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## Letter to the Editor

# Good long term quality of life after emergency extracorporeal life support for cardiogenic shock and extracorporeal cardiopulmonary resuscitation



To the Editor,

Tremendous efforts are made to provide emergency extracorporeal life support (ECLS) and extracorporeal cardiopulmonary resuscitation (eCPR) to patients in cardiogenic shock and refractory cardiac arrest. Data on long term neurological and functional outcome however are lacking as are randomized controlled trials.<sup>1</sup> Therefore, ECLS programs are substantiated by observational data and case series. ECLS critics highlight that the aftermath of the invasive therapy is mostly unknown and hospital survival as surrogate and substitution for good neurological long term outcome is insufficient.

Few data are available on long term outcome after ECLS. A Taiwanese study reported high incidence of depression in 32 ECLS patients.<sup>2</sup> A German study found quality of life of 19 eCPR patients comparable to patients on hemodialysis.<sup>3</sup> And an American group reported problems in school in 37 pediatric patients after ECLS for pulmonary failure.<sup>4</sup>

To investigate outcome after emergency ECLS, we followed all patients discharged from our institution and quantified quality of life with the SF-36 questionnaire and the cerebral performance category (CPC). SF-36 measures emotional and physical functioning. Ethics Committee of the Albert-Ludwigs University of Freiburg approved the study (525/17).

All patients cannulated (in-hospital) for emergency ECLS in cardiogenic shock or eCPR between 10/2010 and 10/2017 at a single institution were included. Out of 302 emergency ECLS therapies, 97 patients survived to hospital discharge (32%). The main indication for ECLS was myocardial infarction (34% STEMI, 30% NSTEMI), followed by cardiomyopathy (24%) and rare causes (like pulmonary embolism, congenital arrhythmogenic disease, constrictive pericarditis, coronary spasm). In June 2018, 16 patients (17%) had ceased, 43 (44%) were interviewed by telephone survey, and 38 (39%) were lost to follow-up. A total of 33 survivors (aged  $53 \pm 17$  years, 8 females) consented to take part in the SF-36 questionnaire. Of these, 18 underwent eCPR (16 with shockable initial rhythm, time to ECLS  $34 \pm 32$  min).

Average follow-up duration was  $27 \pm 18$  months (range 1–80 months). Neurological outcome was preferable in 40 patients (68%) defined as CPC 1–2, see Fig. 1A and B. There was no difference between patients after eCPR and ECLS for shock ( $p = 0.40$ ). Results of the SF-36 questionnaire are given in Fig. 1C. When compared to a general Dutch population aged 55–64 years,<sup>5</sup> we found a surprisingly similar good general and physical quality of life.

In conclusion, once discharged from hospital, patients after emergency ECLS accomplish an overall satisfactory neurological functioning and perceived quality of life. The limitations of our study are the small sample size and the lack of a control group. We cannot report long term survival since a substantial number of patients were lost to follow-up.

We hope that these encouraging results on long term outcome after emergency ECLS will increase further research.

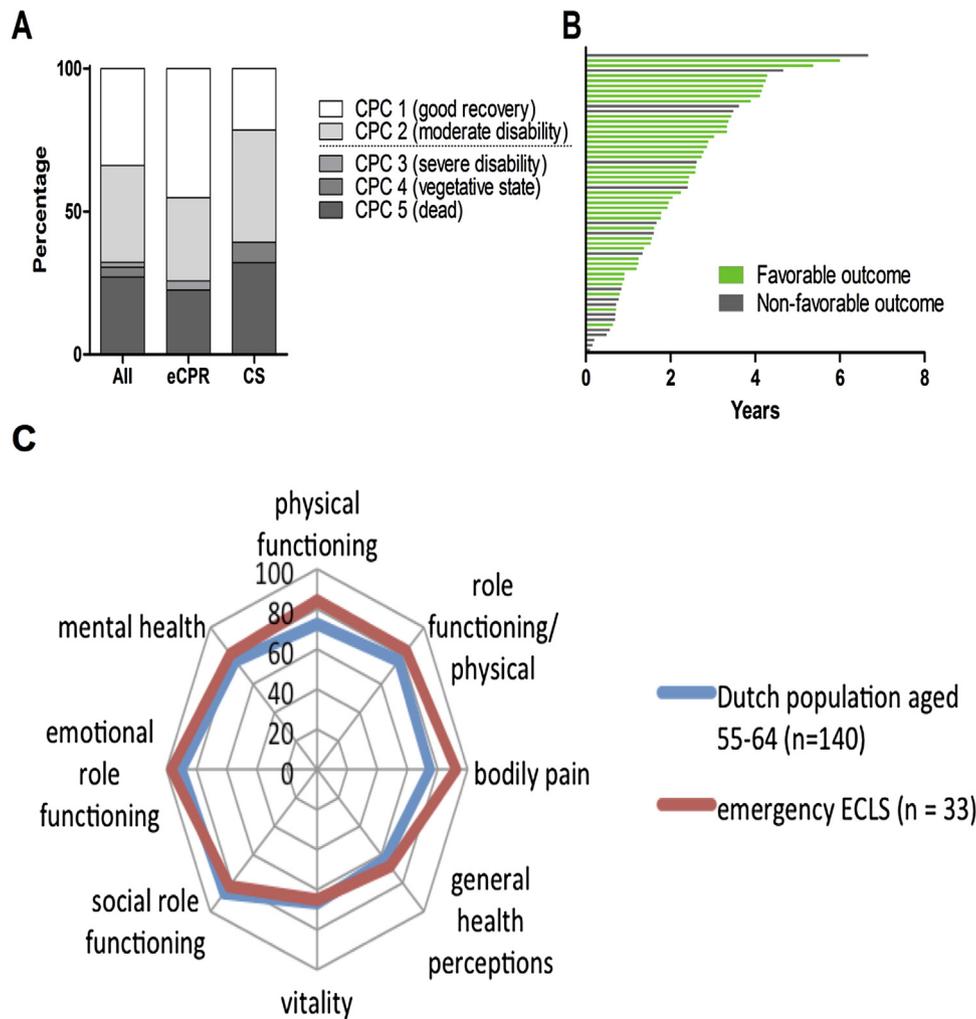
## Conflict of interest

No author reports any conflict of interest concerning this publication.

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**Fig. 1 – Long term neurological outcome after emergency extracorporeal life support (ECLS). (A) Cerebral performance category (CPC) is given for 59 patients after an average follow up of  $27 \pm 18$  months. There was no significant difference between patients after ECLS for extracorporeal cardiopulmonary resuscitation (eCPR) or cardiogenic shock (CS). (B) Time to follow up is given for patients with favorable neurological outcome (defined as CPC 1–2) in green and patients with non-favorable outcome (CPC 3–5). (C) Emotional and physical functioning as evaluated by the SF36 questionnaire of 33 patients after ECLS given in red. The observed quality of life is comparable to the general Dutch population aged 55–64 (N = 140) as evaluated by.<sup>5</sup>**

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