CONGRESSO NAZIONALE IRC 2023

Vicenza

Italian Resuscitation Conference 2023

20 • 21 OTTOBRE

Vicenza Convention Centre

LA RIVOLUZIONE DEI SISTEMI

IRC | Italian Resuscitation Council

Ottimizzazione neurologica: Temperatura, brivido e convulsioni

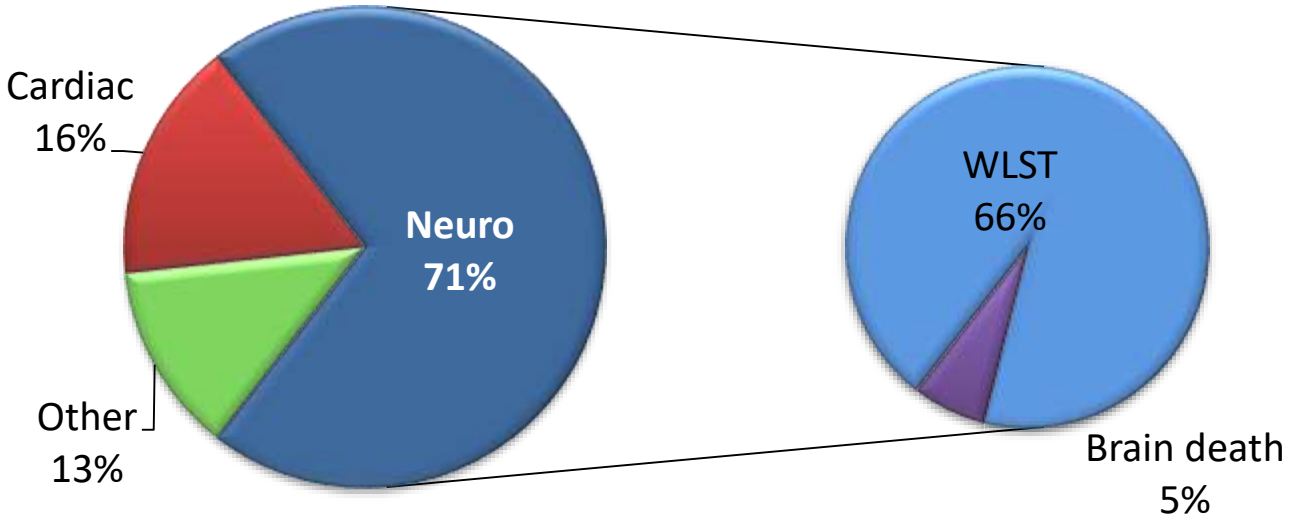
Tommaso Pellis
thomas.pellis@gmail.com

Direttore SC Anestesia e Rianimazione
Direttore Dipartimento di Emergenza
As Friuli Occidentale

Causes of death after resuscitation

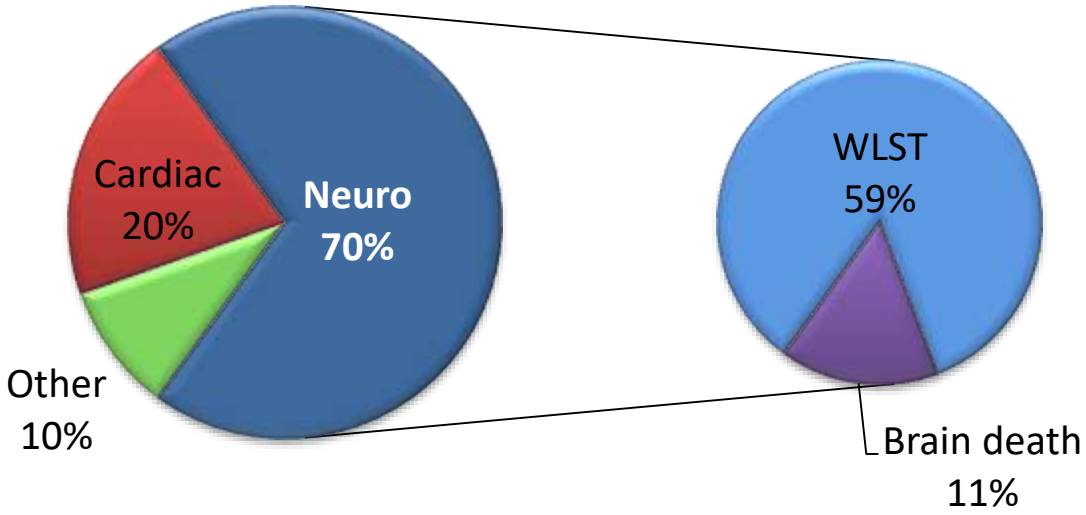
Dragancea 2013, Sweden

n= 86



Elmer 2016, USA

n= 2760



WLST = Withdrawal of Life-Sustaining Treatment

Dragancea I et al Resuscitation 2013; 84:337-42

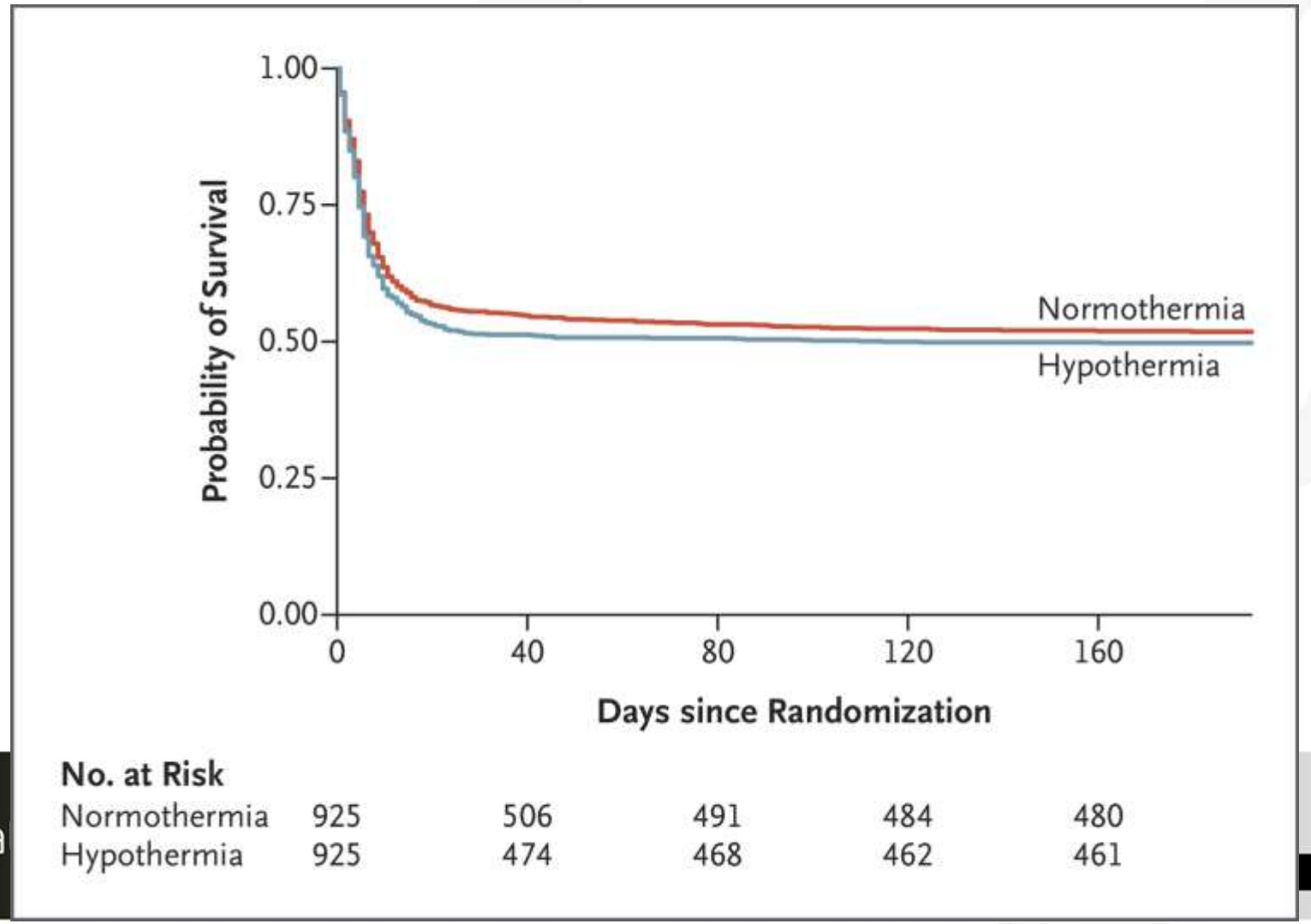
Elmer J et al Resuscitation 2016; 102:127-35

Paradigm shift in the new millenium

Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest

J. Dankiewicz, T. Cronberg, G. Lilja, J.C. Jakobsen, H. Levin, S. Ullén, C. Rylander, M.P. Wise, M. Oddo, A. Cariou, J. Bělohlávek, J. Hovdenes, M. Saxena, H. Kirkegaard, P.J. Young, P. Pelosi, C. Storm, F.S. Taccone, M. Joannidis, C. Callaway, G.M. Eastwood, M.P.G. Morgan, P. Nordberg, D. Erlinge, A.D. Nichol, M.S. Chew, J. Hollenberg, M. Thomas, J. Bewley, K. Sweet, A.M. Grejs, S. Christensen, M. Haenggi, A. Levis, A. Lundin, J. Düring, S. Schmidbauer, T.R. Keeble, G.V. Karamasis, C. Schrag, E. Faessler, O. Smid, M. Otáhal, M. Maggiorini, P.D. Wendel Garcia, P. Jaubert, J.M. Cole, M. Solar, O. Borgquist, C. Leithner, S. Abed-Maillard, L. Navarra, M. Annborn, J. Undén, I. Brunetti, A. Awad, P. McGuigan, R. Bjørkholt Olsen, T. Cassina, P. Vignon, H. Langeland, T. Lange, H. Friberg, and N. Nielsen, for the TTM2 Trial Investigators*

Sopravvivenza a 180 giorni



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

The NEW ENGLAND JOURNAL of MEDICINE

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

Perinatal asphyxia - % of patients with favourable outcome
Randomised controlled trials

Cooling for newborns with hypoxic ischaemic encephalopathy (Review)

Jacobs SE, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG

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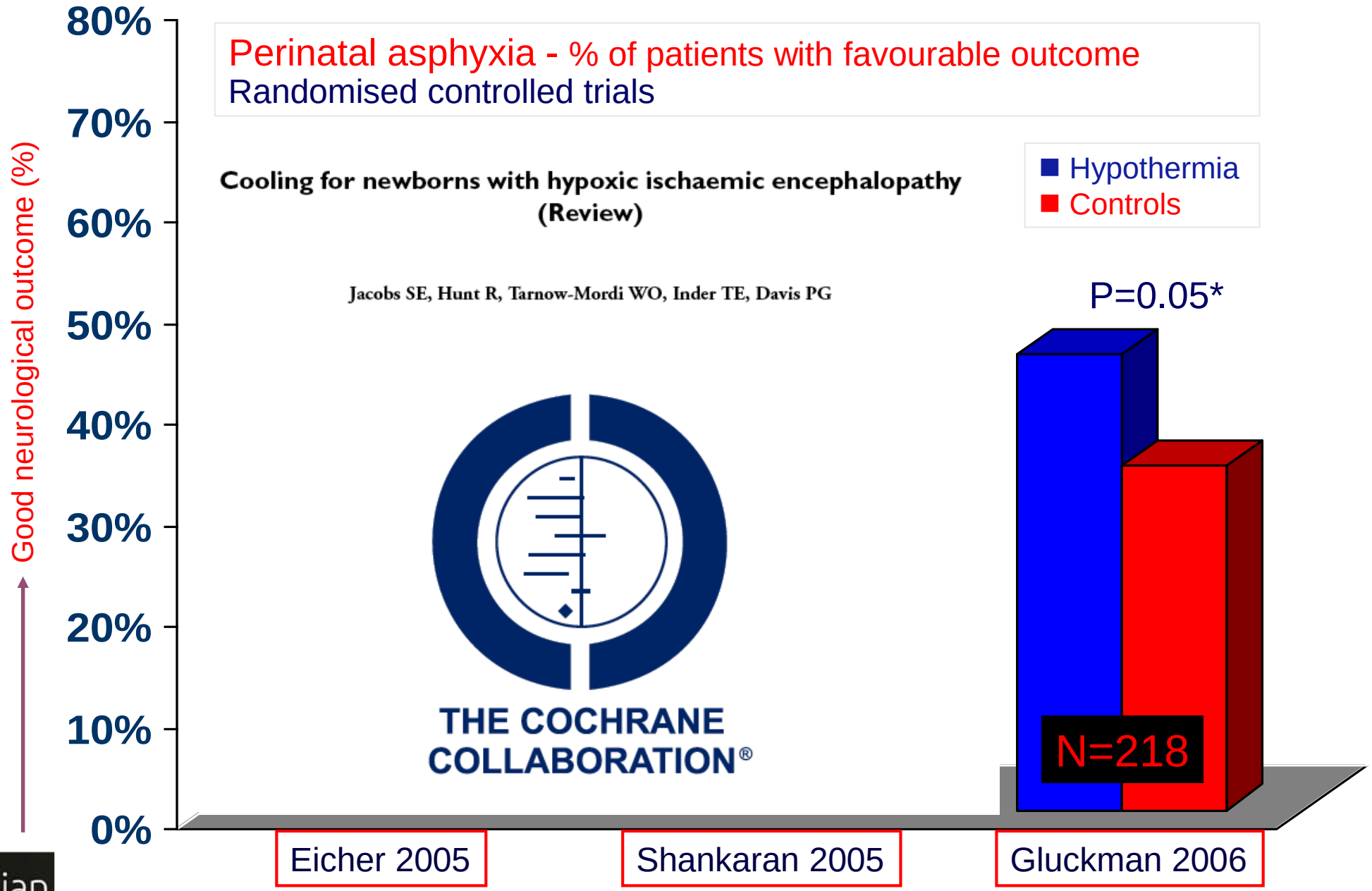

IRC Italian Resuscitation Council

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Moderate Hypothermia to Treat Perinatal Asphyxial Encephalopathy

Denis V. Azzopardi, F.R.C.P.C.H., Brenda Strohm, R.G.N.,
A. David Edwards, F.Med.Sci., Leigh Dyet, M.B., B.S., Ph.D.,
Henry L. Halliday, F.R.C.P.H., Edmund Juszczak, M.Sc.,
Olga Kapellou, M.D., Malcolm Levene, F.Med.Sci., Neil Marlow, F.Med.Sci.,
Emma Porter, M.R.C.P.C.H., Marianne Thoresen, M.D., Ph.D.,
Andrew Whitelaw, F.R.C.P.C.H., and Peter Brocklehurst, F.F.P.H.,
for the TOBY Study Group*

N Engl J Med 2009;361:1349-58.

Arch Pediatr Adolesc Med. 2011;165(8):692-700.
Published online April 4, 2011.
doi:10.1001/archpediatrics.2011.43

ARTICLE

ONLINE FIRST | JOURNAL CLUB

Whole-Body Hypothermia for Term and Near-Term Newborns With Hypoxic-Ischemic Encephalopathy

A Randomized Controlled Trial

Susan E. Jacobs, MD; Colin J. Morley, MD; Terrie E. Inder, MD; Michael J. Stewart, MD; Katherine R. Smith, MBiostat; Patrick J. McNamara, MD; Ian M. R. Wright, MD; Haresh M. Kirpalani, MD; Brian A. Darlow, MD; Lex W. Doyle, MD; for the Infant Cooling Evaluation Collaboration

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effects of Hypothermia for Perinatal Asphyxia on Childhood Outcomes

Denis Azzopardi, M.D., Brenda Strohm, R.N., Neil Marlow, D.M., Peter Brocklehurst, F.F.P.H., Aniko Deierl, M.D., Ph.D., Oya Eddama, Ph.D., Julia Goodwin, Ph.D., Henry L. Halliday, M.D., Edmund Juszczak, M.Sc., Olga Kapellou, M.D., Malcolm Levene, M.D., Louise Linsell, M.Sc., Omar Omar, M.Sc., Marianne Thoresen, M.D., Ph.D., Nora Tusor, M.D., Andrew Whitelaw, M.D., and A. David Edwards, D.Sc., for the TOBY Study Group*

N Engl J Med 2014;371:140-9.
DOI: 10.1056/NEJMoa1315788

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Cooling for newborns with hypoxic ischaemic encephalopathy (Review)

Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG

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This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2013, Issue 1

http://www.thecochranelibrary.com

Sposta in...

Tommaso Pellis

Inviata - iCloud 16 settembre 2022, 00:47

Autorizzazione in emergenza all'uso di nostro device presso TI Neonatale Burlo Trieste

A: Fiappo Eva - ASFO, Castellarin Cinzia, ilenia.mores@asfo.sanita.fvg.it Cc: + 1

Dettagli

Gentili,

Con la presente si informa che, dietro richiesta per le vie brevi della dr.ssa Laura Travan, direttrice della SC di TI Neonatale del Burlo, ho autorizzato il prelievo e l'uso del device ArcticSun per l'ipotermia, oltre ai consumabili necessari ad effettuare un ciclo di trattamento.

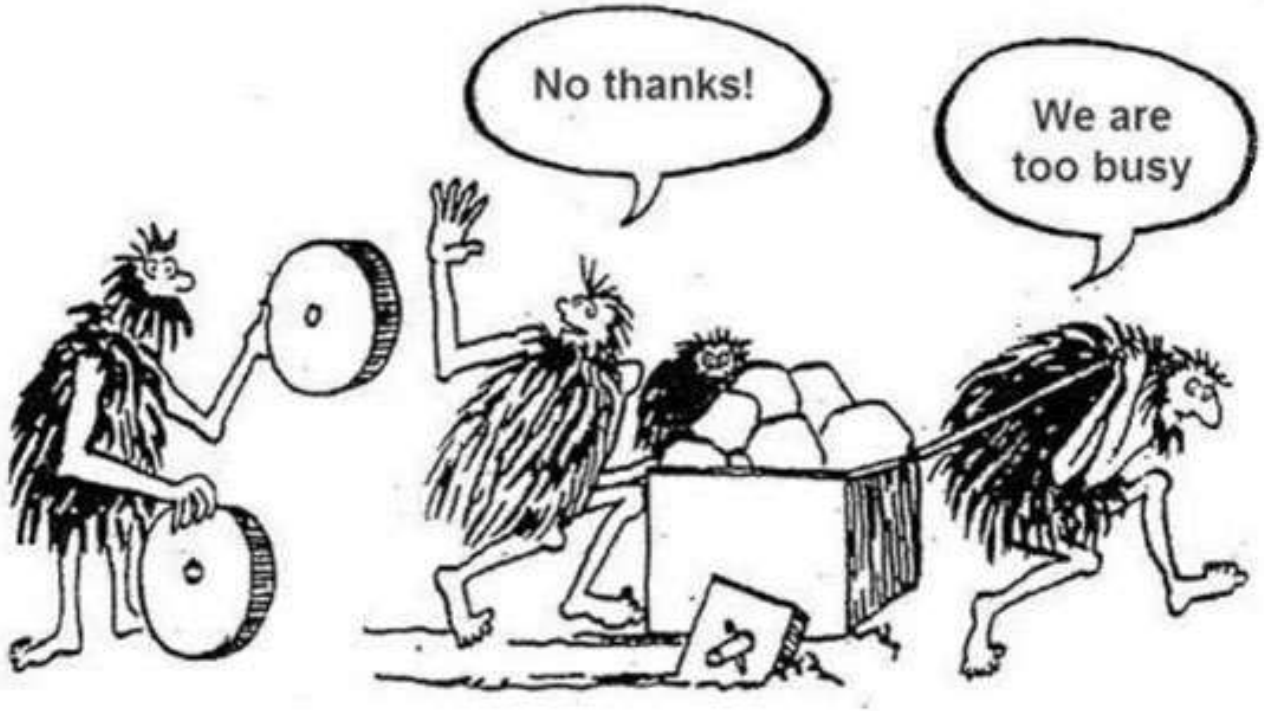
Tale terapia di emergenza, finalizzata a ridurre il danno ipossico neonatale, si è resa necessaria per un piccolo paziente nato a Pordenone e in previsione di trasferimento nella notte presso la TI neonatale del Burlo.

L'unico device in possesso dal Burlo è già in uso per analogo trattamento di emergenza su un altro paziente. Il Burlo non sarebbe stato quindi in grado di fornire al paziente la terapia ottimale. Contestualmente al trasferimento del neonato ho quindi autorizzato l'equipe a prelevare il device e materiale necessario a garantire la terapia di emergenza.

Chiedo cortesemente di indicare/provvedere formalità volte a regolarizzare il prestito effettuato in regime di emergenza nella notte.

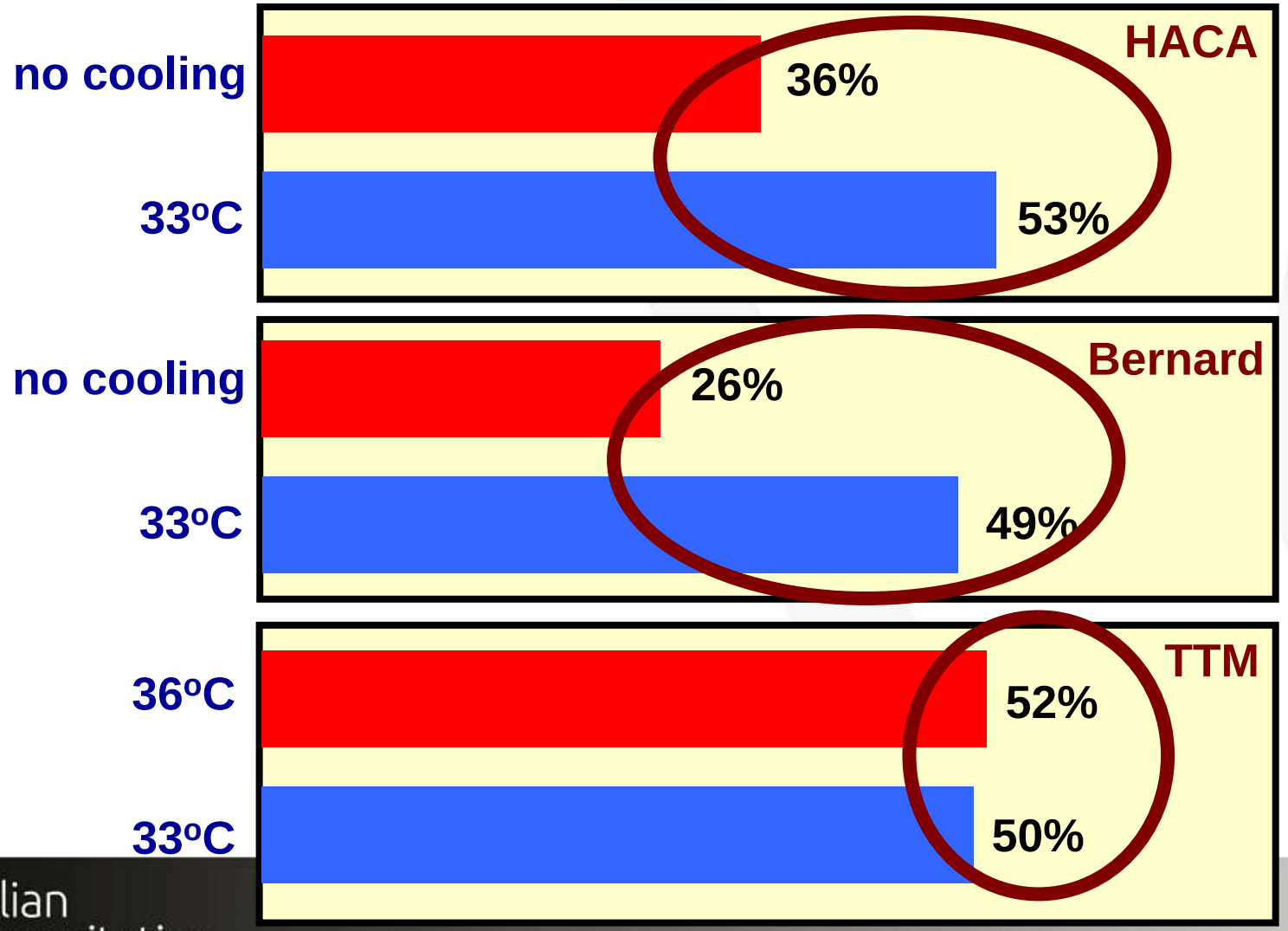
Cordiali saluti,

Dr. Tommaso Pellis
Direttore SC Anestesia e Rianimazione 1
Direttore ad interim SC Anestesia e Rianimazione 2
Direttore Dipartimento Emergenza e Cure Intensive
AS Friuli Occidentale


No thanks!
We are too busy

400
200
0
Bernard
HACA
Hyperion
TTM
TTM2

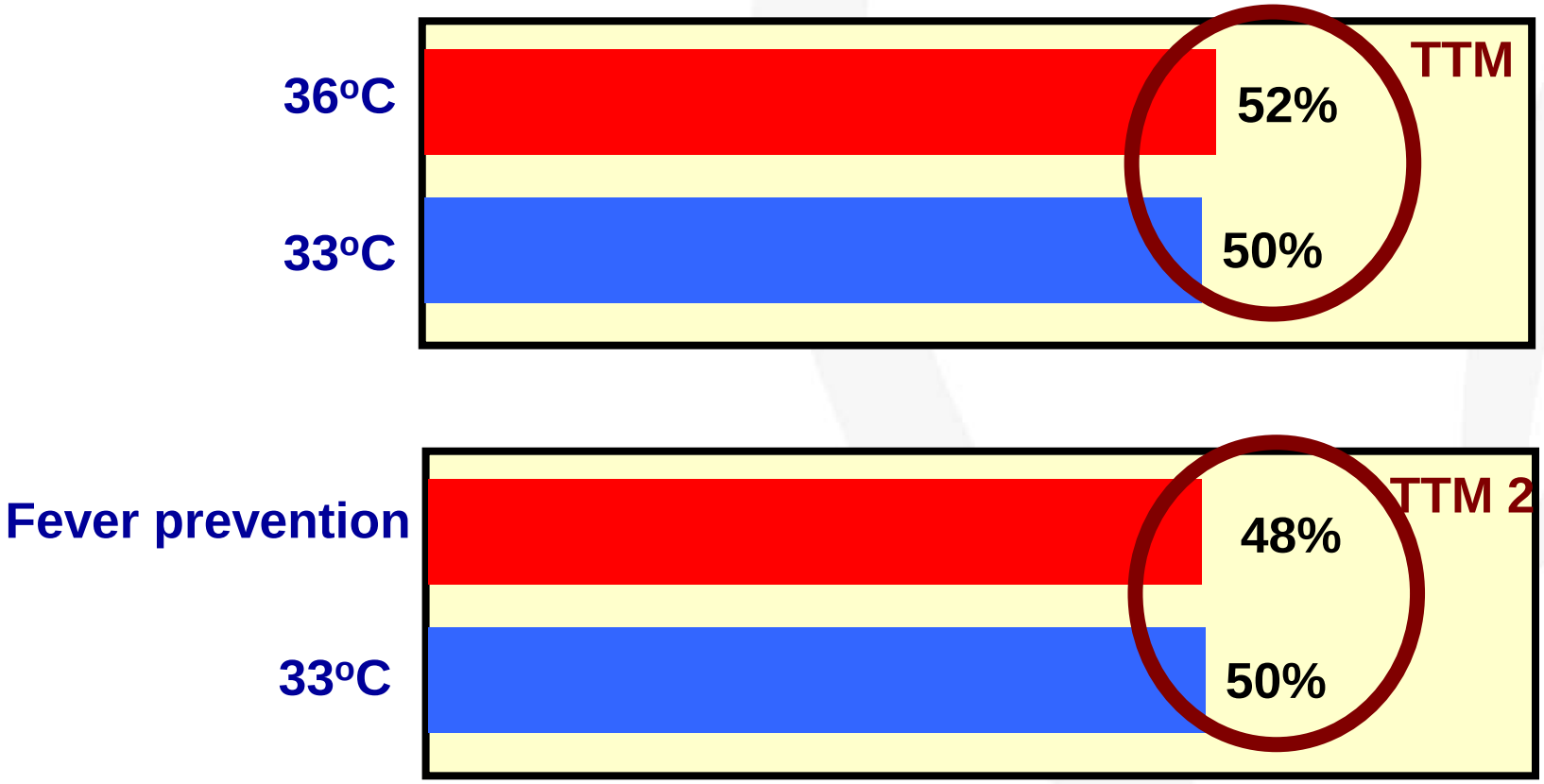
Making sense of the post-arrest trials



How can this be?

Courtesy of B. Abella

Making sense of the post-arrest trials



Consensus on Science with Treatment Recommendations (CoSTR)

SR

Temperature Management in Adult Cardiac Arrest: Advanced Life Support Systematic Review

SEE DRAFT FOR PUBLIC COMMENT

ILCOR staff

Created: August 30, 2021 · Updated: August 31, 2021

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Title | Publicatior

TIME RANGE

Treatment Recommendations

- We suggest actively preventing fever by targeting a temperature ≤37.5 for those patients who remain comatose after ROSC from cardiac arrest
  - weak recommendation, low certainty evidence

- Whether subpopulations of cardiac arrest patients may benefit from targeting hypothermia at 32-34^{o}C remains uncertain.

Treatment Recommendations

- We suggest surface or endovascular temperature control techniques when temperature control is used in comatose patients after ROSC
  - weak recommendation, low certainty of evidence

- When a cooling device is used, we suggest using a temperature control device that includes a feedback system based on continuous temperature monitoring to maintain the target temperature
  - good practice statement

Treatment Recommendations

- We suggest active prevention of fever for at least 72 hours in post-cardiac arrest patients who remain comatose
  - good practice statement

Justification and evidence to decision framework highlights

- All members of the Task Force agreed that we should **continue to recommend active temperature control** in post-cardiac arrest patients, although the evidence for this is limited.

- There are concerns that poor implementation of temperature control may lead to patient harm

Justification and evidence to decision framework highlights

- There was discussion about the definitions of normothermia and fever.

- Among a diverse cohort of 35,488 hospital patients the 99% range for normal temperature was 35.3-37.7°C, and 95% range was 35.7 to 37.3°C

- The comparison between 33 v 36 C was included in a sensitivity analysis of 33 C v normothermia/fever prevention, **as 36 C falls within the normothermia temperature range** – this did not change the point estimates in favor of either group

Definizioni di strategie di controllo della temperatura

- Il termine TTM di per sé non è di aiuto
- Per essere più chiari vengono proposti:
  - Hypothermic Temprature Control: controllo attivo della temperatura con target di temperatura sotto il range di normalità
  - Normothermic Temprature Control: controllo attivo della temperatura con target di temperatura nel range di normalià
  - Fever Prevention Temperature Control: monitoraggio della temperatura e prevenzione attiva, nonché il trattamento attivo di temperature al disopra della norma.
  - No Temperature Control: nessuna strategia protocollata di trattamento attivo della temperatura

Ipotermia vs normotermia o prevenzione della febbre

- La maggioranza della Task Force si è espressa in favore della prevenzione della febbre invece che dell'ipotermia:
  - L'evidenza a supporto di revisioni sistematiche
  - Tale strategia richiede meno risorse
  - Minori effetti collaterali dell'ipotermia

- Nel TTM2 nel gruppo normotermia/prevenzione della febbre si è fatto ricorso a:
  - Per mantenere T ≤ 37.5: paracetamolo, scoprire il paziente, ridurre la temperatura ambientale
  - Un presidio per il controllo della temperatura se questa diveniva ≥ 37.7°C
  - Il presidio è stato usato nel 46% dei pazienti
  - La temperatura impostata era di 37.5 °C

ARTICLE IN PRESS

RESUSCITATION xxx (2022) xxx

Available online at ScienceDirect

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

ERC-ESICM guidelines on temperature control after cardiac arrest in adults ☆

Jerry P. Nolan[a,b,1,*], Claudio Sandroni[c,d,1], Lars W. Andersen[e,f,g], Bernd W. Böttiger[h], Alain Cariou[i], Tobias Cronberg[j], Hans Friberg[k], Cornelia Genbrugge[l,m], Gisela Lilja[j], Peter T. Morley[n], Nikolaos Nikolaou[o], Theresa M. Olasveengen[p], Markus B. Skrifvars[q], Fabio S. Taccone[r], Jasmeet Soar[s]

[a] University of Warwick, Warwick Medical School, Coventry CV4 7AL, UK

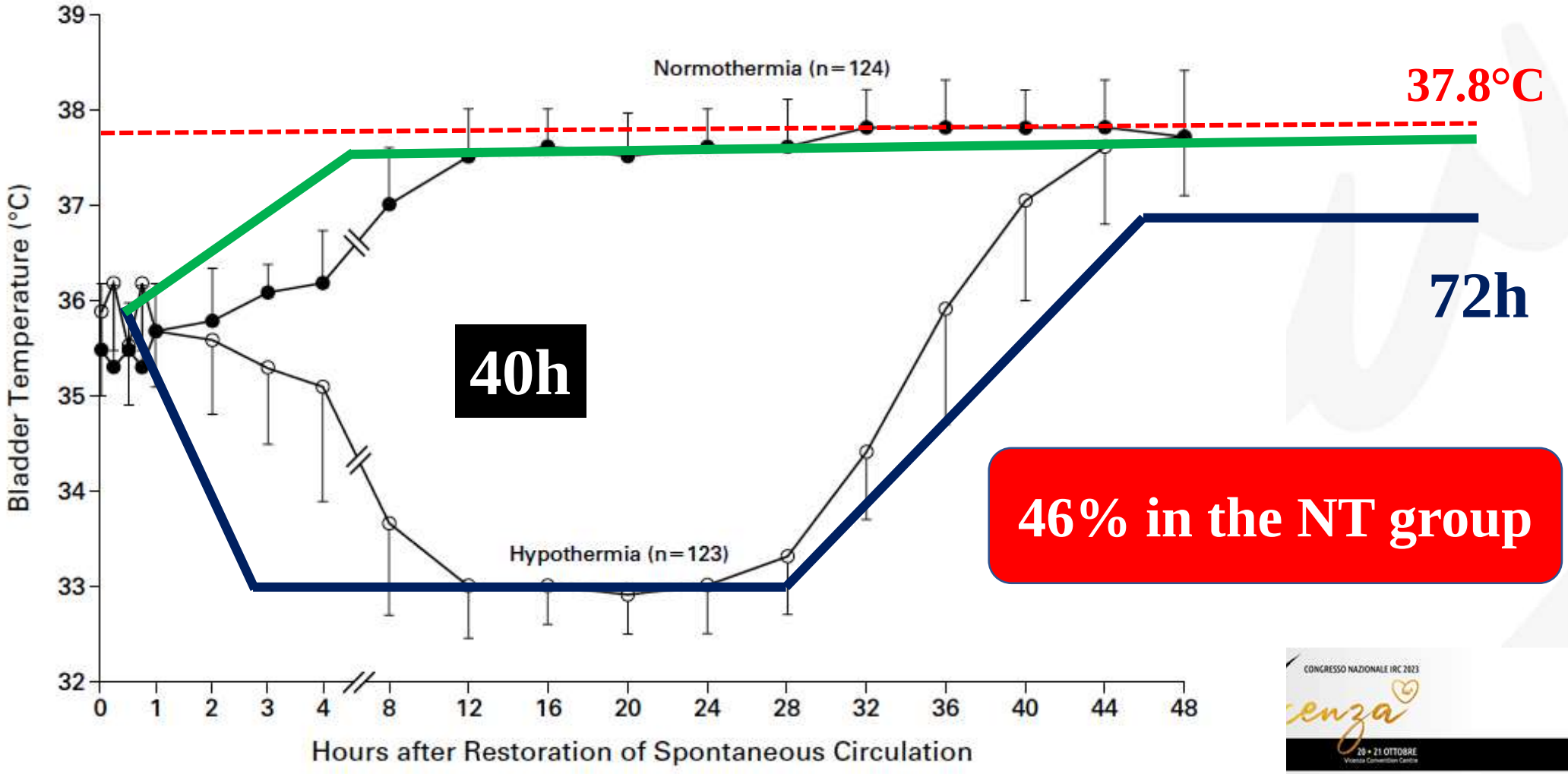
[b] Department of Anaesthesia and Intensive Care Medicine, Royal United Hospital, Bath BA1 3NG, UK

Table 2 – ERC-ESICM Recommendations for temperature control after cardiac arrest in adults.

We recommend continuous monitoring of core temperature in patients who remain comatose after ROSC from cardiac arrest (good practice statement).
We recommend actively preventing fever (defined as a temperature > 37.7 °C) in post-cardiac arrest patients who remain comatose (weak recommendation, low-certainty evidence).
We recommend actively preventing fever for at least 72 hours in post-cardiac arrest patients who remain comatose (good practice statement).
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 statement).
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 (good practice statement).
We recommend not using prehospital cooling with rapid infusion of large volumes of cold IV fluid immediately after ROSC (strong recommendation; moderate certainty evidence).


GRILLADES
ses SANDWICHS
Ouvert Jour

Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest



37.8°C

72h

40h

46% in the NT group

American Journal of Emergency Medicine 50 (2021) 202–206

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Passive antipyretic therapy is not as effective as invasive hypothermia for maintaining normothermia after cardiac arrest

Talal S. Alnabelsi, MD [a,*], Sarah P. Faulkner, MD [b], Matthew Cook, MD [b], Kalen Freeman, PharmD [b], Julie Shelton, MD [a], Marc Paranzino, MD [a], Sethabhisha Nerusu, PhD [c], Susan S. Smyth, MD [a], Vedant A. Gupta, MD [a]

Dont loose momentum on high quality Post Resuscitation Care

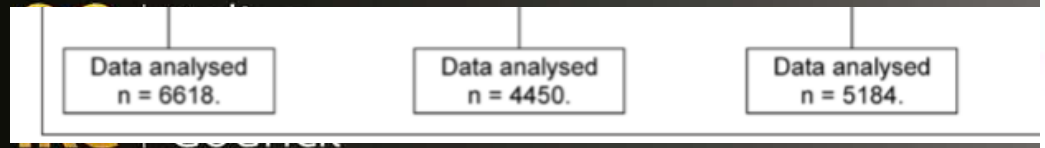
Changes in Temperature Management of Cardiac Arrest Patients Following Publication of the Target Temperature Management Trial

Ryan Salter, FANZCA[1]; Michael Bailey, PhD[2–4]; Rinaldo Bellomo, MD[2,3,5]; Glenn Eastwood, PhD[2,5]; Andrew Goodwin, BEng (Env)[6]; Niklas Nielsen, PhD[7,8]; David Pilcher, FCICM[2,9,10]; Alistair Nichol, PhD[2,9,11]; Manoj Saxena, PhD[12–14]; Yahya Shehabi, PhD[4,15]; Paul Young, PhD[1,16]; on behalf of the Australian and New Zealand Intensive Care Society Centre for Outcome and Resource Evaluation (ANZICS-CORE)

January 2014 until December 2016 (change in slope 1.9 percentage points per year [99% CI, −0.6 to 4.4]). Fever occurred in 568 (12.8%) of 4,450 pretarget temperature management trial patients and 853 (16.5%) of 5,184 posttarget temperature management trial patients (odds ratio, 1.35 [99% CI, 1.16–1.57]).

Conclusions: The average lowest temperature of postcardiac arrest patients in the first 24 hours in ICU rose after publication of the target temperature management trial. This change was associated with an increased frequency of fever not seen in the target temperature management trial. (*Crit Care Med* 2018; XX:00–00)

Key Words: cardiac arrest; implementation science; intensive care medicine; knowledge translation; therapeutic hypothermia



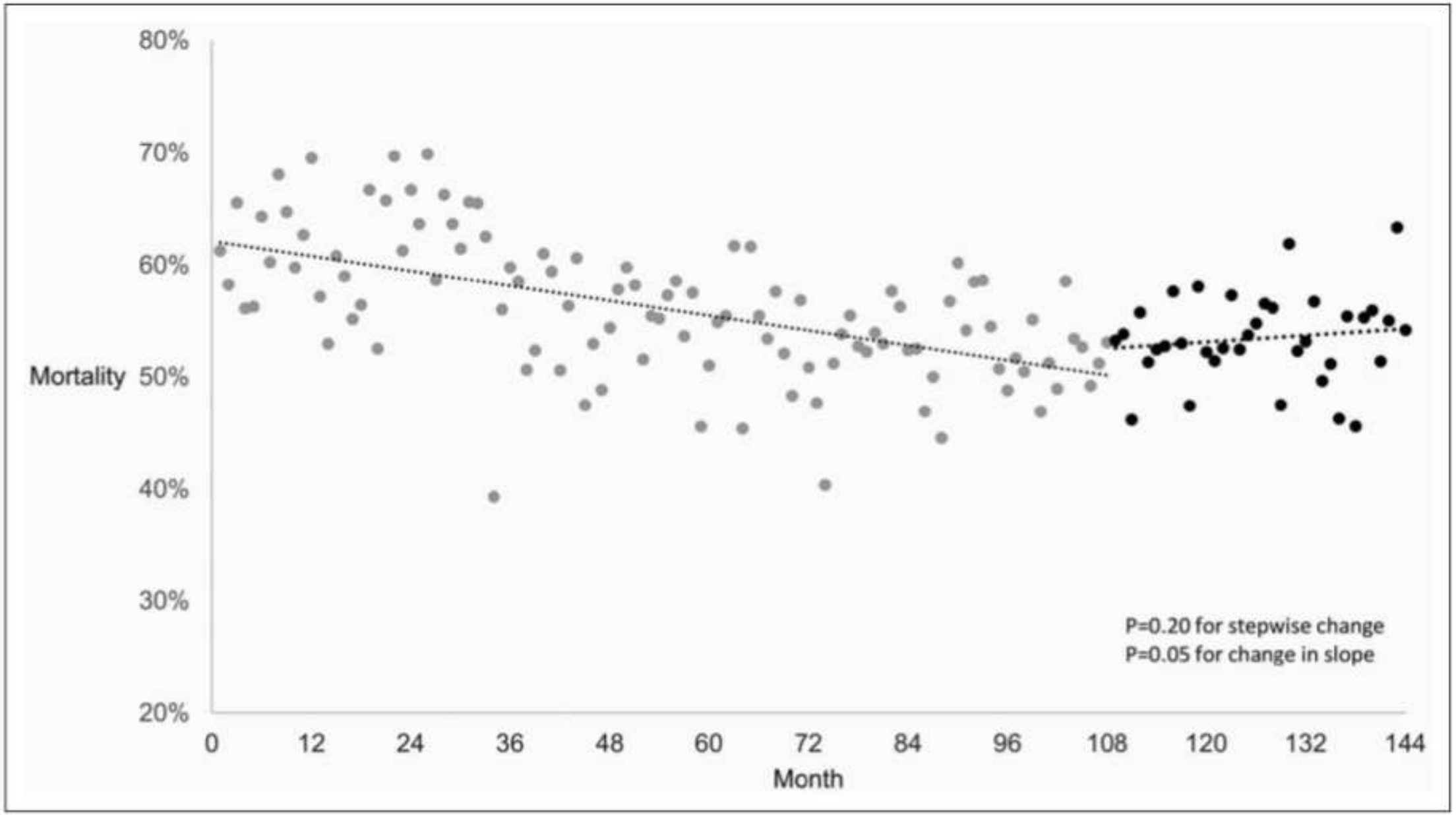


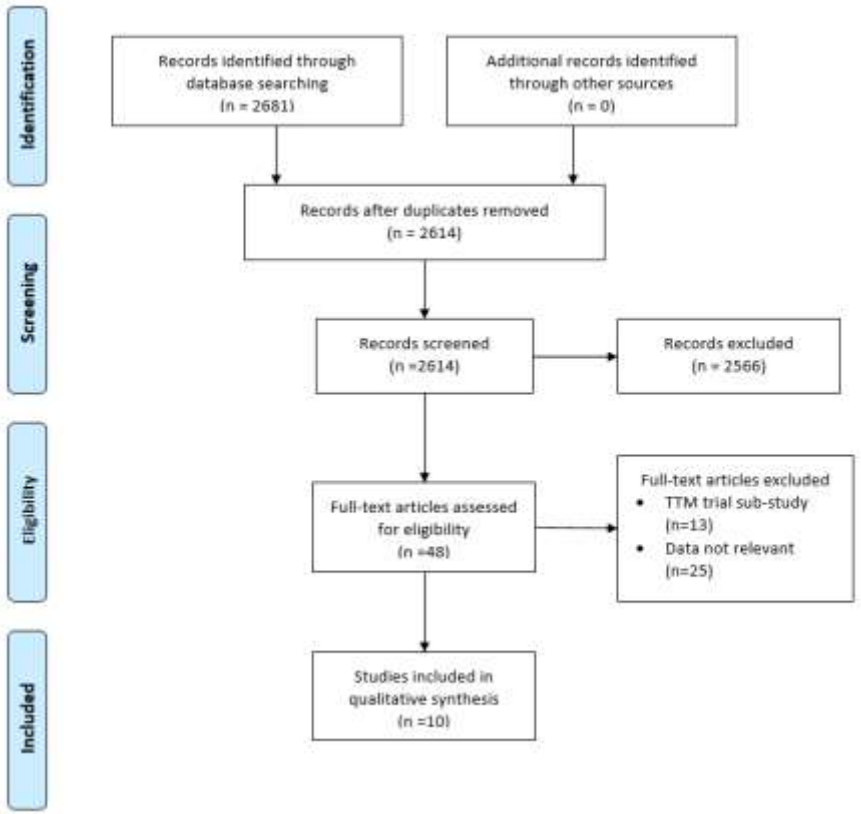
Figure 3. Inhospital mortality by month. The *gray dots* are for the months from January 2005 until December 2013 inclusive; the *black dots* are for the months from January 2014 until December 2016 inclusive. The targeted temperature management study was published online on November 17, 2013, and was published in print on December 5, 2013.

POOR TTM PROTOCOLS SHOULD BE AVOIDED

Review

Which Target Temperature for Post-Anoxic Brain Injury? A Systematic Review from "Real Life" Studies

Andrea Minini, Filippo Annoni, Lorenzo Peluso, Elisa Go and Fabio Silvio Taccone *



Study or Subgroup	Low TTM Events	Low TTM Total	High TTM Events	High TTM Total	Weight	Odds Ratio M-H, Random, 95% CI
1.3.1 Poor Neurological Outcome						
Bray et al. [13]	7	24	23	52	1.2%	0.52 [0.18, 1.46]
Callaway et al [20]	685	728	554	591	6.0%	1.06 [0.68, 1.67]
Cragun et al. [21]	10	14	9	18	0.6%	2.50 [0.57, 11.01]
Düggelin et al. [22]	30	57	30	55	2.2%	0.93 [0.44, 1.95]
Johnson et al. [23]	155	258	137	195	7.9%	0.64 [0.43, 0.95]
Johnsson et al. [24]	853	1242	333	468	22.8%	0.89 [0.70, 1.12]
Kleissner et al. [25]	50	116	26	59	3.1%	0.96 [0.51, 1.81]
Okazaki et al. [26]	180	319	73	116	6.5%	0.76 [0.49, 1.18]
Subtotal (95% CI)		**2758**		**1554**	**50.3%**	**0.85 [0.73, 0.99]**
Total events	1970		1185			
Heterogeneity: Tau² = 0.00; Chi² = 6.46, df = 7 (P = 0.49); I² = 0%						
Test for overall effect: Z = 2.03 (P = 0.04)						
1.3.2 Poor Neurological Outcome CPC 3-5						
Bray et al. [13]	7	24	23	52	1.2%	0.52 [0.18, 1.46]
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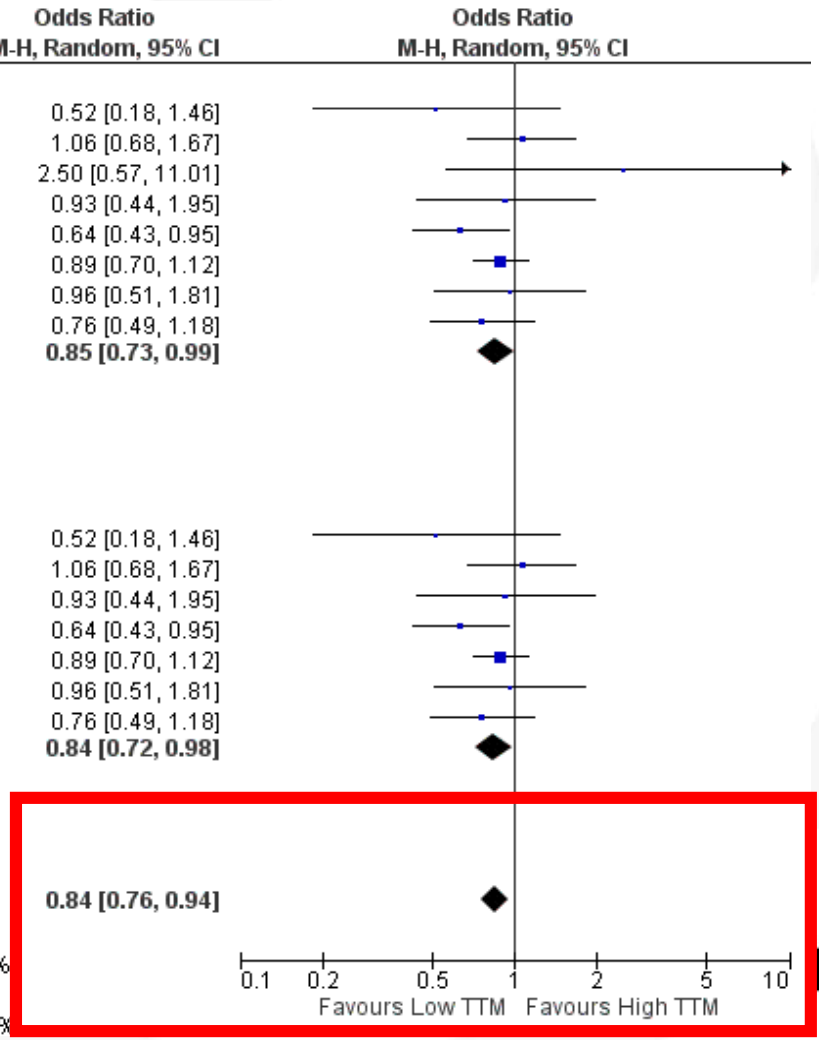
Okazaki et al. [26]	180	319	73	116	6.5%	0.76 [0.49, 1.18]
Subtotal (95% CI)		**2744**		**1536**	**49.7%**	**0.84 [0.72, 0.98]**
Total events	1960		1176			
Heterogeneity: Tau² = 0.00; Chi² = 4.40, df = 6 (P = 0.62); I² = 0%						
Test for overall effect: Z = 2.17 (P = 0.03)						
Total (95% CI)		**5502**		**3090**	**100.0%**	**0.84 [0.76, 0.94]**
Total events	3930		2361			
Heterogeneity: Tau² = 0.00; Chi² = 10.88, df = 14 (P = 0.70); I² = 0%						
Test for overall effect: Z = 2.97 (P = 0.003)						
Test for subgroup differences: Chi² = 0.01, df = 1 (P = 0.91), I² = 0%						



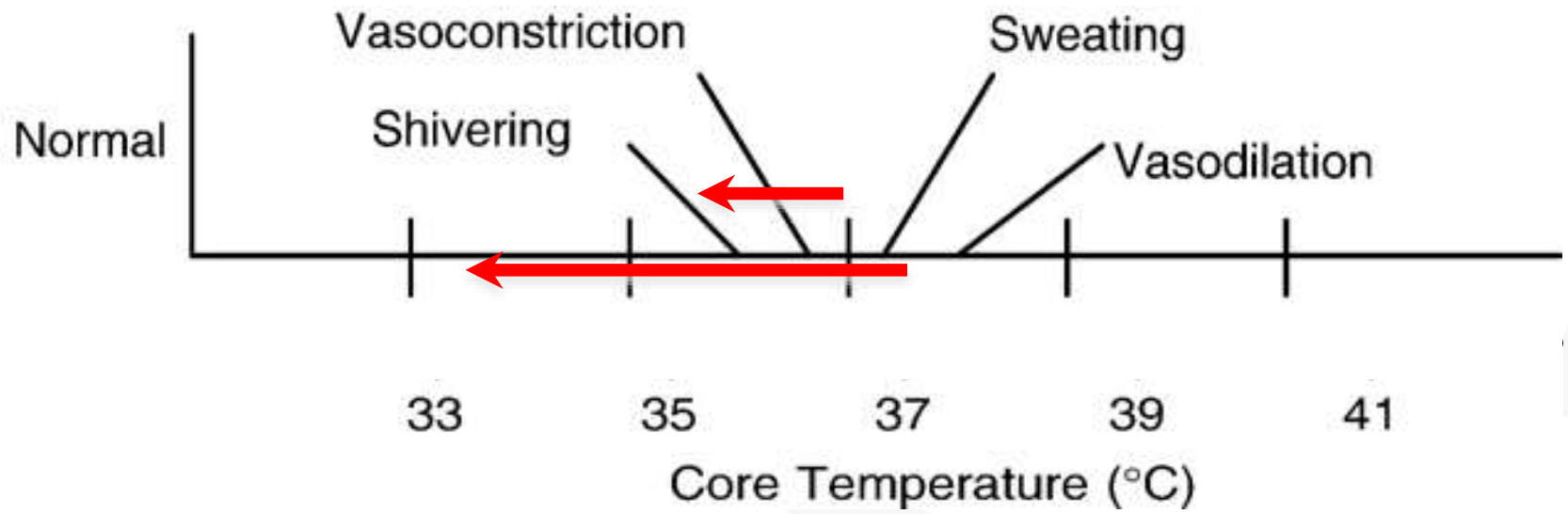
BRIVIDO

How to manage temperature after hypthermia?

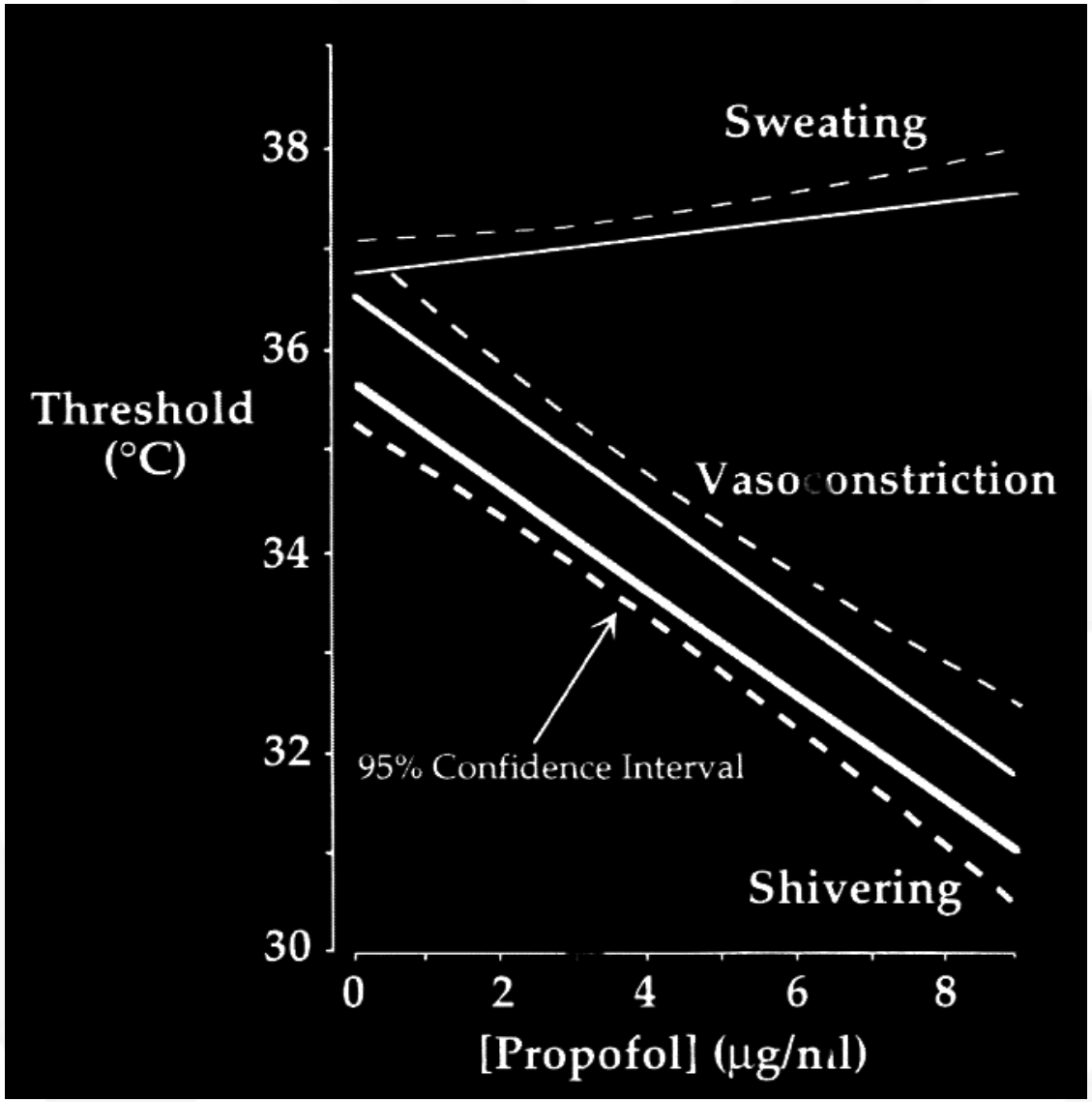
- Paracetamol
- Keep the device active
  - Limit lower water temperture (20-25ºC)
- Follow closely patient & device
  - Shivering?
  - Patient trend?
  - Keep an eye on water temperature…
- Antishivering protocols
  - Meperidine (bolus)
  - Magnesium (or in combination with buspirone, dexmedetom etc)
  - Counter warming
- Propofol & paralysis (only if necessary)


Paziente
Ipotermia
Sistema
Temperatura
36,6°c
Trend
Temp 2
36,5°c
°C/°F
Livello acqua
Temperatura acqua
24,4°c
Flusso
2,4 l/m
Buono
04:00
08:00
12:00
16:00
18.34
00
38°
36°
34°
32°
30°
°C
36°
28°
20°
12°
4°
°C
01-05-13
Raffreddare Paziente
Target
33.0°C
Durata
00 00
Ore: Min
Inizia
Regolazione
Riscaldare Paziente
Target
37.0°C
Durata
02 10
Ore: Min
Inizia
Regolazione
Stop
Aiuto

Drugs may widen the interthreshold range by lowering the vasoconstriction and shivering thresholds



- Propofol
  - markedly impairs the vasoconstriction and shivering thresholds
  - superior to thiopentone in the prevention of postanesthetic shivering



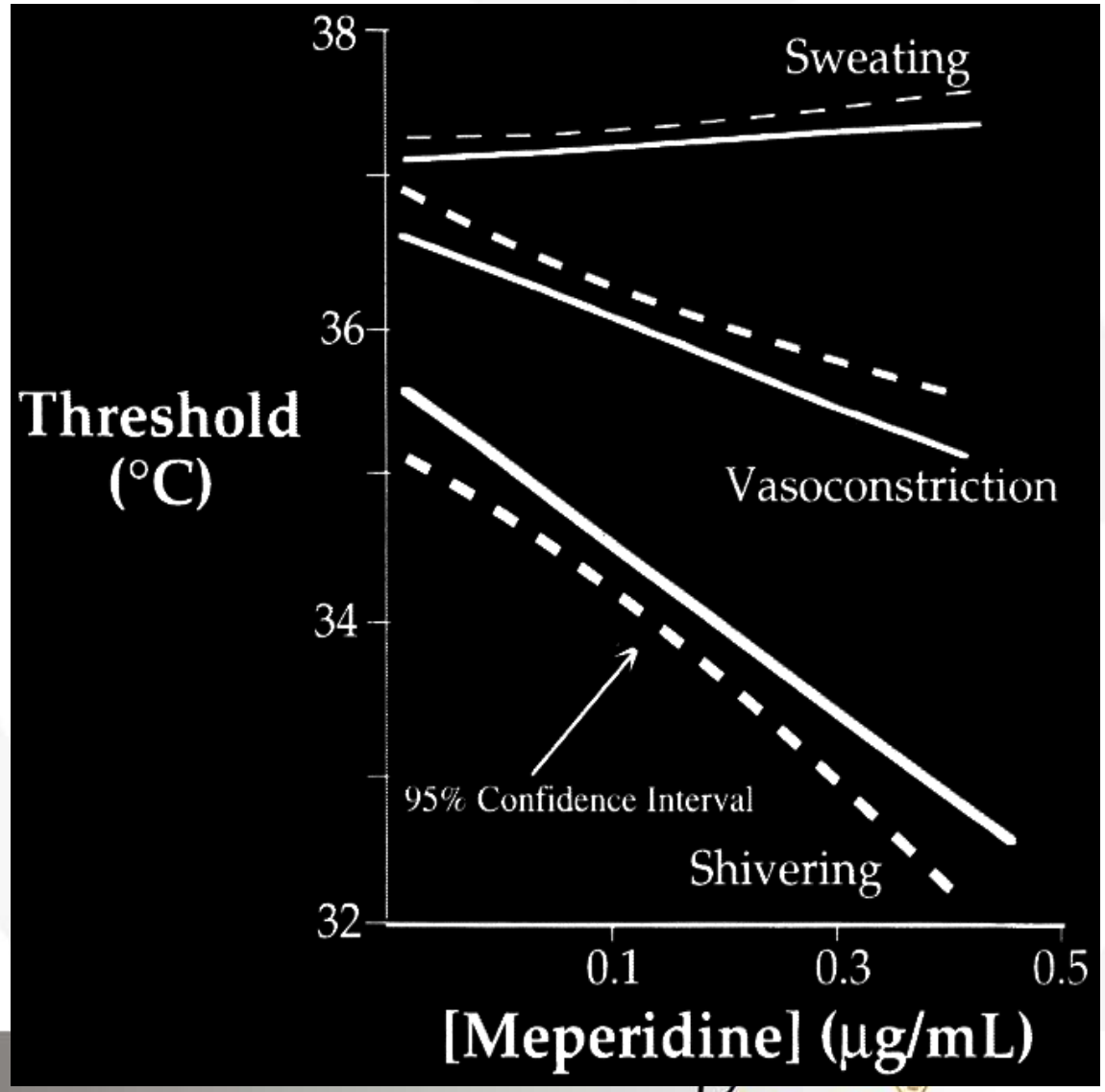
Matsukawa T. Propofol linearly reduces the vasoconstriction and shivering thresholds. Anesthesiology 1995;82(5):1169–80.

Singh A. A comparison of thiopentone and propofol with respect to the incidence of postoperative shivering. Anaesthesia 1994;49(11):996–8.

Cheong KF. Propofol and postanaesthetic shivering. Anaesthesia 1995;50(6):550–2.

Cheong KF. Postanaesthetic shivering — a comparison of thiopentone and propofol. Ann Acad Med Singapore 1998;27(6):

- Special antishivering effect
  - predominantly via κ-receptor
  - additional potential mechanisms
    - inhibitions of biogenic amine reuptake
    - NMDA receptor antagonism
    - α_2 adrenoreceptor stimulation
- Decreases shivering threshold twice as much as the vasoconstriction threshold



Kurz A. Meperidine decreases the shivering threshold twice as much as the vasoconstriction threshold. Anesthesiology 1997;86: 1046-54.

a_2 agonists: Clonidine & **Dexmedetomidine**

- α_2 agonists hyperpolarize neurons
  - suppress neuronal firing linked to thermosensitivity
- sedative with scarce respiratory depression
- ↓ vasoconstriction and shivering
- combo with meperidine addictive effect on shivering threshold

Talke P, AG et al. Dexmedetomidine and meperidine additively reduce the shivering threshold in humans. Stroke 2003;34(5):1218.

Shivering assesment scales

Table 1 | The Bedside Shivering Assessment Scale

Score	Shivering status	Description	Action
0	None	No shivering noted on palpation of the masseter, neck or chest wall	None needed
1	Mild	Shivering localized to the neck and/or thorax only	Monitor BSAS score closely
2	Moderate	Shivering involves gross movement of the upper extremities (in addition to neck and thorax)	Escalate anti-shivering intervention to maintain BSAS score ≤1
3	Severe	Shivering involves gross movements of the trunk and upper and lower extremities	Bolus sedation and escalate anti-shivering intervention to maintain BSAS score ≤1

The BSAS score is measured by palpating the temples and masseters, neck and shoulders, pectoralis muscles, biceps, and quadriceps. Abbreviation: BSAS, Bedside Shivering Assessment Scale. Adapted from Badjatia, N. *et al.* Metabolic impact of shivering during therapeutic temperature modulation: the Bedside Shivering Assessment Scale. *Stroke* **39**, 3242–3247 (2008).

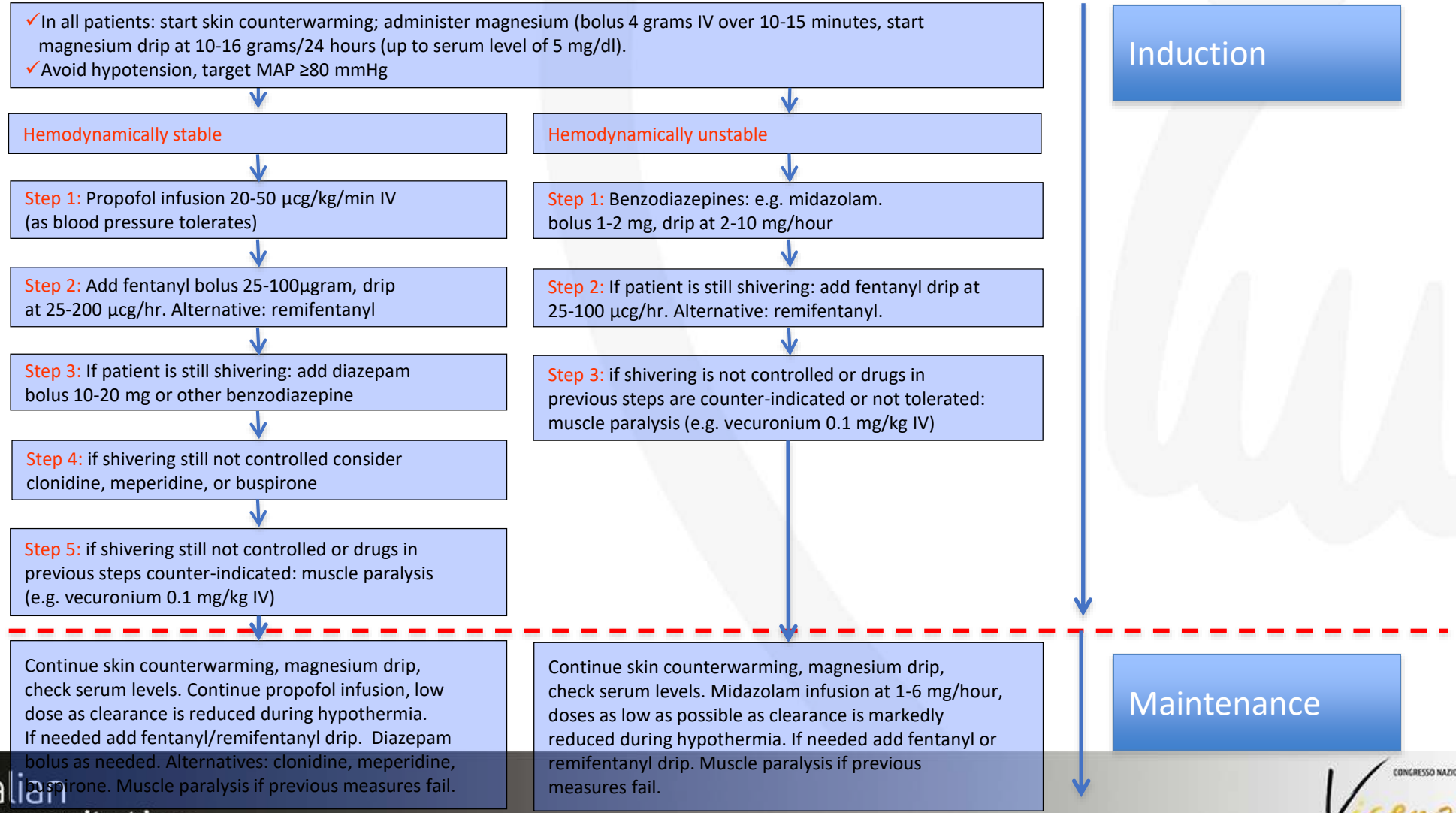
Anti-Shivering Treatment Protocol

Table 2 | The Columbia Anti-Shivering Protocol

Step	Level of sedation	Intervention for shivering	Dosage
0	None	Acetaminophen Busiprone Magnesium sulphate Skin counterwarming	650–1000 mg every 4–6 h 30 mg every 8 h 0.5–1 mg/h i.v. (goal: 3–4 mg/dl) Maximum temperature 43 °C
1	Mild	Dexmedetomidine	0.2–1.5 μg/kg/h
2	Moderate	Opioids	Fentanyl, starting dose: 25 μg/h Meperidine 50–100 mg i.m. or i.v.
3	Deep	Propofol	50–75 μg/kg/min
4	Neuromuscular blockade	Vecuronium	0.1 mg/kg i.v.

Abbreviations: i.v., intravenously; i.m., intramuscularly. Adapted from Choi, H. A. *et al.* Prevention of shivering during therapeutic temperature modulation: the Columbia Anti-Shivering Protocol. *Neurocrit. Care* **14**, 389–394 (2011).

Shivering control - Pittsburg



Prevention/treatment of fever

- Prophylactic use of paracetamol 1g every 6 h
- Maintain pads & device on (37ºC)

- If shivering:
  1. Meperidine: 50-100 mg IV bolus
  2. Magnesium: 2-4 g bolus (over 15 min)
     - Infusion 16g/24h
     - Maintain < 5 mg/dl (patellar relfex)
     - Monitor ionized Ca^{++}
     - Caution if AKI
  3. Resume sedation (dexemedetomidine)
  4. Limit lower water temperature (20-25ºC)
  5. Consider counter warming
  6. Paralysis (spot and only if necessary)

American Clinical Neurophysiology Society (ACNS) terminology

Per uso in terapia intensiva

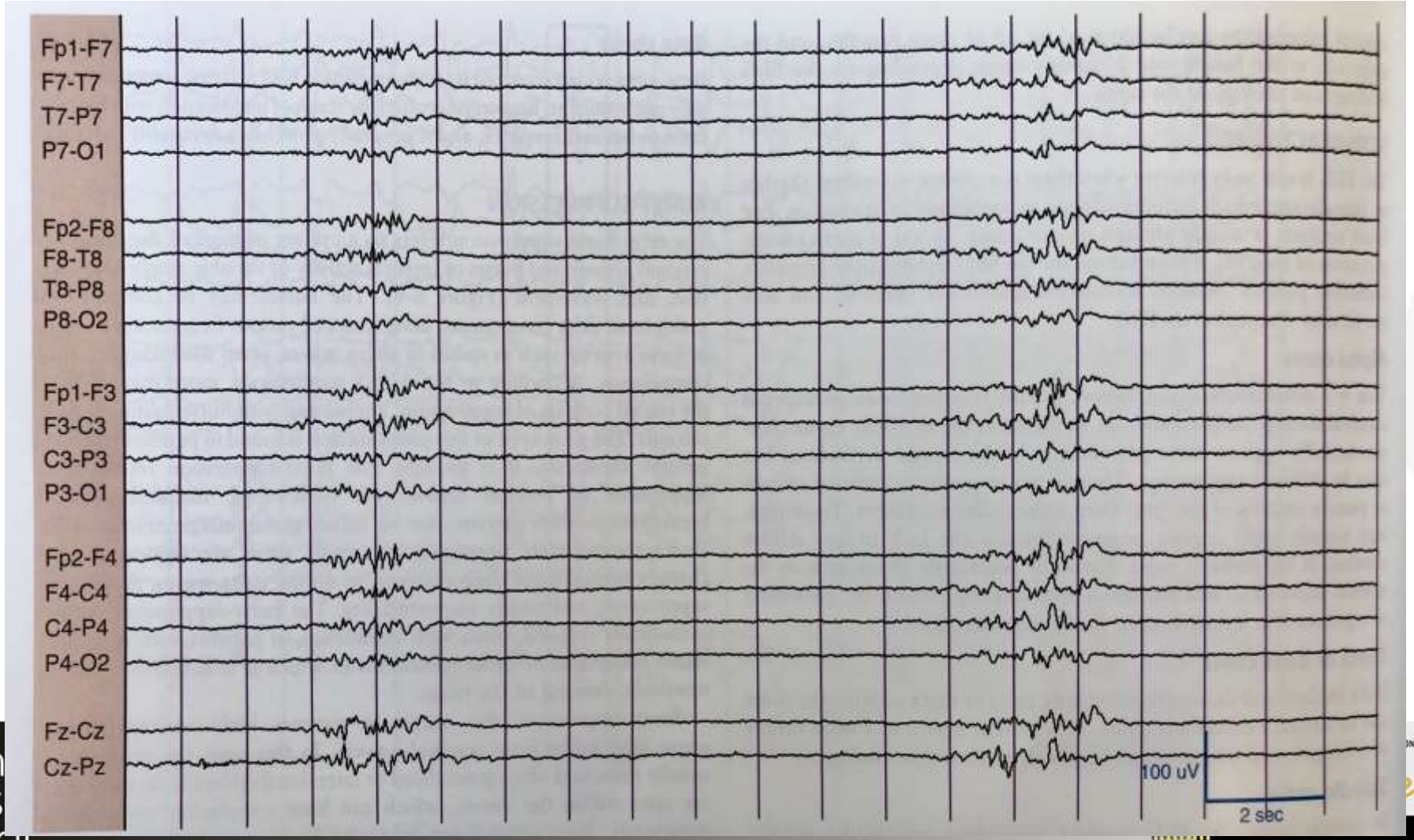
Definizioni standardizzate:

- Voltaggio
- Burst-suppression
- Attività epilettica

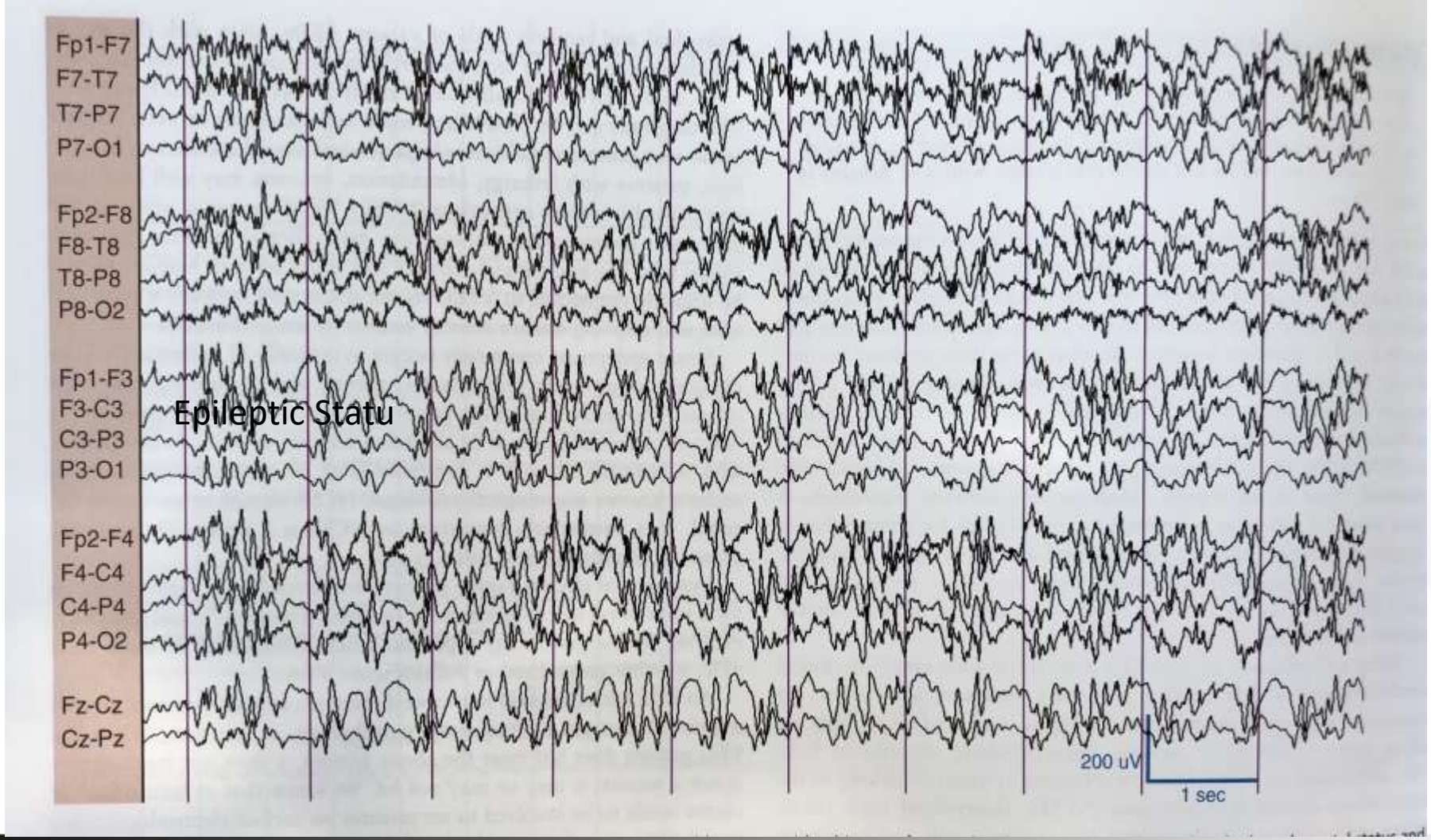
Italian Resuscitation Council

Hirsch et al., J Clin Neurophysiol 2013; 30:1-27

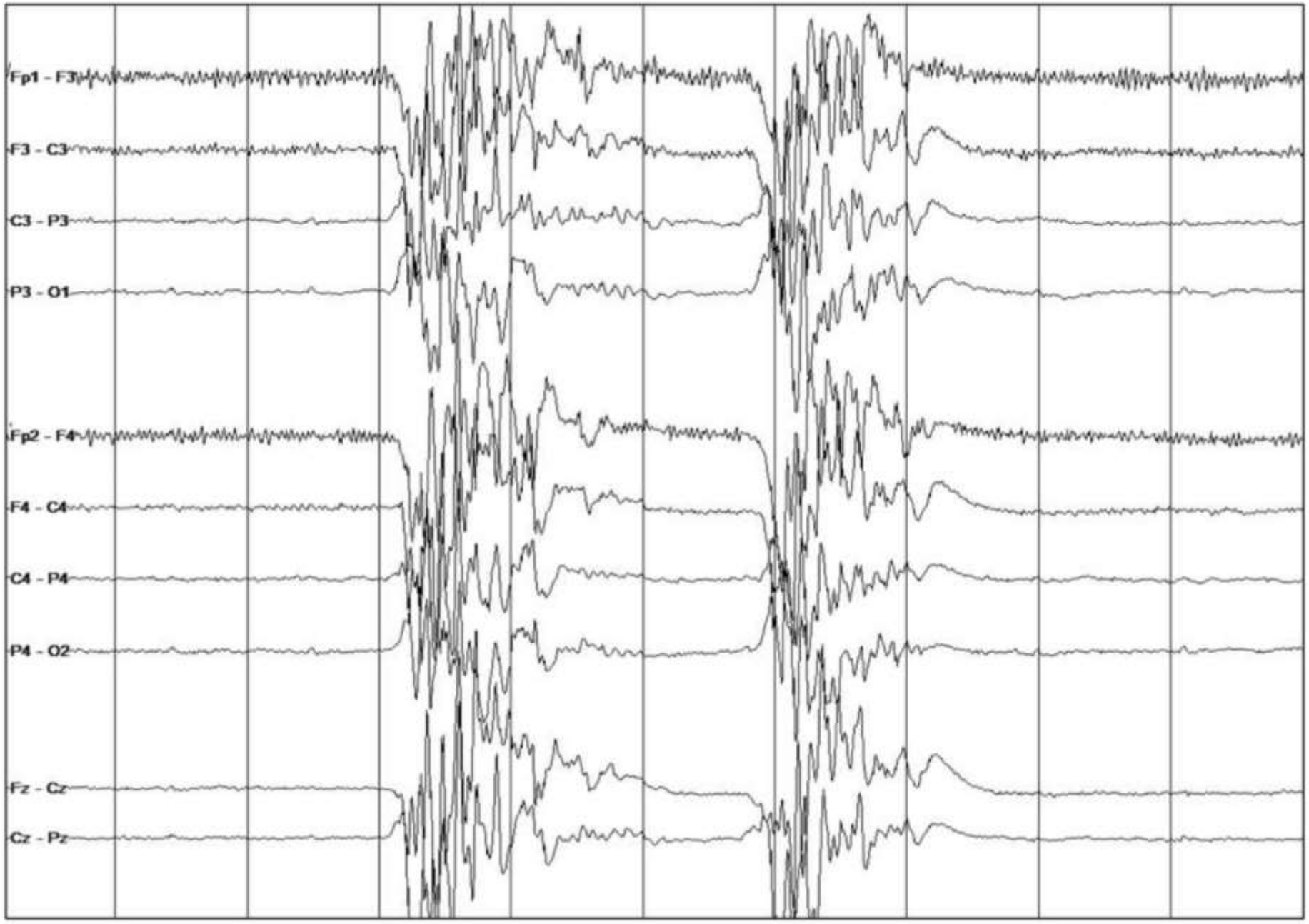
Burst Suppression

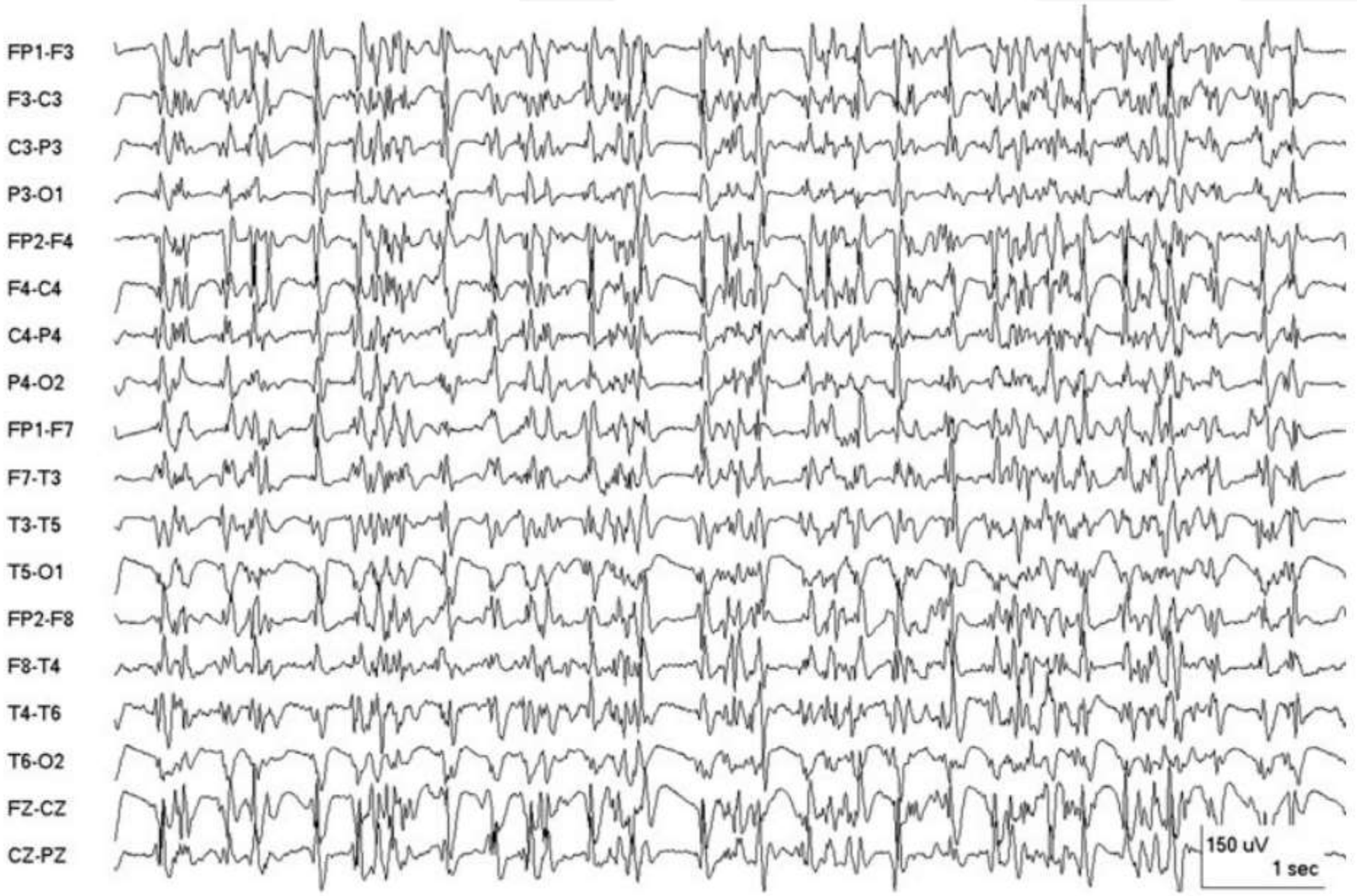


Epileptic Status

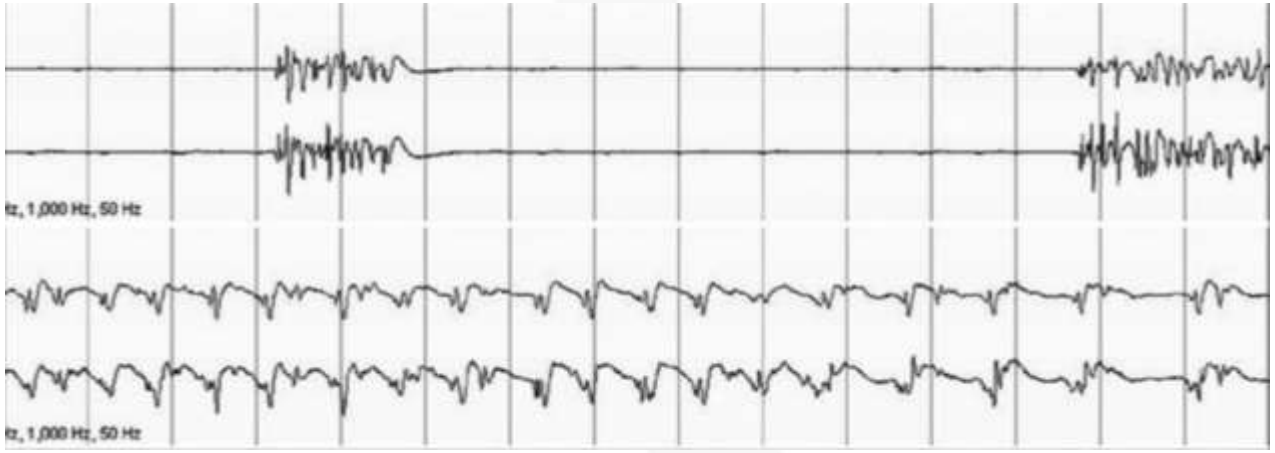


Epileptic Statu


Fp1 - F3
F3 - C3
C3 - P3
P3 - O1
Fp2 - F4
F4 - C4
C4 - P4
P4 - O2
Fz - Cz
Cz - Pz

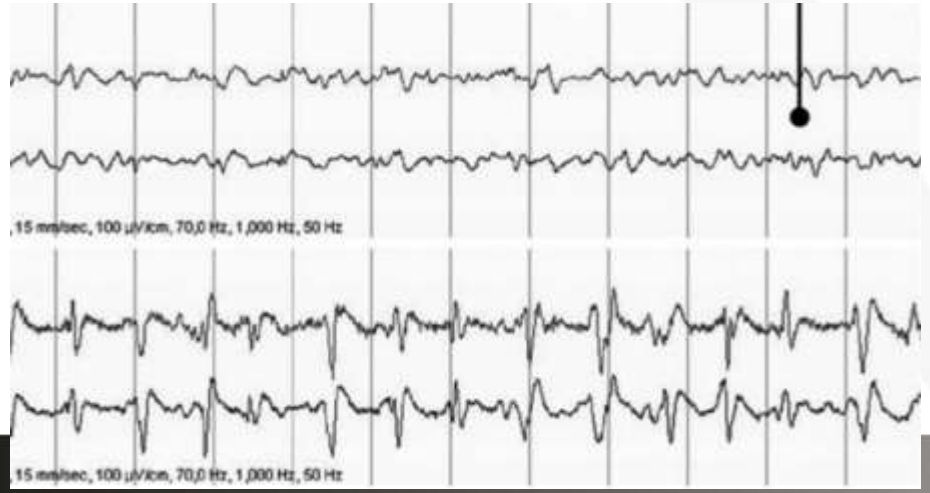

FP1-F3
F3-C3
C3-P3
P3-O1
FP2-F4
F4-C4
C4-P4
P4-O2
FP1-F7
F7-T3
T3-T5
T5-O1
FP2-F8
F8-T4
T4-T6
T6-O2
FZ-CZ
CZ-PZ
150 uV
1 sec

Importanza del background



SE da BS

0% risveglio



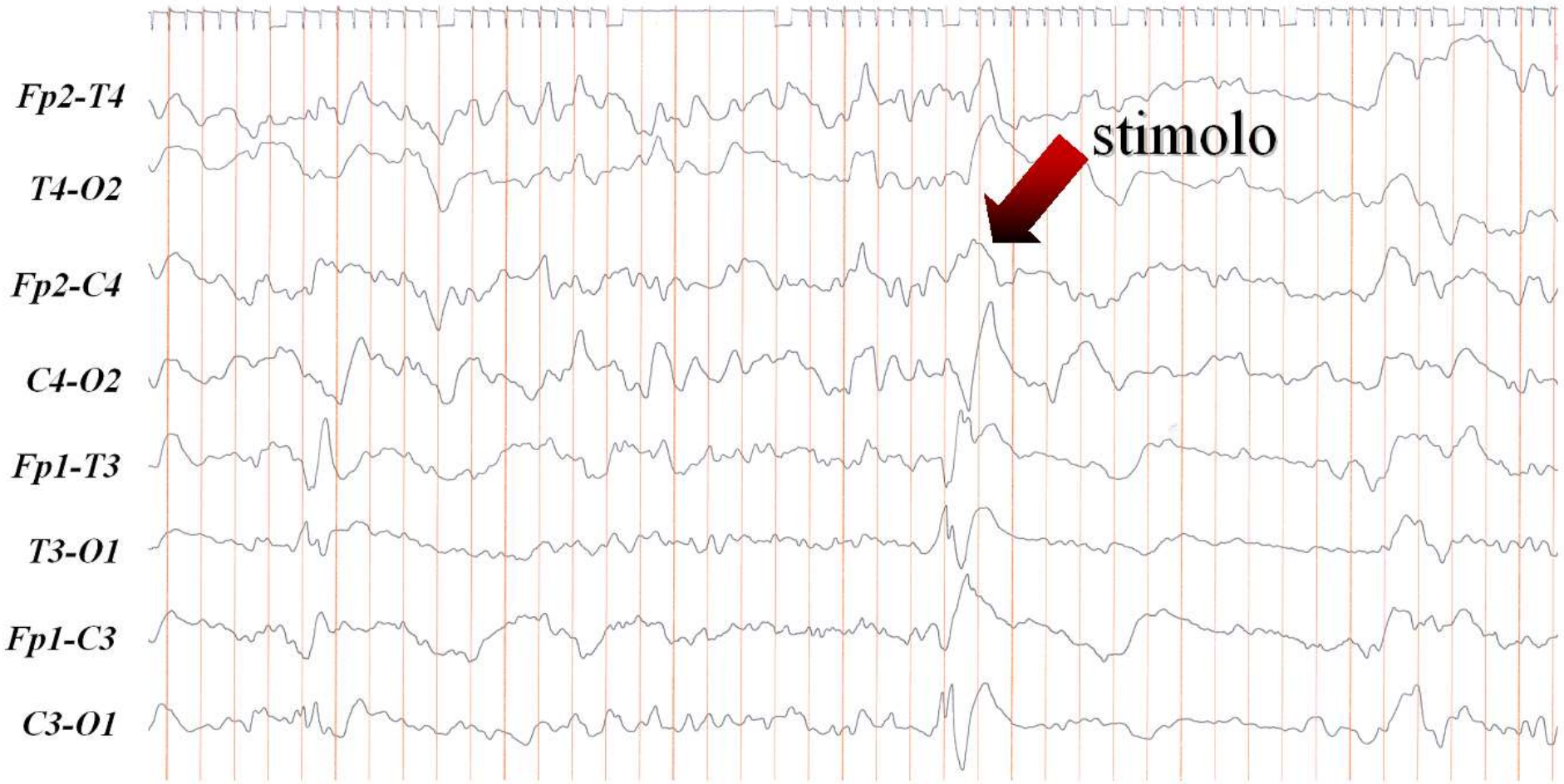
SE da EEG continuo

20% risveglio

Rundgr...

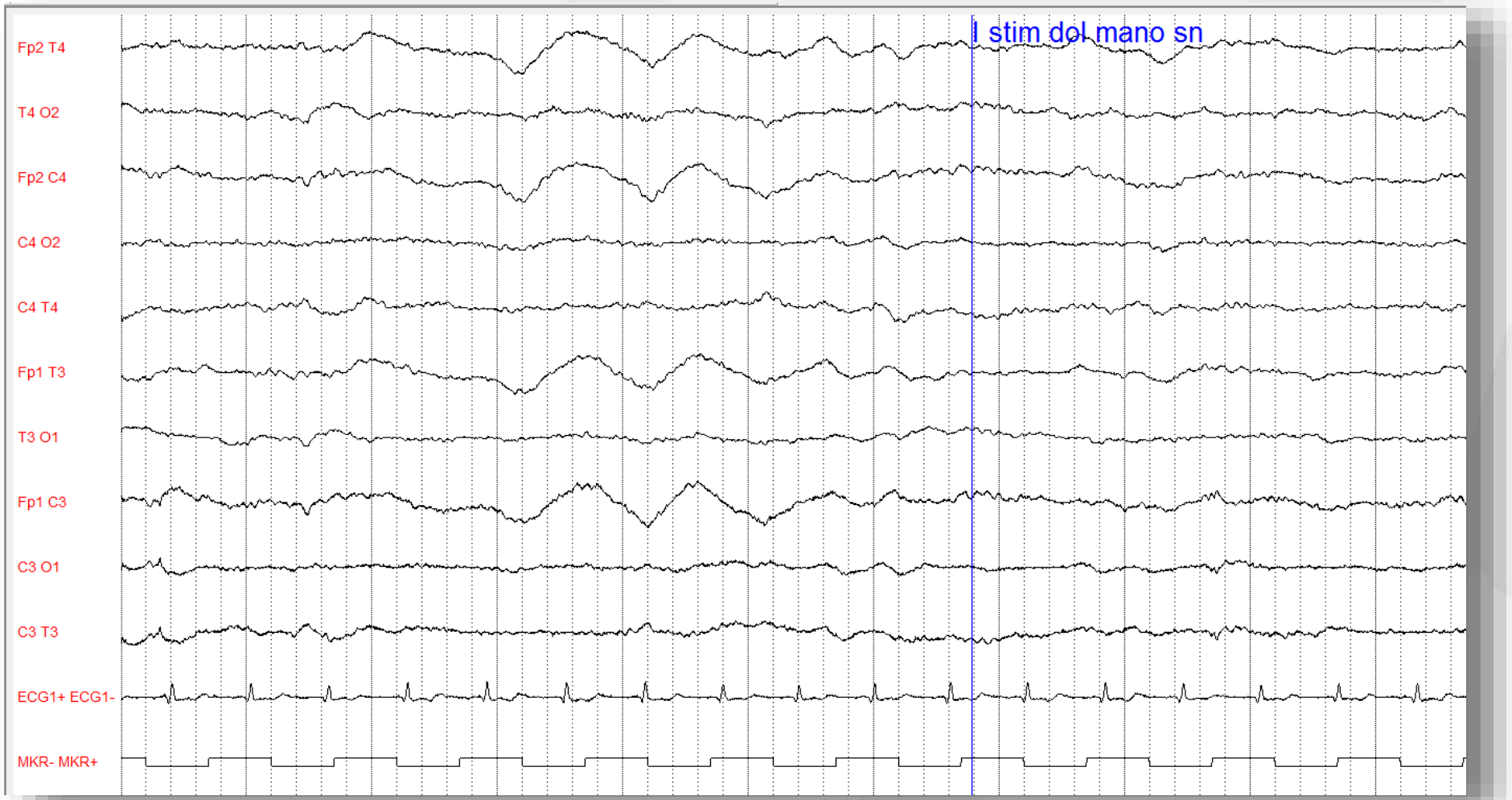
Rujiter B, Eoilepsia 2015

Reattività EEG



Cambiamento di ampiezza e/o frequenza dopo stimolazione

56h after CA


I stim dol mano sn
Fp2 T4
T4 O2
Fp2 C4
C4 O2
C4 T4
Fp1 T3
T3 O1
Fp1 C3
C3 O1
C3 T3
ECG1+ ECG1-
MKR- MKR+

Epilessia

- Si verifica nel 20-30% pazienti
- Espressione di insulto ipossico-ischemico severo
- Può associarsi a manifestazioni motorie ma più spesso solo EEG
  - Epilessia non convulsivante
  - Spesso più che episodi sono uno stato di male (continuo > 30 min)

- Raccomandazioni:
  - No profilassi
    - weak recommendation, very low certainty evidence.
  - Trattare l'epilessia
    - weak recommendation, very low certainty evidence.

Farmaci

- Propofol e BDZ, ma anche dexmedetomidina e ketamina
  - Sopprimono sia attività clinica che EEG (fase anestesiologica – target SR 75%)

- Antiepilettici:
  - Scarsa evidenza
  - Levetiracetam, valproato e fenitoina (meno maneggevole in TI)
  - Richiede EEG in continuo (e/o averaged/semplificato)
  - Spesso necessaria terapia multifarmacologica con variazioni dopo 48h di burst-suppression
  - Ritardato recupero neurologico in quel 20% circa che si riprende a distanza di qualche settimana
  - Background continuo e reattivo sono segnali positivi
  - La gestione di questa fase non può prescindere da un approfondimento degli elementi utili alla prognosi multimodale
  - Altri farmaci includono topiramato, lacosamide, e perampanel.

Mioclono

- Contrazioni muscolari brevi, improvvise, involontarie (twitch o shock like contractions)
- Sono la manifestazione motoria più frequente in TI
- Spesso generalizzate ma possono essere focali o multifocali
  - Apertura occhi periodica
  - Deglutizione
  - Contrazioni diaframmatiche
- Da ‘subtle’ a intense e generalizzate
- Inducibili

Mioclono

- La comparsa precoce è indicativa di prognosi infausta
- Possono avere una corrispondenza EEG corticale
- S. di Lance-Adams in chi riprende coscienza
  - Più comune dopo arresto asfittico
  - Interessa soprattutto gli arti
  - Indotto da movimento volontario o stimolazione

THANK YOU

Coffee break

Oltre le frontiere della formazione

F. Semeraro, A. Trevisan, M. Tumolo

16.30-16.50 La formazione Psicosociale: l'apprendimento all'interno delle organizzazioni *(S. Scelsi)*

16.50-17.10 L'epidemiologia della formazione: il database IRC uno strumento prezioso *(G. Stirparo)*

17.10-17.30 Do not stop CPR! Corsi base e avanzati negli Ospedali Emergency in Afghanistan nel 2023 *(C. Ruffini, M. Rossi)*

17.30-17.50 La cultura della rianimazione in contesti a basse risorse: la collaborazione tra IRC ed Emergency. Cosa abbiamo fatto e dove stiamo andando *(M. Cormio, S. Di Marco)*

17.50-18.30 Discussione

Workshop:

Post-ROSC

- *16.30-16.50* Algoritmo di gestione post-ROSC *(G. Ristagno)*
- *16.50-17.10* Fisiopatologia della sindrome post-arresto cardiaco *(A. Cucino)*
- *17.10-17.30* Trattamento delle cause reversibili
- *17.30-17.50* Ottimizzazione neurologica: temperatura, brivido e convulsioni *(T. Pellis)*
- *17.50-18.10* Prognosi del paziente rianimato da arresto cardiaco *(S. D'Arrigo)*
- *18.10-18.30* Fine vita e comunicazione *(L. Cabrini)*

Industry session

16.30-16.50 **PHILIPS**

The importance of the Association between Amplitude Spectrum Area and an Automated External Defibrillator Algorithm's Detection of Ventricular Fibrillation during Cardiopulmonary Resuscitation

16.50-17.10 **LAERDAL**

Poster session *(17.15-18.00)*