

## 4th Annual ELSO-SWAC Conference Proceedings

# Neonatal VA ECMO: Why and how?

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For neonates, veno-arterial (VA) extracorporeal membrane oxygenation (ECMO) support is still commonly used for respiratory as well as for cardiac or combined failure. However, in the pediatric population, veno-venous (VV) ECMO is establishing itself as the standard mode of support for respiratory failure.<sup>1</sup>

The need for ECMO in neonatal respiratory support has declined over the past years following introduction of alternative options. Conversely, a significant increase in VA ECMO for cardiac support has been identified (see Figure 1). The present article aims to describe the various indications for VA ECMO in the neonatal population.

Although the majority of cardiac runs for neonates still relates to congenital heart defects, widening experience and indications, such as myocarditis, sepsis, poisoning (reversible), or extracorporeal cardiopulmonary resuscitation (ECPR), have led to an increased use of VA ECMO in neonates and children. For congenital heart defects, special considerations must be made, especially for ECMO in the context of single ventricle (SV) physiology:<sup>3</sup> the balancing between pulmonary and systemic circulation remains crucial whether a Blalock-Taussig shunt or a Sano shunt is used. For the second and third stages of single ventricular palliation, cannulation strategies must be adapted to the underlying anatomy on a case-to-case basis.

Myocarditis due to various reasons can be supported successfully with VA ECMO, which constitutes the ultimate endpoint of the myocarditis management algorithm. Timely deployment before irreversible multi-organ damage has occurred is crucial. Further attention must be paid that myocardium can be quite stunned and left ventricular decompression is mandatory to allow adequate myocardial recovery.<sup>4</sup> Sepsis has become an indication if conventional management fails,<sup>5</sup> as reflected in the algorithm

## Cardiac

### Annual Cardiac Runs (0 - 30 days old)

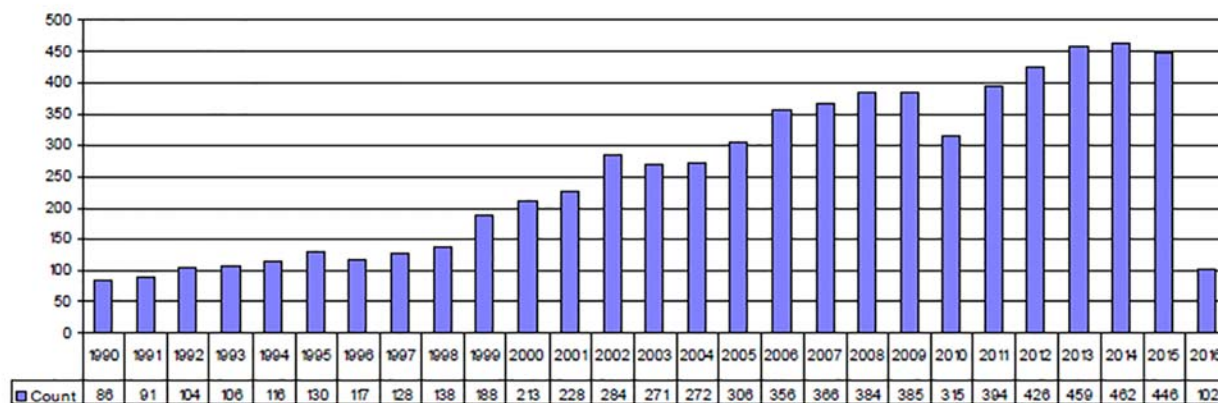


Figure 1. Number of neonatal VA ECMO run per year on the Extracorporeal Life Support Organization (ELSO) registry until July 2016.<sup>2</sup>

published by the Surviving Sepsis Campaign in 2012, which recommends starting ECMO in refractory shock. Case reports with successful support of heart and lung function until recovery for various poisonings or during cath lab interventions have been published.<sup>6</sup> ECPR with the deployment of extracorporeal life support (ECLS) during resuscitation has been

mentioned in the PALS guideline since 2010 as class II recommendation. As could be expected, outcomes for survival and neurological deficits are related to centers' experience and resuscitation time prior to ECLS installment.<sup>7</sup>

Keywords: VA-ECMO ECLS, indications

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