



Kent & Medway Critical Care & Trauma NETWORK


Kent & Medway Critical Care Network audit: Therapeutic Hypothermia

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Thanks to

Dartford and Gravesham 
NHS Trust

East Kent Hospitals University 
NHS Foundation Trust

Medway 
NHS Foundation Trust

Maidstone and 
Tunbridge Wells
NHS Trust

- And all the staff who provided data

Overview of presentation

- Introduction
- The audit
- Results
- Recommendations

Introduction

- Out of hospital cardiac arrest (OOHCA) has a poor prognosis with approx 10% overall survival

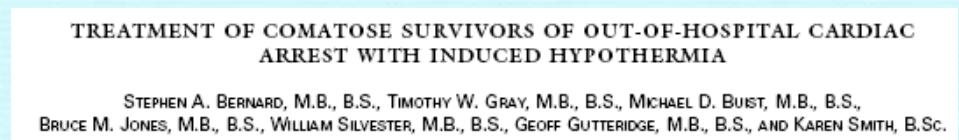
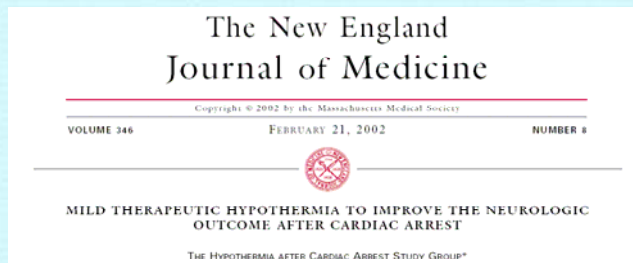
Pell et al. Heart 2003; 89:839-42

Atwood et al. Resuscitation 2005; 67:75-80

- There are however some evidence-based therapies to improve outcomes:
 - Early cardiac reperfusion (thrombolysis vs PCI)
 - Therapeutic Hypothermia

Introduction

- Therapeutic Hypothermia (TH) is the induction of mild hypothermia (32 -34°C) following cardiac arrest for 12-24 hrs
- It has been shown to be **safe**, and effective at improving **long-term neurological outcome** following cardiac arrest:



Introduction

- The use of therapeutic Hypothermia is advocated by all international resuscitation organisations:
- The UK Resus council states in its 2005 guidelines:



Resuscitation 57 (2003) 231–235

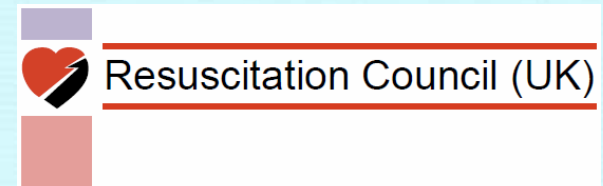
RESUSCITATION



www.elsevier.com/locate/resuscitation

Therapeutic hypothermia after cardiac arrest.
An advisory statement by the Advanced Life Support Task Force of
the International Liaison Committee on Resuscitation[☆]

Jerry P. Nolan^{a,*}, Peter T. Morley^b, Terry L. Vanden Hoek^c, Robert W. Hickey^{d,1},
ALS Task Force²



Post resuscitation care – therapeutic hypothermia

- Unconscious adult patients with spontaneous circulation after out-of-hospital VF cardiac arrest should be cooled to 32-34°C for 12-24 h.



MILD THERAPEUTIC HYPOTHERMIA TO IMPROVE THE NEUROLOGIC
OUTCOME AFTER CARDIAC ARREST

THE HYPOTHERMIA AFTER CARDIAC ARREST STUDY GROUP*

- Multicentre European trial, 273 pts
- OOH VF arrest only
- CPR started within 15 mins
- ROSC within 1 hr
- TH within 8 hrs (cooling blankets)
- Cooled for 24 hrs
- Neurological assessment 6/12

Results:

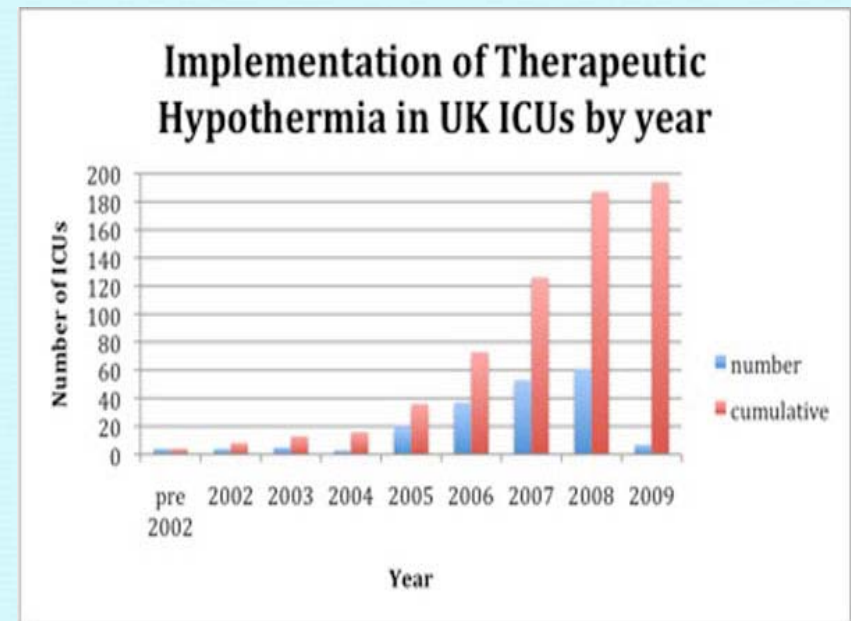
- ***Reduced 6 month mortality***
 - 41% vs 55% (p=0.02)
- ***Improved 6 month 'favourable neurological outcome' (GOS 4-5)***
 - 55% vs 39% (p=0.009)

Published data

Trial	N (TH group)	Year	Trial design	Hosp survival	Complications	6/12 good neuro recovery	CA to initiation of TH (median)	Duration of TH (median)
Bernard	42	2002	RCT, Australia	21 (49%)	Hyperglycaemia	21 (49%)	? (TH started in ambulance)	12 hrs
Holzer	136	2002	RCT, European	84 (62%)	Nil significant difference from normothermia group	75 (55%)	127 mins	24 hrs
HACA registry	462	2007	European registry: VF 318, asystole 84, PEA 40.	267 (58%)	3% haemorrhage, 6% arrhythmia	212 (45.9%)	159 mins	24 hrs

UK implementation of TH

- 2010 survey of all UK ICUs *(Nolan et al, unpublished data)*
- **86%** ICUs now use TH following OOHCA
- Of these;
 - **60.6%** use TH for Non-VF OOHCA
 - **63.5%** use TH for in hospital cardiac arrest



Purpose of the audit

- To determine KMCCN's compliance with international & national recommendations for Therapeutic Hypothermia following VF cardiac arrest.
- To compare KMCCN's outcomes with published literature

Audit Criteria

1. All ICUs use TH following OOH VF cardiac arrest
2. TH is administered for all eligible patients following OOH VF cardiac arrest
3. TH should be initiated within 8 hrs of cardiac arrest
4. TH should be maintained for 12-24 hrs
5. Complications of therapy
6. Hospital survival compared with published data
7. 6 month neurological outcome compared with published data

Audit methodology

- 1 year prospectively collected data: April 2009-10
- Audit data collection tool: paper/ *Microsoft Excel*[™] format
- Demographic data retrieved from *Wardwatcher*[™] ICU systems
- 6 month post-discharge assessment of neurological status using Glasgow Outcome Score (GOS)

Glasgow Outcome Score

1. Death
2. Vegetative state
3. Severe disability. Unable to live independently
4. Moderate disability. Able to live independently.
Unable to return to work/school
5. Good recovery. Able to return to work/school



Results

Criterion 1: All ICUs should use TH for survivors of OOH VF cardiac arrest

Unit	Routine Use of TH	Reason if not using TH
A	N	Do not admit OOH CA pts
B	Y	
C	Y	
D	N	No perceived benefit
E	Y	
F	Y	
G	Y	

Result: 83% (5 out of 6) ICUs use TH for pts following cardiac arrest

Criterion 2: All *appropriate* pts receive TH following OOH VF cardiac arrest

ICU	Total number post-VF OOHCA pts	Number receiving TH	%
B	19	14	74
C	12	8	67
E	24	24	100
F	No data submitted		
G	No data submitted		

Result: Overall, 84% of *potentially* eligible patients were treated with TH following cardiac arrest

Criterion 3: TH should be started within 8 hrs of cardiac arrest

ICU	n	Median time (minutes) to commence TH [range]
B	14	175 [58-420]
C	8	180 [30-420]
D	24	108 [0-270]
F	N/A	No data submitted
G	N/A	No data submitted

Result: Overall, TH was initiated within ~2 hours across the Network.

•There was no statistical difference between median time for survivors vs non-survivors.

Criterion 4:

TH should be maintained for 12-24 hrs

ICU	n	Median duration (hrs) of TH [range]
B	14	21 [2-30]
C	8	24 [17-72]
E	24	21 [4-24]
F	N/A	No data submitted
G	N/A	No data submitted

Result: Median duration of TH across network = 21 hours.

Actual time receiving TH was longer but several patients took a prolonged period to reach target temperature

Criterion 5: Complications of therapy

Complication	frequency
Bradycardia requiring therapy	7
Pneumonia	4
Haemorrhage	1
Acute pancreatitis	0
Lactate > 2 mmol/l	18

Result: There were no serious complications resulting in death/ severe harm.

Whilst TH has several *potential* complications, it is impossible to assign causality by TH to any of these complications.

High lactate measurements are common in patients receiving TH and resolve once TH is ceased.

Criterion 6: Hospital mortality is similar to published data

ICU	n	Hospital survival (%)
B	14	7 (50)
C	8	5 (62.5)
E	24	16 (63.7)
F	na	
G	na	

Result: Overall hospital survival for out of hospital VF cardiac arrest patients that receive TH in ICU = **61%**

- This is at least as good as published data from Trials/ international registries

Criterion 7: 6 month neurological outcome is similar to published data

ICU	n	Hosp survival	6/12 GOS score 4-5 (% of survivors)
B	14	7	7 (100%)
C	8	5	5 (100%)
E	24	16	15 (94%)
F	N/A		
G	N/A		

Result: Overall 6 month neurological recovery to GOS score 4-5 = 27 patients (**59%** of total patients admitted post VF cardiac arrest)

This is at least as good as published data from Trials/ international registries

Conclusions

- The use of Therapeutic Hypothermia (TH) following VF cardiac arrest is safe and may improve long term neurological outcomes.
- For those ICUs that submitted data to the audit, implementation of TH fulfils best practice guidelines with outcomes comparable to published literature.

Recommendations

- Based on current evidence, TH should be considered in patients admitted to the ICU following VF cardiac arrest in **all** ICUs across the KMCCN.
- Regular audit should be performed to assess the safety and efficacy of TH.
- Post audit, NICE (2011) advised that TH as a treatment option for people who are at risk of brain injury after cardiac arrest should be used

Any questions



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