

# Multisystem Inflammatory Syndrome in Children – The Importance of Monitoring these Patients for the Occurrence of Long-Term Sequelae

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## ABSTRACT

Multisystem inflammatory syndrome in children is a relatively recent condition related to SARS-CoV-2 infection. Although short and mid-term sequelae have been previously addressed, long-term sequelae persisting several years after the disease are still unknown.

**Keywords:** MIS-C Associated with COVID-19, Multisystem Inflammatory Syndrome in Children, PIMS-TS, Pediatric Inflammatory Multisystem Syndrome

## Introduction

Multisystem inflammatory syndrome in children (MIS-C) is a rare illness that appeared after the beginning of the COVID-19 pandemic [1]. It is caused by an amplified immune response that happens in response to SARS-CoV-2 virus at least 2 weeks after the viral infection has occurred [2].

The clinical picture is characterized by fever, increased inflammatory markers, and multisystem organ involvement [3]. Gastroenterological, mucocutaneous, cardiac and hematologic affection is very common [4]. Respiratory, renal or neurologic involvement occurs in smaller percentages [4]. A differential diagnosis with Kawasaki disease and toxic shock syndrome is mandatory [3].

Although vaccination against SARS-CoV-2 virus has been shown to be protective against the occurrence of this potentially fatal illness, some patients who survived to MIS-C might have sequelae that persist several years after the disease has occurred [3].

## Body of the commentary

Although some follow-up studies have been performed trying to address short and mid-term sequelae in MIS-C patients, long-

term sequelae are still unknown, as well as their impact on the patients' lives [5-7].

The most common heart changes at 6–24 months of follow-up are tricuspid regurgitation (nearly 50% of the patients) and mitral regurgitation (nearly 35% of the patients) [8]. Although left ventricular ejection fraction (LVEF) seems to return to normal in nearly all patients at follow-up, cardiac magnetic resonance (CMR) changes compatible with myocardial fibrosis occur in 10–15% of MIS-C patients six months after the acute illness [8-10]. Further studies are needed to understand if CMR findings become persistent over the years, since myocardial fibrosis is related to an increased risk of ventricular arrhythmias and, consequently, sudden death [11].

Some respiratory symptoms are reported at follow-up, such as dyspnoea on exertion and asthenia, but they tend to improve at 12 months (15–20% of the patients) compared to six months of follow-up (25–30% of the patients) [6]. Almost all MIS-C patients show normal diffusing capacity of the lungs for carbon monoxide (DLCO) and no changes at spirometry or plethysmography seem to occur at six months of follow-up [5].

Acute kidney injury occurs in a significant percentage of the cases at admission (25–30%) [6,12]. However, blood creatinine level has been shown to normalize in all patients at six months of follow-up [5,6].

Of the patients with severe disease, requiring intensive care, the majority (nearly 60%) reported physical complaints, such as fatigue (40%), headaches (nearly 30%), and decreased exercise tolerance (nearly 20%) at 12 months of follow-up [7].

Psychological problems were reported in nearly 30% at six months of follow-up and in nearly 20% at 12 months of follow-up [7,13].

### Conclusion

MIS-C can leave clinical sequelae with unknown long-term repercussions. Although this is a rare condition, prevented by the SARS-CoV-2 vaccine, it is important not to forget the patients who suffered from this illness in the past, since they might have sequelae that are important to address and treat, whenever possible.

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