Resuscitation Council UK

Post-resuscitation care Guidelines

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References

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Key points

- After return of spontaneous circulation (ROSC), use an ABC approach.
- Insert an advanced airway (tracheal intubation when skills are available).
- As soon as SpO_2 can be measured reliably or arterial blood gas values are obtained, titrate the inspired oxygen to achieve an arterial oxygen saturation

of 94-98%, and ventilate lungs to achieve normocapnia.
- Aim for a systolic blood pressure > 100 mmHg or a mean arterial pressure > 60-65 mmHg.
- Prioritise immediate coronary angiography for patients with clear ST-elevation on the ECG or other high suspicion of coronary occlusion (e.g. haemodynamic and/or electrical instability).
- Actively prevent fever by targeting a temperature ≤ 37.5 °C for patients who remain comatose after ROSC from cardiac arrest.
- Use a multimodal strategy including clinical examination, electrophysiology, biomarkers, and imaging to predict good or poor neurological outcome.
- Perform functional assessments of physical and non-physical impairments before discharge to identify rehabilitation needs and refer to early rehabilitation if indicated.

Introduction

These guidelines are based on the 2025 European Resuscitation Council (ERC) and European Society of Intensive Medicine (ESICM) Guidelines for Post-resuscitation Care and relevant sections of the International Liaison Committee on Resuscitation 2025 Consensus on Science and Treatment Recommendations for Advanced Life Support. Refer to the ERC-ESICM 2025 Guidelines for the detailed supporting science.

The guidelines process includes systematic reviews, scoping reviews, and evidence update that have been undertaken by international experts. The ERC-ESICM Post-Resuscitation Care Writing Group comprised 14 individuals who were selected based on their expertise, ERC and ESICM representation, diversity and geographical location.

Guidelines

Immediate post-resuscitation care

- Post-resuscitation care is started immediately after sustained return of spontaneous circulation (ROSC), regardless of location.

Diagnosis of cause and complications of cardiac arrest

- Early identification of a non-coronary cause can be achieved by performing transthoracic echocardiography and a dual-phase whole-body computed tomography (CT) scan (including head, neck, chest, abdomen, pelvis, and CT pulmonary angiography) at hospital admission, before or after coronary angiography if indicated.
- Prioritise immediate coronary angiography for patients with clear ST-elevation on the ECG or other high suspicion of coronary occlusion (e.g. haemodynamic and/or electrical instability). Perform a head-to-pelvis CT scan (including CT pulmonary angiography) if coronary angiography fails to identify causative lesions.
- If there are signs or symptoms pre-arrest suggesting a non-coronary cause (e.g. headache, seizures or neurological deficits, shortness of breath or documented hypoxaemia in patients with known respiratory disease, abdominal pain), perform a dual phase whole body CT-scan (including CT pulmonary angiography).

Airway and breathing

Airway management after return of spontaneous circulation

- Airway and ventilation support should continue after ROSC is achieved.
- Patients who have had a brief period of cardiac arrest and an immediate return of normal cerebral function and are breathing normally may not require airway or ventilatory support, but should be given supplemental oxygen via a face mask if their arterial blood oxygen saturation is less than 94%.
- Patients who remain comatose following ROSC, or who have another clinical indication for sedation and mechanical ventilation, should have their trachea intubated if this has not been done already during CPR.
- Tracheal intubation (with or without drugs) should be performed only by experienced operators who have a high success rate.
- Correct placement of the tracheal tube must be confirmed with waveform capnography.
- In the absence of personnel experienced in tracheal intubation, it is reasonable to retain or insert a supraglottic airway (SGA) or maintain the

airway with basic techniques until personnel skilled in drug-assisted tracheal intubation are available.
- Post ROSC patients may require drug-assisted tracheal intubation; the same level of care should be provided as for any other critically ill patient with a physiologically or anatomically challenging airway in terms of skills of the provider, monitoring, and choice of drugs for induction, and maintenance of sedation.

Control of oxygenation

- Immediately after ROSC, use 100% (or the maximum available) inspired oxygen until the arterial oxygen saturation (SpO_2) can be measured and titrated reliably with pulse oximetry or the partial pressure of arterial oxygen (PaO_2) can be measured.
- As soon as SpO_2 can be measured reliably or arterial blood gas values are obtained, titrate the inspired oxygen to achieve an arterial oxygen saturation of 94-98% or arterial partial pressure of oxygen (PaO_2) of 10-13 kPa (75-100 mmHg). Be aware that pulse oximetry can overestimate the true oxygen saturation in people with darker skin tones, and low-flow states will cause low signal quality.
- Avoid hypoxaemia (PaO_2 < 8 kPa or 60 mmHg) following ROSC.
- Avoid hyperoxaemia following ROSC.

Control of ventilation

- Obtain arterial blood gases and use end tidal CO_2 in mechanically ventilated patients.
- Target normocapnia (a partial pressure of carbon dioxide of 4.7-6.0 kPa (35-45 mm Hg) in adults with ROSC after cardiac arrest.
- In patients with accidental hypothermia or treated with hypothermia, monitor $PaCO_2$ frequently, as hypocapnia may occur.
- In hypothermic patients, use consistently either temperature or non-temperature corrected blood gas values.
- Use a lung protective ventilation strategy aiming for a tidal volume of 6-8 mL kg^{-1} ideal body weight.

Circulation

Coronary reperfusion

- Emergent cardiac catheterisation laboratory evaluation (and primary percutaneous coronary intervention (PPCI) if required) should be performed in adult patients with ROSC after cardiac arrest of suspected cardiac origin with persistent ST-elevation on the electrocardiogram (ECG).
- In patients with ROSC after out-of-hospital cardiac arrest (OHCA) without ST-elevation on the ECG, cardiac catheterisation laboratory evaluation should be delayed unless the clinical context suggests a high likelihood of acute coronary occlusion.

Haemodynamic monitoring and management

- All patients should be monitored with an arterial line for continuous blood pressure measurements, and it is reasonable to monitor cardiac output in haemodynamically unstable patients.
- Perform echocardiography as soon as possible in all patients to detect any underlying cardiac pathology and quantify the degree of myocardial dysfunction.
- Avoid hypotension and target a mean arterial pressure (MAP) > 60-65 mmHg after cardiac arrest.
- Maintain perfusion with fluids, noradrenaline and/or dobutamine, depending on individual patient need for intravascular volume, vasoconstriction or inotropy.
- Do not give steroids routinely after cardiac arrest.
- Avoid hypokalaemia and hyperkalaemia, which are associated with ventricular arrhythmias.
- In select patient populations (e.g. Glasgow Coma Scale score ≥ 8 on hospital arrival, with ST-elevation myocardial infarction (STEMI) and < 10 minutes cardiac arrest), consider mechanical circulatory support (such as intra-aortic balloon pump, left-ventricular assist device or arterio-venous extra-corporal membrane oxygenation) for persisting cardiogenic shock from left ventricular failure if treatment with fluid resuscitation, inotropes, and vasoactive drugs is insufficient. Left-ventricular assist devices or arterio-venous extra-corporal membrane oxygenation should also be considered in haemodynamically unstable patients with acute coronary syndromes (ACS) and recurrent ventricular tachycardia (VT) or ventricular fibrillation (VF) despite optimal therapy.

Post-ROSC arrhythmias

- In patients with arrhythmia immediately after ROSC, follow the ALS guideline for peri-arrest arrhythmia.

- In patients with arrhythmia after ROSC, treat any potential underlying causes, such as coronary occlusion or electrolyte disorders.
- In patients with no arrhythmia after ROSC, do not routinely give anti-arrhythmic drug prophylaxis.

Disability (optimising neurological recovery)

Control of seizures

- Use electroencephalography (EEG) to diagnose electrographic seizures in patients with clinical convulsions and to monitor treatment effects.
- Use levetiracetam or sodium valproate as first-line antiepileptic drugs in addition to sedative drugs to treat seizures after cardiac arrest.
- Do not use seizure prophylaxis in post-cardiac arrest patients.
- Attempt a wake-up trial in patients with myoclonus and benign EEG background (days after arrest).

Temperature control

- Actively prevent fever by targeting a temperature ≤ 37.5°C for patients who remain comatose after ROSC from cardiac arrest.
- Comatose patients with mild hypothermia (32-36°C) after ROSC should not be actively warmed to achieve normothermia.
- We recommend against the routine use of prehospital cooling with rapid infusion of large volumes of cold intravenous fluid immediately after ROSC. Use surface or endovascular temperature control techniques when temperature control is used in comatose patients after ROSC.
- When a cooling device is used, we suggest using a temperature control device that includes a feedback system based on continuous temperature monitoring to maintain the target temperature.
- Prevent active fever for 36 to 72 h in post-cardiac arrest patients who remain comatose.

Other therapies to improve neurological outcome

- There is insufficient evidence to recommend the use of any specific neuroprotective drug for comatose survivors of cardiac arrest.

General intensive care management

- Do not use prophylactic antibiotics routinely in patients following ROSC. However, it is reasonable to have a low threshold for giving antibiotics when there is any clinical suspicion of pneumonia.
- Use short-acting sedative agents and daily sedation holds when treating post-cardiac arrest patients receiving mechanical ventilation; this may enable earlier clinical examination that is less confounded by sedation when assessing neurological recovery.
- We do not recommend systematic use of neuromuscular blocking drugs in comatose post-cardiac arrest patients.
- In patients with critical hypoxaemia and ARDS following cardiac arrest, the use of a neuromuscular blocker may be considered.
- Patients should be nursed 30° head-up.
- It is reasonable to start gastric feeding at low rates (trophic feeding) and increase as tolerated.
- Given the high incidence of upper gastrointestinal ulceration in post-cardiac arrest patients and the use of anticoagulant and antiplatelet drugs both pre- and post-arrest, use stress ulcer prophylaxis in post-cardiac arrest patients, especially in those with coagulopathy.
- Anticoagulation of post-cardiac arrest patients should be individualised and be based on general ICU recommendations.
- Use standard glucose management protocols for adults with ROSC after cardiac arrest.

Predicting neurological outcome

General guidelines

- In patients who are comatose after resuscitation from cardiac arrest, neurological prognostication should be performed using clinical examination, electrophysiology, biomarkers, and imaging, to both inform the patient's relatives and to help clinicians target treatments based on the patient's chances of achieving a neurologically meaningful recovery.
- No single predictor is 100% accurate. Use multimodal neuroprognostication strategies.
- When predicting poor neurological outcome, a high specificity and precision are desirable to avoid falsely pessimistic predictions. When predicting a good outcome, the aim is to identify those patients with a better potential for recovery. Since the consequence of a false prediction in this setting is less

severe, the predictive performance of the test is not as critical. Both predicting good and poor outcomes are important to reduce prognostic uncertainty.
- The clinical neurological examination is central to prognostication. To avoid falsely pessimistic predictions, clinicians should exclude potential residual effects of sedatives and other drugs that may confound the results of the tests.
- Index tests for neurological prognostication are aimed at assessing the severity of hypoxic-ischaemic brain injury. Neurological prognosis is one of several aspects to consider in discussions about an individual’s potential for recovery.

Clinical examination

- Perform a daily neurological examination in patients who are unconscious after cardiac arrest.
- Clinical examination is prone to interference from sedatives, opioids or muscle relaxants. Potential confounding from residual sedation should always be considered and excluded.
- Consider neurological prognostication in patients who are not awake and obeying commands (Glasgow coma scale motor score < 6) at 72 h or later after ROSC
- In unconscious patients at 72 h or later after ROSC, the following tests may predict a poor neurological outcome:
    - The bilateral absence of the pupillary light reflex.
    - The bilateral absence of corneal reflex.
    - The presence of myoclonus within 96 h and, in particular, status myoclonus within 72 h.
- We also suggest recording the EEG in the presence of myoclonic jerks to detect any associated epileptiform activity or to identify EEG signs, such as background reactivity or continuity, suggesting a potential for neurological recovery.

Neurophysiology

- Perform EEG from day 1 after ROSC to predict outcome and detect seizure activity in comatose patients. Routine EEG or continuous EEG monitoring may be used.
- Suppressed background with or without periodic discharges and burst suppression on EEG (‘highly malignant’ patterns) are accurate indicators of a

poor prognosis. We suggest using these EEG patterns after 24 h from ROSC.
- The bilateral absence of somatosensory evoked cortical N20 potentials indicates poor prognosis after cardiac arrest.
- Always consider the EEG and somatosensory evoked potentials (SSEPs) results in the context of clinical examination findings and other tests. Always consider using a neuromuscular blocking drug when performing SSEP.

Biomarkers

- Use serial measurements of neuron-specific enolase (NSE) to predict outcome after cardiac arrest. Increasing values between 24 and 48 h or 72 h in combination with high values at 48 and 72 h indicate a poor prognosis.

Imaging

- Use brain imaging studies to predict poor neurological outcome after cardiac arrest. Ensure that the images are evaluated by someone with specific experience in these studies.
- Where specialist neuroradiology expertise is unavailable, consider telemedicine consultation for brain imaging interpretation.
- Use the presence of generalised brain oedema, manifested by a marked reduction of the grey matter/white matter ratio on brain CT, or extensive diffusion restriction on brain MRI to predict poor neurological outcome after cardiac arrest.
- Repeat the brain CT if the patient is unconscious at the time of prognostication (72-96 h after ROSC) and the first brain CT does not show signs of HIBI.

Multimodal prognostication

- Once major confounders have been excluded, start the prognostication assessment with an accurate clinical examination.
- In an unconscious patient at ≥ 72 h from ROSC, in the absence of confounders, poor outcome is likely when two or more of the following predictors are present: no pupillary and corneal reflexes at ≥ 72 h, bilaterally absent N20 somatosensory evoked potential (SSEP) wave at ≥ 24 h, highly malignant EEG at > 24 h, neuron specific enolase (NSE) > 60 mcg L^{-1} at 48 h and/or 72 h, status myoclonus ≤ 72 h, or a diffuse and extensive anoxic injury on brain CT/MRI. Most of these signs can be recorded before 72 h from ROSC; however, conclusions on prognosis will be made only at the time of

clinical prognostic assessment at ≥ 72 h.

Withdrawal of life-sustaining therapy

- Separate discussions around withdrawal of life-sustaining therapy and the assessment of prognosis for neurological recovery; withdrawal of life-sustaining therapy decisions should consider aspects other than brain injury, such as age, co-morbidity, general organ function and the patients' preferences.
- Allocate sufficient time for communication around the level-of-treatment decision within the team and with the relatives.
- After a decision on withdrawal of life-sustaining therapy, use a structured approach to shift from curative to end-of-life palliative care and consider organ donation.

Rehabilitation and follow-up after cardiac arrest

- Implement early mobilisation, delirium management and ICU diaries during hospitalisation.
- Provide information for patients and co-survivors.
- Perform functional assessments of physical and non-physical impairments before discharge to identify rehabilitation needs and refer to early rehabilitation if indicated.
- Provide cardiac rehabilitation as indicated by the cause of the cardiac arrest.
- Organise a follow-up of cardiac arrest survivors within three months after hospital discharge; screening for cognitive, physical, emotional problems, fatigue, and impact on life roles.
- Invite co-survivors to the follow-up; ask about emotional problems and impact on life roles.
- Undertake specialist referral and further rehabilitation as indicated.

Organ donation

- We recommend that all patients who have restoration of circulation after CPR and who subsequently progress to death be evaluated for organ donation.

- In comatose ventilated patients who do not fulfil neurological criteria for death, if a decision to start end-of-life care and withdrawal of life support is made, organ donation should be considered for when circulatory arrest occurs.
- All decisions concerning organ donation must follow local legal and ethical requirements.
- Cardiac arrest registries should report if organ donation after initial resuscitation from cardiac arrest occurred.

Investigating unexplained cardiac arrest

- Diagnostic testing of patients with unexplained cardiac arrest includes blood sample collection for toxicology and genetic testing, data retrieval from cardiac implantable electronic devices and wearable monitors, repeated 12-lead ECG and continuous cardiac monitoring, cardiac MRI, sodium channel blocker tests, and exercise testing.
- A confirmed diagnosis of a heritable condition should prompt targeted genetic testing.
- Long-term follow-up of unexplained cardiac arrest patients is recommended because of the high risk of recurrence of arrhythmia.

Cardiac arrest centres

- Adult patients with non-traumatic OHCA should be considered for transport to a cardiac arrest centre according to local protocols.
- Adult patients with non-traumatic OHCA should be cared for at a cardiac arrest centre whenever possible.
- Health care networks should establish local protocols to develop and maintain a cardiac arrest network.

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