



PREVALENCE OF HEPATOPULMONARY SYNDROME IN PATIENTS WITH CIRRHOSIS OF LIVER

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ABSTRACT

Cirrhosis of liver is a very common disease which clinicians encounter both at primary and tertiary care. Development of pulmonary manifestations in cirrhosis has several clinical implications with regard to their management, since they carry a poor prognosis. These include pleural effusion, restrictive and obstructive lung disease, Hepatopulmonary syndrome and portopulmonary syndrome. Hepatopulmonary Syndrome (HPS) is a triad of liver disease, hypoxemia and intrapulmonary vascular dilatation. The reported prevalence of HPS in cirrhotic patients varies between 4% and 19%.

AIMS & OBJECTIVES: To study the pulmonary profile in patients with cirrhosis with reference to arterial hypoxemia. To detect the presence of hepatopulmonary syndrome among cirrhotic patients.

MATERIAL & METHODS: Patients admitted in Kanyakumari Government medical college, Asaripallam with cirrhosis of liver, proven by clinical, sonographic and endoscopy evidence, fulfilling the inclusion and exclusion criteria were included in the study. Data was collected in a pretested proforma meeting the objectives of the study. 40 cases were selected on the basis of the simple random sampling technique. Patients were investigated for Arterial blood gas analysis, Spirometry and Contrast Echocardiogram. Relevant Statistical methods were applied

RESULTS: In our study, Cirrhosis was common in young adults in the fourth decade with male to female ratio of 3.5:1. The most common respiratory system finding was right pleural effusion and it was the most common chest radiographic abnormality. Restriction was the most common abnormality in pulmonary function tests. Hypoxemia was present in 17.5% of cirrhotics, out of which 4 patients (10%) were found to have Hepatopulmonary Syndrome (HPS). Orthodeoxia was the characteristic feature of the patients who had HPS. All 4 patients with HPS presented with cyanosis, orthodeoxia and spider naevi.

CONCLUSION: The feature of our study was the detection of hypoxemia in patients with cirrhosis of liver. Degree of hypoxemia worsens with higher grade of varices. Severity of liver disease also worsens hypoxemia. Hepato pulmonary syndrome was seen in 10% of patients with cirrhosis. The prevalence of HPS is influenced by the severity of liver disease. The only proven treatment for HPS is liver transplantation. As prognosis of HPS is poor, screening for its presence in cirrhotic patients is very important.

KEYWORDS : Hepato pulmonary syndrome, cirrhosis

INTRODUCTION

Cirrhosis of liver is a very common disease which clinicians encounter both at primary and tertiary care. Cirrhosis is associated with several complications and overall carries a poor prognosis. The management of cirrhosis includes early detection and treatment of various complications like hepatic encephalopathy, coagulopathy, ascites, hepatorenal syndrome etc. Recently there has been an increased interest in literature about pulmonary manifestations of cirrhosis of liver which are equally important and has been relegated to background both in Indian and western countries.

Development of pulmonary manifestations of cirrhosis has several clinical implications with regard to their management, since they carry a poor prognosis. Cirrhosis and portal hypertension are associated with pulmonary manifestations that affect the pleura, lung parenchyma, and pulmonary vasculature. Dyspnea and hypoxemia are the predominant presentations. The pulmonary disease manifestations include pleural effusion, obstructive lung disease, restrictive lung disease, impairments of pulmonary gas exchange (Hepatopulmonary syndrome) etc.¹

Hepatopulmonary Syndrome (HPS) is a triad of Hypoxemia, Pulmonary vascular dilatation, Liver disease. About 4% to 19% prevalence rate of HPS is observed in patients with cirrhosis.² Most cases have occurred in patients with cirrhosis & portal hypertension. The prognosis of HPS is poor in cirrhosis. Aim of our study is to study the pulmonary profile in patients with cirrhosis with reference to arterial hypoxemia. To detect the presence of hepatopulmonary syndrome among cirrhotic patients.

Materials And Methods

Patients admitted in Kanyakumari government medical college, Asaripallam diagnosed to have Cirrhosis of liver, fulfilling the inclusion and exclusion criteria were included in the study group. 40 such patients were taken up for this study done as an observational study for a period of 18 months from October 2019 to march 2021 Patients with coexisting primary pulmonary diseases like COPD, Bronchial asthma, ILD etc. Coexisting intrinsic heart disease., Patients with life threatening complications of cirrhosis like active upper

gastrointestinal hemorrhage, hepatic encephalopathy. Smokers. were excluded from the study 40 patients were selected on the basis of simple random sampling. They were subjected to detailed history taking and clinical examination. Required blood and radiological investigations were done. Echocardiogram, arterial blood gas analysis and Pulmonary function test was done. Hepatopulmonary syndrome in cirrhosis identified by Delayed positive contrast echocardiography, microbubble visualization in left atrium occurring within 3 to 6 beats after its visualization on right side, abnormal oxygenation, PaO₂ <70mmHg or, P(A-a) O₂ >20mmHg in any position (supine, standing). Data were analysed using the SPSS software. Statistical significance was indicated by the Chi square test. Variables were considered to be significant if p<0.05

Observation And Results

Most cases of cirrhosis (13 patients) occur in the age group of 31-40 (32.5%) years, followed by 25% of cases in 41- 50 age group and 22.5% cases in 51- 60 age group. Male preponderance was there with a male: female ratio of 3.5: 1, 31patients (78%) were males and 9 patients (22%) were females.

Coming to etiology the most common cause for cirrhosis in the study group was alcohol seen in 24 patients (60%). Followed by hepatitis virus few patients had other causes too. In our study, abdominal distension was the most common presenting symptom present in 30 patients (75%). The most common respiratory symptom was cough present in 10 patients (25%) followed by breathlessness in 7 patients (17.5%). Jaundice was present in 27 patients followed by swelling of legs in 22 patients' fever in three cases and fatigue in 16 patients.

Next we analysed signs, Clubbing was seen in 13 (32.5%) patients. Out of the 40 cirrhotic patients, cyanosis was seen in 4 patients (10%), spider naevi were seen in 8 patients (20%). In our study, respiratory system examination showed pleural effusion in 10 patients (25%) which is the most common pulmonary finding in patients with cirrhosis of liver. Ascites was present in 30 patients (75%) whereas ascites was absent in 11 patients (25%). In our study of 40 patients, splenomegaly was predominantly present in 38 patients (95%)

On Chest X ray examination, in our study right sided pleural effusion was seen in 7 patients (17.5%), left sided pleural effusion was seen in 1 patient (2.5%), bilateral pleural effusion was seen in 2 patients (5%), cardiomegaly was seen in 3 patients (7.5%) and normal chest x-ray was seen in 27 patients (67.5%).

Upper GI endoscopy was done in all patients and in our study, 17 patients (42.5%) showed Grade 1 varices, 16 patients (40%) showed Grade 2 varices and 7 patients (17.5%) showed Grade 3 varices. PFT was done and 29 patients (72.5%) showed normal pulmonary function tests by spirometry whereas 11 patients (27.5%) showed restrictive pattern of lung disease. In our study, cardiovascular system examination was normal in 29 patients (72.5%) whereas Ejection systolic murmur (ESM) was present in 11 patients (27.5%).

In our study of 40 cirrhotic patients, hypoxia (PaO₂ <70 mm Hg) was present in 7 patients (17.5%). In our study of 40 cirrhotic patients, 8 patients (20%) were in Child- Pugh class A, 20 patients (50%) were in Child-Pugh class B and 12 patients (30%) were in Child-Pugh class C. In our study, 4 patients (10%) showed intrapulmonary shunting in contrast echocardiogram. In our study Hepato pulmonary syndrome was present in 4 (10%) of patients.

Table1. Prevalence Of Hepatopulmonary Syndrome Among Cirrhotics

Hepatopulmonary syndrome (Hypoxia + IPS)	Frequency	Percent
Present	4	10
Absent	36	90
Total	40	100

In our study, PaO₂ was compared with the grading of varices. It was found that there was a decrease in PaO₂ with severity of varices which was statistically significant with p-value 0.01 In our study, FEV1 was compared with the grading of varices. It was found that there was no significant correlation between FEV1 and grading of varices.

Table 2: Correlation between FEV1 and PaO₂ with grading of varices

	Grading of varices	Mean	SD	CORRELATION	P VALUE
PaO ₂	1	77.94	3.83	-0.43	0.01
	2	76.69	7.17		
	3	74.57	12.30		
FEV1	1	88.21	6.69	-0.19	0.23
	2	82.68	13.25		
	3	83.64	10.45		

In our study, PaO₂ was correlated with the severity of liver disease (by Child-Pugh class). It was found that there was a decrease in PaO₂ with severity of liver disease which was statistically significant with p-value 0.01. In our study, PFT was correlated with the severity of liver disease among the study group. No significant correlation was obtained from our study and it is not statistically significant.

Table 3. Correlation Between Child-pugh Class & Hps

		HPS		Total	Chi square	p value
		YES	NO			
Child Pugh class	A	0	8	8	10.370	0.006
	B	0	20	20		
	C	4	8	12		
Total		4	36	40		

In our study, prevalence of HPS was correlated with the severity of liver disease (by Child-Pugh class). All the 4 patients with HPS were under Child-Pugh class C. This indicates that the prevalence of HPS increases with increasing severity of liver disease. This was statistically significant in our study with p-value 0.006.

DISCUSSION

Our study was conducted in patients with cirrhosis of liver to know the prevalence of hepato-pulmonary syndrome. Our study population included 40 patients who were diagnosed as cirrhosis of liver either by clinical, endoscopic or sonographic evidence. All 40 patients were evaluated for presence of hypoxemia and were screened for the presence of hepato-pulmonary syndrome. Analysis was made to study the correlation between hypoxemia & severity of liver disease, hypoxemia & grading of varices, and to establish the correlation

between severity of liver disease and prevalence of hepato-pulmonary syndrome using Chi-square test. Following were the observations made from our study in cirrhotic patients.

Out of 40 patients, majority of cases were in the age group of 31-40 years (32.5%). This showed that cirrhosis is most commonly seen in young adults. Out of 40 patients in this study, 31 patients (77.5%) were males and 9 patients (22.5%) were females. Male to female ratio is 3:1.

Among 40 patients, Alcohol was the most common etiology in 24 patients (60%) followed by other causes of cirrhosis in 11 patients (27.5%). This can be compared to studies of De BK et al.,³ Rao MY et al.⁴

Among the presenting complaints, abdominal distension was most common symptom present in 30 patients (75%). The most common respiratory symptom was cough present in 10 patients (25%) followed by breathlessness in 7 patients (17.5%) Out of 40 patients studied, 38 patients (95%) had Splenomegaly, 30 patients (75%) had ascites. Clubbing was present in 13 patients (32.5%), cyanosis in 4 patients (10%) and spider naevi in 8 patients (20%). Splenomegaly was the significant finding in patients of cirrhosis and it indicates the presence of portal hypertension.

In our study, out of 40 patients, 20 patients (50%) were in class B, 12 patients (30%) were in class C and 8 patients (20%) were in class A. Majority of patients were in class B. Child-Pugh class is a good indicator of the severity of liver disease. It is used to assess the patients for liver transplantation

In respiratory system pleural effusion was the commonest examination finding present in 10 patients (25%). Right sided pleural effusion was more common. This was similar to study conducted by Hourani et al.⁵

The most common radiographic finding was Right sided pleural effusion seen in 7 patients (17.5%) followed by bilateral pleural effusion in 2 patients (5%) and left sided pleural effusion in 1 patient (2.5%). This finding was similar to that seen in the study of Hourani et al.⁵ The most common endoscopic finding was Grade 1 varices present in 17 patients (42.5%) followed by Grade 2 varices in 16 patients (40%) and Grade 3 varices in 7 patients (17.5%)

Out of 40 patient, 7 patients (17.5%) showed hypoxemia with PaO₂ <70 mm Hg which was comparable to a study of Lange P A et al.⁶ Clinical signs of hypoxemia like cyanosis was present in 4 patients (10%), orthodeoxia in 4 patients (10%) which were similar to the finding observed by Krowka et al.⁷

The correlation between partial pressure of oxygen (PaO₂) and grading of oesophageal varices was done in this study. It was observed that there was a decrease in PaO₂ with higher grade of varices. This was statistically significant with p-value of 0.01. It was similar to the observations in the study of Zhang HY et al.⁸

The correlation between PaO₂ and severity of liver disease was also done. It was observed that there is progressive decrease in PaO₂ with increasing severity of liver disease. This was statistically significant in our study. PaO₂ was more decreased in patients with Child-Pugh class C than other classes.

In pulmonary function tests, a restrictive pattern was the most common abnormality present in 11 patients (27.5%). A restrictive pattern of PFT could be observed in 25% of cases while 3.4% cases have an obstructive pattern. The above observation in our study was similar to the study of Rao MY et al.⁴ The correlation between predicted values of Forced Expired Volume in One Second (FEV1) with grading of varices as well as with the severity of liver disease was done in this study. It was observed that no significant correlation exists between predicted values of FEV1 and grading of varices & severity of liver disease.

Out of 40 patients in our study, HPS was identified in 4 patients (10%). All 4 patients had hypoxemia (PaO₂ <70 mm Hg) and intra pulmonary shunting as established by contrast echo. They all had varices indicating portal hypertension. Hence increased portal venous pressure is a significant factor for development of HPS. The prevalence of HPS in cirrhotics in this study was comparable to studies conducted by Schenk P et al.² Krowka et al.,⁷ De BK et al.,³ Rao MY et al.,⁴ and Hourani et al.⁵

Orthodeoxia was present in all 4 patients who had HPS. All 4 patients of HPS had spider angiomas. This can be compared with other studies including De BK et al.,⁹⁵ Hourani et al.,⁹⁷ and Krowka et al.⁷

In this study correlation between prevalence of HPS and severity of liver disease was done. It was observed that prevalence of HPS was increased with the increasing severity of liver disease. All 4 patients of HPS in this study were under Child-Pugh class C.

CONCLUSION

Development of pulmonary manifestations of cirrhosis has several clinical implications with regard to their management, since they carry a poor prognosis. Diagnosis of HPS needs a high index of suspicion among cirrhotics. As the prognosis of HPS poor, all patients with cirrhosis of liver must be screened for the presence of hypoxemia and HPS. The only proven treatment for HPS is liver transplantation. All patients with HPS showed hypoxemia and intrapulmonary shunting on contrast echocardiogram. The clinical markers of hypoxemia such as cyanosis, orthodeoxia were seen in all patients of HPS. All the patients with HPS had esophageal varices indicating the presence of portal hypertension. Elevated portal pressure probably is a significant factor for the development of HPS. Hypoxemia worsens with higher grade of varices and increasing severity of liver disease. Significant correlation exists between HPS prevalence and severity of liver disease. HPS is commonly underdiagnosed. Screening for HPS is important in patients with cirrhosis of liver.

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