Time-course of upper respiratory tract viral infection and COPD exacerbation

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ABSTRACT Viral respiratory tract infections have been implicated as the predominant risk factor for acute exacerbations of chronic obstructive pulmonary disease (AECOPD). We aimed to evaluate, longitudinally, the association between upper respiratory tract infections (URTI) caused by viruses and AECOPD.

Detection of 18 viruses was performed in naso- and oropharyngeal swabs from 450 COPD patients (Global Initiative for Chronic Obstructive Lung Disease stages 2–4) who were followed for a mean of 27 months. Swabs were taken during stable periods (n=1909), at URTI onset (n=391), 10 days after the URTI (n=356) and during an AECOPD (n=177) and tested using a multiplex nucleic acid amplification test.

Evidence of at least one respiratory virus was significantly higher at URTI onset (52.7%), 10 days after the URTI (15.2%) and during an AECOPD (38.4%), compared with the stable period (5.3%, p<0.001). During stable visits, rhinovirus accounted for 54.2% of all viral infections, followed by coronavirus (20.5%). None of the viruses were identified in two consecutive stable visits. Patients with a viral infection at URTI onset did not have a higher incidence of exacerbation than patients without viral infection (p=0.993). The incidence of any viral infection during an AECOPD was similar between URTI-related AECOPD and non-URTI-related AECOPD (p=0.359). Only 24% of the patients that had a URTI-related AECOPD had the same virus at URTI onset and during an AECOPD. Detection of parainfluenza 3 at URTI onset was associated with a higher risk of an AECOPD (p=0.003). Rhinovirus and coronavirus were the most frequently detected viruses during AECOPD visits, accounting for 35.7% and 25.9% of all viral infections, respectively.

The prevalence of viral infection during the stable period of COPD was low. The risk of exacerbation following the onset of URTI symptoms depends on the particular virus associated with the event and was significant only for parainfluenza 3.