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# Echocardiographic abnormalities in cirrhosis & their correlation with severity of cirrhosis using Child-Pugh score among patients in a tertiary care hospital

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*Background & objectives*: Child-Pugh score (CPS) is a widely used prognostic marker in cases of cirrhosis and pulmonary arterial hypertension (PAH). However, the role of this score in the quantification of severity of PAH is not well studied. In mild cases, echocardiography is more sensitive. This study was done to assess the association between echocardiography and severity of cirrhosis using CPS.

*Methods*: A cross-sectional study was done from April to June 2014 in 42 patients with cirrhosis using a pre-tested semi-structured interview schedule.

*Results*: There was no significant association between echocardiographic changes and CPS in patients with liver cirrhosis.

*Interpretation & conclusions*: Advising an echocardiographic evaluation may prove beneficial in patients of Child-Pugh Grades B and C. However, more extensive studies are required to confirm the same.

Key words Alcoholic liver disease - cirrhosis - portal hypertension - pulmonary hypertension

Vascular changes in the pulmonary circulation are a well-recognized complication in cirrhosis of the liver. There can be subtle and subclinical cardiac abnormalities among patients with cirrhosis and pulmonary arterial hypertension (PAH). These changes can lead to systolic and diastolic dysfunction and can be detected by echocardiography<sup>1</sup>. Child-Pugh score (CPS) is an independent prognostic marker for complications of PAH and also in predicting mortality in patients with cirrhosis. It has also been used for selecting candidates for the resection of liver in patients with carcinoma liver<sup>2</sup>. The role of CPS in predicting severity of PAH is not known. This study was aimed at predicting the role of CPS and its association with severity of PAH. Hence, the objective was to assess the echocardiographic abnormalities in cirrhosis and their association with severity of cirrhosis using CPS.

### **Material & Methods**

The study was conducted as a cross-sectional analysis over a period of two months (April to June 2014). Patients with cirrhotic liver from the departments of Medicine and Cardiology were selected for the study. Patients with any pre-existing cardiovascular (CV) abnormalities, PAH due to other causes (chronic obstructive pulmonary disease, chronic kidney disease and sarcoidosis) and endocrinopathies were excluded from the study. A total of 42 patients were included in the study. The sample size required was calculated using Epi Info 7 (CDC, Atlanta, GA, USA). A sample size of 42 was calculated with an expected frequency of CV complications to be 30 per cent. The confidence level was 80 per cent, and absolute precision was 5 per cent. Institutional Ethics Committee approval was obtained. A written informed consent was obtained from all the patients.

The history of patients was obtained by using semi structured pre-tested interview schedule. Clinical history, examination and laboratory details were recorded. Investigations included serum bilirubin, albumin, total protein, activated partial thromboplastin time and prothrombin time/international normalized ratio, liver enzymes (alkaline phosphatase, aspartate transaminase, alanine transaminase), transthoracic echocardiography, ultrasonography abdomen and upper gastrointestinal (UGI) endoscopy.

Data were analyzed by IBM SPSS v15.0 (SPSS Inc. Chicago, IL, USA). Significance was determined using Chi-square test or Fisher's exact test.

#### **Results & Discussion**

In the study, majority of patients were males in the age group of >50 yr, which was consistent with a study in Denmark that showed incidence of cirrhosis to be higher among men<sup>3</sup>. The most common (n=26, 61.9%) presenting complaint was abdominal distension, which might be secondary to ascites, present in 31 (73.8%) patients. The most common aetiology for cirrhosis was alcoholic liver injury. A study conducted in Iceland showed that alcoholic fatty liver disease had a higher mortality and a worse survival compared to other aetiological factors<sup>4</sup>.

On UGI endoscopy, 29 (69%) patients had oesophageal varices, but pulmonary hypertension was found only in 15 (35.7%), in contrast to a study in Texas, where portal hypertension was closely associated with development of PAH<sup>5</sup>. Thirty two

patients (76.2%) were detected to have an abnormality when echocardiogram was done, which proved of clinical significance, 21.4 per cent (n=9) had both cardiac abnormalities and pulmonary abnormality. All these patients belonged to CPS Grade C, showing a pattern between these abnormalities and severity of disease (of the 42 patients, seven belonged to Grade B and 35 to Grade C).

Fifteen patients were found to have PAH. Previous studies conducted in patients with cirrhosis have found a prevalence of PAH between two and 20 per cent<sup>6-9</sup>. High occurence of PAH (35.7%) in our study could be attributed to the use of transthoracic echocardiography as opposed to precise methods such as right heart catheterization<sup>6</sup>. Fourteen of these 15 patients with CPS Grade C had mild PAH while one with CPS Grade C had moderate PAH. Although this association between CPS and PAH was not significant, it might have clinical significance. Of the 27 who did not have PAH, seven belonged to CPS Grade B and 20 to CPS Grade C.

A study conducted in Egypt did not show significant difference in echocardiographic parameters among the subgroups of CPS<sup>10</sup>, which was in agreement with other studies<sup>11-13</sup> including ours. A study from Portugal showed significant decrease in peak systolic strain of left ventricle (PSLV) in cirrhosis<sup>14</sup>. In the present study, PSLV was 22.23±7.6/sec, but it did not show any association with CPS. Diastolic dysfunction was found in 22 patients (52.3%). Of these 22, 19 were of CPS Grade B and three were of Grade C. Systolic dysfunction was not checked for. It may be significant in determining prognosis in cirrhosis and help in early diagnosis and treatment of co-existing cardiac abnormalities. Subtle diastolic and systolic impairments that are missed by conventional echocardiography may be picked up by echo parameters such as strain, strain rate from tissue-Doppler and speckle tracking echocardiography<sup>14</sup>. Thus, further studies are warranted to check for subclinical cardiovascular involvement among patients with cirrhosis.

In conclusion, no significant association was found between echocardiographic changes and CPS in patients with cirrhosis of liver. However, advising an echocardiogram for patients with cirrhosis (CPS - B and C) may prove beneficial in early screening. This needs further evaluation by larger studies, with echocardiographic modalities that can detect subtle changes in right/left ventricular function.

## Conflicts of Interest: None.

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