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SCIENTIFIC LETTER

Intravenous Immunoglobulin and Methylprednisolone Refractory Multisystem Inflammatory Syndrome in Children (MIS-C) in Steroid-Dependent Nephrotic Syndrome Following Rituximab

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To the Editor: A 9-y-old male, known steroid-dependent nephrotic syndrome patient, on alternate-day prednisolone, and having received rituximab 10 d back, presented with high fever and maculopapular rashes for 2 d. On admission, he was in shock, which was diagnosed as septic shock. Fluid resuscitation and inotropes were started. 2D echo revealed global dyskinesia of the heart and an ejection fraction (EF) 40%. COVID IgG level was 8719.6 (cutoff < 60 AU/mL), NT-proBNP was 26202 pg/mL (< 300 pg/mL), D-dimer was 6252.7 ng/mL (< 500 ng/mL), ferritin was 1595 ng/mL (< 150 ng/mL), IL-6 was 743.9 pg/mL (< 43 pg/mL), CRP was 26.5 mg/dL, and procalcitonin was 27.4 ng/mL. Cultures were negative.

The diagnosis was revised to MIS-C; IVIg 1 g/kg and methylprednisolone 10 mg/kg were initiated, but fever spikes persisted with hypotension, and the EF lowered to 20%. Methylprednisolone was increased to 1 g/d but on day 3, platelets dropped to 45000/cmm and ferritin elevated to 16585, INR 3.5, SGPT 4540 IU/L, and creatinine 2.1 mg/dL. Considering a refractory hypercytokinemic state with multiorgan dysfunction, he was administered the IL-6 inhibitor tocilizumab IV, 8 mg/kg. Fever and inflammatory markers decreased, and EF improved to 50% over the next 3 d.

Post-COVID MIS-C is a life-threatening condition; IVIg and steroids being the mainstays of treatment, with an overall good prognosis if diagnosed and treated rapidly. The data over the last 2 y showed that patients on rituximab fared poorly following COVID-19 infection [1], but there are no reports on the severity of MIS-C in post-Rituximab patients. Our patient received rituximab, which induces trogocytosis of B-cells, resulting in acute production and release of IL-6 [2]. IL-6 concentrations are elevated in critically ill MIS-C patients, and hence is implicated in diagnosis, prognosis, and more importantly, the use of tocilizumab in treatment [3, 4].

Our patient had stormy presentation with cardiogenic shock on day 2 of fever, showed rapidly increasing severity in spite of IVIg and steroids, and finally responded to tocilizumab. This is the first reported case of post-rituximab MIS-C.

Declarations

Conflict of Interest None.

References

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