Dynamics of SARS-CoV-2 shedding in the respiratory tract depends on the severity of disease in COVID-19 patients

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Shareable abstract (@ERSpublications)
This work finds that elevated SARS-CoV-2 shedding in the second week of hospitalisation, a systemic inflammatory reaction peaking between the second and third week, and prolonged viral shedding are associated with a more severe COVID-19 disease course https://bit.ly/3p544zr

Cite this article as: Munker D, Osterman A, Stubbe H, *et al*. Dynamics of SARS-CoV-2 shedding in the respiratory tract depends on the severity of disease in COVID-19 patients. *Eur Respir J* 2021; 58: 2002724 [DOI: 10.1183/13993003.02724-2020].

This article has supplementary material available from erj.ersjournals.com

Received: 10 July 2020
Accepted: 13 Dec 2020

Abstract

A fraction of COVID-19 patients progress to a severe disease manifestation with respiratory failure and the necessity of mechanical ventilation. Identifying patients at risk is critical for optimised care and early therapeutic interventions. We investigated the dynamics of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) shedding relative to disease severity.

We analysed nasopharyngeal and tracheal shedding of SARS-CoV-2 in 92 patients with diagnosed COVID-19. Upon admission, standardised nasopharyngeal swab or sputum samples were collected. If patients were mechanically ventilated, endotracheal aspirate samples were additionally obtained. Viral shedding was quantified by real-time PCR detection of SARS-CoV-2 RNA.

45% (41 out of 92) of COVID-19 patients had a severe disease course with the need for mechanical ventilation (severe group). At week 1, the initial viral shedding determined from nasopharyngeal swabs showed no significant difference between nonsevere and severe cases. At week 2, a difference could be observed as the viral shedding remained elevated in severely ill patients. A time-course of C-reactive protein, interleukin-6 and procalcitonin revealed an even more protracted inflammatory response following the delayed drop of virus shedding load in severely ill patients. A significant proportion (47.8%) of patients showed evidence of prolonged viral shedding (>17 days), which was associated with severe disease courses (73.2%).

We report that viral shedding does not differ significantly between severe and nonsevere COVID-19 cases upon admission to the hospital. Elevated SARS-CoV-2 shedding in the second week of hospitalisation, a

systemic inflammatory reaction peaking between the second and third week, and prolonged viral shedding are associated with a more severe disease course.