Original Research Article

Obstructive sleep apnea in patients with interstitial lung diseases

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Abstract

Background: Interstitial lung diseases (ILD) are a heterogeneous group of diffuse parenchymal lung disorders with highly variable clinical courses and outcomes pulmonary fibrosis. The present study was conducted to assess cases of Obstructive sleep apnea (OSA) in patients with interstitial lung diseases (ILD). **Materials & Methods:** 58 patients of ILD of both genders were assessed for pulmonary function testing, forced expiratory volume in one second, and forced vital capacity (FVC), arousal index, AHI index, arousal index and desaturation index. **Results:** Interstitial lung diseases were IPF seen in 22 in OSA group and 25 in no OSA group, NSIP seen in 4 in each group and CTD seen in 2 in OSA group and 1 in no OSA group. Pulmonary function showed FVC (%, predicted) as 75.2 and 70.5, FEV1 (%, predicted) as 85.2 and 77.3, DLco (%, predicted) as 58.6 and 52.6. Six-minute walk test distance (m) was 382.3 and 332.8 and initial SpO2 (%) as 95.4 and 95.0. AHI index was 17.6 and 2.5, desaturation index was 11.2 and 1.6, arousal index was 12.5 and 8.4, longest apnea was 36.4 and 17.6 and snoring was 3.8 and 4.7 in OSA and no OSA group. The difference was significant (P< 0.05). **Conclusion:** Interstitial lung disease patients exhibited high cases of obstructive sleep apnoea.

Key words: Interstitial lung disease, Obstructive sleep apnoea, Snoring.

Introduction

Interstitial lung diseases (ILD) are a heterogeneous group of diffuse parenchymal lung disorders with highly variable clinical courses and outcomes pulmonary fibrosis (IPF) is the most common type of idiopathic interstitial pneumonia and has a median survival time of 3–4 years[1]. ILD patients often have comorbidities that significantly affect their clinical outcomes. Several comorbidities, including gastroesophageal reflux disease, pulmonary hypertension, depression, and obstructive sleep apnea (OSA), are known to be frequently associated with ILDs[2]. Sufferers exhibit lung restriction and exercise intolerance, often developing progressive hypoxia over time. Independent of the presence of daytime hypoxia, many individuals with ILD are observed to desaturate during sleep, with or without associated apnoea. Interstitial lung disease (ILD) is a chronic and restrictive lung disease with high morbidity and mortality. It is associated with hypoxemia that progresses to respiratory failure, pulmonary hypertension, and death[3].

Sleep disturbance negatively affects the well-being of patients with ILD. Obstructive sleep apnea (OSA), characterized by airflow interruption during sleep due to repetitive pharyngeal narrowing and collapse, is one of the most common comorbidities seen in this population[4].

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There is increasing recognition of OSA as a phenotypic heterogeneous syndrome with different predisposing factors and pathophysiological traits, or endotypes, including both anatomical and non-anatomical factors[5]. While OSA has been postulated to contribute to the pathogenesis of ILD through tractional or aspiration-related injury and intermittent hypoxia, it is equally plausible that impaired respiratory mechanics and gas exchange in ILD may also predispose the individual towards developing OSA[6]. The present study was conducted to assess cases of Obstructive sleep apnea (OSA) in patients with interstitial lung diseases (ILD).

Materials & Methods

The present study comprised of 58 patients of ILD of both genders. All patients gave their written consent for the participation of study. All patients met diagnostic criteria in international guidelines by the American Thoracic Society (ATS) and European Respiratory Society (ERS).

Parameters such as pulmonary function testing, forced expiratory volume in one second, and forced vital capacity (FVC) were performed. Apnea was defined as a cessation of airflow (>90% compared to baseline level) for more than 10 seconds, and hypopnea was defined as a clear amplitude reduction of 50–90% in the thermistor of the nasal pressure transducer during sleep that was associated with oxygen desaturation of >3%. The arousal index was defined as total number of awakenings per hour of sleep. All were asked to respond AHI index and desaturation index. P value less than 0.05 was considered significant.

Results

Table 1: Baseline characteristics

Parameters	Variables	OSA (28)	No OSA (30)	P value
Interstitial lung disease	IPF	22	25	0.04
	NSIP	4	4	
	CTD	2	1	
Pulmonary function	FVC (%, predicted)	75.2	70.5	0.12
	FEV1 (%, predicted)	85.2	77.3	0.05
	DLco (%, predicted)	58.6	52.6	0.16
Six-minute walk test	Distance (m)	382.3	332.8	0.04
	Initial SpO2 (%)	95.4	95.0	0.11

Table I, graph I shows that interstitial lung diseases were IPF seen in 22 in OSA group and 25 in no OSA group, NSIP seen in 4 in each group and CTD seen in 2 in OSA group and 1 in no OSA group. Pulmonary function showed FVC (%, predicted) as 75.2 and 70.5, FEV1 (%, predicted) as 85.2 and 77.3, DLco (%, predicted) as 58.6 and 52.6. Six-minute walk test distance (m) was 382.3 and 332.8 and initial SpO2 (%) as 95.4 and 95.0. The difference was significant (P< 0.05).

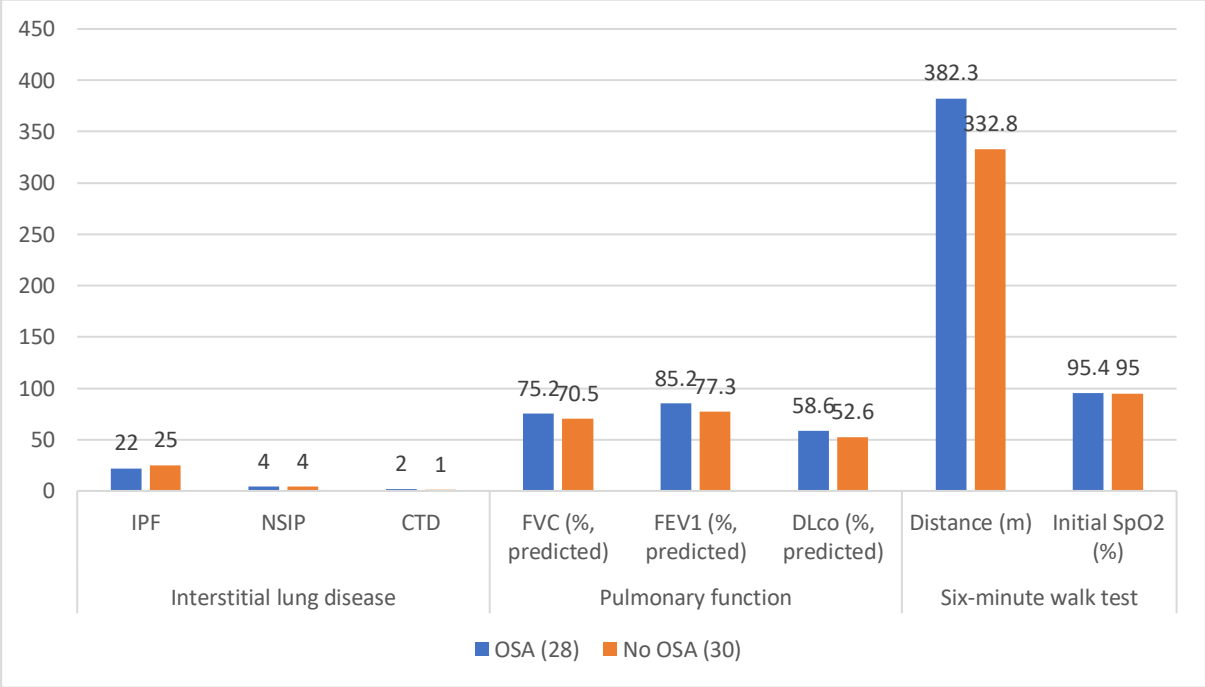

Fig 1: Baseline characteristics

Table 2: Comparison of sleep data and questionnaire

Variables	OSA (28)	No OSA (30)	P value
AHI index	17.6	2.5	0.01
Desaturation Index	11.2	1.6	0.03
Arousal index	12.5	8.4	0.05
Longest apnea	36.4	17.6	0.01
Snoring	3.8	4.7	0.17

Table II, graph II shows that AHI index was 17.6 and 2.5, desaturation index was 11.2 and 1.6, arousal index was 12.5 and 8.4, longest apnea was 36.4 and 17.6 and snoring was 3.8 and 4.7 in OSA and no OSA group. The difference was significant (P< 0.05).

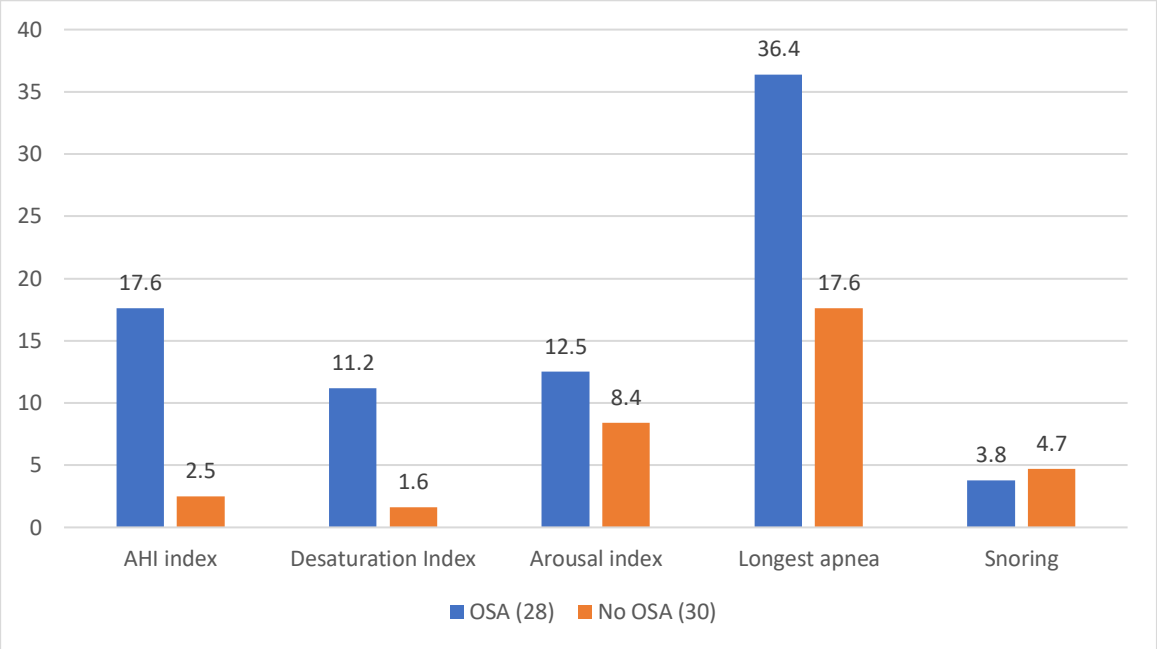

Fig 2: Comparison of sleep data and questionnaire

Discussion

Interstitial lung disease (ILD) comprises a group of diffuse inflammatory and fibrotic parenchymal lung diseases of varying etiologies, which are characterized by dyspnea, fatigue, and poor health-related quality of life[7]. The incidence of ILD is increasing globally. Obstructive sleep apnea (OSA) is estimated to occur in approximately 2–4 % of healthy adults[8]. The morbidity and the mortality of OSA are high especially when it occurs concomitantly with other respiratory diseases[9]. The present study was conducted to assess cases of Obstructive sleep apnea (OSA) in patients with interstitial lung diseases (ILD).In present study, interstitial lung diseases were IPF seen in 22 in OSA group and 25 in no OSA group, NSIP seen in 4 in each group and CTD seen in 2 in OSA group and 1 in no OSA group. Pulmonary function showed FVC (%, predicted) as 75.2 and 70.5, FEV1 (%, predicted) as 85.2 and 77.3, DLco (%, predicted) as 58.6 and 52.6. Six-minute walk test distance (m) was 382.3 and 332.8 and initial SpO2 (%) as 95.4 and 95.0. Aydogdu et al[10] included different diagnoses of ILD such as IPF (n=18), sarcoidosis (n=7), and other interstitial lung diseases (n=12) in small numbers, and they reported an OSA diagnosis rate of 64.8 % in ILD patients and also compared the PSG findings from patients with IPF and a mixed group of different ILDs. There were only seven patients with sarcoidosis in their population, but there were no patients with scleroderma.We observed that AHI index was 17.6 and 2.5, desaturation index was 11.2 and 1.6, arousal index was 12.5 and 8.4, longest apnea was 36.4 and 17.6 and snoring was 3.8 and 4.7 in OSA and no OSA group. Lee et al[11] found that among the ILDs, idiopathic pulmonary fibrosis (IPF) was the most common (66.3%), followed by connective tissue disease–associated ILD (16.3%) and cryptogenic organizing pneumonia (5.8%). Forty-six ILD patients (53.5%) were diagnosed with OSA, and IPF patients had OSA more frequently (64.9% vs. 31.0%, p = 0.003) than those with other ILDs. Older age (odds ratio [OR], 1.11, 95% CI 1.04–1.19, p = 0.002), higher body weight (OR 1.05, 95% CI 1.01–1.10, p = 0.012), and diabetes mellitus (OR 4.03, 95% CI 1.26–12.91, p = 0.019) were independent risk factors for OSA in the multivariable logistic regression analysis. In the multivariable Cox analysis, an IPF diagnosis was a significant risk factor for one-year mortality (hazard ratio [HR] 7.92, 95% CI: 1.01– 61.83, p = 0.048) in ILD patients; however, OSA was not. In conclusion, half of Korean patients with ILD had OSA. Older age, higher body weight, and diabetes mellitus were risk factors for OSA in patients with ILD.

Intermittent hypoxia is a common feature of OSA, which is now recognized as a potential major contributing factor to the pathogenesis of OSA-related comorbidities, particularly cardiovascular and metabolic diseases. Recurrent apneas and hypopneas during sleep result in cycles of desaturation and re-oxygenation. Similar to hypoxia-reperfusion injury, this process induces oxidative stress with the accumulation of reactive oxygen species in lung tissues and systemic circulation. Increased oxidative stress levels have been demonstrated in lung and blood samples from patients with ILD[12].

Conclusion

Authors found that interstitial lung disease patients exhibited high cases of obstructive sleep apnoea.

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