Journal of
Clinical Respiratory Diseases and Care

Agrawal, J Clin Respir Dis Care 2019, 5:1

Editorial Open Access

Interstitial Lung Diseases: A Major Threat for Cardiovascular System

Anand Agrawal*

Department of Respiratory Medicine, BPS Government Medical College for Women, Sonepat, Haryana, India

***Corresponding author:** Anand Agrawal, Department of Respiratory Medicine, BPS Government Medical College for Women, Sonepat, Haryana, India, Tel: +919812197352; E-mail: ashidocbps@yahoo.com

Received date: April 26, 2019; **Accepted date:** April 29, 2019; **Published date:** May 06, 2019

Editorial

The interstitial pulmonary diseases (ILDs) comprise a huge group of more than 200 entities , on pathological as well as specific clinico-radiological ground [1]. Moreover idiopathic pulmonary fibrosis is considered as commonest entity among them characterised by chronic progressive fibrosis, associated with hidden etiology ,showing a motif of usual interstitial pneumonia (UIP). Addition to this, it is attributed by heterogeneous disease pattern associated with proliferative fibroblasts at different strata of genesis. Moreover pulmonary vascular as well as cardiac association is growingly highlighted as an essential component of increased morbidity as well as mortality in interstitial lung disease [2,3]. Researchers proposed that connective tissue disorders associated interstitial fibrosis , sarcoidosis, as well as pulmonary Langerhans cell histiocytosis are frequently complicated with secondary pulmonary hypertension, diagnosed by mean PAP >25 mmHg measured at rest during right heart catheterization [4] . Somehow Pulmonary hypertension is an under explored co morbidity in patients with interstitial lung ailment and have potential to deteriorate the function of lung as well survival. Pulmonary hypertension originate in patients with interstitial fibrosis through various mechanisms, including vascular inflammation, thrombotic angiopathy, pulmonary vasoconstriction and vascular remodeling, which may lead to vascular destruction associated with progressive lung parenchymal fibrosis . Doppler echocardiography recognized as an indispensable device in the screening of suspected pulmonary hypertension , however Right heart catheterization is needed to confirm the presence as well as, assess its severity to suggest therapy[5].

Although the prevalence of pulmonary hypertension in Interstitial lung diseases is unpredictable , Leuchte et al found it 31.8% among 88 consecutive patients with various ILDs [6]. In advanced lung disease, PH generally results from chronic hypoxic pulmonary vasoconstriction and vascular remodeling [7-10]. This vascular remodeling involves all layers of the pulmonary arterial wall and includes intimal thickening and medial hypertrophy. Factually, pulmonary hypertension not dependent on the severity of the diseases and can be precipitated even in absence of hypoxemia in patients with ILDs [11]. The pulmonary endothelial cell produces several important vasoactive mediators (eg, nitric oxide, prostacyclin, and endothelin) that modulate pulmonary vasomotor tone, vascular smooth muscle cell proliferation, and vascular remodeling [12] Hypoxia increases plasma endothelin 1 levels [13]. The titer of circulating endothelin 1 has been reported to be elevated in patients with ILD, particularly in those with pulmonary hypertension [14,15]. According to few eminent researcherss vascular smooth muscle dysfunction has been accused in the pathogenesis of pulmonary arterial hypertension. Pulmonary arterial smooth muscle cells from patients with this disorder exhibit abnormal proliferative response to growth factors such as transforming growth factor β, bone morphogenetic protein, and platelet-derived growth factor [8]. Additionally, these smooth muscle cells exhibit abnormal migration and extracellular matrix formation as well as dysfunctional ion channels [16-18]. Though various hypothesis may contribute to the development of pulmonary hypertension among various ILDs while, Panagiotou et al carried out a comprehensive study and promulgate that the increased vascular resistance in the pre-capillary pulmonary circulation leads to increased pulmonary arterial pressure (PAP) which may be responsible for the development of pulmonary hypertension in ILD [19,20]. However hypoxic pulmonary vasoconstriction and obliteration of the vascular bed by progressive parenchymal fibrosis are considered major culprits for the increased pulmonary vascular resistance in ILD [21,22]. The development of pulmonary hypertension, further deteriorate the condition of moribund patient and increase the frequency of re admission in intensive care setup resulting in increased mortality however further research in this dimension to explore the underlying mechanisms of this complex phenomenon will enable a better understanding of the natural history of ILD, which may be helpful to generate the remedial tool to protect them from further deterioration and to take early preventive measures.

References

1. Demedts M, Wells AU, Antó JM, Costabel U, Hubbard R, et al. (2001) Interstitial lung diseases: An epidemiological overview. Eur Respir J. 32 Suppl: 2s-16s.
2. Agrawal A, Verma I, Shah V, Agarwal A, Sikachi RR (2016) Cardiac manifestations of idiopathic pulmonary fibrosis. Intractable Rare Dis Res 5: 70-75.
3. Panagiotou M, Church AC, Johnson MK, Peacock AJ (2017) Pulmonary vascular and cardiac impairment in interstitial lung disease. Eur Respir Rev 26: 160053.
4. Chaowalit N, Pellikka PA, Decker PA, Aubry MC, Krowka MJ, et al. (2004) Echocardiographic and clinical characteristics of pulmonary hypertension complicating pulmonary Langerhans cell histiocytosis. InMayo Clin Proc. 79: 1269-1275.
5. Lederer DJ (2013) Clinical trials in idiopathic pulmonary fibrosis: A framework for moving forward. Eur Respir J 42: 1446-1448.
6. Carrington CB, Gaensler EA, Coutu RE, FitzGerald MX, Gupta RG (1978) Natural history and treated course of usual and desquamative interstitial pneumonia. N Engl J Med 298: 801-809.
7. Tomiyama H, Yamashina A, Arai T, Hirose K, Koji Y, et al. (2003) Influences of age and gender on results of noninvasive brachial-ankle pulse wave velocity measurement-a survey of 12517 subjects. Atherosclerosis 166: 303-309.
8. Yamashina A, Tomiyama H, Takeda K, Tsuda H, Arai T, et al. (2002) Validity, reproducibility, and clinical significance of noninvasive brachial-ankle pulse wave velocity measurement. Hypertens Res. 25: 359-364.
9. Yokoyama H, Shoji T, Kimoto E, Shinohara K, Tanaka S, et al. (2003) Pulse wave velocity in lower-limb arteries among diabetic patients with peripheral arterial disease. J Atheroscler Thromb 10: 253-258.

10. Ryu JH, Krowka MJ, Pellikka PA, Swanson KL, McGoon MD (2007) Pulmonary hypertension in patients with interstitial lung diseases. Mayo Clin Proc 82: 342-350.
11. Leuchte HH, Baumgartner RA, Nounou ME, Vogeser M, Neurohr C, et al. (2006) Brain natriuretic peptide is a prognostic parameter in chronic lung disease. Am J Respir Crit Care Med 173: 744-750.
12. Naeije R (2005) Pulmonary hypertension and right heart failure in chronic obstructive pulmonary disease.Proc Am Thorac Soc 2: 20-22.
13. Pietra GG, Capron F, Stewart S, Leone O, Humbert M, et al. (2004) Pathologic assessment of vasculopathies in pulmonary hypertension. J Am Coll Cardiol 43: S25-S32.
14. Galié N, Manes A, Branzi A (2004) The endothelin system in pulmonary arterial hypertension.Cardiovasc Res 61: 227-237.
15. MacLean MR (1999) Endothelin-1 and serotonin: mediators of primary and secondary pulmonary hypertension? J Lab Clin Med 134:105-114.
16. Channick RN, Sitbon O, Barst RJ, Manes A, Rubin LJ (2004) Endothelin receptor antagonists in pulmonary arterial hypertension. J Am Coll Cardiol 43: S62S-S67.
17. Kirchengast M, Luz M (2005) Endothelin receptor antagonists: Clinical realities and future directions. J Cardiovasc Pharmacol 45: 182-191.
18. Toledano K, Guralnik L, Lorber A, Ofer A, Yigla M, et al. (2011) Pulmonary arteries involvement in Takayasu's arteritis: Two cases and literature review. In Seminars in Arthritis Rheum 41: 461-70.
19. Coultas DB, Zumwalt RE, Black WC, Sobonya RE (1994) The epidemiology of interstitial lung diseases. Am J Respir Crit Care Med 150: 967-972.
20. McLaughlin VV, McGoon MD (2006) Pulmonary arterial hypertension. Circulation 114: 1417-1431.
21. Seeger W, Adir Y, Barberà JA, Champion H, Coghlan JG, et al. (2013) Pulmonary hypertension in chronic lung diseases. J Am Coll Cardiol 62: D109-D116.
22. Travis WD, Costabel U, Hansell DM, King TE Jr, Lynch DA, et al. (2013) An official American Thoracic Society/European Respiratory Society statement: Update of the international multidisciplinary classification of the idiopathic interstitial pneumonias. Am J Respir Crit Care Med 188: 733-748.