A Study of Hepatopulmonary Syndrome in Patients of Chronic Liver Disease in North Indian Population

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Introduction
Liver is the largest organ of body and about 1.5 kg in average adult human. The basic functional unit of liver is lobule which is cylindrical, several mm in length and 0.8 to 2 mm in diameter. Cirrhosis is the most common condition associated with HPS. The cause of liver disease leading to portal hypertension does not seem to affect the development of HPS. Kennedy et al.1,2 first defined HPS in 1977. HPS is characterized as a triad: liver disease, intrapulmonary vascular dilatation and arterial hypoxemia. HPS has been reported in patients with prehepatic portal hypertensionin the absence of chronic liver disease, in Budd-Chiari syndrome and even in patients with acute or chronic inflammatory liver disease without evidence of cirrhosis or portal hypertension3-7 The presence of HPS increases mortality in affected patients. No effective medical therapies are available for HPS, although liver transplantation reverses the syndrome in most patients. In clinical studies, the increase of nitric oxide production in the lung plays a role in HPS pathogenesis8-13. When compared with cirrhotic control patients, exhalation NO levels increase in the cases with cirrhotic HPS.

Materials and Methods
An observational cross sectional study was conducted at S.N. Medical College and hospital, Agra in P.G. Department of Medicine. Cases for study were taken from the patients attending regular medicine outpatient department, patients admitted in hospital wards, patients attending the specialty outpatient department of gastroenterology and hepatology.

Inclusion Criteria
Patient who are known case of chronic liver disease.
1) Patient having essentially near normal chest radiograph.
2) Patient age more than 10 yrs
3) Patient who are non-smokers and not having history of chronic respiratory disease.

Exclusion Criteria
1) Patient who are critically ill.
2) Patient having lower respiratory tract infection.
3) Patient having lung parenchyma disease like tuberculosis or chronic obstructive pulmonary disease etc
4) Patient having cardiovascular disorder
5) Patient who did not give their consent to be part of study.
Observation

Table 1: Sex Distribution

|       |       |
|-------|-------|
| Male  | 80%   |
| Female| 20%   |

Study comprises total of 80 patients who are fulfilling the inclusion criteria, 64 were male and 12 were female as shown in pie chart.

Table 2: Distribution of patients according to age group

| Age Group | Percentage |
|-----------|------------|
| 15-25 yrs | 5%         |
| 26-35 yrs | 10%        |
| 36-45 yrs | 20%        |
| 46-55 yrs | 33%        |
| 56-65 yrs | 20%        |
| 66-75 yrs | 14%        |
Table 3: Distribution of patients according to diagnosis

| Diagnosis            | Percentage |
|----------------------|------------|
| CLD with PHTN        | 95%        |
| NCPF                 | 2%         |
| EHPVO                | 2%         |
| Others               | 1%         |

Patients are categorised as having CLD with portal hypertension, NCPF, EHPVO and others. Maximum number of cases were CLD with portal hypertension 95% while that of EHPVO and NCPF were 1% each.

Table 4: Distribution according to cause of CLD

Patients in various groups are divided on the basis of cause of CLD (alcohol, viral, NASH, others)

| Cause       | Percentage |
|-------------|------------|
| Alcohol     | 67%        |
| Viral       | 18%        |
| NASH        | 11%        |
| Others      | 3%         |

Among causes of CLD in maximum number was alcoholic 67% of total while that of viral 18%, NASH 11% others 3%.
Table 5: Distribution according to ABG findings

|                          |       |
|--------------------------|-------|
| Saturation difference in Supine and upright position (>4 mm Hg) | 14.5% |
| P(A-a)O2 mm Hg (>15)     | 33.3% |
| Shunts on CEE            | 6.6%  |

On ABG alveolar to arterial saturation difference of >15mm of Hg was found in 33.3% (20), on ABG analysis po2 was 80.63mm of Hg, spo2 difference of > 4mm of Hg was found in 4 (13.3%) patients. 4 patients were found to have shunts on CEE. So 4(6.6%) patients fulfilling the triad were assigned to have HPS. in 8(13.3%) patient out of 60 difference in spo2 was pathological. Out of all 8 patients with pathological spo2 6(75%) had CTP score C, while 2 had score B. out of all 8 patients with pathological spo2 difference, average of MALD score was 25.75, while in rest it was 20.19.

**Discussion**

Hepatopulmonary syndrome is an important complication of chronic liver disease with portal hypertension and an indication of liver transplantation. In our study 20 patients had pathological difference of alveolar to arterial oxygen saturation, 8 patient have pathological saturation difference on assuming upright posture from supine among these 6 were in CPT score C and 2 were in score B , 4 patient were found to have shunts on CEE.4 patients fulfilling diagnostic criteria are assigned in HPS.

With P (A-a)2>15 mmHg as the cut off, the prevalence in our patients20 was higher compared with the studies of Rolla and colleagues 15 and Martinez-Palli and colleagues 12.In the study of Rolla et al more patients had a positive contrast echocardiography and patients were less hypoxaemic (mean Pao2 85.1 mmHg V 71.5mmHg in our patients ;mean P(A-a)O2 17.8 mmHg V 18.2 mmHg in our patients.

In Stoller et al study, HPS was diagnosed in four of 98 patients but the frequency of intrapulmonary vasodilation and arterial blood gas analysis in the remaining 94 patients were not provided.

In the study of Vedrinne and colleagues the frequency of positive contrast echocardiography and the prevalence for HPS in cirrhotics increased by 5%and 19% respectively when the transoesophageal approach was used compared with the transthoracic procedure in concordance using the transoesophageal technique. Our study
clearly showed 75% patients are in class C while 25% in class B among patients having HPS, it clearly shows a significant correlation between the severity of HPS and Child-Pugh score this is the difference of our from previously done. Also study results shows correlation of SpO2 as an screening test to detect the presence of HPS as chances of false positive were less compare to P(A-a)O2 on ABG.

**Conclusion**

The study concludes that proportion of patients with HPS found are 6.6%(4) out of 60 patients. clinical profile of the HPS patient as observe was patients average age was 43yrs,3(75%) were alcoholic while 1(25%) having viral etiology almost 100% presented with ascites splenomegaly, clubbing, platypnoea. Spider angiomata were not detected may be dark complexion of our patients, on UGIE all shows oesophageal varices, all have hematemesis and melena . Out of 4 , 3 were in CPT score C and 1 in score B. Also finding suggest more stronger relationship of saturation difference as an screening test for HPS than P (A-a)O2 on ABG.

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