VA-ECMO in Neonatal and Pediatric Acute Respiratory Failure: It is a good option?

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Antecedents

In neonates and small pediatric patients with acute respiratory failure (ARF), VV-ECMO may be limited by technical challenges, vascular complications, and restricted availability of dual-lumen cannulas in many Latin American centers (1-3). Furthermore, approximately 8% of pediatric patients initially supported with VV-ECMO require conversion to VA-ECMO or other ECMO configurations because of severe cardiac dysfunction or inadequate gas exchange (2,4,5). In this context, VA-ECMO represents a feasible alternative for respiratory support, overcoming some of the limitations associated with VV-ECMO cannulation.

Objective

To describe the clinical characteristics, complications, and outcomes of pediatric patients with ARF supported with VA-ECMO at a high-complexity center in Colombia.

Methods

Observational, descriptive cohort study including pediatric patients with acute respiratory failure who received VA-ECMO between 2020 and 2025. Data were obtained from medical records and analyzed using R. Continuous variables are presented as median (IQR) and categorical variables as frequencies and percentages. Normality was assessed using the Shapiro–Wilk test.

CON EL RESPALDO

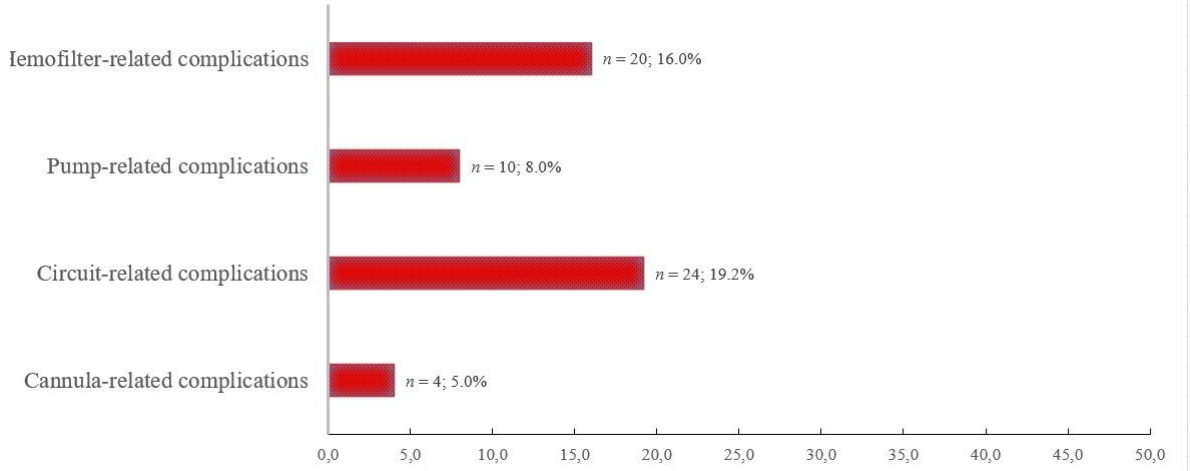
Resulted

A total of 125 pediatric patients with refractory acute respiratory failure received VA-ECMO between 2020 and 2025. Median age was 2.0 months (IQR 23.8), with 40.0% neonates and 60.0% pediatric patients. The most frequent etiologies were viral pneumonia/bronchiolitis (22.4%) and bacterial pneumonia (12.0%), while other causes accounted for 65.6% of cases. Median ECMO support duration was 8.0 days (IQR 6.0), and Awake ECMO was implemented in 48.8% of patients, with an extubation failure rate of 16.4%. ECMO equipment-related complications occurred in 28.8% of patients, mainly involving the circuit (19.2%), whereas patient-related complications were observed in 55.2%, predominantly neurological (36.0%) and pulmonary (22.4%). ECMO survival was 74.4%, and survival to hospital discharge was 62.4%.

Conclusion

In this cohort VA-ECMO was a feasible alternative for respiratory support in pediatric patients with refractory ARF. Despite the occurrence of complications, survival outcomes were favorable, supporting its consideration in settings where VV-ECMO is not feasible.

ECMO equipment-related complications type (*n = 125*)



Patient-related complications type (*n = 125*)

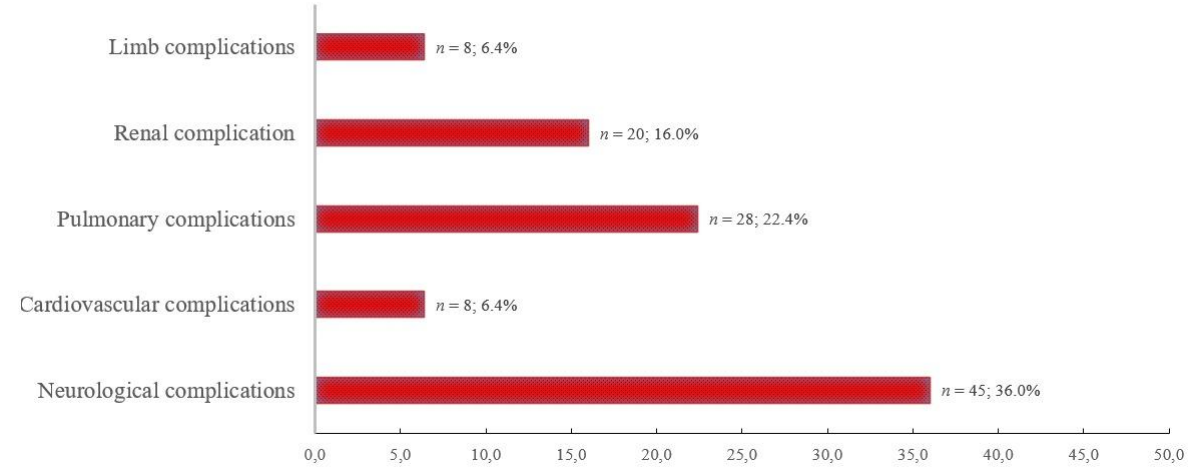


Table 1. Baseline characteristics, ECMO support characteristics, complications, and outcomes of pediatric patients with refractory ARF treated with VA-ECMO (n = 125)

Variable	Mediana (RIC)
Edad (meses)	2,0 (23,8)
Awake ECMO (days); n = 61	3,0 (4,0)
ECMO support duration (days)	8,0 (6,0)
Variable	***f* (%)**
Sex	
Male	63 (49,6)
Female	62 (50,4)
Age group	
Neonate	50 (40,0)
Pediatric	75 (60,0)
Rescue type	
Air	50 (40,0)
Ground	27 (21,6)
Institutional transfer	48 (38,4)
ECMO transport-related complications (*n* = 77)	
Yes	3 (2,4)
No	122 (97,6)
Awake ECMO	
Yes	61 (48,8)
No	64 (51,2)
Awake ECMO extubation failure (*n* = 61)	
Yes	10 (16,4)
No	51 (83,6)
ECMO equipment-related complications	
Yes	36 (28,8)
No	89 (71,2)
Patient-related complications	
Yes	69 (55,2)
No	56 (44,8)
ECMO survival	
Yes	93 (74,4)
No	32 (25,6)
Survival to hospital discharge	
Yes	78 (62,9)
No	46 (37,1)

Note. VA-ECMO, venoarterial extracorporeal membrane oxygenation; IQR, interquartile range. Continuous variables are presented as median (IQR), and categorical variables as *n* (%). Percentages were calculated using the total cohort (*n* = 125).

Reference

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