

Editorial



Quantifying Hemodynamic Instability in Fulminant Myocarditis: Clinical Implications for Decision-Making

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► See the article “Association Between Vasoactive Inotropic Score and Clinical Outcomes in Patients With Fulminant Myocarditis” in volume 55, e87.

Myocarditis is an inflammatory disease of the heart with a broad spectrum of clinical presentations, ranging from subclinical cases to severe clinical syndromes. In some patients, it manifests as acute fulminant myocarditis (FM), characterized by sudden-onset cardiac inflammation, profound hemodynamic compromise, and the requirement for circulatory support, including inotropes or mechanical devices.^{1,2} FM can lead to a rapid deterioration in cardiac function and cardiogenic shock, for which venoarterial extracorporeal membrane oxygenation (VA-ECMO) has become a pivotal treatment.³ With the increasing use of VA-ECMO and accumulating clinical experience, survival rates in FM have improved over time.⁴ However, in-hospital mortality remains substantial,^{4,5} underscoring the importance of timely intervention and appropriate patient selection.

In a study published in the current issue, Hong et al.⁶ investigated the prognostic implications of the vasoactive inotropic score (VIS) in patients with FM. This multicenter retrospective study included 417 patients treated at seven hospitals in South Korea, and demonstrated that VIS, a metric quantifying the degree of vasoactive and inotropic support, was associated with major adverse outcomes, including death, heart transplantation, and left ventricular assist device implantation. The association between VIS and the primary outcome was observed in both patients who received VA-ECMO and those who did not, with a stronger relationship in the non-extracorporeal membrane oxygenation (ECMO) group (interaction $p < 0.001$). However, VIS remained an independent predictor of outcome only in patients who did not receive VA-ECMO.

This study provides clinical insight into how hemodynamic status, as quantified by the VIS, may reflect a patient's condition and help predict prognosis in FM. In addition, the findings suggest a potential role for VIS in informing the transition from intravenous inotropes to mechanical circulatory support, indicating that it could serve as a supportive clinical indicator in decision-making, though this possibility requires prospective validation. These observations are consistent with previous studies. Hyun et al.⁷ reported that, in patients with cardiogenic shock, VIS was associated with in-hospital mortality and could help guide the timing of VA-ECMO initiation. Similarly, the Extracorporeal Life Support Organization registry emphasizes the importance of considering ECMO initiation before the onset of severe hemodynamic compromise and demonstrates that prognosis in ECMO-supported myocarditis patients depends not only on hemodynamic parameters but also on a range of other clinical

Data Sharing Statement

The data required to reproduce these findings cannot be shared as this is an editorial.

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factors.⁴⁾ Although VIS was not directly assessed in the registry, the present study's observation that its predictive value appears to decrease after ECMO initiation may be understood in this context, as hemodynamic stabilization reduces inotrope requirements, making hemodynamic parameters alone, such as VIS, less reflective of the patient's clinical status.

FM is a life-threatening condition that can cause sudden cardiac arrest even in previously healthy young individuals. In this setting, the use of VA-ECMO, and particularly the timing of its initiation, plays a critical role in determining patient outcomes. This study suggests that VIS may serve as a useful indicator for assessing hemodynamic status and supporting treatment decisions. Although the retrospective design limits the ability to account for changes in VIS over time or to clearly define the timing of VIS measurement in ECMO patients, the findings nonetheless provide meaningful insights that may contribute to improving care for patients with FM.

Future research is needed to clarify the clinical utility of VIS, particularly regarding the timing of ECMO initiation and its interpretation across different clinical contexts. It will also be important to investigate how VIS relates to other factors such as biopsy results, imaging findings, and individual patient characteristics, in order to improve risk stratification and treatment planning in FM. As more evidence becomes available, integrating VIS with other clinical data may support more timely and personalized decision-making.

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