Editorial

Remodeling in asthma and COPD–recent concepts

Remodeling in airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD), is defined as structural alterations of both small and large airways due to subepithelial fibrosis, increased smooth muscle mass of airways, neovascularization, and glandular hypertrophy. Unlike the true remodeling or renovation of a structure which should result in improvement, the airway remodeling causes further functional and clinical deterioration due to thickening of bronchial walls and narrowing of the lumina.

Airway remodeling in occurring in asthma patients, which was first documented in 1922, is now a recognized entity.[1] However, it is not commonly appreciated that airway remodeling also occurs in patients with COPD, although the structural damage to the airways and the lung parenchyma is known to occur. Further, remodeling is not limited to the airways alone. It is also the pulmonary vascular remodeling that adds to the complications, especially in COPD patients.

Airway remodeling in asthma patients has been documented in all degrees of asthma severity and types of airways.[2] It is not necessarily related to the duration of the illness since it may also occur in children with early asthma when it may act as a precursor to a chronic and debilitating respiratory disease.[3] It possibly occurs as a result of ongoing inflammation and activation of different inflammatory cells. The inflammatory cells such as the mast cells, eosinophils, and CD8 + lymphocytes correlate with airway hyperresponsiveness.[4] Some important inflammatory mediators with significant remodeling action are transforming growth factor (TGF)-beta, interleukin (IL) 11, IL-17, and histamine.[5,6]

In asthma, airway remodeling is responsible for significant clinical effects such as greater asthma symptomatology, higher aryl hydrocarbon receptor (AHR), excessive use of rescue medication, and an accelerated decline in lung function. However, it is not clear if it results in permanent alterations in lung function.

Remodeling also occurs in patients with COPD, typically involving the peripheral airways causing thickening of walls and narrowing of bronchial lumen.[7,8] In the recent years, it has been shown that the larger and central airways are also involved.[9] This happens apparently due to deposition of extracellular matrix in subepithelial layer and hypertrophy of smooth muscles in the airway walls. Of various pathobiological mechanisms, the proteolytic enzymes matrix metalloproteinases (MMPs), especially MMP-9, play an important role in remodeling in patients suffering from asthma and COPD.[10] Integrins, a group of transmembrane proteins, are also likely to cause AHR and remodeling.[11]

Vascular remodeling is another common pathological consequence of inflammation in patients suffering from COPD and asthma. Pulmonary hypertension is known to occur as a complication of COPD that is responsible for chronic cor pulmonale. It has been recently recognized that airway remodeling not only results in severity of airway obstruction but also correlates with mean pulmonary artery pressure (mPAP) and pulmonary hypertension.[12]

The exact mechanism to link pulmonary hypertension with bronchial obstruction is not clear. Pulmonary vascular remodeling may also occur in chronic asthma although to a lesser extent than in COPD.

It has been observed recently that mPAP >25 mmHg used to define pulmonary hypertension is not a good indicator to suggest the development of symptoms and severity of COPD. Pulmonary artery stiffness is a more important marker for early detection of pulmonary vascular disease and right ventricular failure.[13]

Some of these findings have an important bearing on early diagnosis and treatment of remodeling as well as prevention of development of severe airway obstruction and pulmonary hypertension. Role of inhaled corticosteroids that constitute the cornerstone of treatment of asthma and acute exacerbations of COPD is not clearly understood for prevention of remodeling and chronic structural changes in the airways.[14] Same holds true regarding the role of antileukotriene.[14] There is little effect of beta-agonists and anti-immunoglobulin E (IgE) treatment on airway remodeling.

Several potential therapies have emerged which are still undergoing further tests for their place in clinical prescriptions. Prostanoids such as prostacyclins (i.e. prostaglandin E-2 and I-2), which elevate cyclic AMP, constitute an attractive target.[15] MMP-9 inhibition is another potential line of approach to therapy.[10] Anti-IL-5 molecules and Bacillus Calmette–Guérin (BCG) vaccinations are also under investigation.[14] Similarly, the integrin antagonists may find their role as a potential target for treatment.[11]

In summary, one can conclude that a lot of progress has been made in the understanding of pathological alterations and mechanisms of airway and vascular remodeling in patients suffering from asthma and COPD. A number of new and potential therapeutic targets have been also found. One can only hope that one or more of them find place in the clinical armamentarium.

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Minutes of Meeting of Editorial Board of Lung India

Meeting editorial board of Lung India took place at NAPCON 2015 venue on the 5th of November 2015. Dr. Virendra Singh, Dr. NK Jain, Dr. V. K. Vijayan, Dr. Ashok Shah, Dr. Parvaiz Koul, Dr. Bharat Bhushan Sharma, Dr. Ramakant Dixit, Dr. Pashant Chhajed, Dr. P.R. Mohapatra, Dr. Sheetu Singh and other members attended the meeting.

Agenda were: Report of Lung India, Non-response from referees, Paucity of good review articles, Responsibilities of section editors and editorial board members and new features like from bimonthly to monthly publication and improved timelines.

The report of Lung India was presented in front of editorial board of editorial board of Lung India first. Scopus ranking of Lung India among science journals of India has risen from 321 in 2010 to 93 in 2015. Dr. Virendra Singh attributed this success to the honest efforts of all the members of editorial board of Lung India

Dr. Ashok Shah gave his valuable suggestions on how to improve the quality of review process. He was of opinion that initial screening of articles should be done by a committee of editorial board members. The issue of increase the number of publications per year was also discussed. The members including Dr. Shah and Dr. V.K. Vijayan suggested that increasing publication number may reduce the rejection rate thereby compromising the quality of the journal. Dr Shah also suggested that a subscription of Scopus should be procured in order to monitor the progress of the journal in a better manner.

Responsibilities of section editor were also reiterated and it was agreed that they should contribute regularly to the review articles. Other import issues such as maintaining review and publication time-line were also discussed.