

# Immunotherapy, steroids had positive outcomes in children with COVID-related multi-system inflammatory syndrome

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Rash on the skin of a child who has COVID-19 related multi-system inflammatory syndrome. Credit: Damien Bonnet, M.D., Ph.D.

Treatment with antibodies purified from donated blood—immune globulin therapy—and steroids restored heart function in the majority of children with COVID-related multi-system inflammatory syndrome, according to new research published yesterday in *Circulation*, the

flagship journal of the American Heart Association.

Physicians around the world have recently noted that a small number of children exposed to COVID-19 have an emerging condition with features overlapping [toxic shock syndrome](#) and similar to a heart condition known as Kawasaki disease, together with cardiac inflammation. The symptoms most commonly observed are high-spiking fever, unusual lethargy over several days (asthenia), digestive signs including severe abdominal pain, vomiting or diarrhea, swollen lymph nodes (adenopathy) and skin rash.

In this small study, "Acute heart failure in multisymptom inflammatory syndrome in children (MIS0-C) in the context of global SARS-CoV-2 pandemic," researchers in France and Switzerland retrospectively collected and analyzed clinical, biological, therapeutic and early outcome data for children admitted to the pediatric intensive care unit from March 22 to April 30, 2020, with fever, cardiogenic shock or acute left ventricular dysfunction with inflammatory state.

This analysis included 35 children (ages 2 to 16; median age of 10 years). Thirty-one (88.5%) children tested positive for SARS-CoV-2 infection, and none of the children had underlying cardiovascular disease. Secondary conditions were limited, and 17% of [patients](#) were overweight (n=6). All patients presented with fever and unusual lethargy (asthenia) lasting approximately 2 days, and 83% of patients (n=29) presented with gastrointestinal symptoms.

Left ventricular systolic dysfunction was present in all patients in association with low systolic blood pressure. Almost all patients required respiratory assistance (n= 33). Left ventricular function recovered in the majority of patients discharged from the intensive care unit (n=25). Ten patients treated with ECMO (extracorporeal membrane oxygenation) for 3-6 days were successfully weaned. (ECMO is a process whereby the

blood is sent through a machine to increase the amount of oxygen in the blood. The oxygen-rich blood is then returned to the body.)

The majority of patients received intravenous immune globulin treatment (n=25), and 12 patients were treated with intravenous steroids. Three [children](#) were treated with an interleukin 1 receptor antagonist due to persistent severe inflammatory state. 23 patients were treated with a therapeutic dose of heparin. No deaths were observed.

"The majority of patients recovered within a few days following intravenous immune globulin, with adjunctive steroid therapy used in one third. Treatment with immune globulin appears to be associated with recovery of left ventricular systolic function," researchers reported.

The researchers' key findings are:

- Multi-System Inflammatory Syndrome in Children (MIS-C) is a new syndrome that appears to be temporally related to previous exposure to SARS-CoV-2.
- MIS-C shares similarities with atypical Kawasaki disease, but prominent clinical signs are largely different.
- Myocardial involvement with [acute heart failure](#) is likely due to myocardial stunning or edema rather than to inflammatory myocardial damage.
- Whereas the initial presentation may be severe with some patients requiring circulatory and respiratory mechanical assistance, rapid recovery with the use of immune globulin and steroids is currently observed.
- Early diagnosis and management appear to lead to favorable outcome using classical therapies.
- Additional study is needed to determine the full spectrum of the illness and whether long-term cardiac complications may arise.

**More information:** Zahra Belhadjer et al. Acute heart failure in multisystem inflammatory syndrome in children (MIS-C) in the context of global SARS-CoV-2 pandemic, *Circulation* (2020). [DOI: 10.1161/CIRCULATIONAHA.120.048360](https://doi.org/10.1161/CIRCULATIONAHA.120.048360)

Provided by American Heart Association

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