



ORIGINAL RESEARCH PAPER

General Medicine

A PROSPECTIVE CLINICAL ANALYSIS OF PULMONARY PROFILE IN PATIENTS WITH CIRRHOSIS OF LIVER WITH REFERENCE TO ARTERIAL OXYGEN SATURATION AND PULMONARY FUNCTION TESTS.

KEY WORDS:

Hepatopulmonary Syndrome, pulmonary function test, Child Pugh Score.

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ABSTRACT

BACKGROUND: Cirrhosis of liver and its complications including pulmonary dysfunction are a major cause of death among adults and have several clinical implications with regard to their early detection and management.

OBJECTIVES OF THE STUDY: Evaluation of patients for pulmonary manifestations in cirrhotic patients with special reference to arterial hypoxemia and lung function.

METHODOLOGY: A prospective analysis of cirrhotic patients fulfilling the inclusion and exclusion criteria.

RESULTS: The prevalence of arterial hypoxemia in cirrhotic patients was present in 10 %, out of which 66.6% patients were detected to have Hepatopulmonary Syndrome (HPS). The severity of hypoxemia was positively correlated with severity of liver disease assessed by Child Pugh Score.

CONCLUSION: Liver cirrhosis is associated with pulmonary complications. The early identification is crucial as it affects the prognosis and guides the further management.

INTRODUCTION:

A very common disease which clinicians encounter both at primary and tertiary care is cirrhosis of liver. It 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. The pulmonary disease manifestations include pleural effusion, obstructive lung disease, restrictive lung disease, impairment of pulmonary gas exchange (Hepatopulmonary syndrome) etc¹. Hypoxia has been found in one third of patients with chronic liver disease.²

Pathogenesis of hypoxemia in chronic liver disorder is multifactorial; nevertheless, ascites, hepatopulmonary syndrome, extreme hepatomegaly, low albumin levels, anaemia, increased closing volume and respiratory muscle weakness are still implicated as factors for hypoxemia.³

Most of the authorities are of the opinion that there is a need for further study regarding pulmonary complications (including HPS) of cirrhosis of liver. Hence this study has been undertaken in Meenakshi Medical College Hospital and Research Institute Hospital (tertiary care, teaching hospital) for the study of the clinical profile of pulmonary manifestations in patients with cirrhosis of liver.

MATERIALS AND METHODOLOGY:

AIM OF THE STUDY: Evaluation of pulmonary dysfunction in cirrhotic patients with reference to pulmonary function test and Child Pugh Score.

SOURCE OF DATA:

Patients admitted in the Department of General Medicine and Medical Gastroenterology in Meenakshi Medical College Hospital and Research Institute Hospital, during May 2018 to May 2019 diagnosed to have cirrhosis of liver fulfilling the inclusion and exclusion criteria were included in the study group.

METHOD OF COLLECTION OF DATA:

Data was collected in a pretested proforma meeting the objectives of the study. 90 cases were selected on the basis of the simple random sampling technique. The size of the sample was on the basis of a suitable formula of sampling.

INCLUSION CRITERIA:

- 1) Patients with cirrhosis of liver proven by clinical, laboratory investigations, endoscopic and sonographic evidence.
- 2) Age above 18 years,
- 3) including males and females.

EXCLUSION CRITERIA:

- 1) Patients of Age below 18 years.
- 2) Patients with coexisting primary pulmonary diseases.
- 3) Coexisting intrinsic heart disease.
- 4) Patients with life threatening complications of cirrhosis like active upper gastrointestinal haemorrhage, hepatic encephalopathy.
- 5) Smokers.

- The following investigations were done for the study, Complete Blood count, Liver function test, Blood urea, Serum creatinine and Serum electrolytes, Chest X ray, Electrocardiogram, Abdominal ultrasound, Upper GI Endoscopy, Viral markers (HBsAg, Anti HCV), Arterial blood gas analysis, Pulmonary function tests.
- Evaluation the degree of liver disease severity.

Using The Child-Pugh Score: Three tests (bilirubin, albumin, and prothrombin time), with the presence and severity of encephalopathy and ascites, are included in the Child-Pugh Score⁴. The Child-Pugh Score is given by the sum of the score (1 to 3) of each of the five parameters. A score of 6 or lower defines the patient as class A, 7 to 9 as class B, and 10 or higher as class C.

All statistical calculations (Frequencies, Descriptive, Independent "T" test, cross tabs and One way Anova) were carried out through the SPSS version 20 software.

RESULTS:

The study included 90 patients diagnosed to have cirrhosis of liver. Cirrhosis was common in the age groups of 36 years to 45 years with mean age of 52years. Out of 90 patients with cirrhosis of liver, 68 patients (75%) were males and 22 patients (25%) were females in the ratio of 3:1. Examination of respiratory system revealed Pleural effusion as commonest clinical finding in 11 (18.3%) patients followed by consolidation in (3.4%) patients.

Distribution of aetiologies of cirrhosis among cases. Out of 90

patients, 43 patients (47.78%) had alcohol associated cirrhosis, 27 patients (30%) cryptogenic cirrhosis 16 patients (17.78%) had Hepatitis B virus associated cirrhosis and 4 patients (4.44%) had hepatitis C related cirrhosis. (Table 1)

Table 1: Aetiologies of cirrhosis of liver.

Aetiology	No. of Cases
Alcoholic	43
Cryptogenic	27
HBV	16
HCV	4

In our study, the most common abnormality in pulmonary function tests was restriction, seen in 38 patients (35 %) and only 6 patients (7%) had obstructive changes. (Figure 1) and

the rest of 44 patients had normal pulmonary function test

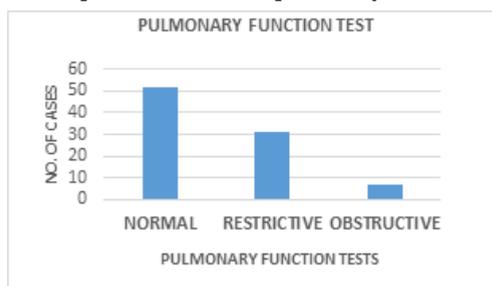


Fig.1. Pulmonary Function Test in liver cirrhosis patients.

Table 2: Descriptive comparison of Child Pugh Score with variables of Arterial blood gas analysis and Pulmonary function tests in the study group.

	Child Pugh Score	No. of patients	MEAN	STD DEVIATION	MINIMUM	MAXIMUM	P value
PAO2	A	33	81.3	4.08	76	94	<0.001 (significant)
	B	42	76.62	5.10	63	85	
	C	15	71.01	6.12	60	80	
FEV1	A	33	87.93	11.47	55	97	0.003 (significant)
	B	42	83.62	6.95	59	96	
	C	15	74.29	4.23	60	80	
FVC	A	33	86.5	12.40	48	99	0.027 (significant)
	B	42	83.28	8.75	55	98	
	C	15	75.14	9.85	57	96	

When PaO2 was analysed with Child Pugh Score, it was found that there was a decrease in PaO2 with severity of cirrhosis which was statistically significant (P <0.001) between and within groups. (Figure 2)

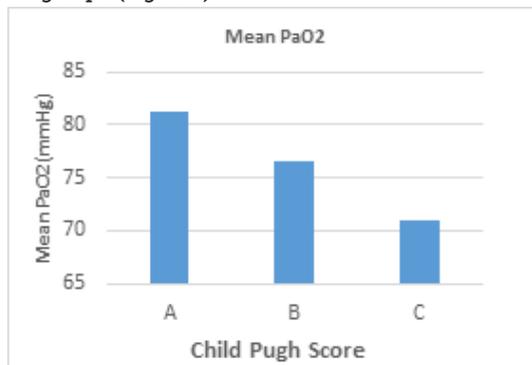


Fig.2. Mean PaO2(mmHg) in liver cirrhosis patients.

When FEV1 was analysed with Child Pugh Score, it was found that there was decrease in FEV1 with severity of cirrhosis which was statistically significant (p - 0.003) between and within groups. (Figure 3)

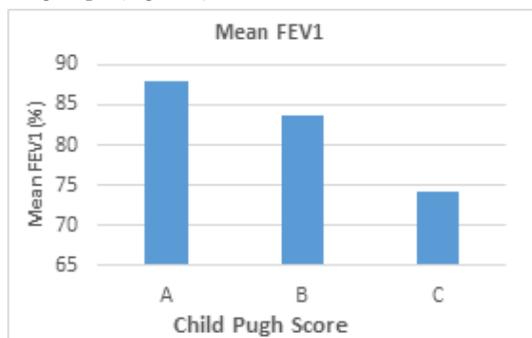


Fig.3. Mean FEV1(%) in liver cirrhosis patients.

When FVC was analysed with Child Pugh Score, it was found that there was decrease in FVC with severity of varices which was statistically significant (p- 0.027) between and

within groups.(Figure 4)

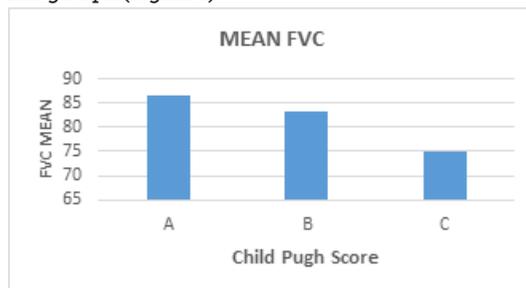


Fig.4. Mean FVC (%) in liver cirrhosis patients

DISCUSSION:

The study population consisted of 90 patients diagnosed to have cirrhosis of liver and evaluation of above patients for presence of pulmonary manifestations and identify aetiology of hypoxemia.

Age:

Cirrhosis was common in the age groups of 36 years to 45 years with mean age of 52 years, which was similar to study of Anand AC et al.⁵

Sex:

Out of 90 patients with cirrhosis of liver, 68 patients (75%) were males and 22 patients (25%) were females in the ratio of 3:1.

Aetiology:

Alcoholic cirrhosis was the commonest etiology in 43 patients (47.78%) followed by Cryptogenic cirrhosis in 16 patients (17.78%) as compared to studies of De BK et al.⁶, Rao MY et al.⁷

Hypoxemia:

Hypoxemia was seen in 10% of patients which was comparable to a study conducted by Lange PA et al.⁸ In this study correlation between Partial Pressure of Oxygen (PaO2) and Saturation of Oxygen (SaO2), with Child Pugh Score was done. It was observed that there was progressive decrease in PaO2 and SaO2 values as the Child Pugh Score increased which was statistically significant between and within the

groups as similar to study done by Zhang HY et al.⁹ and Schenk P et al.¹⁰

Hepatopulmonary syndrome:

In this study, Hepatopulmonary syndrome was found in 3 patients (5%) which was comparable to studies done by Schenk P et al.¹⁰, Krowka et al.¹¹. Orthodeoxia was the characteristic feature of the three patients who had HPS. Comparable results were seen in other studies including De BK et al.⁶, Anand AC et al.⁵.

Pulmonary function tests:

In our study, the most common abnormality in pulmonary function tests was restriction, seen in 38 patients (35%) and only 6 patients (7%) had obstructive changes as similar to study by Rao MY et al.⁷ In this study correlation between predicted values of Forced Expired Volume in One Second (FEV1), Forced Vital Capacity (FVC) and Peak Expiratory Flow Rate (PEFR) with grading of Child Pugh Score, it was observed that there was progressive decrease in predicted values of FEV1 as the Child Pugh Score increased which was statistically significant between and within the groups as similar to study done by Schenk P et al.¹⁰ Similar results were obtained for predicted values of FVC and PEFR which was statistically significant between the groups. However, predicted values of PEFR were not statistically significant within the groups. The pulmonary changes discovered in cirrhotic patients are related to the degree of hepatic affection.

CONCLUSION:

This study concludes that, the pulmonary function abnormalities were seen in patients with liver cirrhosis, restrictive ventilator defect being more common compared to obstructive ventilatory defect. With regard to pulmonary function test, FEV₁ and FVC values were discovered to be less in the Child-Pugh C group, when compared to Child-Pugh A & B group. The severity of hypoxemia was proportionally increased with increasing severity of hepatic dysfunction.

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