



Frequency of respiratory viruses among patients admitted to 26 Intensive Care Units in seven consecutive winter-spring seasons (2009–2016) in Northern Italy



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ABSTRACT

Background: The role of respiratory viruses in the etiology of community-acquired pneumonia (CAP) is still debated. The advent of molecular assays has improved the identification of viruses in patients with CAP and according to published studies, viruses account for 11–55% of adult CAP cases.

Objectives and study design: In the present study, the frequency of respiratory viruses was evaluated in respiratory samples collected from 414 patients with CAP admitted to 26 ICUs in the Lombardy Region (10 million inhabitants) during seven winter-spring seasons (2009–2016).

Results: In 226 (54.6%) patients one or more respiratory viruses were identified, while 188 (45.4%) patients were negative. A single virus infection was observed in 214/226 (94.7%) patients; while, in 12/226 (5.3%) at least two respiratory viruses were detected. Influenza A was the most common virus in 140/226 patients (61.9%) followed by rhinoviruses (33/226, 14.6%), respiratory syncytial virus (13/226, 5.8%), influenza B virus (9/226, 4.0%), human coronaviruses (9/226, 4.0%), cytomegalovirus (9/226, 4.0%) and human metapneumovirus (1/226, 0.4%).

Conclusions: Viral infections are present in a consistent proportion of patients admitted to the ICU for CAP. Influenza A and rhinovirus accounted for three-quarters of all CAP in ICU patients. The use of lower respiratory instead of upper respiratory samples might be useful in the diagnosis of viral CAP.

1. Background

In the majority of patients with a poor outcome, who are admitted to intensive care units (ICUs), there is an association with severe respiratory distress syndromes [1]. Severe community-acquired pneumonia (CAP) is usually attributed to bacterial agents, but the introduction of broader diagnostic panels with increased sensitivity have improved the diagnosis of respiratory viruses with a relevant impact on outcomes for ICU-patients [2]. Indeed, based on recent reports, viruses account for 11–55% of the total infections in patients admitted to the ICU with severe respiratory distress [1,3–5]. However, many studies have only focused on the role of influenza A virus (e.g. H1N1pdm09) as an etiologic agent of acute respiratory failure [6,7]. Respiratory viruses other than influenza such as human rhinovirus (HRV), human parainfluenza viruses 1–4 (hPIV1–4), human respiratory syncytial virus (hRSV) and human coronaviruses (hCoVs) are not routinely investigated in respiratory samples of ICU patients, and their

role as the cause of ICU admission might be under estimated. Understanding the etiologic agents of CAP may improve treatment decisions and patient outcome. However, despite technological advances, establishing the etiologic causes of pneumonia remains a challenge.

2. Objectives

The aim of this study was to investigate the prevalence of respiratory viruses in patients admitted to 26 ICUs in the Lombardy Region (nearly 10 million inhabitants) during seven consecutive winter seasons (2009–2016).

3. Study design

3.1. Study design and patients

Respiratory samples collected from patients admitted to 26 ICUs in

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