

# Third day in hospital identified as a 'tipping point' in severity of COVID-19 pneumonia

April 23 2022

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New research being presented at this year's European Congress of Clinical Microbiology & Infectious Diseases (ECCMID) in Lisbon, Portugal, (23-26 April), has identified the third day of hospitalization as

a tipping point in the progression of disease among symptomatic patients admitted for COVID-19 pneumonia.

An overactive [immune response](#) to the SARS-CoV-2 virus can cause COVID-19 pneumonia with severe complications. Although medications such as corticosteroids can help control the inflammation associated with severe COVID-19 disease, there is significant variability in treatment response. Thus, there is an urgent need to identify biomarkers that are predictive of disease progression to help optimize treatment.

Dr. Anthony Sophonsri and senior author Dr. Annie Wong-Beringer, of the University of Southern California, Los Angeles, U.S. and colleagues studied patients hospitalized with COVID-19 pneumonia between March and October 2021.

The 90 patients (54% male) had a median age of 60 and were classified as having severe or non-severe COVID-19 as defined by the World Health Organization.

Baseline characteristics were similar between groups except for higher rates of diabetes and [chronic heart failure](#) among the severe patients.

Blood samples were taken at days 1, 3, 5, and 7 of hospitalization and levels of three [host proteins](#) that play vital roles in the COVID-19 immune response were measured using a novel point-of-need platform (MeMed) that yielded results within 15 minutes: interferon- $\gamma$  induced protein 10(IP-10), C-reactive protein (CRP) and tumor necrosis factor-related apoptosis-inducing ligand (TRAIL).

In general, TRAIL levels increased over time, while CRP and IP-10 fell in all patients.

On Day 1, there was no difference in levels of the proteins between the

two groups.

But by Day 3, clear differences had emerged. TRAIL levels were lower (median 21 vs. 30 pg/mL) and IP-10 levels higher (median 713 vs. 328 pg/mL) in the severe group than the non-severe group. IP-10 levels also remained elevated until day 5 in the severe patients (median 560 vs. 212 pg/mL).

On Day 3, an IP-10 level of  $\geq 570$  pg/mL and a TRAIL level  $\geq 25$  pg/mL were indicators of progression to severe COVID-19 pneumonia.

Additionally, the severe group took longer to recover (12 days on average vs. 4 days), had a higher mortality rate (20% vs. 0%), and was eight times more likely to develop invasive secondary infections than the non-severe group.

The researchers say that the patterns in the host immune response could potentially be used to identify patients who are likely to become severely ill before they deteriorate.

They explain: "There are many patients who present to the [emergency department](#) only requiring minimal oxygen supplementation such as [nasal cannula](#) but soon progress to needing [mechanical ventilation](#)."

"Monitoring these immune proteins may help identify these patients sooner, allowing prompt escalation of care and more aggressive management of their overactive inflammatory response."

Dr. Sophonsri adds: "The observed patterns in the host immune response provide insight into the immunopathology of COVID-19, revealing a potential turning point in disease progression on Day 3 of admission and the utility of IP-10 and TRAIL as sensitive markers for [disease progression](#) to guide therapeutic intervention."

Provided by European Society of Clinical Microbiology and Infectious Diseases

Citation: Third day in hospital identified as a 'tipping point' in severity of COVID-19 pneumonia (2022, April 23) retrieved 26 April 2024 from <https://medicalxpress.com/news/2022-04-day-hospital-severity-covid-pneumonia.html>

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