What is happening in my hospital?
Any Attempt At Resuscitation Is Better Than No Attempt

Therapeutic Hypothermia in Cardiac Arrest

The Australian Resuscitation Council is a voluntary co-ordinating body which represents all major groups involved in the teaching and practice of resuscitation.

The Australian Resuscitation Council is sponsored by the Royal Australasian College of Surgeons and the Australasian and New Zealand College of Anaesthetists.

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AL S Level 1 (ILS) and ALS

ARC Guidelines
Visitors to our website can now read and print the ARC Guidelines. In the interest of public awareness, Council has made the decision to make the guidelines freely available.

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Current Issue
October 2019, Vol. 8, No. 40

Editor of the Month

September 2019

Karen Halford, Editor-in-Chief, the European Resuscitation Council in a more senior role elsewhere.

Article of the Month

September 2019

Critical state transitions: A mobile advanced life support PLT in hospital cardiac arrest.

Editorial

Issue Highlights

Prehospital therapeutic hypothermia after cardiac arrest: A systematic review and meta-analysis of randomized controlled trials

August 2013, 69, 844 No. 8 (Pages 1021-1026)

Mengxin Mao, Fang Wei, Jie Guan, Jie Jia, Zhe Zhang, Yue Han, Yi Shan, Zixiong Lin, Longju Dai

Abstract: Full Text: PDF (132 KB)

Hand response team calls to patients with a pre-existing out for resuscitation order

August 2013, 69, 844 No. 8 (Pages 1034-1039)

Charles Country, Adrian Walls, John Gardner, Thoery Chosky

Abstract: Full Text: PDF (153 KB)

Perioperative neurologic outcomes after therapeutic hypothermia for cardiac arrest

August 2013, 69, 844 No. 8 (Pages 1059-1061)

Marie Leary, Anne V. Scharer-Dreyer, Stephanie Henners, Marike van Duijsen, Francesco S. Evers, Claire van Weerden, Susana S. Shockey, Elizabeth C. Miller, Susan Van Duijns, Djakic

Abstract: Full Text: PDF (405 KB)

The European Resuscitation Council
Australian Resuscitation Council

COI
South Western Sydney Local Health District

- From 2011: SWSLHD provides health services for more than >0.8 million residents
- > 6,000 sq km
An integrated heart service

“OK, Williams, we’ll vote . . . how many here say the heart has four chambers?”
Liverpool Hospital

1. Patients resuscitated after prolonged cardiac arrest will develop post cardiac arrest syndrome

2. Out-of-hospital cardiac arrest survivors should be considered for urgent PCI unless the cause of cardiac arrest was clearly non-cardiac or continued treatment is considered futile.

3. Interventions may impact on neurological outcome: especially targeted temperature management.
Coordinated care

• Ambulance service-AMRS
• ED (almost bypass)
• Anaesthetic service
• Cardiology
• ICU

• Planning, agreement, policy
• Time critical transfer
• Resourcing
Incidence, predisposing factors, management and survival following cardiac arrest due to subarachnoid haemorrhage: a review of the literature

Markus B Skrifvars¹* and Michael J Parr²,³
Guideline

Guideline Title: Intubated/ventilated patients requiring urgent procedures outside the Operating Theatre Suite principles of management.

Document Number: LH_GL2012_C07.08

Functional Sub-Group: Clinical

Summary: Procedures are outlined to ensure that there is appropriate management of intubated/ventilated patients outside the ICU and operating theatre suite. This includes interventional cardiology and radiology procedures on patients from ED and ICU.

Approved by: Director Medical Services
General Manager

Publication (Issue) Date: TBA

Next Review Date: TBA
Airway and breathing with controlled re-oxygenation
Early coronary reperfusion
PCI after cardiac arrest
ST elevation vs. no ST elevation

![Graph showing survival to discharge and favorable neuro among survivors for ST elevation and no ST elevation with corresponding percentages and references.](attachment:image.png)

Radsel P. Am J Cardiol 2011;108:634-8

Dumas F. Circ Cardiovasc Interv 2010;3:200-7

Cronier P. Crit Care 2011;15:R122-9

Mooney MR. Circulation 2011;124:206-14

Kern KB. J Am Coll Cardiol Intv 2012;5:597-605
What’s missing?

- Insulin
- Inotropes
- Ventilation
- Enteral nutrition
- Cooling
- Defibrillator
- Pacing
- IABP
Therapeutic hypothermia after cardiac arrest

An Advisory Statement by the ALS Task Force of the International Liaison Committee on Resuscitation (ILCOR)

- Unconscious adult patients with spontaneous circulation after out of hospital cardiac arrest should be cooled to 32-34°C for 12-24 hours when the initial rhythm was VF
- For any other rhythm, or cardiac arrest in hospital, such cooling may also be beneficial
Cerebral resuscitation

• Targeted temperature management
  – Cold IV fluid
  – Surface cooling
  – NMB use is OK to facilitate TTM

• Sedation
  – propofol, fentanyl
  – Clearance of many drugs is reduced by a third at 34°C

• Cerebral perfusion
  – Autoregulation is impaired after cardiac arrest
  – Aim to maintain a normal mean arterial pressure for that particular patient.

• Seizures or myoclonus or both occur in about 24% of those who remain comatose and cooled after cardiac arrest
  – Clonazepam, sodium valproate, levetiracetam

• Blood glucose
  – 4-10 mmolL⁻¹
Prognostication
Neurological prognostication after cardiac arrest—Recommendations from the Swedish Resuscitation Council

Tobias Cronberg a,†, Marco Brizzi b, Lars Johan Liedholm c, Ingmar Rosén d, Sten Rubertsson e, Christian Rylander f, Hans Friberg g

a Department of Clinical Sciences, Division of Neurology, Lund University, Lund, Sweden
b Department of Clinical Sciences, Division of Neurology, Lund University, Malmö, Sweden
c Department of Neurology and Clinical Neurophysiology, Örebro University Hospital, Örebro, Sweden
d Department of Clinical Sciences, Division of Neurophysiology, Lund University, Lund, Sweden
e Department of Surgical Sciences/A Anaesthesiology and Intensive Care, Uppsala University, Uppsala, Sweden
f Department of Clinical Sciences/A Anaesthesiology and Intensive Care, University of Gothenburg, Göteborg, Sweden
g Department of Clinical Sciences, Division of Intensive and Perioperative Care, Lund University, Lund, Sweden

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ABSTRACT

Cardiopulmonary resuscitation is started in 5000 victims of out-of-hospital cardiac arrest in Sweden each year and the survival rate is approximately 10%. The subsequent development of a global ischaemic brain injury is the major determinant of the neurological prognosis for those patients who reach the hospital alive. Induced hypothermia is a recommended treatment after cardiac arrest and has been implemented in most Swedish hospitals.

Recent studies indicate that induced hypothermia may affect neurological prognostication and previous international recommendations are therefore no longer valid when hypothermia is applied. An expert group from the Swedish Resuscitation Council has reviewed the literature and made recommendations taking into account the effects of induced hypothermia and concomitant sedation.

A delayed neurological evaluation at 72 h after rewarming is recommended for hypothermia treated patients. This evaluation should be based on several independent methods and the possibility of lingering pharmacological effects should be considered.

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The current consensus is that a multimodal approach should be used for prognostication in comatose patients after cardiac arrest; ideally, this means a combination of neurological examination and electrophysiological investigations. Concerns about delayed clearance of sedation have led some experts to suggest that prognostication should be delayed until 72 h after return to normothermia.
What is the prognostic significance of factual circumstances?

• (1) ventricular fibrillation as the first registered rhythm, (2) short wait for an ambulance, (3) cardiac arrest outside the patient’s home, (4) witnessed cardiac arrest, (5) cardiopulmonary resuscitation performed by a layperson while waiting for the ambulance, and (6) young age. In the absence of all of these circumstances, the survival rate after one month was only 0.4 percent.
• History and findings at repeated clinical neurological examination
• Neurophysiological methods (EEG/SSEP)
• Clinical and electrographic seizures
• Diagnostic imaging (CT/MRI)
• Biochemical markers
• Agreed process for prognostication
Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

Niklas Nielsen, M.D., Ph.D., Jørn Wettleslev, M.D., Ph.D., Tobias Cronberg, M.D., Ph.D.,
David Erlinge, M.D., Ph.D., Yvan Gasche, M.D., Christian Hassager, M.D., D.M.Sci.,
Janneke Horn, M.D., Ph.D., Jan Hovdenes, M.D., Ph.D.,
Jesper Kjaergaard, M.D., D.M.Sci., Michael Kuiper, M.D., Ph.D., Tommaso Pellis, M.D.,
Pascal Stammet, M.D., Michael Wanscher, M.D., Ph.D., Matt P. Wise, M.D., D.Phil.,
Anders Åneman, M.D., Ph.D., Nawaf Al-Subaie, M.D.,
Søren Boesgaard, M.D., D.M.Sci., John Bro-Jeppesen, M.D., Iole Brunetti, M.D.,
Jan Frederik Bugge, M.D., Ph.D., Christopher D. Hingston, M.D.,
Nicole P. Juffermans, M.D., Ph.D., Matty Koopmans, R.N., M.Sc.,
Lars Køber, M.D., D.M.Sci., Jørund Langørgen, M.D., Gisela Lilja, O.T.,
Jacob Eifer Møller, M.D., D.M.Sci., Malin Rundgren, M.D., Ph.D.,
Christian Rylander, M.D., Ph.D., Ondrej Smid, M.D., Christophe Werer, M.D.,
Per Winkel, M.D., D.M.Sci., and Hans Friberg, M.D., Ph.D.,
for the TTM Trial Investigators*
Guideline

Policy Title: Cooling – Post Cardiac Arrest

Summary:
Patients presenting to the Emergency Department after a cardiac arrest will receive therapeutic hypothermia to preserve cerebral functioning. This treatment will continue upon transfer to the ICU, as appropriate.

Approved by: ICU Director (M. Parr) and Emergency Consultant (M. Smith)

Publication (Issue) Date: July 2010

Next Review Date: 2013

Replaces Existing Policy: Cooling post cardiac arrest (ICU)

Previous Review Dates: February 2003
3. **Principles / Guidelines**

**Indications**
- Likely primary cardiac cause for cardiac arrest. Any initial rhythm, and
- Persistent coma (GCS < 9), and
- Return of spontaneous circulation (ROSC) within 60 minutes of collapse.
- Adult patient age > 18 years. Female patients < 45 years should have BHCG checked and if positive this should be discussed immediately with the emergency physician or intensivist.

**Contraindications - Absolute**
- Coma due to another cause (drugs, head trauma, stroke)
- Terminal illness
- Known coagulopathy (e.g. patient on warfarin). Thrombolysis is NOT a contraindication.
- Advanced care directive/futile

**Contraindications - Relative**
- Cardiogenic shock (unable to maintain MAP > 60mmHg with inotropes (discuss with emergency physician or intensivist)
- Persistant dysrhythmia
- Pregnancy (discuss with emergency physician or intensivist and involve Obstetric and Gynaecology team)

**Procedure for Cooling:**
- Cooling must start as soon as possible after ROSC (should be started in the Emergency Department).
- Patient should be cooled to 33°C within 6 hours of ROSC.
Therapeutic Hypothermia in Cardiac Arrest
An information update

The Australian Resuscitation Council (ARC) recommends the use of Therapeutic Hypothermia as part of a care bundle in the post arrest management of unconscious patients following cardiac arrest.(1) It is recommended that such patients are cooled to between 32° and 34°C for a period of 12 to 24 hours. This recommendation is consistent with international guidelines and was based on the findings of published literature including two randomised trials (2-4).

Recently a randomised trial published in the New England Journal of Medicine compared the outcomes of cooling patients to 33°C with those cooled to 36°C.(5) The "Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest" study enrolled 950 patients and found that survival and neurological outcomes were not statistically different between the two groups.

The publication of this study has led to increased discussion of post cardiac arrest patient temperature management. In reviewing the findings of this trial the ARC makes the following observations:

- This study did not show a difference in mortality between the two target temperature groups.
- Both groups were undergoing active target temperature management, which prevented fever, and was part of intensive post resuscitation care.
- Mean temperature of patients in both groups at time of resuscitation was 35°C.
- No differences in complications between the two groups were observed.
- The study included both shockable and non-shockable arrest rhythms.

A key message from this study is that targeted temperature management remains an important treatment strategy in the post resuscitation care of the unconscious cardiac arrest patient. As detailed by the study investigators and the authors of the accompanying editorial,(6) this study does not support a treatment strategy where temperature management is abandoned.

Further results from this study are also likely to be published, and an international re-evaluation of the evidence on targeted temperature management is underway.

At this stage, the ARC continues to recommend the use of mild therapeutic hypothermia (cooling to 32°–34°C) in the unconscious patient after cardiac arrest. If clinicians are not cooling to 32°–34°C, fever should be avoided and a target temperature of 36°C should be aimed for.
Introducing a new era in acute cardiac care response—the new LIFEPAK 12 defibrillator/monitor series. A defibrillator and multiparameter monitor, all in one small, rugged, lightweight unit. With both AED and manual modes, it can be used by healthcare professionals with varied skill levels. A large, easy-to-read display and user-friendly Selector knob make training on the 12 simple. And the FASTPAK battery provides a fuel gauge to show the state of charge at the push of a button. Plus, an extensive data management system ties it all together. The 12 is also future upgradeable, which means this will be the only system you'll need for quite a while. In fact it just may last longer than most marriages.

For more information give us a call: 1.800.442.1142, or circle #101 on the reader service card.