

# Use of Real Time IP-10 Measurements to Identify and Monitor the Dysregulated Immune Response in COVID-19 Patients



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## Background

It is estimated that up to 10% of SARS-CoV-2 patients progress from early and pulmonary stages to the most severe stage of illness, which manifests as an extra-pulmonary systemic hyperinflammatory syndrome. Interferon gamma-induced protein 10 (IP-10) is an inflammatory marker that plays a role in the dysregulated host response of COVID-19 infected patients. Clinical monitoring of IP-10 has been restricted in the absence of a rapid diagnostic test. MeMed Key™ is a novel platform recently cleared to provide IP-10 measurements in 15 minutes. We hypothesized that providing physicians with real time IP-10 measurements would support detection and continuous monitoring of patients with a dysregulated immune response and potentially allow personalized immunomodulation to improve patient outcome.

## Materials & methods

From 7<sup>th</sup> April 2020 to 10<sup>th</sup> May 2020 blood was routinely collected serially from 52 SARS-CoV-2 positive patients hospitalized at a COVID-19 dedicated medical center. A clinical decision support protocol was in place focused on managing viral response, oxygenation and inflammatory state (NCT04389645).

## Results

The median age of the 52 patients was 69, 69% were male, 21% were ventilated, 4 died, 2 due to non-COVID-19 related complications. The most common comorbidities were Diabetes 40% and Hypertension 46%. IP-10 >1000 *pg/ml* correlated with ICU admission ( $p < 0.05$ ) and increased COVID-19 severity score ( $p < 0.01$ ). 19 of the 52 patients had IP-10 >1000 *pg/ml*, of these 12 were treated with corticosteroids. Monitoring IP-10 within the clinical decision support protocol assisted with personalized corticosteroid regimens with the aim of reducing IP-10 <1000 *pg/ml* (figure 1). The 10 patients that survived exhibited IP-10 levels >1000 *pg/ml* for 2.6 days on average. In contrast, the 2 patients that died of COVID-19 related complications displayed an average of 7.5 days with IP-10 >1000 *pg/ml* ( $p < 0.05$ ).

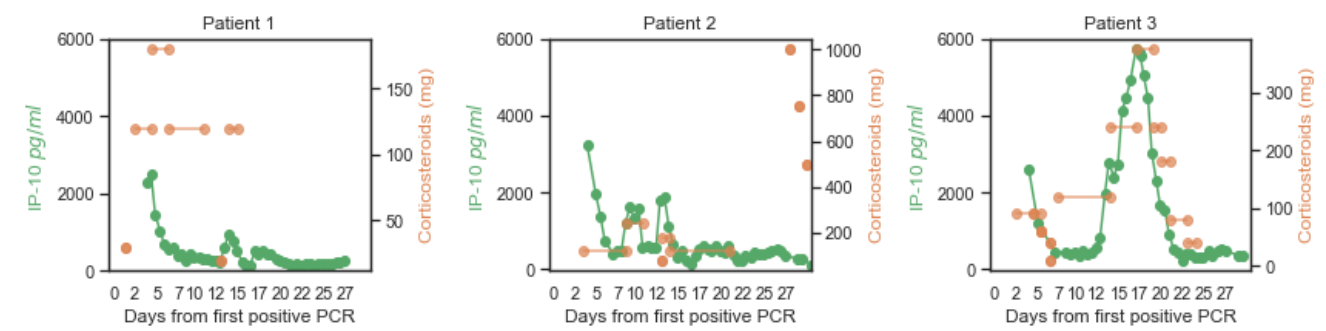


Figure 1 legend: These 3 patients had IP-10 >1000 *pg/ml* at the start of the study. Right Y axis shows the normalized levels of Corticosteroids administered (Solumedrol and Hydrocortisone). Left Y axis shows the levels of IP-10 measured by MeMed Key™. X axis shows days from first positive SARS-CoV-2 PCR. Patient 1 survived, Patients 2 and 3 died.

## Conclusions

Providing physicians with real time measurements of IP-10 in COVID-19 patients proved a useful tool as part of the clinical decision support protocol. Timely identification, monitoring and personalized treatment of COVID-19 patients exhibiting a dysregulated immune response may aid in improving patient outcome. Further studies are warranted.

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