

Helicopter inter-hospital transfer for patients undergoing extracorporeal membrane oxygenation: a retrospective 12-year analysis of a service system

Alexander Fuchs, Renate Schmucki, Lorenz Meuli, Pedro David Wendel-Garcia, Roland Albrecht, Robert Greif & Urs Pietsch

BACKGROUND

Patients undergoing extracorporeal membrane oxygenation (ECMO) are critically ill and show high mortality. Inter-hospital transfer of these patients has to be safe, with high survival rates during transport without potentially serious and life-threatening adverse events. The Swiss Air-Rescue provides 24-h/7-days per week inter-hospital helicopter transfers that include on-site ECMO cannulation if needed. This retrospective observational study describes adverse events of patients on ECMO transported by helicopter, and their associated survival.

METHODS

All patients on ECMO with inter-hospital transfer by helicopter from start of service in February 2009 until May 2021 were included. Patients not transported by helicopter or with missing medical records were excluded. Patient demographics (age, sex) and medical history (type of and reason for ECMO), mission details (flight distance, times, primary or secondary transport), adverse events during the inter-hospital transfer, and survival of transferred patients were recorded. The primary endpoint was patient survival during transfer. Secondary endpoints were adverse events during transfer and 28-day survival.

RESULTS

We screened 214 ECMO-related missions and included 191 in this analysis. Median age was 54.6 [IQR 46.1-62.0] years, 70.7% were male, and most patients had veno-arterial ECMO (56.5%). The main reasons for ECMO were pulmonary (46.1%) or cardiac (44.0%) failure. Most were daytime (69.8%) and primary missions ($n = 100$), median total mission time was 182.0 [143.0-254.0] min, and median transfer distance was 52.7 [33.2-71.1] km. All patients survived the transfer. Forty-four adverse events were recorded during 37 missions (19.4%), where 31 (70.5%) were medical and none resulted in patient harm. Adverse events occurred more frequently during night-time missions (59.9%, $p = 0.047$). Data for 28-day survival were available for 157 patients, of which 86 (54.8%) were alive.

CONCLUSION

All patients under ECMO survived the helicopter transport. Adverse events were observed for about 20% of the flight missions, with a tendency during the night-time flights, none harmed the patients. Inter-hospital transfer for patients undergoing ECMO provided by 24-h/7-d per week helicopter emergency medical service teams can be considered as feasible and safe. The majority of the patients (54.8%) were still alive after 28 days.

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