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Letter to the Editor

Reply to: Patient selection and early withdrawal of life support in extracorporeal cardiopulmonary resuscitation (ECPR): Do we have a problem?

We read with interest the correspondence by Dr Argudo and colleagues. The authors raise several important questions.

First, they discuss whether a low flow time exceeding 60 min should be a strict criterion for halting a procedure already indicated? In our pilot trial we aimed at achieving ECMO-initiation within 60 min from cardiac arrest considering dismal survival above this time limit.¹ However, this time interval turned out difficult to achieve and only in 9% was ECMO initiated within 60 min from OHCA.² Half of the patients, 49%, arrived at the hospital within the time limit of 45 min from collapse but the time from hospital arrival to ECMO-initiation was far longer than the 15 min first aimed. Thus, even if our prehospital time intervals were rather fast and similar to three RCTs^{3–5} the time from hospital arrival to ECMO-initiation was far longer than aimed for. The authors correctly point out that even if some patients with a time interval of > 60 min were put on ECMO, in a fairly large group cannulation or ECMO following cannulation was not initiated. The two dominating reasons were lactate > 15 and time from collapse to ECMO-initiation > 60 min and these decisions were made after an overall assessment at the discretion of the attending physicians. Nonetheless, even if we aimed for ECMO-initiation < 60 min, the vast majority of cases included who received ECPR exceeded this time interval. In terms of what this meant for survival, it was also somewhat surprising that the vast majority of survivors had low flow > 60 min and that overall survival rates were similar to previous RCTs. This is one of the main findings of our trial and we agree that the strict time limit of 60 min perhaps should not be that strict. However, our study was not randomised and included a limited number of patients, making harder conclusions about time intervals and patient selection difficult to draw.

Second, the authors discuss whether ECMO should be withdrawn early after initiation? This is an important question, and we agree with the authors that prematurely anticipating the clinical outcomes of ECPR can carry significant risks and premature withdrawal. We certainly also acknowledge the need for correct neurological prognosis and opportunities for organ donation in those with poor neurological prognosis. However, in our trial, we have no data indicating premature withdrawal. Moreover, it is somewhat difficult to directly compare our data to other trials as patient selection and quality of care as well as involvement of one versus several centres might perhaps explain some differences.

In summary, patient selection for ECPR including defining crucial time intervals and other important selection criteria is of utmost importance for the success of ECPR programs. The fact that the majority of survivors in our trial had a low flow time of more than 60 min from cardiac arrest to ECMO-initiation is an important finding. Future trials focusing on finding optimal selection criteria for ECPR are warranted.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

1. Bartos JA, Grunau B, Carlson C, et al. Improved survival with extracorporeal cardiopulmonary resuscitation despite progressive metabolic derangement associated with prolonged resuscitation. *Circulation*. 2020;141:877–86 [PMC free article] [PubMed] [Google Scholar].
2. Frykler Abazi L, Liliequist A, Böhm F, et al. Implementation of an extracorporeal resuscitation (ECPR) program for out-of-hospital cardiac arrest in Stockholm, Sweden: Feasibility, safety, and outcome. *Resusc Plus* 2024;1:100596.
3. Yannopoulos D, Bartos J, Raveendran G, et al. Advanced reperfusion strategies for patients with out-of-hospital cardiac arrest and refractory ventricular fibrillation (ARREST): a phase 2, single centre, open-label, randomised controlled trial. *Lancet* 2020;396:1807–16 [PMC free article] [PubMed] [Google Scholar].
4. Belohlavek J, Smalцова J, Rob D, et al. Effect of intra-arrest transport, extracorporeal cardiopulmonary resuscitation, and immediate invasive assessment and treatment on functional neurologic outcome in refractory out-of-hospital cardiac arrest: a randomized clinical trial. *JAMA*. 2022;327:737–47 [PMC free article] [PubMed] [Google Scholar].
5. Suvrein MM, Delnoij TSR, Lorusso R, et al. Early extracorporeal CPR for refractory out-of-hospital cardiac arrest. *N Engl J Med*. 2023;388:299–309 [PubMed] [Google Scholar].

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