The current temperature: a survey of post-resuscitation management across Australian and New Zealand intensive care units.

A/Prof Janet Bray
Susie Cartledge, Judith Finn, Glenn Eastwood, Nicole McKenzie, Dion Stub, Lahn Straney, and Stephen Bernard

Monash University, Curtin University
Australian Resuscitation Outcomes Consortium (Aus-ROC)

Funded by the ACCCN
Background

- Post-arrest care is an important link in the chain of survival.
- Significant changes
- Target temperature management (TTM):
  - 2002 therapeutic hypothermia (TH) at 33-34°C 12-24hrs = survival & neuro benefit
  - Dec 2013 TTM trial 33°C vs 36°C & fever prevention for 36 hours = NS diff in survival & neuro
- Implementation to practice?
What about Aust & NZ?

ANZCOR guideline 11.8
January 2016

- TTM OHCA and IHCA unresponsive post-ROSC
- Maintaining a constant TTM temp between 32-36°C
- Duration should be at least 24 hours
What about Aust & NZ?

- Early studies suggest:
  - not all patients are receiving TTM
  - centres targeting 36C have had issues maintaining target temperature – suggest worse outcomes

- What about other care??

**AIM:** To examine the current status of post-arrest care in Australia and New Zealand
Methods

- A list of ICUs participating in ANZICs
- Survey Monkey link was emailed to ICU directors
- Survey:
  - hospital characteristics
  - post-arrest protocol
  - post–arrest care (TTM, prognostication, cardiac care)
  - Attitudes about current level of TTM evidence
  - awareness of ANZCOR guideline.
  - barriers if TTM was not used
- Descriptive analysis
- Validation of responses (against comments and protocols)
## Sample n=61

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall N=163</th>
<th>Participating N=61</th>
<th>Non-participating N=102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan location</td>
<td>-</td>
<td>43 (70%)</td>
<td>-</td>
</tr>
<tr>
<td>Teaching</td>
<td>-</td>
<td>49 (80%)</td>
<td>-</td>
</tr>
<tr>
<td>PICU</td>
<td>5 (3%)</td>
<td>2 (3%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td><strong>Country</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>141 (87%)</td>
<td>50 (82%)</td>
<td>91 (89%)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>22 (13%)</td>
<td>11 (18%)</td>
<td>11 (11%)</td>
</tr>
<tr>
<td><strong>Australian State</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria</td>
<td>36 (25%)</td>
<td>10 (20%)</td>
<td>26 (28%)</td>
</tr>
<tr>
<td>New South Wales</td>
<td>51 (36%)</td>
<td>16 (32%)</td>
<td>35 (38%)</td>
</tr>
<tr>
<td>Queensland</td>
<td>26 (18%)</td>
<td>12 (24%)</td>
<td>14 (15%)</td>
</tr>
<tr>
<td>Western Australia</td>
<td>12 (8%)</td>
<td>5 (10%)</td>
<td>7 (8%)</td>
</tr>
<tr>
<td>South Australia</td>
<td>11 (8%)</td>
<td>3 (6%)</td>
<td>8 (9%)</td>
</tr>
<tr>
<td>Tasmania</td>
<td>3 (2%)</td>
<td>1 (2%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>ACT</td>
<td>2 (1%)</td>
<td>2 (4%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>2 (1%)</td>
<td>1 (2%)</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>
Post-cardiac arrest guideline

- 59/61 of responding ICUs admit comatose cardiac arrest patients
- 41/59 (70%) of ICUs followed a post-resuscitation guideline
  - Metro (68% vs. 72%, p=0.76)
  - Teaching (85% vs. 78%, p=0.47)

![Elements of guideline chart](chart.png)
TTM use

2 ICUs no TTM:

Rural NSW (teaching):
- Technically too difficult to implement
- Lack of staff resources
- Already hypothermic
- Beneficial, plans to implement

Metro NSW (teaching):
- Insufficient evidence
- No benefit, no plans to implement

**Neither transports pts out for TTM, both have cardiac intervention capabilities**
51/56 TTM information

- 64% have TTM protocol
  - 80% NZ
  - 65% Aus
- 18% commence TTM pre-ICU
- 45 (88%) ICUs changed target temp after TTM trial (NS with hospital type or location)
  - 100% NZ
  - 85% Aust

<table>
<thead>
<tr>
<th>Change in practice</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTM</td>
<td>73%</td>
</tr>
<tr>
<td>TTM, 12 hours</td>
<td>2%</td>
</tr>
<tr>
<td>TTM, 24 hours</td>
<td>2%</td>
</tr>
<tr>
<td>TTM, avoidance of fever</td>
<td>2%</td>
</tr>
<tr>
<td>TTM, no cooling devices</td>
<td>2%</td>
</tr>
<tr>
<td>33-36</td>
<td>6%</td>
</tr>
<tr>
<td>no active cooling</td>
<td>2%</td>
</tr>
<tr>
<td>no active cooling unless fever</td>
<td>2%</td>
</tr>
<tr>
<td>normothermia</td>
<td>7%</td>
</tr>
</tbody>
</table>
Target temperatures

- 28% of ICUs have temps >36 degrees
- 92% of these ICUs are in teaching hospitals
- 100% were Aust ICUs
LOE Concerns

- 23/46 (50%) concerns level of evidence for TTM
  - Insufficient
  - Design flaws
  - Efficacy
  - Applicability to practice

“Suggests hypothermia useful. Never tested whether avoidance of hyperthermia is as efficacious.”
“Still not sure about the <36. Currently doing an audit to see how much normothermia occurs. When targeted 32-33, no normothermia during cooling phase.”

“Temperature management in ICU is too late”
“All studies have major weakness/design flaws that limit clinical utility.”

“The TTM trial needs to be replicated. There are issues with the time to significantly different temps and also the bias of clinicians observing neurology in patients with hypothermia induced delayed excretion of sedative agents.”

“There is no conclusive evidence about its efficacy.”
ANZCOR guideline

- 31 (67%, of 46) ICUs stated they have read the ANZCOR guideline (similar in Aust and NZ ICUs)
  - No concerns (n=15, 50%)
  - Target temp
  - Method
  - Inconsistent
  - Other

- "No evidence 12 hours is inferior to 24 or more hours. No evidence that anything other than avoidance of hyperpyrexia is of benefit."

- "Recommendation to cool to 32-36 despite lack of evidence"
  - "32 degrees too cold with no extra benefit - always needs paralysis"

- "Not consistent with current evidence"
  - "It creates confusion"

- "Rapid infusion of ice cold saline is, in my mind, bordering on ridiculous...."
Cardiology and prognostication

- Cardiology services (n=42)
  - 30 (71%) 24-hours access
  - Part-time or transfer

- PCI (n=44)
  - 26 (59%) 24-hour access
  - Part-time or transfer

- 44 responded to questions about prognostication
  - 16 (36%) have a prognostication protocol
  - 9 used EEG, 5 used EEG and SSEP, 1 used SSEP
Conclusions and limitations

- **Limitations**
  - Survey and response rate

- **Key findings**
  - Post-resuscitation care in ICUs varies
  - Some ICUs are practicing outside the ANZCOR guideline
  - Change in TTM practice in Australia and New Zealand is widespread
  - Some ICUs are now treating to “normothermia” – not TTM.

Despite evidence-based national and international guidelines, there are high levels of variability in post resuscitation care and guideline adherence is inconsistent. The presence of national guidelines does not necessarily translate to evidence-based care. So strategies to ensure effective implementation of research evidence for post resuscitation care practice are urgently required. A large amount of work has led to current evidence-based guidelines. It behoves us to translate this knowledge into routine practice if our patients are to receive the full benefit.
Lowest temperature for first 24 hours in ICU:

- <34°C: 57% vs 25% (p=<0.001)
- 35.5-36.5°C: 17% vs 27% (p<0.001)

Highest temperature for first 24 hours in ICU:

- >37°C: 37% vs 53% (<0.001)
- >38°C: 13% vs 16.5% (<0.001) (AOR, 1.35 [CI 99%, 1.16–1.57])

***diff in fever not observed in TTM trial***

In-hospital mortality rate:

- Decreased by 1.3% per year from January 2005 until December 2013
- Increased by 0.6% per year from January 2014 until December 2016
Changes in Temperature Management of Cardiac Arrest Patients Following Publication of the Target Temperature Management Trial

Ryan Salter, FANZCA; Michael Bailey, PhD; Rinaldo Bellomo, MD; Glenn Eastwood, PhD; Andrew Goodwin, BEng; Niklas Nielsen, PhD; David Pilcher, FCICM; Alistair Nichol, PhD; Manoj Saxena, PhD; Yahya Shehabi, PhD; Paul Young, PhD, on behalf of the Australian and New Zealand Intensive Care Society Centre for Outcome and Resource Evaluation (ANZICS-CORE)

2005 May

Date: 2005 May
Temperature: 32.6 °C
Mortality: 56% (n=68)
2006-2011

Mortality

60%

49%

44%

2013-2016

Mortality

48%

50%
Questions??

Funding

Australian College of Critical Care Nursing (ACCCN)

Heart Foundation Fellowship

Janet.bray@monash.edu

janet.bray@monash.edu
www.ausroc.org.au
International evidence

  - 12% to 48% 36C TTM
  - Duration and rewarming varies
  - 50%-83% ICUs had protocols
  - Timing and testing for neuro-prognostication varied.

- Issues:
  - Insufficient time post TTM publication
  - Clinicians not ICUs
  - Before guidelines changed recommendation