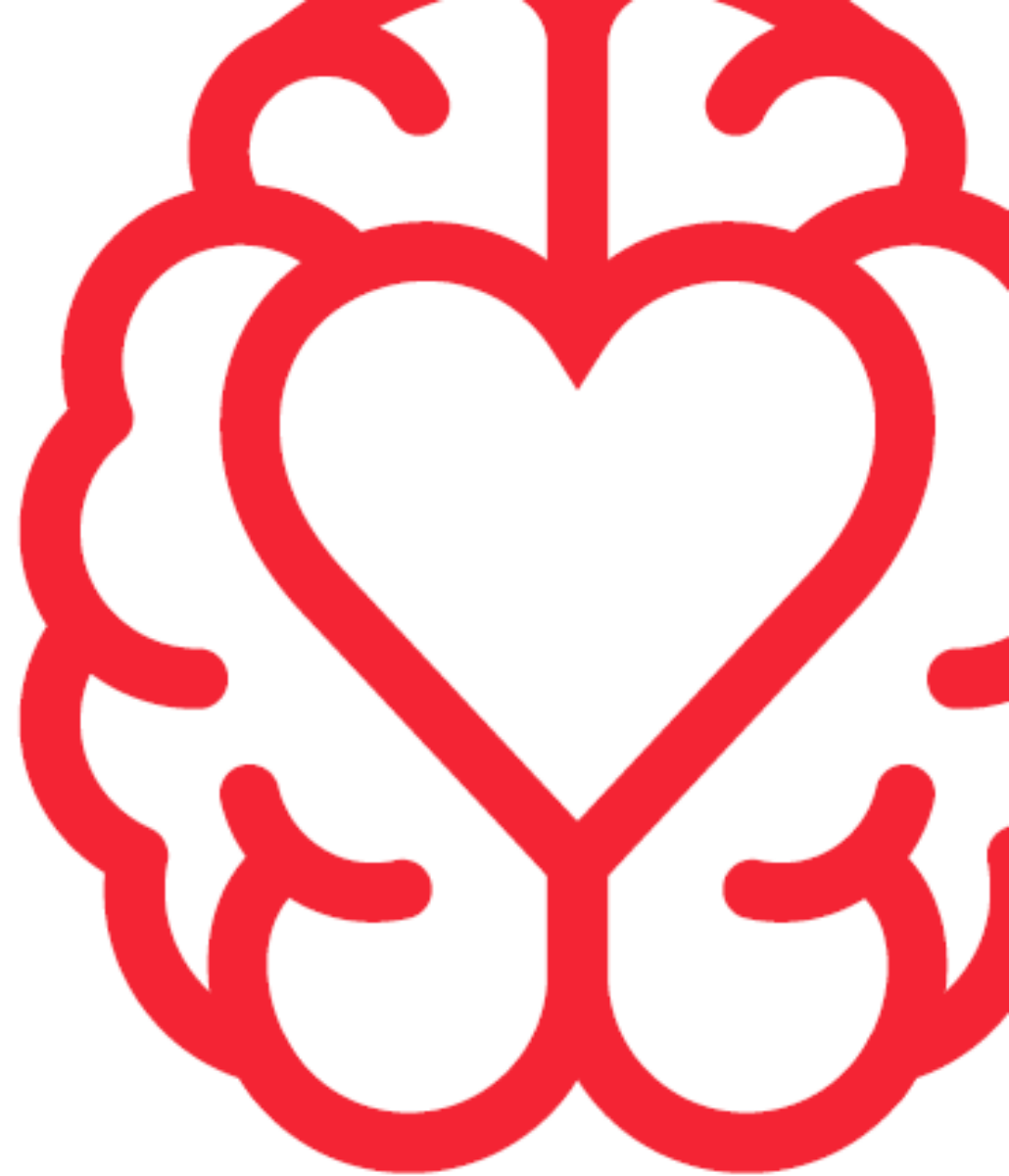


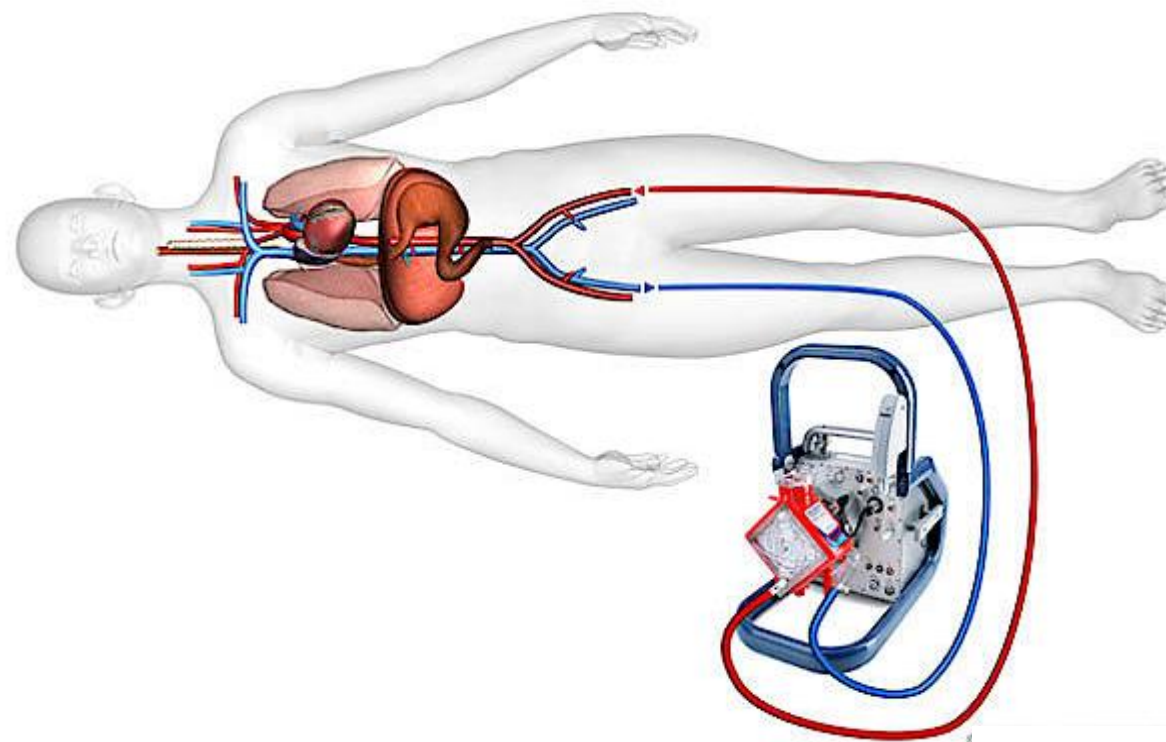
**Mekanisk
kredsløbsstøtte til
patienter med
hjertestop**



Indhold

- 1 Hvad er det
- 2 Nye studier
- 3 Guidelines og klinisk implikation

Mekanisk kredsløbsstøtte



Overlevelse

- Retrospektive data fra Danmark
- 2011-2020
- 259 patienter med en overlevelse på 26%
- Godt neurologisk outcome 25%

RESEARCH

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Mechanical circulatory support for refractory out-of-hospital cardiac arrest: a Danish nationwide multicenter study



Sivagowry Rasalingam Mørk^{1*}, Carsten Stengaard¹, Louise Linde², Jacob Eifer Møller², Lisette Okkels Jensen², Henrik Schmidt³, Lars Peter Riber⁴, Jo Bønding Andreasen⁵, Sisse Anette Thomassen⁵, Helle Laugesen⁵, Phillip Michael Freeman⁶, Steffen Christensen⁷, Jacob Raben Greisen⁷, Mariann Tang⁸, Peter Hasse Møller-Sørensen⁹, Lene Holmvang¹⁰, Emilie Gregers¹⁰, Jesper Kjaergaard¹⁰, Christian Hassager¹⁰, Hans Eiskjær¹ and Christian Juhl Terkelsen^{1,11}

Evidens

- Tidligere baseret på observationelle studier
- Flere begrænsninger
 - Critical risk of confounding
 - Quality of evidence across studies is very low

Extracorporeal cardiopulmonary resuscitation for cardiac arrest: A systematic review

**Mathias J. Holmberg^{a,b}, Guillaume Geri^{c,d}, Sebastian Wiberg^{b,e}, Anne-Marie Guerguerian^f,
Michael W. Donnino^{b,g}, Jerry P. Nolan^h, Charles D. Deakinⁱ, Lars W. Andersen^{a,b,*}, and
International Liaison Committee on Resuscitation's (ILCOR) Advanced Life Support and
Pediatric Task Forces**

Randomiserede studier

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

Demetris Yannopoulos, Jason Bartos, Ganesh Raveendran, Emily Walser, John Connett, Thomas A Murray, Gary Collins, Lin Zhang, Rajat Kalra, Marinos Kosmopoulos, Ranjit John, Andrew Shaffer, R J Frascone, Keith Wesley, Marc Conterato, Michelle Biros, Jakub Tolar, Tom P Aufderheide

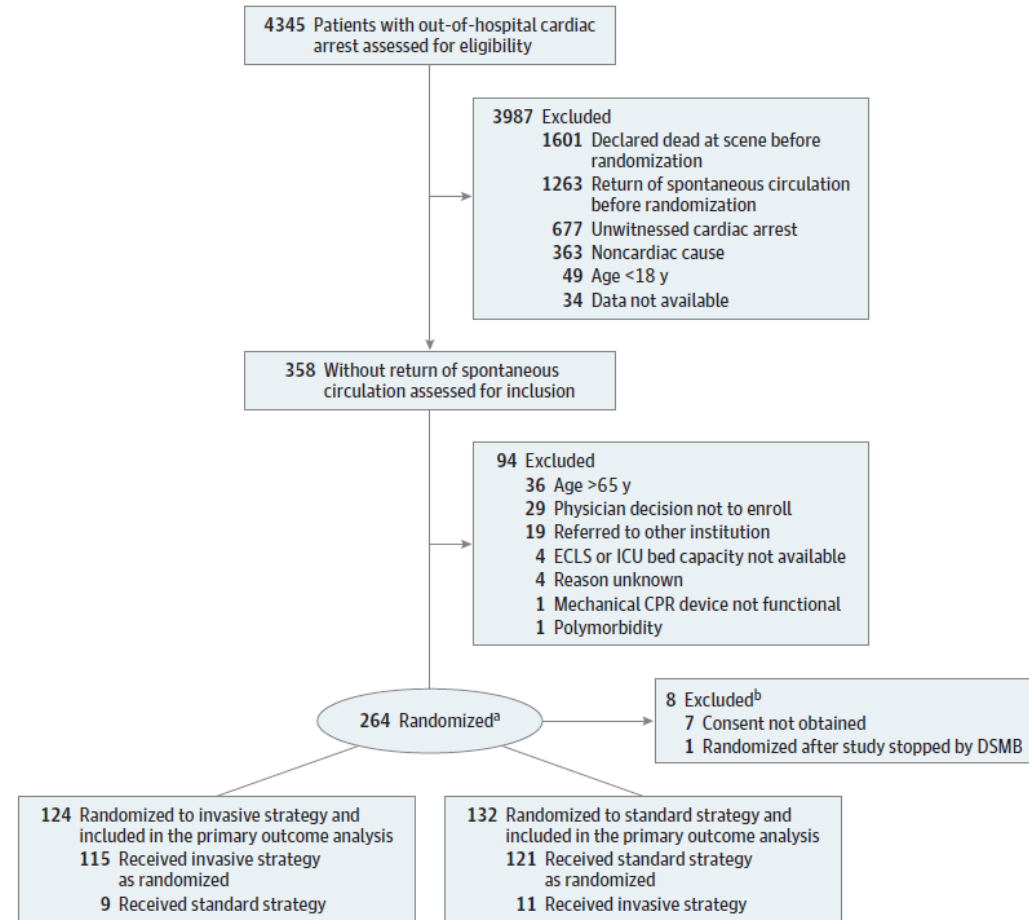
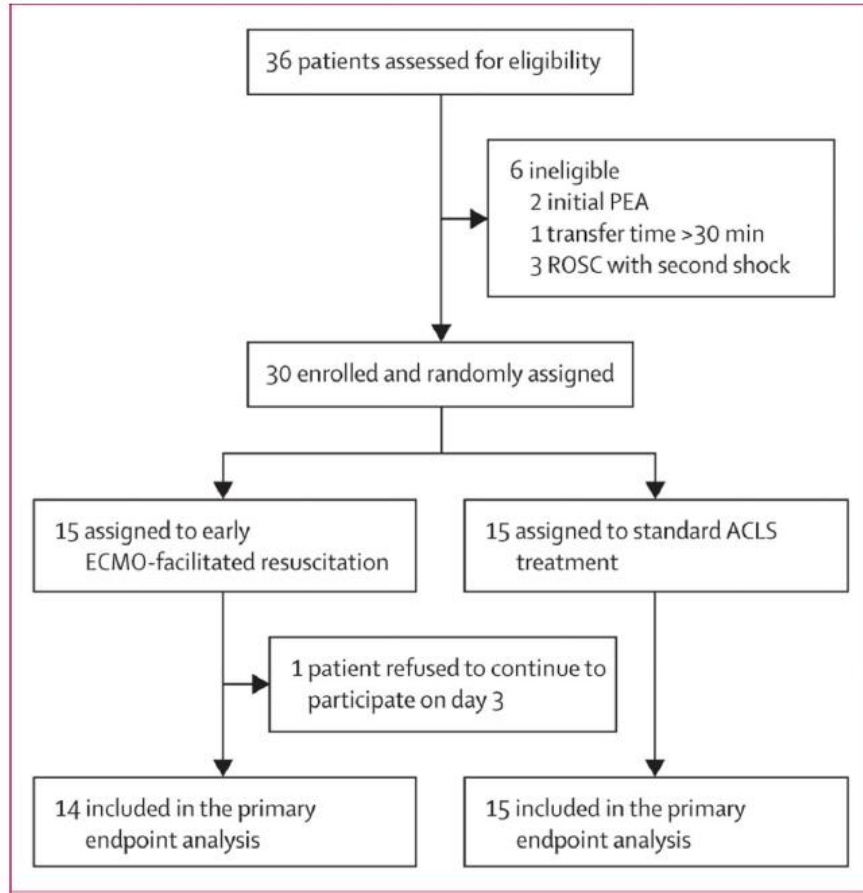
JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

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

Jan Belohlavek, MD, PhD; Jana Smalцова, MD; Daniel Rob, MD; Ondrej Franek, MD; Ondrej Smid, MD; Milana Pokorna, MD, PhD; Jan Horák, MD; Vratislav Mrazek, MD; Tomas Kovarik, MD, PhD; David Zemanek, MD, PhD; Ales Kral, MD, PhD; Stepan Havranek, MD, PhD; Petra Kavalkova, PhD; Lucie Kompelentova, MD; Helena Tomkova, MD; Alan Mejstrik, MSc; Jaroslav Valasek, MD; David Peran, MSc; Jaroslav Pekara, MSc; Jan Rulisek, MD, PhD; Martin Balik, MD, PhD; Michal Huptych, PhD; Jiri Jarkovsky, PhD; Jan Malik, MD, PhD; Anna Valertanova, MD, PhD; Frantisek Mlejnsky, MSc, PhD; Petr Kolouch, MD; Petra Havrankova, MD, PhD; Dan Romportl, MD; Arnost Komarek, PhD; Ales Linhart, MD, PhD; for the Prague OHCA Study Group

Lancet. 2020 December 05; 396(10265): 1807–1816
JAMA Feb 22 2022 327 (8) , pp.737-747

EVIDENS



Inclusion Criteria

- **ARREST TRIAL**

- 18–75 years
- OHCA rhythm of ventricular fibrillation or pulseless ventricular tachycardia
- No ROSC after three defibrillation shocks
- Body morphology able to accommodate a LUCAS
- Estimated transfer time to the emergency department shorter than 30 min.

- **Belohlavek TRIAL**

- Adults aged 18 to 65 years
- All rhythms
- A minimum of 5 minutes of advanced cardiac life support without ROSC
- Witnessed OHCA
- Presumed cardiac etiology

Treatment

- **ARREST TRIAL**

- Standard strategy group
 - patients stayed in the emergency department under care of emergency physicians
- ECPR
 - access to the cardiac catheterisation laboratory
 - Time to cannulation 59 minutes

- **Belohlavek TRIAL**

- Standard strategy group
 - continued advanced cardiac life support on site
- Invasive strategy group
 - intra-arrest intranasal evaporative cooling (discontinued 2016)
- Crossover allowed
- Time to cannulation 58 (43-70)

Results

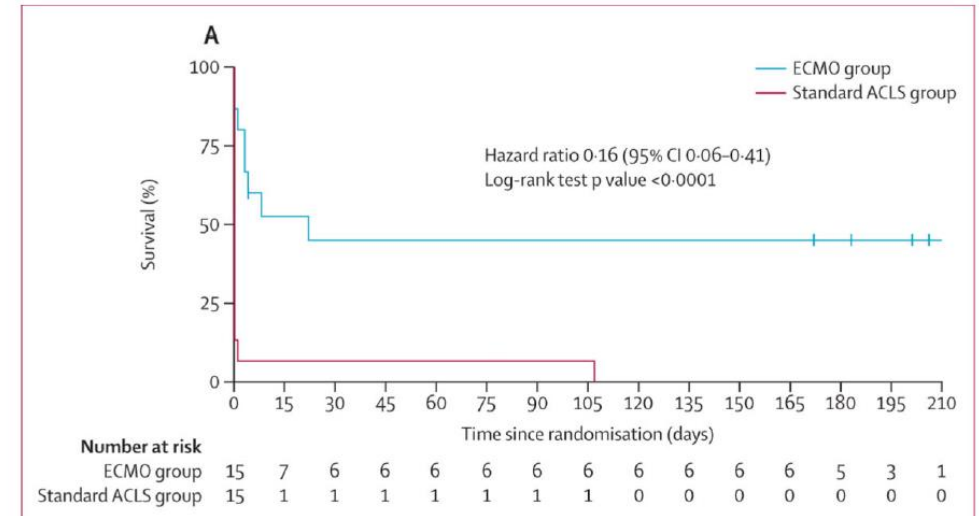
- **ARREST TRIAL**

Termination of the study due to superiority

Aug 8, 2019, - June 14, 2020

The primary outcome was survival to hospital discharge

6/14 (43%) vs 1/15 (7%) risk difference 36%, 3.7–59.2



Belohlavek TRIAL

Stopped for futility

March 1, 2013, to October 25, 2020

The primary outcome was survival with a good neurologic at 180 days

39/124 (32%) vs 29/132 (22%) risk difference 9.5 (-1.3 to 20.1)

Guidelines og klinisk implikation

We suggest extracorporeal cardiopulmonary resuscitation (ECPR) **may be considered** as a **rescue therapy** for **selected** patients with **out-of-hospital** cardiac arrest when conventional cardiopulmonary resuscitation is failing to restore spontaneous circulation in settings where this can be implemented (**weak recommendation, low certainty of evidence**).

We suggest extracorporeal cardiopulmonary resuscitation (ECPR) **may be considered** as a **rescue therapy** for **selected** patients with **in-hospital cardiac arrest** when conventional cardiopulmonary resuscitation is failing to restore spontaneous circulation in settings where this can be implemented (**weak recommendation, very low certainty of evidence**).

Diskussion

- Skal alle så ikke bare tilbydes ECPR?
- Studierne inkluderede selekterede patienter


Patient selektion

RESEARCH

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Mechanical circulatory support for refractory out-of-hospital cardiac arrest: a Danish nationwide multicenter study



Sivagowry Rasalingam Mørk^{1*} , Carsten Stengaard¹, Louise Linde², Jacob Eifer Møller², Lisette Okkels Jensen², Henrik Schmidt³, Lars Peter Riber⁴, Jo Bønding Andreasen⁵, Sisse Anette Thomassen⁵, Helle Laugesen⁵, Phillip Michael Freeman⁶, Steffen Christensen⁷, Jacob Raben Greisen⁷, Mariann Tang⁸, Peter Hasse Møller-Sørensen⁹, Lene Holmvang¹⁰, Emilie Gregers¹⁰, Jesper Kjaergaard¹⁰, Christian Hassager¹⁰, Hans Eiskjær¹ and Christian Juhl Terkelsen^{1,11}

Original research

Selection of patients for mechanical circulatory support for refractory out-of-hospital cardiac arrest

Louise Linde ,¹ Sivagowry Rasalingam Mørk,² Emilie Gregers,³ Jo Bønding Andreasen,⁴ Jens Flensted Lassen,¹ Hanne Berg Ravn,⁵ Henrik Schmidt,⁵ Lars Peter Riber,⁶ Sisse Anette Thomassen,⁴ Helle Laugesen,⁴ Hans Eiskjær,² Christian Juhl Terkelsen,⁷ Steffen Christensen,⁸ Mariann Tang,⁹ Hasse Moeller-Soerensen,¹⁰ Lene Holmvang,³ Jesper Kjaergaard,^{3,10} Christian Hassager,^{3,10} Jacob Eifer Moller  ^{1,3}

Patient selektion

- 1 Patienten
- 2 Varighed af hjertestop
- 3 Rytme
- 4 Metabolisk
- 5 ETCO₂
- 6 Bevidnet

Håndtering af patienter med hjertestop udenfor hospital

- et holdningspapir fra Dansk Cardiologisk Selskab

Diskussion

- Skal alle så ikke bare tilbydes ECPR?
- Studierne inkluderede selekterede patienter
- Kompleks intervention
- Stay and play vs. scoop and run
 - Pre-hospital ECMO
- Post-resuscitation care

Spørgsmål



Table 1

Kriterier for eCPR til OHCA-ptt. (præ-hospital visitation)

Ved vedvarende hjertestop (ikke ROSC efter 15 min.) skal eCPR overvejes.

Potentielle indikationer:

- › < 65 år, eller efter individuel vurdering
- › Første registrerede rytme stødbar (VF/VT) eller i særlige tilfælde PEA
- › Normotermi
- › Formodet kardiell årsag
- › Bevidnet hjertestop
- › Bystander HLR

Potentielle kontraindikationer:

- › Primær rytme asystoli
- › Betydende komorbiditet (vurderes individuelt)
- › End-tidal CO₂ < 1,3 kPa
- › No-flow tid > 10 min