

SARS-CoV-2 related fulminant myocarditis: successful management with Impella CP mechanical circulatory support

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Introduction: Fulminant myocarditis (FM) is a severe and rapidly progressive cardiac inflammatory disease with high mortality rates. Mechanical circulatory support (MCS) has significantly improved survival outcomes, but there are only a few cases of successful recovery with Impella CP support¹. Here, we report a case of SARS-CoV-2-related FM managed with Impella CP.

Case report: 41-year-old female with a history of scleroderma tested positive for SARS-CoV-2 four days before admission. Immunosuppression with mycophenolate mofetil was discontinued immediately, and treatment with nirmatrelvir/ritonavir was initiated but stopped two days later due to side effects. On the fourth day of symptoms, she was admitted due to elevated troponin I (TnI) and a reduced ejection fraction (EF of 45%) on echocardiography (echo).

She received pulse corticosteroids and intravenous immunoglobulins along with heart failure therapy. On the fifth day, she was transferred to University Hospital Center Zagreb due to cardiogenic shock. Initial laboratory findings showed severely elevated NT-proBNP (30,662 ng/L) and TnI (3,508.3 ng/L), while CRP was normal (2.6 mg/L). Her lactate levels were elevated at 9 mmol/L. The echo showed EF of 20% and mildly reduced right ventricular (RV) function. Initially, she was stabilized with inotropes—dobutamine (10 mcg/kg/min) and milrinone (0.5 mcg/kg/min)—but two days later, Impella CP was implanted due to the progression of shock. The position of Impella CP on echo is shown in **Figure 1**. With Impella CP support, her condition improved, and subsequent echo showed signs of recovery in systolic function. Eight days later, she was successfully weaned off Impella CP support. Control echo before discharge showed an EF of 63% and normal RV function. Magnetic resonance imaging also revealed a recovered EF of 60%, with diffuse myocardial edema consistent with the diagnosis of FM. Complete laboratory findings on admission and discharge are shown in **Table 1**. The patient was discharged home after 18 days. She remained on heart failure treatment, including valsartan, bisoprolol, and eplerenone, for six months following FM.

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Conclusion: Although FM has historically high mortality rates, MCS can be associated with promising results. We described a case of SARS-CoV-2-related FM with full recovery managed solely with Impella CP support, which provides significantly less support than the more commonly used venoarterial extracorporeal membrane oxygenator (VA ECMO) or Impella 5.5.



FIGURE 1. Echocardiography, parasternal long axis, showing Impella CP position and small pericardial effusion.

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