Significance of viral infections detected by reverse-transcriptase - multiplex PCR on hospital-related outcomes in acute exacerbations of chronic obstructive pulmonary disease

Sir,

Viruses are implicated as important causative pathogens for acute exacerbation of chronic obstructive pulmonary disease (AECOPD).[1-3] Modern molecular diagnostics such as the Reverse-transcriptase multiplex polymerase chain reaction (RT-mPCR) are highly sensitive tools for rapid diagnosis of these pathogens.[4]

In view of the sparse data regarding the prevalence of viruses in respiratory diseases such as COPD from the South-east Asian region, we aimed to detect the incidence of the major respiratory viruses via RT- mPCR in hospitalized patients with AECOPD and its impact on hospital related outcomes such as mortality and the requirement of mechanical ventilation.

A total of 137 patients admitted with the diagnosis of AECOPD were recruited over a 3-year period. Each patient was classified as having type I, II or II exacerbation according to the definition proposed by Anthonisen *et al*.[5] Patients were followed upto discharge from hospital or till death. Nasal-pharyngeal aspirates (NPAs) / Endotracheal aspirates (from ventilated patients) were collected within 7 days of onset of symptoms, and the presence of seven common respiratory viruses, i.e. Influenza A, Influenza B, Respiratory syncytial virus (RSV), Parainfluenza virus 1,2, and 3 (PIV1, PIV2, PIV3, and human metapneumovirus (hMPV) were tested using self-designed primers using multiplex RT-PCR. The primers were used in two slots (slot I -Inf A, Inf B, RSV; slot II -PIV1, PIV2, PIV3 and hMPV) and designed to ensure that the size of amplicon of each virus was different and annealing temperature of primers almost same in their respective slot.

A total of 137 patients were evaluated, with a mean age was 62.3 (11.4) years, comprising 78.8% males. Majority (81%) were current/previous smokers and were using inhaled long-acting bronchodilators (77.4%) and inhaled steroids (54%). None had any previous records of having received annual influenza vaccination.

Most of subjects had type I exacerbation (40%), followed by type III (34.5%) and type II (25.5%). The median (range) duration of hospital stay of the entire group (excluding non-survivors) was 7 (1-110) days; 71 patients (51.8%) needed mechanical ventilation; 46 patients (33.6%) eventually succumbed to their illness in hospital.

A total of 16 patients tested positive for virus, giving a prevalence of 13.1%. Influenza was the commonest virus detected (n = 11; 8%), followed by Parainfluenza virus 1 (n = 3; 3.6%), RSV, and PIV3 (n = 1 each). Patients with virus positivity were younger, had female preponderance, shorter duration of hospital stay, higher proportion of type III (milder) exacerbation, and lesser use of inhaled steroids. However, only the difference in age and use of inhaled steroids were statistically significant.

The prevalence of virus infections in our group is less compared to most previous Western reports, wherein picornavirus has been demonstrated as the commonest pathogen detected.[6] A previous systematic review calculated a weighted mean prevalence of viral infections in AECOPD from eight studies across Europe, USA, Australia, and Asia at 34.1%.[3,6] However, our findings compare well with a recent study from Kashmir, which reported an 8% frequency of influenza detected among hospitalized patients with AECOPD and were associated with higher mortality.[7] Clinically relevant outcome measures, such as mortality, requirement of mechanical ventilation, and duration of hospital stay were comparable between virus-positive and -negative groups.

Inspite of some limitations such as incomplete data on spirometry and influenza vaccination among the patients, this study provides important information regarding the prevalence of viruses in AECOPD patients and their clinico-demographic associations, including mortality.

It can be concluded thereby, that viruses are important etiological agents for AECOPD, have a predilection for affecting younger patients and those using inhaled steroids, but do not significantly affect hospital outcomes.

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