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Role of VA ECMO in septic shock: Does it work?

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The use of mechanical circulatory assistance remains controversial during refractory septic shock in adults.¹ However, a profound myocardial dysfunction can occur during bacterial septic shock.²⁻⁴ In this context, extracorporeal membrane oxygenation (ECMO) is highly effective as salvage therapy for children with refractory septic shock.^{5,6} We reported the largest cohort of adults who received VA-ECMO for refractory cardiovascular dysfunction in the context of severe bacterial septic shock.⁵ Despite multiorgan failure at ECMO initiation and simplified acute physiology score (SAPS) 3-predicted mortality of 79%, >70% of these patients survived with complete recovery of cardiac function. The hemodynamic profile we describe herein (low cardiac index, elevated filling pressure, profound myocardial depression, and elevated systemic vascular resistance) is certainly a rare entity in the spectrum of septic shock, which resembles that of the classic paradigm of cardiogenic shock. In this setting, the infusion of very high catecholamine doses used to increase cardiac output and maintain perfusion before ECMO initiation might have contributed to the vicious circle that led to vasoconstriction and refractory cardiovascular failure. Considering the reversibility of myocardial depression associated with septic shock,^{7,8} we hypothesized that ECMO could help salvage these dying patients by restoring adequate perfusion to vital organs to reverse multiple organ failures and by buying time to achieve infection control by antibiotics. Indeed, all our survivors could be explanted without recourse to cardiac transplantation or switching to another cardiac assist device, and all recovered with a normal myocardial function within a few weeks. These results seem to be far better than those obtained with ECMO for cardiogenic shock, with reported survival rates around 40%, that required cardiac transplantation or switching to a LV (left ventricular) assist device for about 10% of the survivors.⁹ Considering

these promising results, ECMO might be considered a valuable therapeutic option for patients with refractory cardiovascular dysfunction in the context of septic shock, although more data and larger patient cohorts are needed to confirm the findings presented herein.

Ethical statement: In accordance with the ethical standards of our hospital's institutional review board, the Committee for the Protection of Human Subjects, informed consent for demographic, physiologic, and hospital-outcome data analyses was not obtained

because this observational study did not modify existing diagnostic or therapeutic strategies. Survivors gave oral consent to participate in the telephone interview, conducted by the same investigator, who asked the questions in the questionnaire in the same order.

Keywords: extracorporeal membrane oxygenation, salvage therapy, shock, septic shock, cardiogenic shock, treatment outcome, quality-of-life assessment

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