

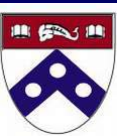
Incidence of post-rewarming pyrexia in patients treated with therapeutic hypothermia after cardiac arrest in the US



Marion Leary, BSN RN

Center for Resuscitation Science
Department of Emergency Medicine
University of Pennsylvania

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Speaker Disclosures

Presenter: Marion Leary, BSN RN

Disclosures: Philips Healthcare, Velomedix, Stryker



Background

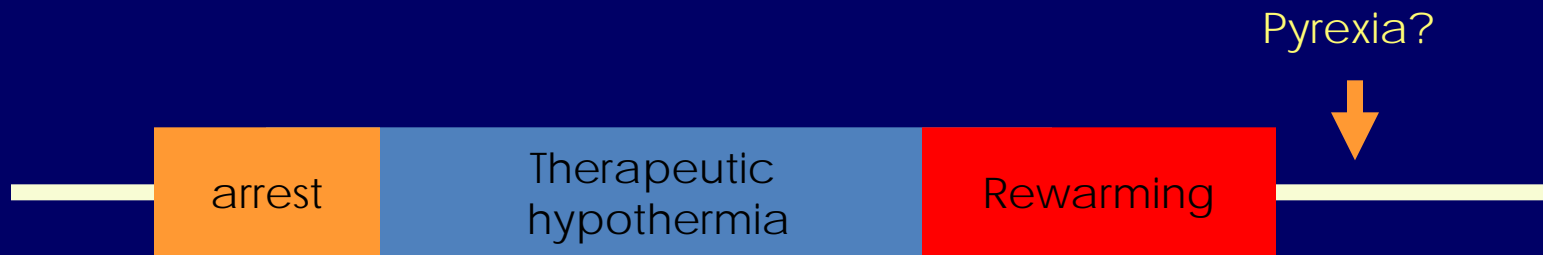
- Therapeutic hypothermia (TH) improves neurologic survival after cardiac arrest^{1,2}
- Pyrexia (sometimes called “neurogenic fever”) is relatively common after ischemic brain injury³
- Pyrexia soon after an ischemic event has been shown to increase neuronal injury and decrease neurologic survival⁴

1. HACA, 2002
2. Bernard, 2002
3. Hata, 2008
4. Zeiner, 2001



Scope of the Problem

- Unknown incidence of pyrexia specifically in the TH-treated post-arrest population
- The effect of pyrexia on clinical outcomes (survival and neurologic recovery) is poorly described
- Practical treatment options are available to protect against pyrexia



Objectives

In post-arrest patients treated with TH:

- Determine the incidence of post-rewarming pyrexia
- Determine its association with patient survival-to-discharge and neurologic outcome



Methods: PATH Registry



- National, multi-center, internet-based
 - 30 data points required for QA
 - 100 additional required for research
 - Further research data points available
- Data entered by trained healthcare providers
 - Mock cases
 - Case review
 - PATH data dictionary
 - Formal auditing process



Methods: PATH Registry



- All cardiac arrest cases:
 - Regardless of initial outcome (ROSC, expired)
 - All rhythms
 - All locations (Out-of-hospital & In-hospital)
- De-identified upon reporting
- IRB approval (or waiver)



Methods: PATH Registry

- 17 institutions from 10 states

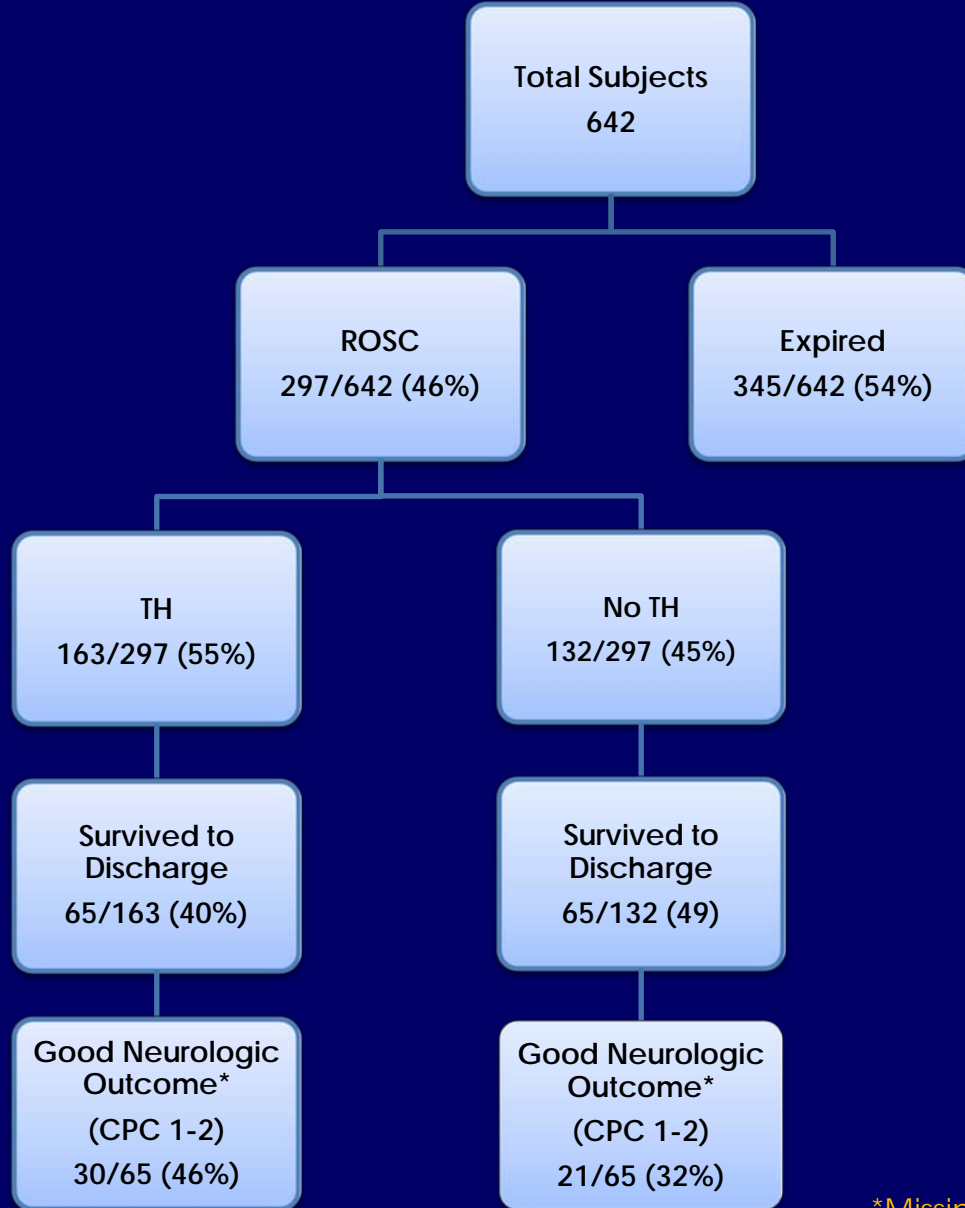


Study Design

- Retrospective chart review
- May 2005 – October 2011
- 10 Institutions from 7 states
- Post-arrest patients treated with TH



Subject Demographics



*Missing 69 total CPC scores



Subject Demographics

TH Cohort	n (%); mean±SD
Total TH Cohort	163 (55)
Female	74 (45)
Age, yrs±SD	59±16
VF/VT	49 (30)
Survival To Discharge	65 (40)
CPC 1-2	30/65 (46)*
GCS 14-15	44/65 (68)**

*Missing 27 CPC scores

**Missing 4 GCS scores



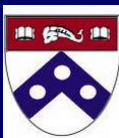
Results – Pyrexia

Defined as $\geq 38^{\circ}\text{C}$ within 24 hours post rewarming

Pyrexia	n (%); mean \pm SD
Incidence	51/124 (41)*
Maximum Temperature	38.6 \pm 0.5 $^{\circ}\text{C}$
Range	31.0-40.8 $^{\circ}\text{C}$
$\geq 38.8^{\circ}\text{C}$	18/51 (35)

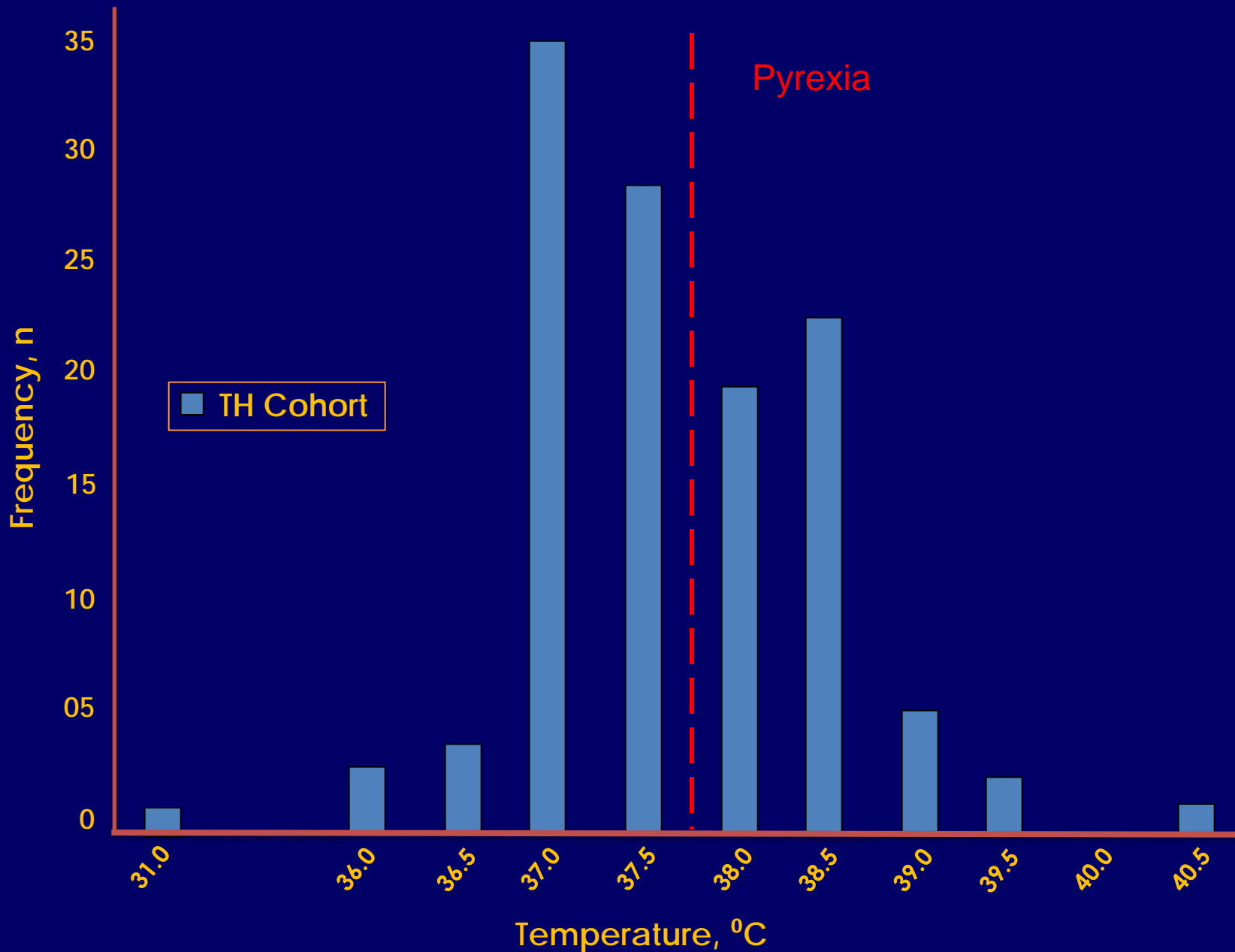
n (%); yrs \pm SD	Pyrexia (n=51)	No Pyrexia (n=73)	p-value
Female	18 (37)	35 (51)	0.20
Age	55 \pm 13	60 \pm 16	0.09
VF/VT	19 (37)	21 (29)	0.18

*36 patients died before 24 hours post rewarming; Temperature data missing for 3 patients



Results

Highest temperature within 24 hours post rewarming



Results - Pyrexia

mean±SD; n (%)	Pyrexia (n=51)	No Pyrexia (n=73)	p-value
Highest average temperature	38.6±0.5	37.2±0.8	<0.001
Arrest duration	24.5±20.0 min	27.8±22.5 min	0.46
Time to target temperature	3.5±3.1 hrs	4.2±4.1 hrs	0.27
Duration of hypothermia	25.1±6.3 hrs	24.9±6.7 hrs	0.87
Duration of rewarming	13.2±6.5 hrs	14.1±5.7 hrs	0.37
Survival to discharge	26 (51)	37 (51)	0.97
Good neurologic outcome			
-CPC	13/26 (50)*	17/37 (46)**	1.00
-GCS	19/26 (73)***	26/37 (70)	0.83

*Missing 10 CPC scores
 **Missing 32 CPC scores
 ***Missing 1 GCS



Results

- Pyrexia is common, occurring in 41% of post-arrest patients treated with TH within 24 hours after re-warming.
- There were no statistically significant differences with regard to clinical outcomes in those patients who experienced pyrexia versus those who did not experience pyrexia.



Limitations

- Small sample size
- Possible unmeasured confounders
- Unknown time of peak temperature
- The causes of pyrexia in those who experienced a temperature $\geq 38^{\circ}\text{C}$ are unknown



Conclusions

- Pyrexia, defined as a temperature $\geq 38.0^{\circ}\text{C}$ within 24 hours after rewarming is fairly common and in a subset of patients, pronounced.
- There was no difference in survival to discharge nor neurologic outcome in those without pyrexia.
- Given the potential importance of controlling for pyrexia, this area requires further research with a larger sample size.



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PATH Participating Institutions



Results

Adverse events profile within 72 hours of arrest

TH Cohort - Adverse Event	n (%)
Arrhythmia	7 (4)
Clinically-evident Bleeding	4 (3)
Seizures	26 (16)
Shivering	23 (14)
Skin Breakdown	8 (5)



Results

Cooling Methods	n (%)
Ice Saline	89 (55)
Ice Bags	22 (14)
Surface Device	93 (57)
Intravascular Device	2 (1)



Results

Institutions	Total Patients n (%)	Number Cooled n (%)
Hospital A	260	78
Hospital B	171	22
Hospital C	89	8
Hospital D	63	37
Hospital E	45	7
Hospital F-K	12	8

*Missing Institution for 2 subjects



Results

Died Prior to 72 Hours	Pyrexia	No Pyrexia
Died: Restrictions by family	3	28
Died: Medical futility	2	3
Died: Efforts terminated	0	1



Subject Demographics

TH Cohort	median	range
Arrest duration	21 mins	2-107 mins
Time to target temperature	3.5 hrs	0-25 hrs
TH maintenance duration	23.9 hrs	2.5-53 hrs
TH rewarming duration	13.4 hrs	2-33 hrs



Subject Demographics

All Subjects	n (%); mean±SD
Total	642
Out-of-Hospital	516 (81)
Female	298 (46)
Age, yrs±SD	63±17
Initial Rhythm	
-VF/VT	117 (18)
-PEA	230 (36)
-Asystole	250 (39)
-Unknown	45 (7)

