investigation. The stress has aggravated the problem in the healthcare system posed by the ongoing epidemic of COVID-19. This study is to identify if there is any association between portal hypertension and increasing Child-Pugh score in our population.

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**METHODOLOGY**

The cross sectional study carried out at the Department of Gastroenterology, Combined Military Hospital Lahore, from February to May 2021. Permission for the research work was taken from Ethical Review Board (ERB) No.270/2021. A sample size was calculated using the Australian Bureau of Statistics online sample size calculator, by considering a 9% prevalence of oesophageal varices in patients with cirrhosis as shown in the study by Merli *et al.*<sup>11</sup>

**Inclusion Criteria:**All patients with cirrhosis, irrespective of age, gender and aetiology, who underwent upper gastrointestinal endoscopy were included in the study.

**Exclusion criteria:**All non-cirrhotic patients were excluded from the study.

Cirrhosis of the liver was confirmed by (1) clinical findings, (2) Liver function tests (3) abdominal ultrasonographic findings (coarse and shrunken liver, splenomegaly). Informed consent was taken from all conscious, oriented patients or next of kin if the patient was unconscious to include their data for research. Clinical detail was recorded, including the presence or absence of hepatic encephalopathy and ascites. Lab record of patients was retrieved from the Pathology department of CMH Lahore to calculate Child-Pugh's score. Child Pugh's Scoring system, parameters and prognostic indicators were explained in Table-I.

**Table-I: Child Pugh's Score System**

| Measure   | 1point  | 2points           | 3points            |
|---|---------|-------------------|--------------------|
| Totalbilirubin,µmol/l(mg/dl)                      | <34(<2) | 34-50(2-3)        | >50(>3)            |
| Serumalbumin(g/dl)                                | >3.5    | 2.8-3.5           | <2.8               |
| Prothrombintime, Prolongation (sec)               | 1-3     | 4.0-6.0           | >6.0               |
| Ascites   | None    | Slight            | Moderate to Severe |
| Hepaticencephalopathy                             | None    | Slight/moderate   | Moderate/severe    |
| Prognostic indicators of child Pug's Score System |         |                   |                    |
| Points  | Class   | One year survival | Two year survival  |
| 5-6   | A       | 100%              | 85%                |
| 7-9   | B       | 81%               | 57%                |
| 10-15   | C       | 45%               | 35%                |

According to Modified Paquet classification, oesophageal varices were classified from grade-I to Grade-III. Grade-I oesophageal varices extend just above the mucosal level, Grade-II varices projecting by one-third of the luminal diameter that cannot be compressed with air insufflation. In contrast, Grade-III varices project up to 50% of the luminal diameter in contact with each other.<sup>12</sup>

A gastroenterologist performed upper gastrointestinal endoscopies with a single Olympus Gastro-scope (GF 180, Olympus Japan). Endoscopic findings of oesophageal varices and portal hypertensive gastropathy were recorded.

Statistical Package for the social sciences (SPSS) version 25:00 was used to interpret and analyze the results. Mean±SD were calculated for age. Frequencies and percentages were found for Grades of oesophageal varices, the severity of portal hypertensive gastropathy and child-Pugh's Class. The correlation of oesophageal varices grades, severity portal hypertensive gastropathy and Child-Pugh's Class were calculated by Pearson's r coefficient method.

**RESULTS**

A total of 148 patients were included in the study who fulfilled the inclusion criteria. Among these, 90(60.8%) were male and 58(39.2%) were female patients. In our study, most of the patients, 62(41.9%), had mild liver cirrhosis (Child Pugh's Class A) and relevantly grade-I oesophageal varices 66(44.6%) and mild portal hypertensive gastropathy 81(54.7%), demonstrated in Table-II.

**Table-II: Descriptive Statistics of the Study Participants (n=148)**

| Esophageal Variceal Grades             | n(%)        |
|--|-------------|
| Grade-1                                | 66(44.6%)   |
| Grade-2                                | 32(21.6%)   |
| Grade-3                                | 50(33.8%)   |
| Portal Hypertensive Gastropathy Grades |             |
| Baveno Mild                            | 76(51.4%)   |
| Baveno Severe                          | 47(31.7%)   |
| No Portal Hypertensive Gastropathy     | 25(16.9%)   |
| Child Pugh's Class                     |             |
| Class-A                                | 62(41.9%)   |
| Class-B                                | 56(37.8%)   |
| Class-C                                | 30(20.3%)   |
| Platelets Counts (150-400*109/L)       |             |
| 80-120                                 | 66(44.6%)   |
| 130-150                                | 52(35.1%)   |
| >150                                   | 30(20.3%)   |
| Total                                  | 148(100.0%) |

Patients with child Pugh's Class B 56(37.8%) and C 30(20.3%), had higher Grades (III) of oesophageal varices 23(15.54%). Severe portal hypertensive gastropathy 24 (16.2%), respectively, which denotes that when liver cirrhosis progresses from Child-Pugh's class A to C, the formation of oesophageal varices also progresses from Grade I to Grade III. Child-Pugh's Class (severity of liver cirrhosis) was directly proportional to portal hypertension. Seven out of thirty patients in child Pugh's Class C and 5 out of 56 patients from child Pugh's class B presented to the

Emergency Department in either semiconscious or drowsy and disoriented states. About 77(90%) patients of both Child Pugh's class B and C had platelet counts between 80- 120 x 10<sup>9</sup> /L, while 60% of patients of Child Pugh's Class-A had platelet counts between 130-150 x 10<sup>9</sup>/L. It was also observed that platelet count negatively correlates with Child pugh's Class by Pearson's coefficient (r=-0.601) and has a p-value of <0.05. It was also found that the severity of the liver disease assessed by Child-Pugh's Class and relevant disorders were more frequent in middle-aged and older people (Child-Pugh class B 82%, Child-Pugh class C 87%) between ages 45-80 years. In our study, Child Pugh's classes positively correlate with oesophageal varices, and portal hypertensive gastropathy with Pearson's coefficient r=0.594 and 0.035 respectively and both have significant p-values (<0.05) each, explained in Table-III.

**Table-III: Pearson's correlation of Child-Pugh's Class (n=148)**

|  |                     |        |
|--|---------------------|--------|
| <b>Age (In years)</b>                  | Pearson Correlation | 0.026  |
|  | p-value             | 0.001  |
| <b>Gender</b>                          | Pearson Correlation | 0.119  |
|  | p-value             | 0.066  |
| <b>Esophageal Varices</b>              | Pearson Correlation | 0.594  |
|  | p-value             | 0.001  |
| <b>Portal hypertensive Gastropathy</b> | Pearson Correlation | 0.035  |
|  | p-value             | 0.001  |
| <b>Platelets Count</b>                 | Pearson correlation | -0.601 |
|  | p-value             | 0.001  |

## DISCUSSION

The severity of the liver disease is classified by child-Pugh's Class which is directly associated with oesophageal varices formation and upper gastrointestinal bleeding.<sup>13</sup> Upper Gastrointestinal bleeding is the most common and worst complication of liver cirrhosis, secondary to oesophageal and gastric varices and portal hypertensive gastropathy. Our study revealed that higher classes of oesophageal vary Grade-III and severe portal hypertensive gastropathy was found in Child Pugh's B (13.51%,14.18%) and C (15.54%,16.2)% as compared to class A ( 4.72 %,1.35%) respectively, which demonstrates that as child Pugh's score rises, grades of oesophageal varices and severity of portal hypertensive gastropathy also rises, as shown by with many local and international studies.<sup>13-15</sup>

Our study has demonstrated that as liver dysfunction progresses to higher child Pugh's Class (Class-C),the tendency of varices formation & bleeding also rises; similar observations have been documented

by previous studies.<sup>16,17</sup> It was found that liver dysfunction and complications of liver cirrhosis (Child-Pugh Class-B 82%, Child-Pugh Class C 87%) were more common in middle age and elderly patients between 40-80 years. This group of patients was more commonly seen in the Emergency Department with hematemesis, which may mean that older age is associated with higher Child Pugh's Class and formation of large oesophageal varices and increased bleeding tendency, where this may be due to the chronicity of disease itself. Similar findings have been endorsed by Tiwari et al.<sup>18</sup>

In a study done by Fontana *et al.*<sup>19</sup> in patients with cirrhosis, it was documented that mucosal mosaic pattern (mild portal hypertensive gastropathy) was identified in 33%, red marks(severe portal hypertensive gastropathy) in 15%, similar results have been recorded in our research.

Our study has shown that Child Pugh's Class positively correlates with oesophageal varices & portal hypertensive gastropathy by Pearson's coefficient r= 0.594 & 0.035, respectively, and both have significant p values <0.05. This further supports the similar results of local studies. Some regional studies have also inferred the same conclusions.

These results can help shape our local and national guidelines, for screening portal hypertension, in the at-risk population. So, all patients with Child-Pugh Class B and C should be screened, while those of Class A can be kept on follow-up by other non-invasive investigations.

## CONCLUSION

Child-Pugh's Class has a positive correlation with both oesophageal varices and portal hypertensive gastropathy in patients with cirrhosis.

**Conflict of Interest:** None.

### Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MAF & MAY: Data acquisition, approval of the final version to be published.

BP & HM: Conception, study design, drafting the manuscript, approval of the final version to be published.

ALK & MS: Data analysis, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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