Central VA-ECMO as a Bridge to Biventricular Recovery After Neonatal Postcardiotomy Shock

Borderline left ventricle, complex aortic arch reconstruction, and five hours of cardiac standstill

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Background

Borderline left ventricular (LV) anatomy associated with severe aortic arch obstruction creates difficult decisions between biventricular and univentricular pathways [1,2]. When profound postcardiotomy cardiogenic shock follows prolonged cardiopulmonary bypass (CPB) and deep hypothermic circulatory arrest (DHCA), rapid mechanical circulatory support may be essential to preserve organ function while myocardial recovery remains uncertain [3].

Objective

To describe central venoarterial extracorporeal membrane oxygenation (VA-ECMO) as a bridge to successful biventricular recovery after extreme postcardiotomy shock in a neonate with borderline LV anatomy.

Methods

Single-patient clinical case report based on perioperative, ECMO, echocardiographic, and hospital-outcome data.

Results

A neonate with borderline LV anatomy, a mitral valve annulus z-score of −2.8, indexed LV end-diastolic volume of 27 mL/m^2, severe aortic arch hypoplasia, and coarctation underwent initial coarctation repair. On postoperative day 3, progressive deterioration and cardiogenic shock occurred because of recoarctation.

Rescue aortic arch augmentation involved 420 minutes of CPB, with DHCA and profound hypothermia. Severe LV dysfunction prevented separation from CPB, prompting central VA-ECMO with right atrial drainage and aortic return. The chest remained open.

The patient had cardiac standstill for 5 hours while supported at 150 mL/kg/min. Management prioritized metabolic stabilization, aggressive afterload reduction with systemic vasodilation, and careful inotropic titration. Diuresis, neurological awakening, and progressive myocardial recovery were observed from ECMO Day 1.

On ECMO Day 5, a structured weaning trial at 30 mL/kg/min demonstrated hemodynamic stability, allowing successful decannulation. Mediastinitis was subsequently treated with vacuum-assisted wound therapy. The patient was discharged on postoperative day 32 with preserved biventricular physiology and no clinically apparent neurological or multisystem deficits.

Conclusion

Early central VA-ECMO can provide myocardial rest and multiorgan protection after extreme neonatal postcardiotomy shock. In selected patients with borderline left-heart structures, ECMO may preserve the possibility of biventricular circulation rather than serving solely as a last-resort rescue therapy.

CON EL RESPALDO

References

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