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Original Research Paper

General Medicine

TO STUDY THE INCIDENCE OF PULMONARY HYPERTENSION IN PATIENTS OF CHRONIC LIVER DISEASE

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ABSTRACT

Background : Cirrhosis and portal hypertension have been found to be associated with pulmonary hypertension and pulmonary dysfunction. Several clinical studies have demonstrated 20% higher prevalence of pulmonary hypertension in patients with advanced liver disease and portal hypertension. There has been increasing recognition of the importance of these pulmonary vascular complications of liver disease, with increasing realization that these complications influence survival before, during and after liver transplantation.

Aim of the Study: The primary objective of our study was to check for the prevalence of pulmonary hypertension in the patients of chronic liver disease by transthoracic echocardiography, presenting with or without symptoms suggestive of cardio-vascular involvement.

The secondary objective of this study was to plan for further study to see the effects of available drugs for pulmonary hypertension on patients with pulmonary hypertension with chronic liver disease and the use of presence of pulmonary hypertension as one of the criteria for referral to liver transplantation.

Material and Methods: This study was conducted in medicine department of MLB medical college, Jhansi from May 2018 to May 2019. 90 patients of chronic liver disease were taken as subjects and 75 age and sex matched patients without CLD were taken as controls. Based upon their symptoms, the subjects were divided into 2 groups:Group A – patients of CLD presenting with symptoms suggestive of CV involvement and Group B – patients of CLD presenting without symptoms suggestive of CV involvement

Observation: In our study, there were 72 male patients (42 in group A, 30 in group B) and 18 female patients (12 in group A and 6 in group B). Majority of the patients were above 40 years of age (60 out of total 90 patients). The cause of CLD in majority of the subjects (50%) was chronic alcoholism, in 30% it was chronic hepatitis-B while 20% had other causes. 40% of our subjects were found to have pulmonary hypertension, 44.44% of all the patients of group A and 33.33% of all patients of group B.

Conclusion: There is high incidence of pulmonary hypertension in patients of CLD and alcohol addiction is the most common cause of CLD in Bundelkhand region. Trans-thoracic echocardiography is a simple and non-invasive technique for diagnosis of pulmonary hypertension.

KEYWORDS : Portal hypertension, pulmonary hypertension, echocardiography.

INTRODUCTION

The liver is a unique organ that is connected in series between the portal system and lungs. In patients with liver diseases and / portal hypertension, constituents of venous blood arising from both liver and the portal system can directly injure the pulmonary vasculature and endothelium. Pulmonary vascular complications in liver disease or portal hypertension have long been documented in the form of porto-pulmonary hypertension (POPH) and hepato-pulmonary syndrome (HPS) producing important morbidity and mortality, including the setting of liver transplantation. There has been increasing recognition of the importance of these pulmonary vascular complications of liver disease, with increasing realization that these complications influence survival before, during and after transplantation.

Porto-pulmonary hypertension (POPH) is best defined as pulmonary arterial hypertension (PAH) associated with portal hypertension, whether or not the portal hypertension is due to underlying liver disease. Hepato-pulmonary syndrome (HPS) is characterized by triad of arterial deoxygenation, intra-pulmonary vascular dilatation and liver disease. HPS can occur with any degree of liver disease, ranging from well compensated chronic liver disease without cirrhosis to non-cirrhotic portal hypertension and cirrhosis.

In previous studies cardiac catheterization was used to diagnose PAH in patients of CLD. Recently echocardiography, a non invasive technique, is used to diagnose PAH. Echocardiography is a simple non invasive technique which replaced invasive catheterization to rule out hepato pulmonary syndrome.

The primary objective of our study was to check for the prevalence of pulmonary hypertension in the patients of chronic liver disease by trans-thoracic echocardiography, presenting to the medicine in patient department, with or without symptoms suggestive of cardio-vascular involvement. We also analyzed causative factors prevailing in the region (Bundelkhand) for causing CLD.

OBJECTIVES

- The primary objective of our study was to check for the prevalence of pulmonary hypertension in the patients of chronic liver disease by trans-thoracic echocardiography, presenting with or without symptoms suggestive of cardiovascular involvement.
- To plan for further study to see effects of available drugs for pulmonary hypertension with chronic liver disease and the use of the presence of pulmonary hypertension as one of the criteria for referral to liver transplant.

MATERIAL AND METHODS

This cross sectional study was conducted on patients

admitted to the medicine wards of Maharani Laxmi Bai Medical College, Jhansi after obtaining ethical clearance from the institutional ethics committee. Informed consent was taken from the participants prior to the study. In our study, 54 patients of chronic liver disease presenting with symptoms suggestive of cardiovascular involvement and 36 patients without these symptoms were screened by clinical examination, blood investigations, USG abdomen, chest X-Ray, ECG and trans-thoracic echocardiography [the following symptoms breathlessness, pedal edema, cough, dizziness, palpitations, chest pain were considered to be suggestive of cardio-vascular involvement]. We also examined 75 age and sex matched controls [excluding CLD].

We excluded patients of interstitial lung disease (ILD), chronic obstructive airway disease (COAD), valvular heart disease, cardiomyopathy and pulmonary tuberculosis both from the study and control groups.

A total of 90 patients of CLD and 75 controls were examined using the echocardiography machine of our department (HITACHI ALOKA Alpha 6) PNDT/ACT/94/2016, for RV dimensions, contractibility and evidence of pulmonary hypertension or RV systolic function by tricuspid valve annular motion technique.

Grading of Pulmonary Artery Hypertension by echo cardiography:

SRVP = $4*TRV^2 + RAP$

PAP = $4*TRV^2$

Severity	SPAP
Mild	>35 mmHg
Moderate	>50 mmHg
Severe	>60 mmHg

SRVP- systolic right ventricular pressure; TRV- tricuspid regurgitation velocity; RAP- right atrial pressure; PAP- pulmonary artery pressure]

Calculation of RAP

IVC Diameter (cm)	Response to sniff	RA Pressure (mmHg)
≤2.1	>50% collapse	3
≥2.1	<50% collapse	8
>2.1	<50% collapse	15

Other factors included right atrial volume index, inferior vena cava diameter, eccentricity index, presence of pulmonary embolism and TAPSE in grading.

Data collected was entered into Excel. Chi-square and Fischer's exact test were done for qualitative data. Bivariate analysis was done to identify selected risk factors for the outcome.

OBSERVATIONS

Table 1: Demographic variables among patients of group A and group B

Variables	Group A (N=54)	Group B (N=36)	Controls (N=75)
Sex			
Male	42	30	60
Female	12	6	15
Age			
<40 years	18	12	25
>40 years	36	24	50
Residence			
Urban	36	9	
Rural	18	27	

In our study, there were 72 male patients (42 in group A, 30 in group B) and 18 female patients (12 in group A and 6 in group B). Majority of the patients were above 40 years of age (60 out of total 90 patients).

Chart 1: Graphical representation of male :female ratio among patients of group A and group B

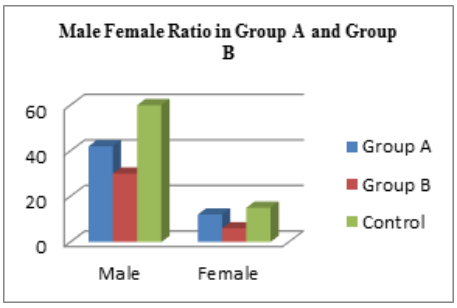


Chart 2: Graphical representation of causative agents of CLD.

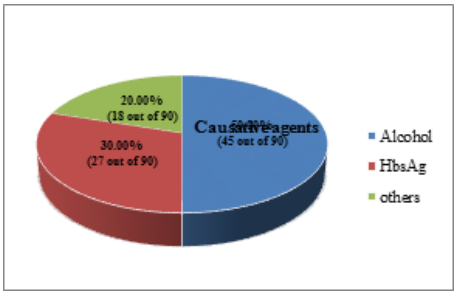


Chart 3: Graphical representation of age distribution in group A Group B.

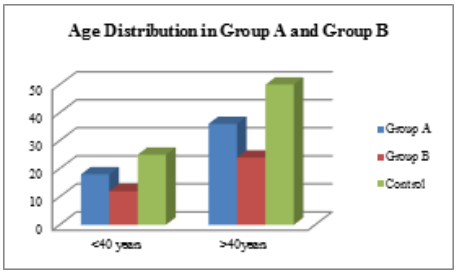


Table 2: Prevalence of Pulmonary Hypertension in patients of Group A and Group B

	Present	Absent
Group A	24 (44.44%)	30 (55.55%)
Group B	12 (33.33%)	24 (66.67%)
Controls	04 (5.33%)	71 (94.66%)

Chart 4: Graphical representation of severity of RV enlargement

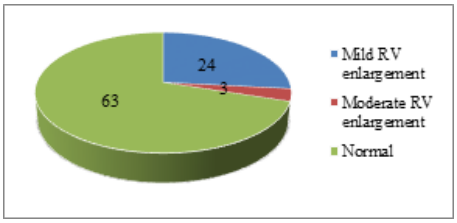
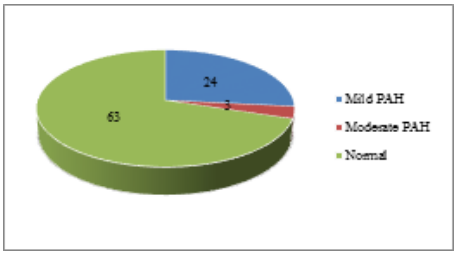


Chart 5: Graphical representation of prevalence and severity of pulmonary artery hypertension (PAH)



26.66% of our subjects (24 out of 90) were found to have mild PAH, 3.33% (3 out of 90) had moderate PAH, while none of the subjects in our study had severe PAH as assessed using trans thoracic echo cardiography.

In our study, all of the subjects of both the groups were found to have normal findings of ECG, chest X-ray and right ventricular systolic function.

Chart 6: Graphical representation of USG abdomen findings

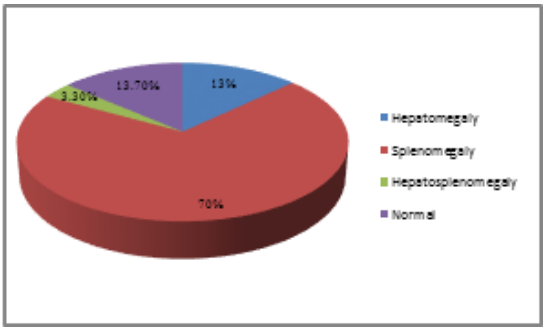
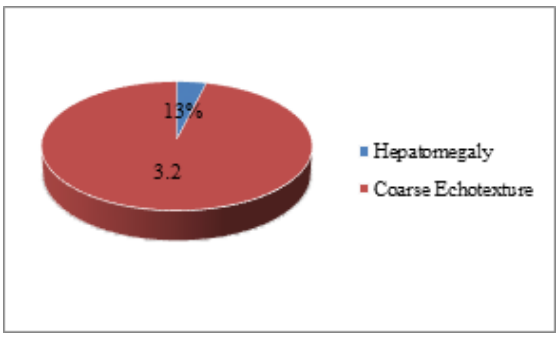


Chart 7: Graphical findings of USG findings of liver



DISCUSSION

Chronic liver diseases (CLDs) are a set of diseases characterized by decreased hepatic function as a result of chronic inflammation or insult to the liver. These can progress through stages of fibrosis to the end stage disease, cirrhosis. Cirrhosis is irreversible and is defined by fibrosis, damage and regeneration of hepatocytes, altered hepatic architecture and decreased hepatic function. The patients of CLDs may suffer from complications like hepato-renal syndrome, hepato-pulmonary syndrome and porto-pulmonary hypertension.

Pulmonary hypertension is the resting mean pulmonary arterial pressure in excess of 25mmHg. Pulmonary involvement is common in patients with portal hypertension and can manifest in diverse manners. Changes in pulmonary arterial resistance, manifesting either as hepato-pulmonary syndrome or porto-pulmonary hypertension (PPHTN), have been increasingly recognized in these patients in recent years. Porto-pulmonary hypertension is combination of portal hypertension and pre-capillary pulmonary hypertension. Several clinical studies and autopsy findings have demonstrated a 20% higher prevalence of pulmonary hypertension in patients with advanced liver disease and portal hypertension, the histological findings of which show features similar to those seen in pulmonary hypertension from other causes.

In our study, we screened 90 patients of chronic liver disease for symptoms suggestive of cardio-vascular complications and presence of pulmonary hypertension by chest X-ray, ECG, echocardiography along with the routine blood investigations and USG abdomen. The findings of chest X-ray and ECG were normal in all of the subjects. The ultrasonography of abdomen revealed that all of our patients had ascitis, 70% (66 out of 90) patients had splenomegaly, 13.33% (12 out of 90) patients had hepatomegaly, 3.33% (3 out of 90) patients had hepatosplenomegaly while the rest had small liver with course echo-texture.

44.44% of patients of group A (i.e. those with symptoms of CV involvement) were found to have pulmonary hypertension and 33.33% of patients of group B (i.e. those without symptoms of CV involvement) indicating that even in the absence of symptoms pulmonary hypertension can be present in patients with chronic liver disease. It was also found that presence of pulmonary hypertension was not in relation with the severity and duration of CLD.

CONCLUSION

1) The study concludes that there is high incidence of pulmonary hypertension in patients of CLD
2) Trans-thoracic Echocardiography is a simple and non-invasive technique for diagnosing pulmonary hypertension in patients of CLD
3) Alcohol addiction is the most common cause of CLD in Bundelkhand region (preventable cause)
4) Presence of pulmonary hypertension does not correlate with the severity of underlying liver disease (to be confirmed by further studies).

REFERENCES:

1) Savale L et al, Presse Med. 2014- Pulmonary hypertension in liver diseases
2) Adriana V. Gurgheah and Iona A. Tudor- Pulmonary hypertension in patients with hepatic cirrhosis and portal hypertension, en echographic study
3) Lamps LW, Carson K, Bradley AL, Pinson CW, Johnson JE, Coogan AC, Hunter EB, Clavien PA, Washington MK- Pulmonary vascular morphological changes in cirrhotic patients undergoing liver transplantation.
4) SS Salvi- Liver disease and pulmonary hypertension.
5) Rowen K. Zetterman – Pulmonary complications of cirrhosis
6) Mateo Porris- Aguilar, Jose T Altemirano, Aldo Torre-Delgadillo, Michael R Charlton and Andres Duarte- Rajo : Pulmonary hypertension and hepato-pulmonary syndrome : a clinician oriented overview
7) Lewis J Rubin : Pulmonary hypertension
8) Micheal J Krowko, Robert Robriguez- Roisin, Alvar Agusti: Hepato-pulmonary disorders : Gas exchange and vascular manifestations in chronic liver disease.
9) Luke S.Howard, Julia Grapsa, David Dawson, Micheal Bellamy, John B.Chambers, Navroz D. Manasi, Petros Nihoyannopoulos and J. Simon R. Gibbs: Echocardiographic assessment of pulmonary hypertension: standard operating procedure.