

Use of Real Time IP-10 Measurements for Identification and Monitoring of the Dysregulated Immune Response in COVID-19 Patients

S. Lev¹, T. Gottesman², G. Sahaf Levin¹, A. Nutman³, T. Ilan Ber⁴, A. Angel⁴, L. Kellerman⁴, E. Barash⁴, R. Navon⁴, E. Simon⁴, N. Avni⁴, M. Hainrichson⁴, T. Gottlieb⁴, K. Oved⁴, E. Eden⁴, B. Tadmor¹

¹Intensive Care Unit, Rabin Medical Center, Hasharon, Petach Tikva, Israel, ²Department of Infectious Disease, Rabin Medical Center, Hasharon, Petach Tikva, Israel, ³National Institute for Infection Control and Antibiotic Resistance, Tel Aviv Medical Centre, Tel-Aviv, Israel, ⁴MeMed, Haifa, Israel

Background

- About 10% of COVID-19 patients progress to the most severe stage of illness, manifesting as an extra-pulmonary systemic hyperinflammatory syndrome. Corticosteroid treatment at this phase has been shown to reduce mortality. The non-specific inflammatory biomarkers CRP and Ferritin are employed to detect and assess the inflammatory state of COVID-19 patients.
- Interferon gamma-induced protein 10 (IP-10) is an inflammatory marker that plays a role in the dysregulated host response of COVID-19 patients.
- MeMed Key™ is a rapid immunoassay platform that provides IP-10 measurements in 15 minutes. We hypothesized that providing physicians with IP-10 measurements would enable them to identify patients with a dysregulated immune response, potentially improving patient outcome.

Methods

From 7th April 2020 to 10th May 2020 serum remnants from routine blood draws were 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 oxygenation, inflammation and viral clearance. (NCT04389645).

Results

- Among the 52 patients measured, 26 patients were classified as severe based on the COVID-19 severity score.
- Severe patients exhibited higher median IP-10 levels, 1190 pg/ml as compared to 328 pg/ml in the non-severe group ($p < 0.01$), and higher median Ferritin levels, 652 ng/dl versus 283 ng/dl ($p < 0.01$).
- Seventeen of the 26 severe COVID-19 patients were treated with corticosteroids.
- All patients exhibited reduction in IP-10 within 3-5 days of corticosteroid initiation; median IP-10 levels decreased from 2961 pg/ml to 372 pg/ml ($p < 0.01$). Median Ferritin levels remained elevated, despite a slight decrease from 821 ng/dl to 610 ng/dl.
- Patients #8 and #11 were the only two patients that exhibited IP-10 flare-ups > 1000 pg/ml and eventually died of COVID-19 related complications.

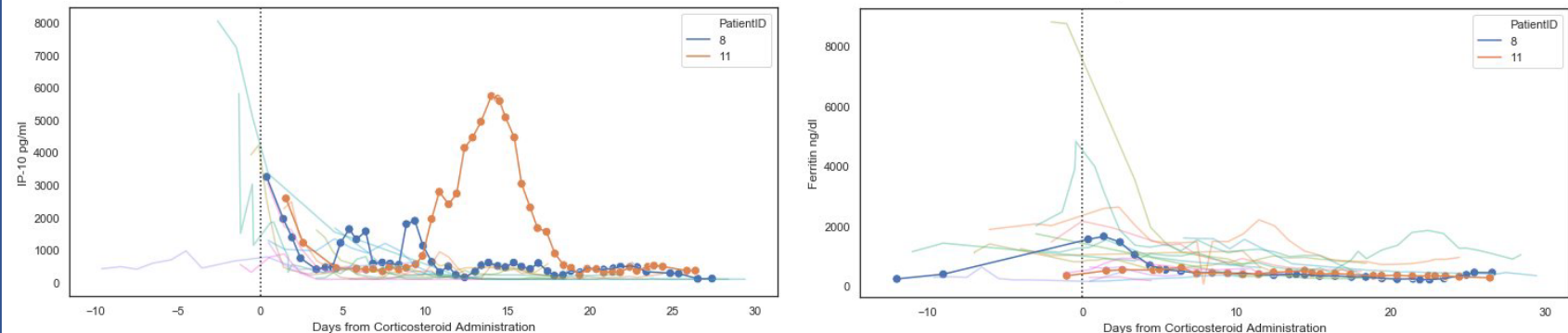


Figure 1: Initiation of corticosteroid therapy was reflected by a decrease in IP-10 and Ferritin levels in severe patients treated with corticosteroids (n = 17)

Conclusions

Real time IP-10 measurements help identify COVID-19 patients in a hyperinflammatory state, specifically those not responding to standard corticosteroid regimens, who may require more aggressive treatment. Further studies are warranted.