

A Focus on Respiratory Tract Infection as an Important Risk Factor in COPD

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Abbreviation: COPD: Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) is a gradually progressive chronic disease that can be characterized by an unavoidable decline in respiratory function, exercise capacity, and health status. Globally more than 3 million people are killed every year due to COPD related complications and it is the fourth largest cause of death worldwide [1]. Exacerbations are events in the natural history of COPD when there is a marked increase in symptoms like dyspnoea, sputum volume, and purulence [2]. The exacerbations are of immense clinical significance as they have a long term effect on health status. There has always been difference in opinion while comparing asthma and COPD. While some clinicians believe that the two of them are similar disease, the others prefer to treat both as different. However, there are several clinical evidences in support the latter view [3-5].

There is a lack of significant data on the COPD morbidity and mortality in Asian populations, including India. However, a few significant studies have been conducted in India, which help us to understand aetiology of this disease, where there are around half a million deaths every year [2]. India contributes a significant and growing percentage of COPD mortality which is estimated to be amongst the highest in the world; i.e., more than 64. An important study, 'Indian Study of Asthma, Respiratory Symptoms and Chronic Bronchitis' (INSEARCH) that was conducted in 12 urban and 11 rural sites, reported the prevalence of chronic bronchitis to be 3.49% (4.29% in males and 2.7% in females) in adults > 35 years [6] COPD remains considerably under diagnosed and under treated in spite of the availability of national and international guidelines for its diagnosis. According to crude estimates there are 30 million COPD patients in India [7].

Several genetic and environmental factors are associated with the development of the disease. Biomass fuel exposure and smoking are the main factors associated with the development of the disease as well as its exacerbation. An acute exacerbation of COPD (AECOPD) causes considerable morbidity and reduces the quality of life in patients with COPD. There are several etiologic factors that alone or in combination cause AECOPD. Infection of the respiratory tract is amongst the major etiologic factor of AECOPD [1].

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Viral and bacterial infection of the respiratory tract may cause exacerbation. Other factors including chronic mucus hyper secretion, malnutrition, home care, socio-economic factor, education status, increasing age and co-morbidity may also play a role in COPD exacerbation [8,9].

Several studies have established that coronavirus, influenza virus A and B, parainfluenza virus, RSV (respiratory syncytium virus) (**Figure 1**), atypical organism like chlamydia, mycoplasma pneumonia were associated with exacerbations [10]. In a recent study conducted in our laboratory, respiratory viruses were found in 70.9% of the patients with exacerbation of COPD. Bacterial infections were detected in 25.6% of the cases of exacerbations of COPD. Co-infection with more than one virus strain was also observed in some patients. In 19.5% of exacerbations were the cause was not infectious (under publication).

Respiratory viral infections, especially rhinoviruses were reported to be a major cause of COPD exacerbations, with upper respiratory tract infections in over 50% of COPD exacerbations. Virus infection was detected even in the stable patients, suggesting that chronic

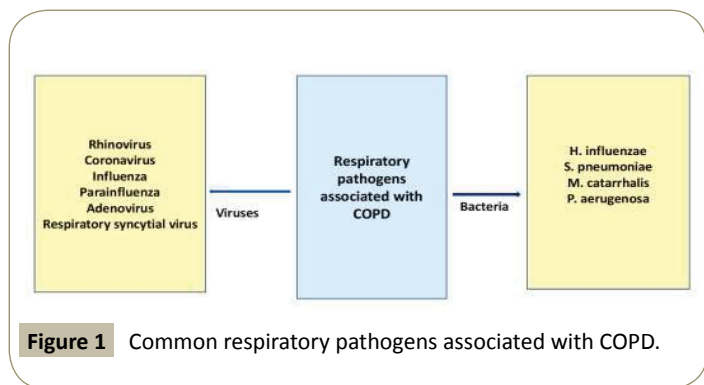


Figure 1 Common respiratory pathogens associated with COPD.

viral infections may also occur [11]. The higher frequency of occurrence of COPD exacerbations during winter season further provides the evidence for co-relation of COPD exacerbation with respiratory viral infections [12].

Most common bacterial pathogens isolated from patients with COPD exacerbations are *Haemophilus influenzae*, *Moraxella catarrhalis*, *Streptococcus pneumoniae*, *Pseudomonas aeruginosa* (Figure 1) [13,14]. In a study conducted in 2012 in India the pattern of microorganisms during COPD was described and it was found that *Klebsiella pneumoniae* was the predominant organism isolated followed by *Pseudomonas aeruginosa*, *Escherichia coli* and *Acinetobacter* spp. It was also observed that gram negative organisms were more commonly isolated than the gram positive organisms [15].

Respiratory infections

are a major etiological factor for exacerbations. Viral infections may make the person more prone to for secondary bacterial infections which leads to the increase in the inflammation of respiratory tract and aggravates the development of the disease. Respiratory infections caused by the viruses are major concern for exacerbation. Respiratory viruses were more frequently detected during acute exacerbations of COPD in patients admitted to hospital and that CRP levels correlated with exacerbation and duration of hospital stay. It is important to identify these infections as a cause of exacerbation to avoid the unnecessary use of antibiotics. Studies have also demonstrated that a large number of patients hospitalized with COPD exacerbations suffer with concomitant viral and bacterial infections which leads to a longer duration of stay in the hospitals hospitalization were found in patients with co-infections. Preventing exacerbations is one of the main components in the management of COPD. It is well establish by various studies that respiratory tract infection is a very important factor associated with COPD exacerbations. Hence, more studies should be focused on the clinical relevance of the bacterial and viral pathogens during COPD and how the management of these pathogens should be done to prevent exacerbations and related complications and also stop the injudicious use of antibiotics.

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