Glucocorticoids as single first-line therapy in MIS-C: experience of a single-center

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Multisystem inflammatory syndrome in children (MIS-C) is a rare but life-threating hyper-inflammatory disorder, that usually develops 2-6 weeks following SARS-CoV-2 infection. There are currently no universally accepted guidelines for the treatment of MIS-C, although authoritative panels and various scientific societies have published clinical guides recommending the use of intravenous immunoglobulin (IVIg) with steroids as a first-line therapy.

Our Experience: Since April 2020, the first choice treatment for MIS-C cases admitted to the Regina Margherita Children's Hospital (OIRM) has been represented by **intravenous steroid monotherapy**; this approach was developed by the hospital's team of Immuno-Rheumatologists, before the publication of the main international indications and was supported by the encouraging results obtained through an internal analysis. The treatment protocol was applied under the supervision of a multi-disciplinary team and is summarised in Table 1.
IVIg treatment was reserved for evidence of coronary abnormalities and/or decline in general condition/marked irritability despite adequate response in terms of fever and inflammation markers reduction.

Cardiological assessment on admission

Cardiac dysfunction	Inotropic support and/or hospitalisation in TIP	First-line therapy
✗	✗	**Methylprednisolone** 2 mg/Kg/die per 3-5 gg
✓	✗	**Methylprednisolone** 10 mg/Kg/die per 3-5 gg
✓	✓	**Methylprednisolone** 10 mg/kg/die + **Anakinra** 4mg/Kg sc oppure 4-8mg/Kg/die ev by continuous infusion

Revaluation at 48h

Therapeutic **step-up** if:
- no defervescence
- failure to reduce indices of inflammation

Table 1: treatment protocol applied at OIRM

Our data: 29 patients with a diagnosis of MIS-C were hospitalized in OIRM (April 2020-June 2021), 55% of them were male and medium age was 8.6 years (range 3-14 years).
Fever was the most frequent clinical manifestation at admission to the Emergency Unit (87%), followed by muco-cutaneous alterations (60.5%) ad gastrointestinal disorders (51.7%). All patients had high levels of anti-SARS-Co-V-2 IgG antibodies.

Echocardiographic alterations	
Coronary abnormalities	3 (10,3)
Transient ectasia - n° (%)	2 (6,9%)
Persistent coronary aneurysms - n° (%)	1 (3,4%)
Left ventricular systolic function impairment	13 (44,8%)
Mild depression EF 45-55% - n° (%)	7 (24,1%)
Moderate depression EF 35-44% - n° (%)	5 (17,2%)
Severe depression <35% - n° (%)	1 (3,4%)
Left ventricular dilatation (LVDD z-score > 2)	2 (6,9%)

Table 2: Echocardiographic findings

44.8% of patients showed variable grade of ventricular dysfunction. 10.3% showed a coronary involvement (echocardiographic findings are reported on Table 2).
Intensive care unit hospitalization was needed in two patients, only one of them underwent inotropic therapy.
Mechanical ventilation or ECMO were not needed.
No patient died.

All the patients received an intravenous high-dose steroid therapy as first line treatment, in 27.6% of cases a step-up to Anakinra was done, with good clinical improvement. Only 13.8% of patients received IVIg associated with steroids (more details on Table 3).

	Mean	Minimum	Maximum
Number of days between onset of fever and start of steroid ther	5.79	4	10
Duration of ev steroid therapy (number of days)	8.76	5	14
Duration of os steroid therapy (number of days)	49.07	9	130
Total duration of steroid therapy (ev + os, number of days)	57.83	17	144
Total duration of therapy with Anakinra (number of days)	26.38	16	32

Table 3: Details of therapeutic treatment

Complete *restitutio ad integrum* was reached in 28 patients.

Conclusion: Our data highlight the effectiveness of intravenous high-dose steroid therapy, eventually associated to a step-up therapy with Anakinra. Although this result is promising, further and larger studies are still needed.

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