



## PROSPECTIVE OBSERVATIONAL STUDY OF CLINICAL PROFILE OF HYPERSENSITIVITY PNEUMONITIS AT A TERTIARY CARE CENTRE

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**ABSTRACT** **Background:** Hypersensitivity pneumonitis (HP) is a spectrum of interstitial, alveolar, and bronchiolar lung diseases caused by immunologically induced inflammation in response to inhalation of a wide variety of different antigens. **Materials and methods:** This was a prospective study conducted with IEC permission. The total number of adult cases of ILD presenting to our institute, department of Pulmonary Medicine (tertiary care centre) were noted. Among them 50 cases of HP were included in this study. **Result:** A total 50 patients were studied, of these 50 patients, 1 patient (2%) was diagnosed as having acute hypersensitivity pneumonitis, 10 patients (20%) were diagnosed as subacute hypersensitivity pneumonitis, 39 patients (78%) were diagnosed as chronic hypersensitivity pneumonitis. Out of total 50 patients, 33 subjects (66%) improved after steroid therapy, 12 patients (24%) developed pulmonary fibrosis, 5 patients (10%) died during the course of study. **Conclusion:** Every patient with hypersensitivity pneumonitis deserves a thorough work-up, in order to understand the degree and nature of pulmonary involvement. Early detection of pulmonary involvement is very important for the initiation of a targeted therapy, because the damage to the lung parenchyma is reversible in initial stages. Early diagnosis and management helps in prevention of development of sequelae and thus helps forestalling multiple hospitalizations reduces morbidity, mortality and decreases the burden on health care services.

**KEYWORDS :** Hypersensitivity, Pneumonitis.

### INTRODUCTION:

Hypersensitivity pneumonitis (HP) is a spectrum of interstitial, alveolar, and bronchiolar lung diseases caused by immunologically induced inflammation in response to inhalation of a wide variety of different materials. The exposure to these agents usually occurs at home, work place or surroundings. These are organic or low-molecular-weight chemical antigens which may lead to irreversible lung damage.<sup>1</sup> HP typically has been classified as manifesting in three phases: acute, subacute, and chronic.<sup>2,3</sup> HP is often arduous to diagnose because the clinical manifestations are nonspecific and the radiologic and histologic patterns can imitate those of other interstitial and small airway diseases.<sup>4</sup>

In as many as 40% of histologically proven cases of HP, the offending agent is not discovered.<sup>5,6</sup> High-resolution computed tomography (HRCT) plays an important role in the diagnosis of HP and often shows characteristic findings in patients with normal chest radiographic findings.<sup>7</sup> Radiologic and pathologic findings can be suggestive but are not diagnostic in the absence of other supportive evidence.<sup>8,9</sup> There is no 'gold standard' test for HP diagnosis in all its forms. HP has therefore been diagnosed primarily based on a multidisciplinary consensus

### MATERIALS AND METHODS:

This was a prospective study conducted with IEC permission in department of pulmonary medicine at T.N.M.C and Nair hospital Mumbai from the period of 2018 to 2021. The total number of adult cases of ILD presenting to our institute were noted. Among them 50 cases of HP were included in this study. Patients not ready to consent were excluded from the study. In cases diagnosed as HP initially demographic data in the form of age, sex was obtained. A detailed history of symptoms and their duration was taken and the causes of hypersensitivity pneumonitis such as history of inhalation of a wide variety of different materials that are usually associated with an exposure to dust at home, surroundings, work place, organic or low-molecular-weight chemical antigens (or happens), history of exposure to moulds and birds, history of persistent exposure to inhaled environmental antigens, were taken. A detailed general examination including assessment for vital parameters, along with Post Exercise

Desaturation was assessed. A detailed respiratory system examination along with cardiovascular system, gastrointestinal system, neurological system was done. Further assessment was done with the help of, Hematological & Histopathological evaluation; ABG; Radiological evaluation; Spirometry; Bronchoscopy, Transbronchial lung biopsy & 2D echography

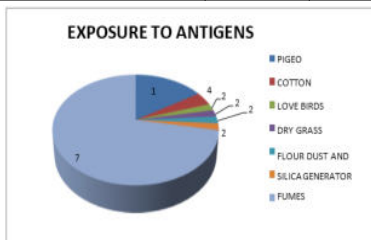
### RESULTS:

A total of 50 patients were studied, of these 50 patients, 41 were female corresponding to 82% and 9 were men corresponding to 18%. While the youngest patient where Hypersensitivity pneumonitis was documented was 18 years old; oldest was 68. The average age being 50.14 years with Standard deviation of 12.05. Further most patients were in age group between 55-65 years, i.e (34%). The most frequent Complaint was presenting dyspnoea and cough. In 96% cases. Fever and chest pain were other associated complaints in 28% and 14% cases respectively. Twenty one patients (42%) had 12-60 months of symptoms before the diagnosis of ILD was made. Only one patient (2%) presented with less than 1 month of symptom, four patients presented with less than 6 months (8%), 14 patients (28%) presented with less than 12 months, and 10 patients (20%) presented with more than 60 months of symptoms. With average duration of 41 months (S.D-37.11). Exacerbations were noted in 22 patients (44%). Most common exacerbations frequency were 1-2/year (28%). Most commonly patients were exposed to pigeons seen in 8 patients accounting for 16% of patients, followed by cotton dust exposure in 2 patients (4%), and 1 patient (2%) each by love birds, dry grass, flour dust and silica, generator fumes. 36 patients (72%) had no exposure to antigens (Table no: 1). The most common comorbid condition seen in hypersensitivity pneumonitis patients is hypertension, seen in 18 patients (36%), osteoporosis, obstructive sleep apnea syndrome (OSAS) each seen in 8 patients (16%), diabetes mellitus in 7 patients (14%), hypertension with diabetes mellitus seen in 1 patient (2%), hypothyroidism in 5 patients (10%), osteopenia in 3 patients (6%) and other conditions like ischemic heart disease, glaucoma, past history of cerebrovascular attack, rheumatoid arthritis, panic attack, depression, hernia, congenital kyphoscoliosis, metabolic disorder, anxiety seen in 13 patients (26%). Past history of tuberculosis or empirical ATT

intake were seen in 11 patients (22%) On clinical examination, Clubbing was seen in 35 patients (70%) out of 50 patients. Post exercise desaturation was present in all patients (100%) and Crackles were heard in all patients (100%). Six minute walk distance of 50 patients were noted. Most patients had 6MWD between 300-399 meters, seen in 25 patients (50%), 16 patients had between 200-299 meters (32%), 6 patients had between 100-199 meters (12%), and 3 patients had more than 400meters (6%)(Table no: 2) Arterial blood gas analysis of 50 patients were noted. Type 1 respiratory failure was noted in 8 patients (16%) and rest 84% patients had normal ABG. The A-a gradient was increased in 39 patients (78%) with mean of 34.32 and Standard deviation of 11.10. Spirometry data of 50 patients was available. Normal lung function was not seen in any patients. Mild restriction was seen in 13 patients (26%), moderate restriction was seen in 16 patients (32%), and severe restriction was seen in 21 patients (42%)(Table no: 3) Most common abnormality noted on 2D echography was presence of pulmonary hypertension. It was mild in 26 patients (52%), moderate degree in 3 patients (6%), severe degree in 5 patients (10%) and normal in 16 patients (32%) Most common type of HP on HRCT thorax was chronic HP, seen in 41 patients, accounting for 82%, followed by subacute in 6 patients (12%) and acute in 3 patients(6%) Trans bronchial lung biopsy was performed for all patients. 21 patients out of 50 had a conclusive diagnosis, for acute hypersensitivity pneumonitis 2 patients (67%) were conclusive,(33%) were inconclusive. For subacute hypersensitivity pneumonitis only 1 patient was (17%) conclusive,(83%) were inconclusive. For chronic hypersensitivity pneumonitis patients (44%) were conclusive,(56%) were inconclusive( Table no: 4) Among 50 patients, only 1 (2%) patient developed pneumothorax. Minor complications included minor bleeding in 5 patients (10%) had, and transient hypoxia was observed in 11 patients (22%),rest 33 patients(66%) had no complication. Among 50 patients, 1 patient (2%) was diagnosed as having acute hypersensitivity pneumonitis,10 patients (20%) were diagnosed as subacute hypersensitivity pneumonitis,39 patients(78%) were diagnosed as chronic hypersensitivity pneumonitis(. Table no: 5) Among all patients, 47 patients were treated with tapering doses of steroids and 3 patients were kept under observation. Out of total 50 patients, 33 subjects (66%)improved after steroid therapy , 12 patients (24%)developed pulmonary fibrosis,5 patients (10%) died during the course of study

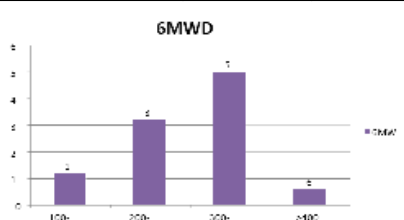
**Table no: 1-ANTIGEN EXPOSURE**

EXPOSURE TO ANTIGENS	NUMBER	PERCENTAGE
Pigeon	8	16
Cotton Dust	2	4
Love Birds	1	2
Dry Grass	1	2
Flour Dust And Silica	1	2
Generator Fumes	1	2
No Exposure	36	72



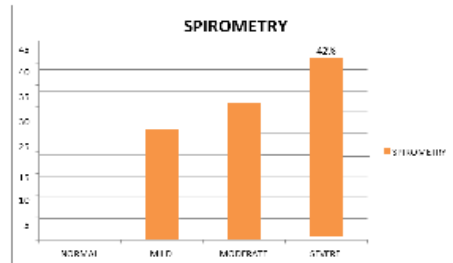
**Table no: 2 SIX MINUTE WALK DISTANCE**

DISTANCE (Meters)	NUMBER	PERCENTAGE
100-199	6	12
200-299	16	32
300-399	25	50
>400	3	6

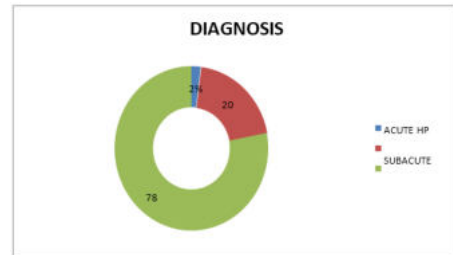
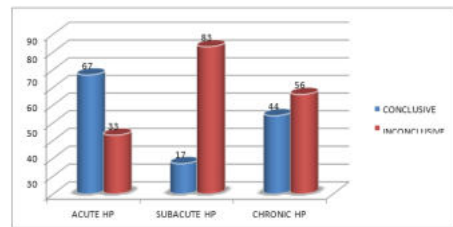


**Table no: 3 Spirometry**

	NUMBER	PERCENTAGE
Normal FVC > 80	0	0
Mild restriction FVC 60-80	13	26
Moderate restriction FVC 45-60	16	32
Severe restriction FVC <45	21	42



**Bar diag. no: 3- Transbronchial Lung Biopsy**



**Bar diag. no: 4- Diagnosis of HP**

**DISCUSSION**

Most common age group affected in our study was 56-65 years, comprising 17 patients (34%). This is in concordance with other studies where mean age was 58.8 years , with standard deviation of 10.9 (standard deviation)<sup>9</sup>. A study done by Jin et al had median age at the diagnosis of 53 years<sup>10</sup>. While study done by johannson et al had mean age of - 59.7(10.8)<sup>11</sup>. Our study showed a female preponderance with male: female ratio of 1: 4.5. This is in concordance with other studies where Hypersensitivity pneumonitis is more common in females (due to greater exposure at home).<sup>10,11</sup>

Total duration of symptoms before the diagnosis of ILD was obtained in 50 patients were noted. Almost 21 patients (42%) had 12-60 months of symptoms before the diagnosis of ILD was made. This is almost in concordance with other studies where the disease duration at presentation ranges from median symptom duration was 2.2 (range, 0.2-13.4) years.<sup>12</sup>

In our study, clubbing was observed in 70% of cases and post exercise desaturation and crackles were seen in all patients. This is in concordance with other studies where crackles and clubbing are the most common physical finding in ILD patients<sup>13</sup> Spirometry was suggestive of restrictive abnormality in all 50 patients with average FVC of 46.82% and standard deviation of 14.21. This is similar to various studies on ILD.<sup>14,15,16</sup> In our study, ABG showed type 1 respiratory failure in 16% of patients and 78% of patients had increased A-a gradient. This is consistent with other studies where hypoxemic (type 1) respiratory failure was more common in interstitial lung diseases patients.<sup>17</sup> Six minute walk distance of 50 patients were noted. Average 6MWD of 50 patients was 288 metres. This is similar to various studies on interstitial lung disease where average 6MWD was 249 metres.<sup>17</sup> Chronic hypersensitivity pneumonitis was most commonly diagnosed in 78% of patients . Similar results are reported in various studies such as lacasse et al<sup>18</sup> Out of total 50 patients, 33 subjects (66%) improved after steroid therapy,

12 (24%) developed pulmonary fibrosis, 5 patients (10%) died during the course of study. This is in concordance with other studies where some patients may experience progression, despite avoiding exposure and undergoing treatment.<sup>18</sup> According to a study, patients with subacute/ chronic disease often progress to irreversible pulmonary fibrosis, and 30% of them die within a few years of diagnosis.<sup>19,20</sup>

### CONCLUSION:

Every patient with hypersensitivity pneumonitis deserves a thorough workup, in order to understand the degree and nature of pulmonary involvement. Early detection of pulmonary involvement is very important for the initiation of a targeted therapy, because the damage to the lung parenchyma is reversible in initial stages. Early diagnosis and management helps in prevention of development of sequelae and thus helps forestalling multiple hospitalizations, reduces morbidity, mortality and decreases the burden on health care services.

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This research got no financial funding.

### Conflicts of Interest

There were no conflicts of interest.

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