

ECPR QUICK REFERENCE HANDBOOK

ROYAL INFIRMARY EDINBURGH
MONDAY – FRIDAY 9-5PM
ECMO TEAM

All Rule-in Criteria

- Age ≤ 70 years *
- Initial shockable rhythm
- No sustained ROSC after 3 shocks
- Consider PEA if signs of life (lacrimation, reactive pupils, attempted respiration or spontaneous movements)



No Rule-out Criteria

- Known life limiting pathology (eg predicted survival <1 year)
- Trauma
- Do not resuscitate order
- Time from SAS arrival to cannulation anticipated > 60 mins (Excluding special circumstances: OD & hypothermia)



STOP CRITERIA

2 or more:

$\text{ETCO}_2 < 1.3\text{kPa}$

$\text{PaO}_2 < 6.6\text{kPa}$ OR $\text{SaO}_2 < 85\%$ (with or without O_2)

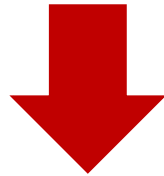
Lactate $> 18\text{mmol/L}$

*Previous studies have proposed advanced age is a predictor of a poor outcome in patients with ECPR : Mørk (2021), de Waha (2016) & ARREST (2021).

Stage 1: Pre-Cannulation

PRE ARRIVAL:

- Clear Resus 2
- Assign action cards
- Position USS *left* of patient
- Prepare ALS drugs and sedation
- **BRIEF TEAM**



ARRIVAL:

Team Leader addresses **RULE IN & OUT** criteria

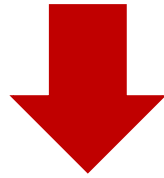


PATIENT PREPARATION:

- Transfer patient & remove garments
- Continue resuscitation & LUCAS
- Apply monitoring (**sats right hand**)
- Secure airway
- Large bore IV access

Stage 2: Cannulation

- Skin Prep& drape
- Place left femoral arterial sheath and take ABG
- Place right venous sheath
- Stop LUCAS briefly if required



- **Check STOP criteria before placing wires**
- Standard ALS change to ECPR ALS
- No further defib/adrenaline until Stage 3



- Place 19F 38cm venous access and 15F 15cm arterial return
- Wet join & go on pump
- Blood flow 3L, Sweep 3L, Fio₂ 1.0

Stage 3: On ECMO

- Pause LUCAS + recheck rhythm
 - VF/VT – shock 3 times
 - Amiodarone if fails



POST ECMO CHECK:

- Airway – Check ETT/place NG
- Breathing – Ventilation settings
- Circulation – ECG
 - Right** radial/brachial arterial line
 - Distal perfusion line (in ICU)
 - Vasopressor: adrenaline
 - Echo: assess ejection
- Disability – sedation & paralysis
- Exposure – Temp 34-37°C, abx, consider heparin



ECMO TARGETS:

- MAP 65
- PO₂ > 10 kPa
- PCO₂ 4.4-5.5 kPa
- Post oxy PO₂ 15-25 kPa (circuit FiO₂ ≥ 0.5)
- Post oxy PCO₂ 5-6 kPa

TEAM LEADER ACTION CARD

(EM CONSULTANT)

Lead & co-ordinate resuscitation
Allocate EM nursing and medical roles
Record times of (1) Patient Arrival & (2) Decision for ECMO
ADDRESS RULE IN & RULE OUT CRITERIA
If PEA: a. Assess for signs of life (lacrimation, reactive pupils, attempted respiration or spontaneous movements) b. Consider thrombolysis for massive PE (not contraindicated in ECMO)
Ensure patient's airway secured
Ensure patient's clothing removed
ADDRESS STOP criteria
Ensure no further Adrenaline after decision for ECMO
Ensure no further defibrillations until on ECMO
Once on ECMO, shock 3 times if still in VF/VT Amiodarone if fails to convert
Ensure liaison with Cardiology team

CANNULATOR ACTION CARD

(ICU/ECMO CONSULTANT)

Prepare for patient arrival in ED <ul style="list-style-type: none"> a. ECMO pack opened on ECPR trolley b. Scrub up c. Prepare additional ECMO equipment with assistant
CONFIRM RULE IN & RULE OUT CRITERIA WITH TEAM LEAD
Clean groins & drapes with cannulation assistant
USS femoral vessels: Places left arterial sheath and takes ABG
Place right venous sheath
ADDRESS STOP CRITERIA WITH TEAM LEAD
Place wires
Sequential dilatation – Left arterial 15F cannula
Remove wire and clamp cannula
Sequential dilatation – Right femoral 19F cannula
Remove wire and clamp cannula
Request brief pause on LUCAS if required
Wet join & unclamp
Liase with perfusionist – on to ECMO
Request LUCAS stops, secure cannulae, confirm ECMO targets
Post ECMO A-E assessment

ASSISTANT CANNULATOR

ACTION CARD

(ICU CONSULTANT/ECMO NURSE)

Bring ECMO trolley + LUCAS (if on ward)
Don hat, mask and eye protection
Give ECMO pack to cannulator
Assist cannulator in preparing equipment (ECPR BOX)
Scrub up
Assist Cannulator in draping
Take dilators, wires and cannula from perfusionist
Assist with cannulation procedure and circuit connection
Assist with securing ECPR cannula

PERFUSIONIST ACTION CARD

Prepare ECMO circuit for use
Pass the dilators, wires and cannulae to cannulator assistant
Pass ECMO circuit once cannulae inserted
Check & confirm with Cannulator that no air is in circuit
Ensure ECMO parameters set: <ul style="list-style-type: none">• 3L/min Sweep• FiO₂ 1.0• 1500 rpm
Monitor unclamping procedure with Cannulator
Confirm ECMO circuit flow and increases to 3L/min

APPENDIX 1: SIGNS of LIFE

- Reactive pupils
- Lacrimation
- Attempted respiration
- Spontaneous movements

APPENDIX 2: STOP CRITERIA

- If >1 STOP CRITERIA:
 - Continue resuscitation as per standard ALS
 - **NOT for ECPR**
 - Transduce arterial sheath for pressure
 - Use venous line for drug infusions
 - Label lines
 - Consider if appropriate to terminate resuscitation

APPENDIX 3: INHOSPITAL CRITERIA

- As per criteria for out of hospital cardiac arrest
 - Activation of team at 10 mins of ongoing CPR
 - Apply LUCAS
 - Move to Critical Care if suitable
 - If in ED or Cath lab – remain there for ECLS
 - Aim to cannulate at 20 mins