



A biomarker assay to risk-stratify patients with symptoms of respiratory tract infection

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The RALI-Dx assay is a biomarker-based approach to emergency department triage for patients with respiratory illness and is superior to conventional strategies. This diagnostic test will help to optimise the utilisation of scarce healthcare resources. <https://bit.ly/3PVjnYp>

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Abstract

Background Patients who present to an emergency department (ED) with respiratory symptoms are often conservatively triaged in favour of hospitalisation. We sought to determine if an inflammatory biomarker panel that identifies the host response better predicts hospitalisation in order to improve the precision of clinical decision making in the ED.

Methods From April 2020 to March 2021, plasma samples of 641 patients with symptoms of respiratory illness were collected from EDs in an international multicentre study: Canada (n=310), Italy (n=131) and Brazil (n=200). Patients were followed prospectively for 28 days. Subgroup analysis was conducted on confirmed coronavirus disease 2019 (COVID-19) patients (n=245). An inflammatory profile was determined using a rapid, 50-min, biomarker panel (RALI-Dx (Rapid Acute Lung Injury Diagnostic)), which measures interleukin (IL)-6, IL-8, IL-10, soluble tumour necrosis factor receptor 1 (sTNFR1) and soluble triggering receptor expressed on myeloid cells 1 (sTREM1).

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Results RALI-Dx biomarkers were significantly elevated in patients who required hospitalisation across all three sites. A machine learning algorithm that was applied to predict hospitalisation using RALI-Dx biomarkers had a mean \pm SD area under the receiver operating characteristic curve of 76 \pm 6% (Canada), 84 \pm 4% (Italy) and 86 \pm 3% (Brazil). Model performance was 82 \pm 3% for COVID-19 patients and 87 \pm 7% for patients with a confirmed pneumonia diagnosis.

Conclusions The rapid diagnostic biomarker panel accurately identified the need for inpatient care in patients presenting with respiratory symptoms, including COVID-19. The RALI-Dx test is broadly and easily applicable across many jurisdictions, and represents an important diagnostic adjunct to advance ED decision-making protocols.