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Bacterial and Viral Infection in Patients Hospitalized for Acute Exacerbation of Chronic Obstructive Pulmonary Disease: Implication for Antimicrobial Management and Clinical Outcome

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Abstract

Patients with chronic obstructive pulmonary disease (COPD) exhibit frequent acute exacerbations (AE). The objectives of this study were first to evaluate the prevalence of pathogens associated to these episodes by combining conventional bacteriology and multiplex viral and bacterial PCR assays in sputum specimens, and second to determine whether C-reactive protein (CRP) value and clinical outcome could be influenced by the type of microbial agent(s) recovered from these samples. A cohort of 84 Tunisian patients hospitalized at the emergency room for AECOPD was investigated prospectively for the semi-quantitative detection of bacteria by conventional culture (the threshold of positivity was of 10^7 CFU/ml) and for the detection of viral genome and DNA of atypical bacteria by quantitative PCR using two commercial multiplex respiratory kits (Seegene and Fast-track). The two kits exhibited very similar performances although the Seegene assay was a bit more sensitive. A large number and variety of pathogens were recovered from the sputum samples of these 84 patients, including 15 conventional bacteria, one *Chlamydia pneumoniae* and 63 respiratory viruses, the most prevalent being rhinoviruses (n = 33) and influenza viruses (n = 13). From complete results available for 74 patients, the presence of bacteria was significantly associated with risk of recurrence at 6 and 12 months post-infection. The combination of these different markers appears useful for delineating correctly the antimicrobial treatment and for initiating a long-term surveillance in those patients with high risk of recurrent exacerbation episodes. A prospective study is required for confirming the benefits of this strategy aimed at improving the stewardship of antibiotics.

Keywords: C-reactive protein; Chronic obstructive pulmonary disease; acute exacerbation; antimicrobial stewardship; clinical outcome; multiplex PCR testing.

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