

# Cardiac Assessment in Children with MIS-C: Late Magnetic Resonance Imaging Features

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**Background:** Multisystem Inflammatory Syndrome (MIS-C), a new entity in children which developed 2-4 weeks after severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, is a severe condition. It can affect the multisystem, while the most severe manifestation is cardiac involvement. Left ventricular dysfunction, cardiogenic shock, coronary artery dilatation/aneurysm, valvulitis, pericardial effusion, arrhythmia, and conduction abnormalities were reported in approximately 80% of children with cardiovascular system involvement. It is still unclear the duration of the cardiac symptoms, and even they are permanent or persistent. Few studies evaluated persistent cardiac abnormalities by cardiac magnetic resonance imaging (MRI). Therefore, we aimed to assess persisting cardiac abnormalities with MIS-C by cardiac MRI and compare them with echocardiograms.

**Methods:** A retrospective study was conducted at a tertiary-level University Hospital between June 2020-July 2021. Thirty-four children diagnosed with MIS-C according to the criteria defined by the Centers for Disease Control and Prevention were retrospectively evaluated.

**Results:** The study included 17 males and 17 females with a mean age of 9.31±4.72 years. Initial echocardiographic evaluation showed cardiac abnormality in 18 (52.9%) patients; 4 (11.8%) pericardial effusion, 4 (11.8%) left ventricular ejection fraction (LVEF) <55%, 5 (14.7%) LV fractional shortening <30%, 5 (14.7%) coronary artery dilatation. Echocardiography showed normal LV systolic function in all patients at follow-up; coronary dilatation persisted in 2 of 5 (40 %)

patients at the 6th-month visit. Cardiac MRI was performed in 31 (91.2%) patients (Table 1). We didn't detect abnormal T1 levels, whereas 9 (29%) had isolated elevated T2 values. 19 (61.3%) of 31 patients had at least one of the following findings: pericardial effusion, right ventricular dysfunction, LVEF abnormality.

**Conclusions:** Cardiac involvement persisted at a higher rate which was shown by cardiac MRI in the late period, particularly pericardial effusion. Cardiac MRI may be suggested for all MIS-C patients at a later phase. Prospective studies with larger sample sizes are needed to determine long-term cardiac effects.

Table 1. Results of Cardiac MRI

	MRI performed (N=31)
Month MRI performed (mean ± SD, month)	4.8±1.5
LVEDV (mean ± SD, ml)	82.7±49.6
LVESV (mean ± SD, ml)	33.4±18.6
LVEF (mean ± SD, %)	58.5±6.2
RVEF (mean ± SD, %)	59.5±8.8
Native T1 at basal mean levels (mean ± SD, ms)	903±38.6
Native T2 at basal mean level (mean ± SD, ms)	47±5.13
LVEF abnormal (n,%)	5 (16.7)
Right ventricular dysfunction (n,%)	6 (19.4)
Pericardial effusion (n,%)	14 (45.2)

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