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"TARGETED TEMPERATURE MANAGEMENT" NELL'ADULTO POST ARRESTO CARDIOCIRCOLATORIO: UNA SCOPING REVIEW

Dott. Inf. Giacomo Bergamelli

INTRODUCTION

NEUROLOGICAL OUTCOMES AND SURVIVAL

HYPOTERMIA 32-34'C **VERSUS** **TTM NORMOTHERMIA 36'C**

METHODS

P	**PATIENT/ POPULATION**	Patients resuscitated from out- of hospital cardiac arrest (OHCA)
I	**INTERVENTION**	TTM «Targeted temperature management»
C	**COMPARISON**	Therapeutic Hypothermia
O	**OUTCOME**	Neurological outcomes and survival

JBI PubMed CINAHL Complete EBSCO Health Cochrane trip database

METHODS

7 STUDIES INCLUDED

INCLUSION CRITERIA:

- Age>18 years
- English-language and italian- language publications
- Experimental studies (RCT), Observational studies and qualitative studies
- Meta-analysis, Systematic Review and Guidelines or Protocols

EXCLUSION CRITERIA:

- Publications in languages other than italian and english
- Age< 18 years

RESULTS: HACA TRIAL

The New England Journal of Medicine

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MILD THERAPEUTIC HYPOTHERMIA TO IMPROVE THE NEUROLOGIC OUTCOME AFTER CARDIAC ARREST

THE HYPOTHERMIA AFTER CARDIAC ARREST STUDY GROUP*

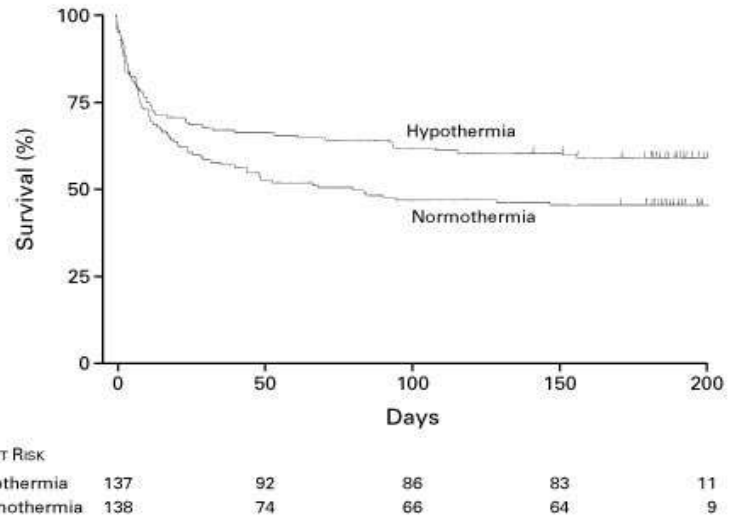


TABLE 2. NEUROLOGIC OUTCOME AND MORTALITY AT SIX MONTHS.

OUTCOME	NORMOTHERMIA	HYPOTHERMIA	RISK RATIO (95% CI)*	P VALUE†
	no./total no. (%)			
Favorable neurologic outcome‡	54/137 (39)	75/136 (55)	1.40 (1.08–1.81)	0.009
Death	76/138 (55)	56/137 (41)	0.74 (0.58–0.95)	0.02

*The risk ratio was calculated as the rate of a favorable neurologic outcome or the rate of death in the hypothermia group divided by the rate in the normothermia group. CI denotes confidence interval.

†Two-sided P values are based on Pearson's chi-square tests.

‡A favorable neurologic outcome was defined as a cerebral-performance category of 1 (good recovery) or 2 (moderate disability). One patient in the normothermia group and one in the hypothermia group were lost to neurologic follow-up.

NORMOTERMIA < HYPOTERMIA

BUT

ONLY SURVIVAL

LIMITED NUMBER OF PATIENT

RESULTS: RCT TTM-1

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest

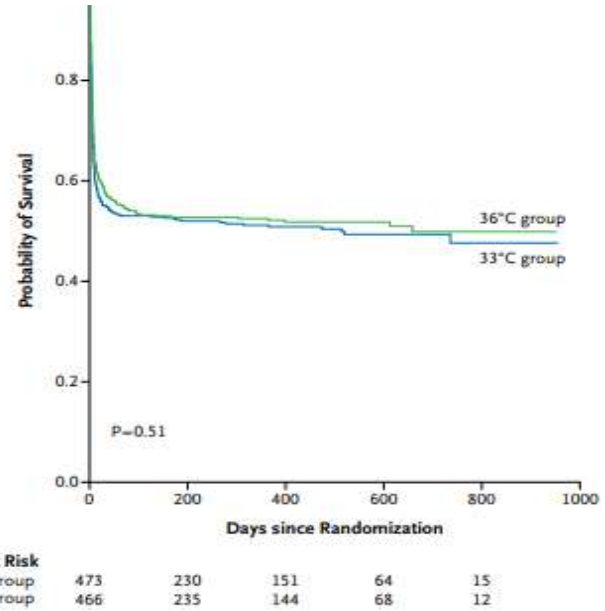


Table 2. Outcomes.

Outcome	33°C Group	36°C Group	Hazard Ratio or Risk Ratio (95% CI)*	P Value
	no./total no. (%)			
Primary outcome: deaths at end of trial	235/473 (50)	225/466 (48)	1.06 (0.89–1.28)	0.51
Secondary outcomes				
Neurologic function at follow-up†				
CPC of 3–5	251/469 (54)	242/464 (52)	1.02 (0.88–1.16)	0.78
Modified Rankin scale score of 4–6	245/469 (52)	239/464 (52)	1.01 (0.89–1.14)	0.87
Deaths at 180 days	226/473 (48)	220/466 (47)	1.01 (0.87–1.15)	0.92

CONCLUSIONS

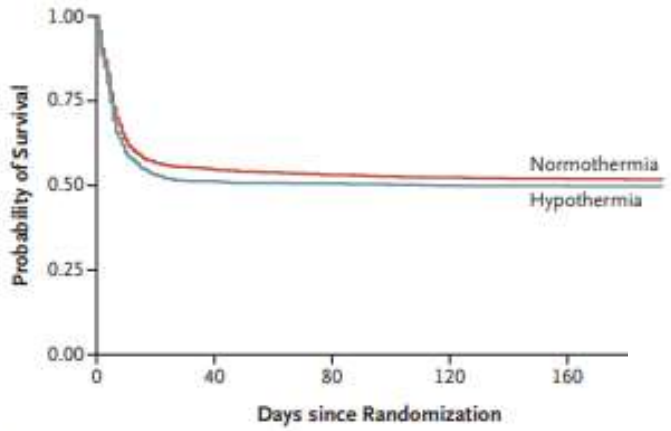
In unconscious survivors of out-of-hospital cardiac arrest of presumed cardiac cause, hypothermia at a targeted temperature of 33°C did not confer a benefit as compared with a targeted temperature of 36°C. (Funded by the Swedish Heart–Lung Foundation and others; TTM ClinicalTrials.gov number, NCT01020916.)

RESULTS: RCT TTM-2

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest



No. at Risk					
Normothermia	925	506	491	484	480
Hypothermia	925	474	468	462	461

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Hypothermia vs. Normothermia after Out-of-Hospital Cardiac Arrest

OPEN-LABEL TRIAL WITH BLINDED OUTCOME ASSESSMENT

1850
Comatose adults after out-of-hospital cardiac arrest

	Hypothermia (target body temperature, 33°C) N=925	Normothermia (target body temperature, ≤37.5°C) N=925
Death from any cause at 6 mo	50%	48%
	RR, 1.04; 95% CI, 0.94 to 1.14; P=0.37	
Modified Rankin scale score ≥4 at 6 mo	55%	55%
	RR, 1.00; 95% CI, 0.92 to 1.09	
Arrhythmia with hemodynamic compromise	24%	17%

Hypothermia did not lead to a lower 6-mo incidence of death than normothermia.

J. Dankiewicz et al. 10.1056/NEJMoa2100591

CONCLUSIONS

In patients with coma after out-of-hospital cardiac arrest, targeted hypothermia did not lead to a lower incidence of death by 6 months than targeted normothermia. (Funded by the Swedish Research Council and others; TTM2 ClinicalTrials.gov number, NCT02908308.)

RESULTS: GUIDELINE ERC 2021 (2022 ADDENDUM ERC-ESICM)

Temperature control

- We recommend targeted temperature management (TTM) for adults after either OHCA or in-hospital cardiac arrest (IHCA) (with any initial rhythm) who remain unresponsive after ROSC.
- Maintain a target temperature at a constant value between 32 °C and 36 °C for at least 24 h.
- Avoid fever (>37.7 °C) for at least 72 h after ROSC in patients who remain in coma.
- Do not use pre-hospital intravenous cold fluids to initiate hypothermia.

Duration of hypothermia

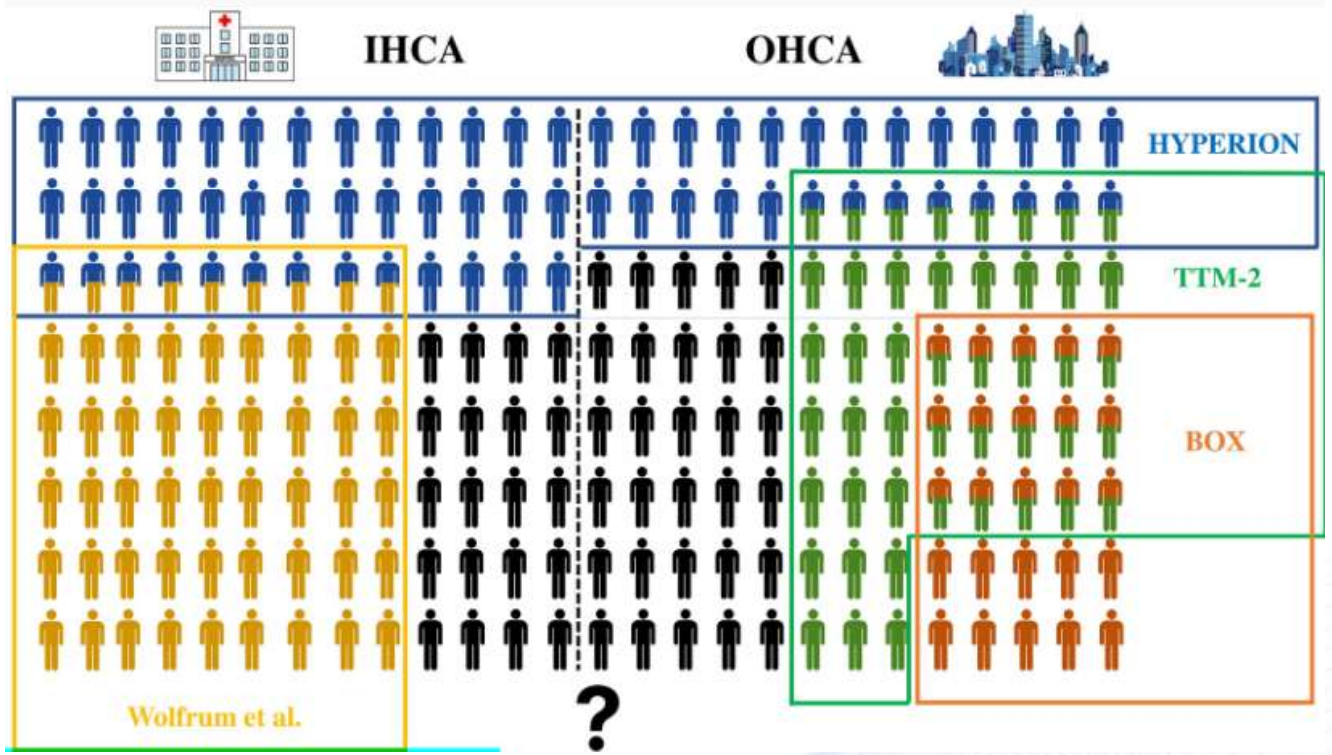
The optimal duration for mild induced hypothermia and TTM is unknown although the period of hypothermia is most commonly 24 h. Previous trials treated patients with 12 to 28 h of TTM.[27,218,219] Two

- We recommend selecting and maintaining a constant target temperature between 32 °C and 36 °C for those patients in whom temperature control is used (strong recommendation, moderate-quality evidence). Whether certain subpopulations of cardiac arrest patients may benefit from lower (32–34 °C) or higher (36 °C) temperatures remains unknown, and further research may help elucidate this.

GOOD PRACTICE	We **recommend** continuous monitoring of core temperature in patients who remain comatose after ROSC from cardiac arrest.
LOW	We **recommend** actively preventing fever (defined as a temperature > 37.7°C) in post-cardiac arrest patients who remain comatose.
GOOD PRACTICE	We **recommend** actively preventing fever for at least 72 hours in post-cardiac arrest patients who remain comatose.
GOOD PRACTICE	Temperature control can be achieved by exposing the patient, using anti-pyretic drugs, or if this is insufficient, by using a cooling device with a target temperature of 37.5°C.
GOOD PRACTICE	There is currently insufficient evidence to recommend for or against temperature control at 32-36°C in sub-populations of cardiac arrest patients or using early cooling, and future research may help elucidate this. We **recommend not** actively rewarming comatose patients with mild hypothermia after ROSC to achieve normothermia.
MODERATE	We **recommend not** using prehospital cooling with rapid infusion of large volumes of cold IV fluid immediately after ROSC.

DISCUSSION: TTM…THAT'S ALL?

- ☑ TTM RECCOMENDED
- ☑ FEVER PREVENTION AND COOLING STRATEGIES
- ☒ TTM DURATION AND TIMING TO INIZIATE
- ☒ OPTIMAL TARGET OF TTM: COOLING VERSUS NORMOTHERMIA
- ☒ TTM AND NEUROMONITORING
- ☒ OHCA VERSUS IHCA
- ☒ SUBGROUPS OF PATIENT ANALYSIS



…Crescat scientia vita excolatur