



CSOP 026 – ECPR - Extracorporeal Cardiopulmonary Resuscitation

Version No: 1.0

Effective date: 11/05/2017

APPROVALS

Original Document Author:	Name	Date	Signature
Author:	Oliver Harrison – HEMS Doctor		
Revised Document Prepared by:			
Reviewed by:	Philip Bridle – Head of Operations		
Approval:	Justin Squires – Deputy Clinical Lead		
Next Review Date:	May 2019		

HISTORY

Effective Date	Version No.	Summary of Amendment
March 2017	1.0	Creation of document

REFERENCES

Document Reference Number	Document Title
1	Sakamoto, T., Morimura, N., Nagao, K., Asai, Y., Yokota, H., Nara, S., Hase, M., Tahara, Y., Atsumi, T. and SAVE-J Study Group, 2014. Extracorporeal cardiopulmonary resuscitation versus conventional cardiopulmonary resuscitation in adults with out-of-hospital cardiac arrest: a prospective observational study. <i>Resuscitation</i> , 85(6), pp.762-768.



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DEFINITIONS/ACRONYMS:

Abbreviations/Acronym	Definitions
CSOP	Clinical Standard Operating Procedure
ECPR	Extracorporeal Cardiopulmonary Resuscitation
VA-ECMO	Veno-arterial Extracorporeal Membrane Oxygenation
UHSM	University Hospital of South Manchester

ANNEX/APPENDIX

Document Reference Number	Document Title
1	ECPR Decision Making and Referral Process
2	Mountain Rescue England & Wales – Pre hospital Management of Severe Hypothermia
3	ECMO Centre Contact Details

1. Purpose

This CSOP describes the process of extracorporeal cardiopulmonary resuscitation (ECPR), the indications, and the logistical considerations for transporting patients that may be suitable for this procedure to the correct centre.

2. Scope

Due to dispatch, travel and transportation times there will be a very limited number of patients that are suitable for referral for ECPR. In addition, the only centre that is able to carry out ECPR does not recommend bypassing nearer suitable hospitals, and has limited availability of their ECPR arrest team. This CSOP will be updated if the situation changes in future.

3. Background



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Extracorporeal cardiopulmonary resuscitation (ECPR) has been investigated as a potential treatment for refractory cardiac arrest¹. Institution of veno-arterial extracorporeal membrane oxygenation (VA-ECMO) in patients in cardiac arrest enables oxygen supply to the brain and other organs to be maintained whilst more invasive investigations and treatments are carried out with the aim of reversing cardiac arrest (eg. coronary angiography).

Within the TAAS area of operations only the University Hospital of South Manchester (UHSM) currently has the ability to treat a patient with E-CPR.

4. Criteria for ECPR referral

Due to the invasive nature of E-CPR the criteria that must be met before starting this treatment are very specific and restrictive. **Only patients who would be taken to this centre under normal circumstances should be referred** (ie. do not bypass a closer appropriate hospital).

The following criteria must be met before considering referral of a patient with medical cardiac arrest for ECPR:

- Refractory cardiac arrest (no ROSC after 15 minutes advanced life support)
- \leq 60 years old
- No evidence of major comorbidities
- Witnessed cardiac arrest with immediate continuous bystander CPR

Patients who are in cardiac arrest following a drowning incident may also be considered for ECPR in the presence of hypothermia and a known time of submersion. Patients who have drowned who are not hypothermic will not be considered as hypothermia confers a degree of neurological protection.

Trauma is a contraindication for ECPR referral due to the need for systemic anticoagulation as part of the ECMO process.



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5. Logistics of ECPR referral

Outcomes from ECPR are thought to be significantly better if patients are started on ECMO within 90 minutes of collapse. Cannulation of the femoral vessels takes 15-30 minutes, therefore patients will need to be taken to UHSM **within 60 minutes of collapse**. The relatively long flight time to this region means that ECPR needs to be considered as a possibility before arrival on scene, so that a rapid decision can be made on arrival to facilitate application of mechanical CPR and loading of the patient onto the aircraft or ambulance.

A patient who meets the geographic and clinical criteria above who the critical care team feel may benefit from ECPR should be transported with ongoing chest compressions using the LUCAS-2 device. A pre-alert should be made to UHSM stating that the patient is suitable for ECPR. The ED team will then arrange for the ECPR team to meet the patient in the emergency department. (See appendix 1)

6. Case review

All patients referred for ECPR should be discussed at the next appropriate clinical governance meeting. If the patient is accepted for ECPR then feedback from the cardiothoracic intensive care consultants at UHSM should be sought before these meetings to ensure all potential learning points are covered.

7. Hypothermia

Patients with severe hypothermia may be suitable for rewarming using extracorporeal circulation systems. Patients who meet the following criteria should be discussed with the nearest accessible ECMO centre to assess their suitability for extracorporeal rewarming (Note: unlike E-CPR, all UK EMCO centres will consider accepting patients with severe hypothermia for extracorporeal rewarming)

- Signs of life + temperature $<32^{\circ}\text{C}$, no shivering, reduced conscious level, or irregular pulse
- No signs of life and no features incompatible with life
- Combination of severe hypothermia plus any injuries



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As above, any patient in cardiac arrest who is being transported to an ECMO centre should have continuous CPR whilst in transport using the LUCAS-2 device.

An example of a treatment algorithm for severe hypothermia is attached at Appendix 2.

Appendix 3 has the telephone numbers for UK ECMO centres - for referral of a hypothermic patient call the ECMO coordinator.

End of Document

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