New blood test predicts which COVID-19 patients will develop severe infection

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Professor Gerry McElvaney (left), the study's senior author and a consultant in Beaumont Hospital, and Professor Ger Curley (right) stand in front of the RCSI Education and Research Centre in Beaumont Hospital, Dublin. Credit: RCSI University of Medicine and Health Sciences

Scientists have developed, for the first time, a score that can accurately

predict which patients will develop a severe form of COVID-19.

The study, led by researchers at RCSI University of Medicine and Health Sciences, is published in *The Lancet*'s translational research journal *EBioMedicine*.

The measurement, called the Dublin-Boston score, is designed to enable clinicians to make more informed decisions when identifying patients who may benefit from therapies, such as steroids, and admission to intensive care units.

Until this study, no COVID-19-specific prognostic scores were available to guide clinical decision-making. The Dublin-Boston score can now accurately predict how severe the infection will be on day seven after measuring the patient's blood for the first four days.

The blood test works by measuring the levels of two molecules that send messages to the body's immune system and control inflammation. One of these molecules, interleukin (IL)-6, is pro-inflammatory, and a different one, called IL-10, is anti-inflammatory. The levels of both are altered in severe COVID-19 patients.

Based on the changes in the ratio of these two molecules over time, the researchers developed a point system where each 1-point increase was associated with a 5.6 times increased odds for a more severe outcome.

"The Dublin-Boston score is easily calculated and can be applied to all hospitalized COVID-19 patients," said RCSI Professor of Medicine Gerry McElvaney, the study's senior author and a consultant in Beaumont Hospital.

"More informed prognosis could help determine when to escalate or de-escalate care, a key component of the efficient allocation of resources

during the current pandemic. The score may also have a role in evaluating whether new therapies designed to decrease inflammation in COVID-19 actually provide benefit."

The Dublin-Boston score uses the ratio of IL-6 to IL-10 because it significantly outperformed measuring the change in IL-6 alone.

Despite high levels in blood, using only IL-6 measurements as a COVID-19 prognostic tool is hindered by several factors. IL-6 levels within the same patient vary over the course of any given day, and the magnitude of the IL-6 response to infection varies between different patients.

More information: Oliver J McElvaney et al. A linear prognostic score based on the ratio of interleukin-6 to interleukin-10 predicts outcomes in COVID-19, *EBioMedicine* (2020). DOI: 10.1016/j.ebiom.2020.103026

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