

Post Cardiac Arrest Management & Care Bundle (Adults)

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Ratified by:	Clinical Guidelines Committee
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Name of responsible committee/individual:	As above
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Target audience:	All hospital staff involved in resuscitation Trust Wide

Key words: cardiac arrest, care bundle, coronary reperfusion, haemodynamic optimisation, ventilation, hypothermia, neuroprotection, glycaemic control.

	A Whittington Hospital Clinical Management Guideline
	Post Cardiac Arrest Management & Care Bundle (Adults)
	Speciality: Intensive Care Directorate: Critical Care Owner: Dr Chris Hargreaves
	Relevant to: All hospital staff involved in resuscitation Trust Wide

> Criteria for use

This guideline applies to patients who have been resuscitated from cardiac arrest. All adult patients surviving cardiac arrest should be considered for support. All bundle components should be used unless deemed unnecessary at senior level. Clinical management should initially be aimed at treating the underlying cause of the arrest eg Myocardial Infarction (MI), electrolyte abnormalities, hypovolaemia etc. There will be a transition from the Advanced Life Support (ALS) resuscitation guideline to the post-arrest care outlined here.

> Background

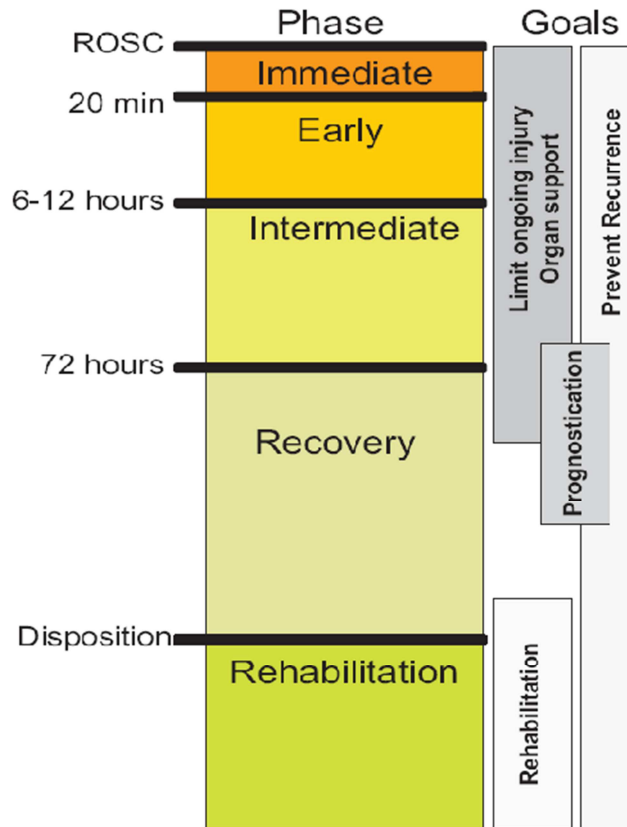
The best chance of long-term recovery following successful restoration of spontaneous circulation (ROSC) after cardiac arrest depends on the following measures being implemented together as a 'bundle', usually with admission to an intensive care unit.

- > Correction of the underlying reason for cardiac arrest (including coronary reperfusion for acute MI).
- > Optimal support of the circulation (rhythm control, adequate blood pressure)
- > Control of breathing (ventilation)
- > Glycaemic control
- > Neuroprotection (brain cooling, seizure control)

The above measures aim to minimise the damage caused by organ ischaemia and hypoxia during cardiac arrest and as a consequence of reperfusion injury.

The principles were outlined in the ALS guidelines of 2005 ¹. More recently, detailed post-resuscitation care guidance has been published by the Intensive Care Society ² and the International Liaison Committee on Resuscitation ³.

The goals of post-cardiac arrest care change over time from arrest as shown below (From ILCOR ³). This guideline focuses on the first 72 hours.



Consideration should also be given to

- Prediction of survival and prospects for recovery ('prognostication')
- Planning rehabilitation of cardiac arrest survivors with neurological damage ^{4, 5}
- Support and information for relatives
- Audit of hospital outcomes for cardiac arrest.

^{3/4} Inclusion/ exclusion criteria

Inclusion

Adults successfully resuscitated from cardiac arrest with ROSC.

Exclusions

Children under 16 years: seek advice from the Paediatricians

Adults with Do Not Attempt Resuscitation (DNAR) orders

Those adults deemed to have a non-survivable problem with no prospect of recovery.

³/₄ Clinical management

Initial management will be a continuation of support at the location where resuscitation has taken place.

Prompt admission to critical care will be needed as soon as feasible.

Involve ICU Middle Grade Doctor (Bleep 2613).

2nd On-Call Anaesthetist (Bleep 3005) may be needed for airway control.

1 Airway & Ventilation

Responding to commands after ROSC (Glasgow Coma Score 13-15)

Administer Oxygen by facemask to maintain O₂ Saturation > 94-98%

Obtunded or unconscious after ROSC

Intubate & ventilate immediately. Targets: arterial oxygen saturation 94-98%

PaO₂ 9-10 kPa PaCO₂ 5 kPa

20 degrees head up tilt

Sedative drugs and muscle relaxant will usually be necessary for intubation. This mandates the presence of a competent anaesthetist (with advanced airway skills) and a trained anaesthetic assistant.

Intubation protects the airway against aspiration. Ventilation minimises intracranial pressure and optimises gas exchange.

Patients intubated at the scene during resuscitation should generally be kept intubated unless demonstrating full recovery of neurological function.

Cooling for neuroprotection also requires sedation & ventilation (see below)

Only short acting sedative agents should be used (Propofol) to permit neurological re-assessment. Opiates should be avoided and benzodiazepines only used for seizure control.

2 Circulation

(i) coronary reperfusion

When acute ST elevation myocardial infarction (STEMI) is suspected as the underlying reason for arrest, coronary angiography & PCI should be urgently considered as restoration of coronary blood flow is the priority. All such patients should be discussed urgently with the Cardiology on-call team at The Heart Hospital. However, cardiopulmonary resuscitation is not a contraindication to thrombolysis and if PCI cannot be achieved quickly, thrombolysis should be considered.

(ii) circulatory support

Use of fluid therapy, inotropes and/or vasodilators should be guided by oesophageal doppler monitoring once available. Central venous and Arterial pressure monitoring is also necessary.

(iii) blood pressure control

Mean arterial pressure must be kept high enough (at least 70 mmHg, up to 90mmHg in elderly hypertensives) to ensure adequate cerebral perfusion. This may require inotrope infusion if unresponsive to doppler guided fluids alone.

Excessive hypertension should be controlled with oral antihypertensives or intravenous infusions of appropriate drugs.

(iv) ***rhythm control***

Stabilisation may require magnesium sulphate infusion, or anti-arrhythmic drugs according to standard practice.

3 Glycaemic control

Target Blood Sugar 6 – 8mM/l

This is achieved by titration of an insulin infusion according to standard practice. Blood glucose levels must be monitored at least 2 hourly.

4 Neurological support

(i) **seizure control**

Fitting must be promptly terminated by anticonvulsant drugs according to standard practice

(ii) **cooling for neuroprotection**

Target temperature 32-34°C as soon as possible after ROSC. Maintained for 24hrs before slow rewarming

See separate guideline:

'Induced hypothermia for neuroprotection after cardiac arrest'

Support and Information for relatives:

Cardiac arrest is sudden and unexpected leading to great anxiety in family members.

Prediction of survival

About 30% of cardiac arrest survivors admitted to ICU leave hospital alive. 80% of hospital survivors return to their own home with good levels of function.

Prognosis and ultimate neurological recovery cannot be extrapolated from the circumstances surrounding the cardiac arrest.

As there are no tests to reliably predict neurological outcome, the only option is to await clinical assessment over time. Improvement can continue for weeks or months.

Brain cooling to optimise brain recovery prevents meaningful assessment of neurological state for at least 48hrs.

Occasionally, survivors of cardiac arrest may progress to brain stem death or to become non-beating heart organ donors if severe irreversible brain damage has occurred.

The ICU team generally explains these matters following admission to ICU.

Later rehabilitation

Some survivors of cardiac arrest will have residual neurological deficit requiring specialist neuro-rehabilitation. Transfer to a neuro-rehab. unit can be a lengthy process and referral is commenced as soon as the need is recognised.

> Compliance monitoring

Adherence to the early phases of this guidance will be monitored through trust-wide audit of **cardiac arrests. This is the remit of the Resuscitation Training Officer**

The survivors of cardiac arrest admitted to ICU will be recorded as part of the ICU clinical database. The implementation of this guideline together with outcome of these patients can then be audited at regular intervals.

This will form part of the ICU clinical audit & evidence based practice reviews.

> Contacts (inside and outside the Trust including out-of-hours contacts)

Intensive Care Unit 5470 or 4470	
Intensive Care Middle Grade Doctor	Bleep 2613
ICU Outreach Service	Bleep 2837
2 nd On-Call Anaesthetist	Bleep 3005

➤ References

- 1 European Resuscitation Council (2005) Adult Advanced Life Support Guidelines: (4g) Post Resuscitation Care. Resuscitation **67** S1 S72 – S75 (download from www.erc.edu)
- 2 Intensive Care Society (2008) Standards for the management of patients after cardiac arrest. (www.ics.ac.uk) Download from clinical practice guidelines section.
- 3 Robert W. Neumar, Jerry P. Nolan et al, (2008) Post-Cardiac Arrest Syndrome, epidemiology, pathophysiology, treatment and prognostication. A consensus statement from

the International Liaison Committee on Resuscitation. *Circulation* **118**: 2452-2483 (download from www.circ.ahajournals.org)

4 Turner-Stokes L. Wade D. (2004) Rehabilitation following acquired brain injury: concise guidance. *Clinical Medicine* **4** 61-65

5 National Institute for Clinical Excellence (NICE) 2009
CG83 Rehabilitation after critical illness. (download from www.nice.org.uk/CG83)



Please see Whittington Hospital NHS Trust Guidelines:

- ***Resuscitation Policy***
- ***Induced hypothermia for neuroprotection after adult cardiac arrest***
- ***Acute MI guideline & ICP***

Appendix A

Plan for Dissemination and implementation plan of new Procedural Documents

To be completed and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval.

Acknowledgement: University Hospitals of Leicester NHS Trust

Title of document:	Post Cardiac Arrest Management & Care Bundle (Adults)		
Date finalised:	reissued Oct 2014	Dissemination lead:	Dr C Hargreaves Ext 5466
Previous document already being used?	No (Please delete as appropriate)	Print name and contact details Chris.hargreaves@whittington.nhs.uk	
If yes, in what format and where?	N/A		
Proposed action to retrieve out-of-date copies of the document:	N/A		
To be disseminated to:	How will it be disseminated/implemented, who will do it and when?	Paper Or Electronic	Comments
Doctors & nurses for all adult areas.	on the intranet	e	
Is a training programme required?			
Who is responsible for the training programme?			

Appendix B

Equality Impact Assessment Tool

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

Impact (= relevance) 1 Low 2 Medium 3 High	Evidence for impact assessment (monitoring, statistics, consultation, research, etc)	Evidential gaps (what info do you need but don't have)	Action to take to fill evidential gap	Other issues
Race	Low	None	N/A	None
Disability	Low	None	N/A	None
Gender	Low	None	N/A	None
Age	Low	None	N/A	None
Sexual Orientation	Low	None	N/A	None
Religion and belief	Low	None	N/A	None

Once the initial screening has been completed, a full assessment is only required if:

- The impact is potentially discriminatory under equality or anti-discrimination legislation
- Any of the key equality groups are identified as being potentially disadvantaged or negatively impacted by the policy or service
- The impact is assessed to be of high significance.

If you have identified a potential discriminatory impact of this procedural document, please refer it to relevant Head of Department, together with any suggestions as to the action required to avoid/reduce this impact.