Original Research Article

Importance of Six Minute Walk Distance Test in Patients With Idiopathic Pulmonary Fibrosis

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Abstract

Background: The most common idiopathic interstitial pneumonia is idiopathic pulmonary fibrosis (IPF) and it is one of the most severe forms of IIP. The incidence of IPF is about 10.7 per 100,000 people for males and 7.4 per 100,000 people for females. **Objective:** To study the association between the six-minute walk distance test in patient with idiopathic pulmonary fibrosis. **Methodology:** A cross-sectional observational study (inpatients and outpatients) visiting the Department of Respiratory Medicine, Gandhi Medical College, Bhopal for the period of 18 months from November 2019 to April 2021. **Results:** The association between different types of IPF and 6MWT was found to be statistically significant (P-value <0.05). 6MWT was found abnormal in 65 (62.5%) of cases, out of which most cases were seen with definitive UIP 57 (54.8).In this study, significant desaturation after the 6-minute walk test was found in 29 patients (27.9%) of IPF and mostly with the definitive UIP 27(26%). **Conclusion:** Significant desaturation in the 6-minute walk test was found in IPF. The association between different types of IPF and 6MWT was found to be statistically significant with a P value <0.05. and maximum with definitive UIP. So 6MWT Should be performed in all cases of idiopathic pulmonary fibrosis.

Keywords: pulmonary fibrosis, observational, desaturation

Introduction

The term "interstitial lung disease" (ILD), or diffuse parenchymal lung disease (DPLD), represents a group of about 200 distinct disorders that encompass clinical disorders that involve the alveolar structures, pulmonary interstitium, and small airways. **[1]**

The most common idiopathic interstitial pneumonia is idiopathic pulmonary fibrosis (IPF) and it is one of the most severe forms of IIP. Idiopathic pulmonary fibrosis, also known as cryptogenic fibrosing alveolitis, is a chronic, progressive fibrosis characterized by progressive worsening of dyspnea and lung function and is associated with a poor prognosis. **[2]**

Katzenstein and Myers proposed the term "IPF" in 1998 for those patients who had the usual interstitial pneumonia (UIP) pattern in histology and no identifiable cause for interstitial lung disease (ILD). **[3]**

The incidence of IPF is about 10.7 per 100,000 people for males and 7.4 per 100,000 people for females. The prevalence of IPF is slightly higher at 20.2 males per 100,000 and 13.2 females per 100,000. IPF is not associated with any particular race, ethnic group, or environment.

The incidence of IPF is higher in males as compared to females. It appears mainly between the fifth and seventh decades of life, and about 33% of patients' age is more than 60 years. The mean age at the time of presentation was 66 years old. IPF can occur in young people and rarely in children. Familial IPF accounts for 0.5 to 2% of all cases of IPF. **[4]**

Patients with IPF can present with dry cough, progressive dyspnea, and bibasilar late inspiratory fine crepitation (Velcro crepts) on auscultation, which is characteristic of idiopathic pulmonary fibrosis. The patient may also have clubbing, but it is not necessary in all cases of IPF. Cigarette smoking is the strongest and most accepted risk factor for IPF, and it increases the risk of IPF by about 2 times.

Serial assessment of resting and exercise gas exchange is one of the methods used to follow ILD activity and responsiveness to treatment, especially in idiopathic pulmonary fibrosis (IPF). The distance walked during the 6MWT is a reproducible measure and correlates with the maximal oxygen consumption (VO2 max) obtained during a maximal exercise test.**[5]**

Material and Methods

A cross-sectional observational study (inpatients and outpatients) visiting the Department of Respiratory Medicine, Gandhi Medical College, Bhopal for the period of 18 months from November 2019 to April 2021, diagnosed to have Idiopathic Pulmonary Fibrosis (IPF) by HRCT who meet the inclusion and exclusion criteria. Idiopathic pulmonary fibrosis classified as per ATS guidelines in Definitive UIP, Probable UIP and Indeterminate UIP. Sample size was 104 . Institute's Ethics Committee (EC) clearance was obtained and a written informed consent was obtained from all patients. 6-minute walk test was performed as per ATS guidelines. the normal value is considered to be more than 400 meters.**[6]** decrease in saturation as a 4% decrease from the baseline saturation (Δ sat of 4% or more) considered as significant desaturation.**[7]**

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Statistical Analysis

Data was entered into MS Excel 2007 and analysis was done with the help of Epi Info Version 7.2.2.2. The frequency and percentages were calculated. The mean and standard deviation were used to represent quantitative variables. Categorical data was expressed as a percentage. The graphs were created using Microsoft Office. Relevant statistical tests (Chi Square, Pearson's correlation) were applied wherever applicable, and wherever needed, Yates correction was also done. P<0.05 was taken as statistically significant.

Results

After applying inclusion and exclusion criteria this study includes 104 participants, encountered during the 18 months of study (November 2019 to April 2021).The study was conducted in department of Respiratory Medicine Gandhi medical college Bhopal.

6MWT was found abnormal in 65 (62.5%) of cases, out of which most cases were seen with definitive UIP 57 (54.8). The association between different types of IPF and 6MWT was found to be statistically significant P value (<0.05).

Association between Significant desaturation after 6MWT with diagnosis of IPF is also statistically significant (P value <0.05) and maximum desaturation seen with definitive UIP 75(72.1%) So, 6MWT should be done in all cases of IPF to grade the severity.

Table 1: Association between 6MWT distance with diagnosis

			Diagnosis			Total
			Definitive UIP	Indeterminate UIP	Probable UIP	
6 MWT Distance	Abnormal	Count	57	1	7	65
		% of total	54.8%	1.0%	6.7%	62.5%
	Normal	Count	18	9	12	39
		% of total	17.3%	8.7%	11.5%	37.5%
Total		Count	75	10	19	104
		% of total	72.1%	9.6%	18.3%	100.0%

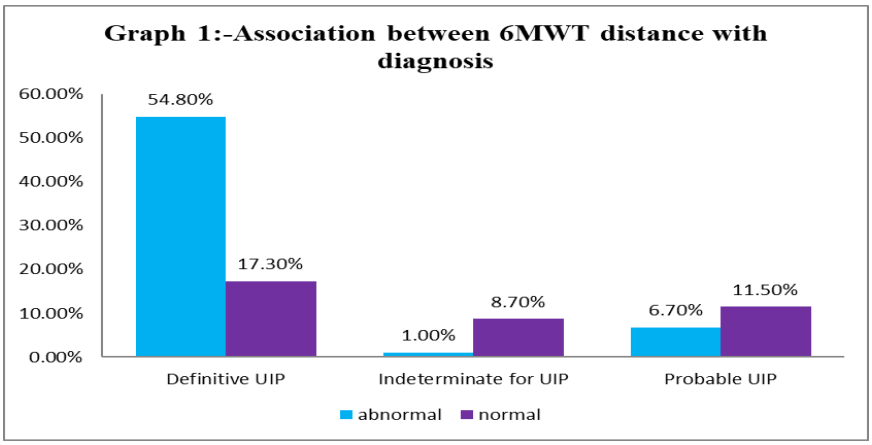

Table 2: Association between Significant desaturation after 6MWT with diagnosis

			Diagnosis			Total
			Definitive UIP	Indeterminate UIP	Probable UIP	
Significant desaturation after 6MWT	No	Count	48	10	17	75
		% of total	46.2%	9.6%	16.3%	72.1%
	Yes	Count	27	0	2	29
		% of total	26.0%	0.0%	1.9%	27.9%
Total		Count	75	10	19	104
		% of total	72.1%	9.6%	18.3%	100.0%

Discussion

The association between different types of IPF and 6MWT was found to be statistically significant (P-value <0.05). 6MWT was found abnormal in 65 (62.5%) of cases, out of which most cases were seen with definitive UIP 57 (54.8).

In this study, significant desaturation after the 6-minute walk test was found in 29 patients (27.9%) of IPF and mostly with the definitive UIP 27(26%). This is in accordance with study done by Lama et al.[8] in which they found significant desaturation in 53 % of patients with IPF. Among Indian literature Kundu et al.[9] found significant desaturation in 43% patients with IPF while Kumar et al.[10] found significant desaturation only in 32.5% of IPF cases.

As an example, the results of a 6MWT have correlated with prognosis in several studies of IPF.[10-11] Pulse oximetry desaturation to 88 percent(>4% drop in SpO2)or below during the 6MWT is associated with a median survival of 3.21 years compared with a median survival of 6.63 years in those who did not desaturate below 89 percent.[11] The distance walked during the 6MWT is a reproducible measure and correlates with the maximal oxygen consumption (VO2 max) obtained during a maximal exercise test. [5]

A heart rate recovery of less than 13 beats per minute by one minute after completion of a 6MWT is associated with a median survival of 1.96 years in patients with idiopathic pulmonary fibrosis, compared to 3.2 years in patients with a faster heart rate recovery.[12]

The association between different types of IPF and 6MWT was found to be statistically significant. 6MWT was found abnormal and significant desaturation also noted in most of the cases, out of which most cases were seen with definitive UIP. Hence, 6MWT should be done at diagnosis to grade the disease.

Conclusion

The association between different types of IPF and 6MWT was found

to be statistically significant (P-value <0.05). 6MWT was found abnormal in 65 (62.5%) of cases, out of which most cases were seen with definitive UIP 57 (54.8). Significant desaturation in the 6-minute walk test was found in IPF. The association between different types of IPF and 6MWT was found to be statistically significant with a P value <0.05. and maximum with definitive UIP. So 6MWT should be done at diagnosis to grade the disease and final diagnosis of IPF is a multidisciplinary approach. Further study is needed with a larger sample size to understand the disease in detail

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