Low-Dose Dexamethasone Following IVIG in Pediatric Inflammatory Multisystem Syndrome in Temporal Association with COVID-19 (PIMS-TC)

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To the Editor: Pediatric inflammatory multisystem syndrome – temporally associated with SARS-CoV-2 (PIMS-TS) is a severe form of illness caused by Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), characterised by hyperinflammatory response and multiorgan dysfunction [1]. Immunotherapy forms the basis of management. We report a child with PIMS-TS managed with IVIG and low-dose dexamethasone.

A 10-y-old male presented with fever, myalgia, headache, cough, throat pain, redness of eyes, rash, pain abdomen, vomiting and respiratory distress, three weeks after contact with COVID-19 positive relatives. He had tachycardia, tachypnea with retractions, SpO₂ of 89%, conjunctivitis, cheilitis, rash, edema, hepatomegaly and meningismus. Investigations revealed anemia, leucocytosis with neutrophilia and lymphopenia, normal platelets, deranged kidney and liver functions, hypoalbuminemia, positive C-reactive protein (CRP) and elevated lactate dehydrogenase (443 U/L), total creatine phosphokinase (> 1600 IU/L), pro-B-type-natriuretic peptide (24,838 pg/ml), interleukin-6 (685.5 pg/ml), procalcitonin (65.0 ng/ml), D-dimer (2573 ng/ml), ferritin (808.4 ng/ml) and triglycerides (357 mg/dl). He had acute respiratory distress syndrome (ARDS) with features of classic COVID on chest X-ray. Rapid antigen test and RT-PCR for SARS-CoV-2 were negative. Anti-SARS-CoV-2 immunoglobulin G (IgG) was positive, with IgG optical density value 1.7 (Cut off—0.65) and IgG index 2.4 (Erbalisa Covid -19 IgG ELISA kit). Patient was started on high flow nasal

cannula, antibiotics and inotropes. After giving IVIG at 2 g/kg, fever and need for respiratory and circulatory support persisted with CRP > 150 mg/L. Hence, intravenous dexamethasone was started (0.2 mg/kg/d OD). He improved with normalisation of inflammatory markers (CRP— 6 mg/L, interleukin-6 < 1.5 pg/ml) and was discharged on tapering dose of oral dexamethasone.

PIMS-TS occurs 2–4 wk after SARS-CoV-2 infection and shares features with Kawasaki disease (KD). Clinical features and hyperinflammatory state reported are similar to that of our patient [1]. The exact mechanism is unknown; an aberrant cellular or humoral immune response leading to overt inflammation with multiorgan dysfunction is postulated [1].

IVIG has been used as the first-line therapy, which acts by binding of its Fc fragment with Fc-gamma receptors on inflammatory cells [2]. Some patients fail to respond to IVIG; the risk factors being anemia, neutrophilia, hypoalbuminemia, elevated interleukin-6 and CRP [3]. They need adjunctive therapy with corticosteroids. Glucocorticoids bind to specific cytoplasmic receptors modifying transcription, protein synthesis and also control prostaglandin and leukotriene synthesis by inhibiting arachidonic acid release [2]. In KD, dexamethasone has better anti-inflammatory action due to its equally inhibiting effect on macrophages, coronary arterial endothelium cells and T cells than IVIG [4]. Dexamethasone has been found to be effective in those with SARS-CoV-2 mediated lung injury requiring respiratory support and presenting after first week of illness (immunopathological stage) [5]. Unlike other corticosteroids studied in ARDS, dexamethasone lacks mineralocorticoid activity [6].

Our case had risk factors for IVIG resistance, hence required adjuvant therapy. Most published reports have used methylprednisolone. As our patient had ARDS also, dexamethasone, which is a readily available low-cost drug, was preferred. To the best of our knowledge, this is the first case managed with low-dose dexamethasone, emphasizing its equivalent efficacy in suppressing inflammatory response, especially in those with ARDS.

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Compliance with Ethical Standards

Conflict of Interest None.

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