

Characterization of septic cardiomyopathy: assessment of left ventricular diastolic function is paramount!

Letter on the article: Characterization of critically ill patients with septic shock and sepsis-associated cardiomyopathy using cardiovascular MRI. Muehlberg F, Blaszczyk E, Will K, Wilczek S, Brederlau J, Schulz-Menger J. ESC Heart Fail. 2022 May 19.

We read with great interest the study by Muehlberg *et al.*¹ where the authors attempted to characterize sepsis-associated cardiomyopathy using cardiovascular magnetic resonance imaging (cMRI). In this study, 12 patients with septic shock received a cMRI study and serial transthoracic echocardiography (TTE) evaluations at 48 and 96 h. The study primarily focused on assessing LV systolic dysfunction (LVSD) by means of left ventricular ejection fraction (LVEF) and overall myocardial performance with global longitudinal strain (GLS). The authors concluded that patients with impaired LVEF have decreased GLS and impaired right ventricular systolic function; moreover, the myocardium of those with impaired LVEF function was characterized by inflammatory features (i.e. greater extracellular water volumes).¹

We applaud the authors for their efforts in conducting such a demanding study that provides some insights in the challenge of assessing septic cardiomyopathy.² However, a crucial point—the assessment of left ventricular diastolic dysfunction (LVDD)—remains not addressed at all. Of note, LVDD has been strongly associated with mortality of septic patients³ and with weaning failure in critically ill patients.⁴ The same association has been detected for GLS in sepsis,⁵ but not for the LVSD as evaluated by LVEF³ or by tissue Doppler's wave,⁶ highlighting the greater importance of LVDD over LVSD.

Considering that assessment of LVDD with cMRI has been reported in several categories of patients^{7,8} and that quantification of left ventricular volumetric filling patterns may provide valuable insight into LVDD, we wonder if the authors could have information in this regard and potentially provide these analyses. Such efforts would be of significant importance as the full characterization of septic

cardiomyopathy is far from being understood and addressed.

Finally, as this prospective study involves the use of TTE in critically ill patients, it may benefit from adherence to the recommendations for reporting critical care echocardiography research studies ('Preferred Reporting Items for Critical-care Echocardiography Studies—PRICES'),^{9,10} as this may help future external validation of the study with easier between-study comparison with similar research studies.

Funding


None.

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References

1. Muehlberg F, Blaszczyk E, Will K, Wilczek S, Brederlau J, Schulz-Menger J. Characterization of critically ill patients with septic shock and sepsis-associated cardiomyopathy using cardiovascular MRI. *ESC Heart Fail.* 2022; **9**: 2147–2156.
2. Sanfilippo F, Orde S, Oliveri F, Scolletta S, Astuto M. The challenging diagnosis of septic cardiomyopathy. *Chest.* 2019; **156**: 635–636.
3. Sanfilippo F, Corredor C, Fletcher N, Landesberg G, Benedetto U, Foex P, Cecconi M. Diastolic dysfunction and mortality in septic patients: A systematic review and meta-analysis. *Intensive Care Med.* 2015; **41**: 1004–1013.
4. Sanfilippo F, Di Falco D, Noto A, Santonocito C, Morelli A, Bignami E, Scolletta S, Vieillard-Baron A, Astuto M. Association of weaning failure from mechanical ventilation with transthoracic echocardiography parameters: A systematic review and meta-analysis. *Br J Anaesth.* 2021; **126**: 319–330.
5. Sanfilippo F, Corredor C, Fletcher N, Tritapepe L, Lorini FL, Arcadipane A, Vieillard-Baron A, Cecconi M. Left ventricular systolic function evaluated by strain echocardiography and relationship with mortality in patients with severe sepsis or septic shock: A systematic review and meta-analysis. *Crit Care.* 2018; **22**: 183.
6. Sanfilippo F, Huang S, Messina A, Franchi F, Oliveri F, Vieillard-Baron A, Cecconi M, Astuto M. Systolic dysfunction as evaluated by tissue Doppler imaging echocardiography and mortality in septic patients: A systematic review and meta-analysis. *J Crit Care.* 2021; **62**: 256–264.
7. Bakir M, Wei J, Nelson MD, Mehta PK, Haftbaradaran A, Jones E, Gill E, Sharif B, Slomka PJ, Li D, Shufelt CL, Minissian M, Berman DS, Bairey Merz CN, Thomson LE. Cardiac magnetic resonance imaging for myocardial perfusion and diastolic function-reference control values for women. *Cardiovasc Diagn Ther.* 2016; **6**: 78–86.
8. Chacko BR, Karur GR, Connelly KA, Yan RT, Kirpalani A, Wald R, Jimenez-Juan L, Jacob JR, Deva DP, Yan AT. Left ventricular structure and diastolic function by cardiac magnetic resonance imaging in hypertrophic cardiomyopathy. *Indian Heart J.* 2018; **70**: 75–81.
9. Huang S, Sanfilippo F, Herpain A, Balik M, Chew M, Clau-Terré F, Corredor C, De Backer D, Fletcher N, Geri G, Mekontso-Dessap A, McLean A, Morelli A, Orde S, Petrinic T, Slama M, van der Horst ICC, Vignon P, Mayo P, Vieillard-Baron A. Systematic review and literature appraisal on methodology of conducting and reporting critical-care echocardiography studies: A report from the European Society of Intensive Care Medicine PRICES expert panel. *Ann Intensive Care.* 2020; **10**: 49.
10. Sanfilippo F, Huang S, Herpain A, Balik M, Chew MS, Clau-Terré F, Corredor C, De Backer D, Fletcher N, Geri G, Mekontso-Dessap A, McLean A, Morelli A, Orde S, Petrinic T, Slama M, van der Horst ICC, Vignon P, Mayo P, Vieillard-Baron A. The PRICES statement: An ESICM expert consensus on methodology for conducting and reporting critical care echocardiography research studies. *Intensive Care Med.* 2021; **47**: 1–13.