Transport of Patients Supported with Extracorporeal Membrane Oxygenation in Costa Rica: National Referral Center Experience

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Abstract

Background: Access to extracorporeal membrane oxygenation (ECMO) is frequently centralized in referral hospitals, making safe interhospital transport essential. Published data from Central America and Latin America remain limited.

Objective: To describe the characteristics, safety, and clinical outcomes of a national ECMO transport program in Costa Rica.

Methods: We performed a retrospective observational cohort study of all consecutive patients transported under ECMO support by the Hospital Calderón Guardia ECMO Program. Demographic, clinical, ECMO, transport, complication, and outcome variables were extracted from an institutional database. The primary outcome was mortality during transport. Secondary outcomes included clinical, technical, logistic, and major transport events, 24-hour mortality, and hospital mortality.

Results: The cohort included 59 ECMO transports. Median age was 34.0 [24.0-44.0] years and 44/59 (74.6%) patients were male. VV-ECMO was used in 47/59 (79.7%), VA-ECMO in 11/59 (18.6%), and VVA-ECMO in 1/59 (1.7%). Ground transport accounted for 45/59 (76.3%) transfers, air transport for 8/59 (13.6%), and combined air-ground transport for 6/59 (10.2%). Median transport distance was 9.0 [7.0-60.0] km and median total transport time was 15.0 [10.0-75.0] minutes. Mortality during transport was 0/58 (0.0%) (95% CI 0.0-6.2). One clinical event occurred during transport; no technical, logistic, or major events were recorded. One patient died within 24 hours after arrival. Hospital mortality was 19/56 (33.9%) (95% CI 21.8-47.8).

Conclusions: In this national referral-center experience, ECMO transport in Costa Rica was feasible and safe, with no deaths during transport and no major technical or logistic events. These findings support the development of structured ECMO retrieval systems in resource-constrained regional networks.

Keywords: extracorporeal membrane oxygenation; ECMO; transport; retrieval; critical care; Latin America; Costa Rica

Table 1. Baseline and ECMO characteristics

Variable	Value
Total transports	59
Age, years	34.0 [24.0-44.0]
Male sex	44/59 (74.6%)
Female sex	15/59 (25.4%)
Respiratory failure indication	47/59 (79.7%)
Cardiogenic shock indication	11/59 (18.6%)
Combined respiratory and cardiogenic indication	1/59 (1.7%)
VV-ECMO	47/59 (79.7%)
VA-ECMO	11/59 (18.6%)
VVA-ECMO	1/59 (1.7%)
Percutaneous cannulation	50/59 (84.7%)
Surgical cannulation	9/59 (15.3%)
ECMO duration, days	14.0 [7.0-32.0]

Table 2. Transport safety and clinical outcomes

Outcome	Value
Any transport event	1/59 (1.7%)
Clinical transport event	1/59 (1.7%)
Technical transport event	0/59 (0.0%)
Logistic transport event	0/59 (0.0%)
Major transport event	0/59 (0.0%)
Death during transport	0/58 (0.0%); 95% CI 0.0-6.2
Death within 24 hours	1/58 (1.7%)
Hospital mortality	19/56 (33.9%); 95% CI 21.8-47.8

Table 3. Geographic distribution of ECMO Transfers.

