Neuroprotective Therapy Consensus Review (NTCR) Recommendations

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Neuroprotective Therapy Consensus Review

- Background/rationale
- Approach
- Process
- Recommendations

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Special Article

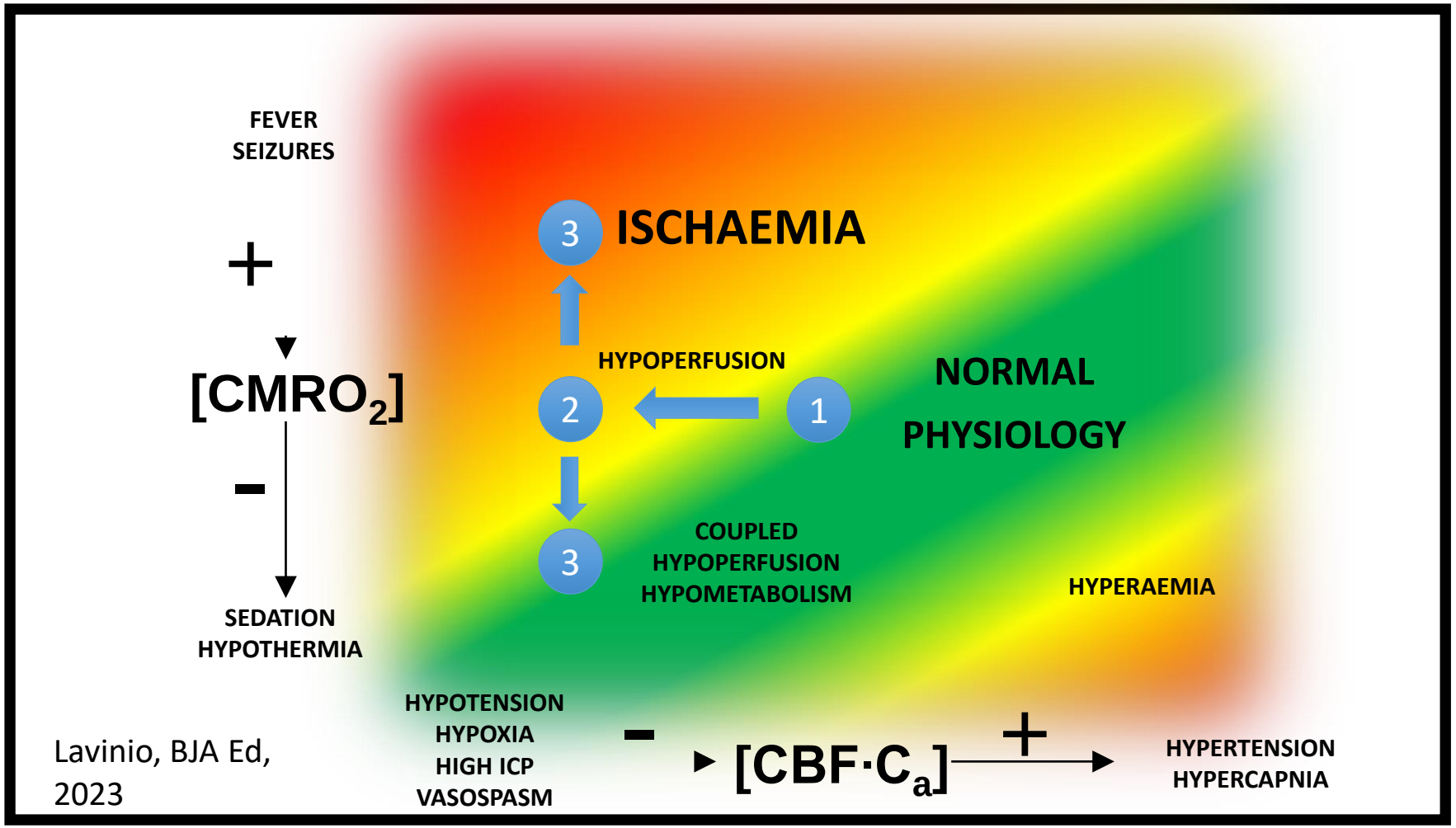
SPECIAL ARTICLE

Targeted temperature management in patients with intracerebral haemorrhage, subarachnoid haemorrhage, or acute ischaemic stroke: updated consensus guideline recommendations by the Neuroprotective Therapy Consensus Review (NTCR) group

Andrea Lavinio[1,*], John Andrzejowski[2], Ileana Antonopoulou[3], Jonathan Coles[1,4], Pierce Geoghegan[5], Kyle Gibson[6], Sandeep Gudibande[7], Carmen Lopez-Soto[8], Randeep Mullhi[9], Priya Nair[10], Vijai P. Pauliah[10], Aoife Quinn[1], Frank Rasulo[11], Andrew Ratcliffe[12], Ugan Reddy[6], Jonathan Rhodes[13], Chiara Robba[14], Matthew Wiles[2] and Ashleigh Williams[15]

Background

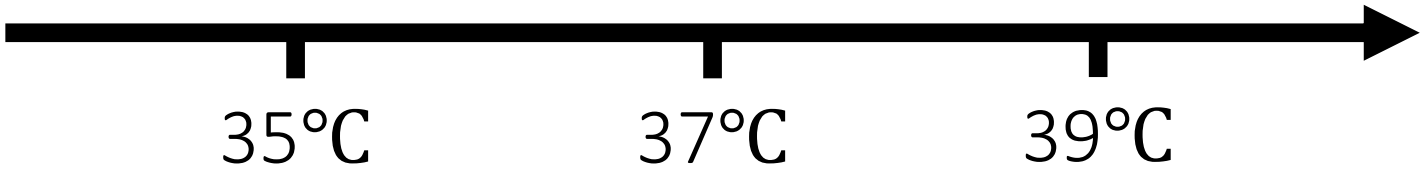
- Intracerebral haemorrhage, subarachnoid haemorrhage or acute ischaemic stroke
- Fever is common
- Worse outcomes
- Lack of evidence


FEVER
SEIZURES
+
[CMRO2]
-
SEDATION
HYPOTHERMIA
3
ISCHAEMIA
HYPOPERFUSION
2
1
NORMAL
PHYSIOLOGY
3
COUPLED
HYPOPERFUSION
HYPOMETABOLISM
HYPERAEMIA
HYPOTENSION
HYPOXIA
HIGH ICP
VASOSPASM
-
[CBF·Ca]
+
HYPERTENSION
HYPERCAPNIA
Lavinio, BJA Ed, 2023

TEMPERATURE MODULATES IMPORTANT PHYSIOLOGICAL PROCESSES: FROM IMMUNE RESPONSE TO CEREBRAL METABOLISM

- Reduced CMRO2
- **Reduced ICP**
- **Immunomodulation**

- Enhanced Immune response



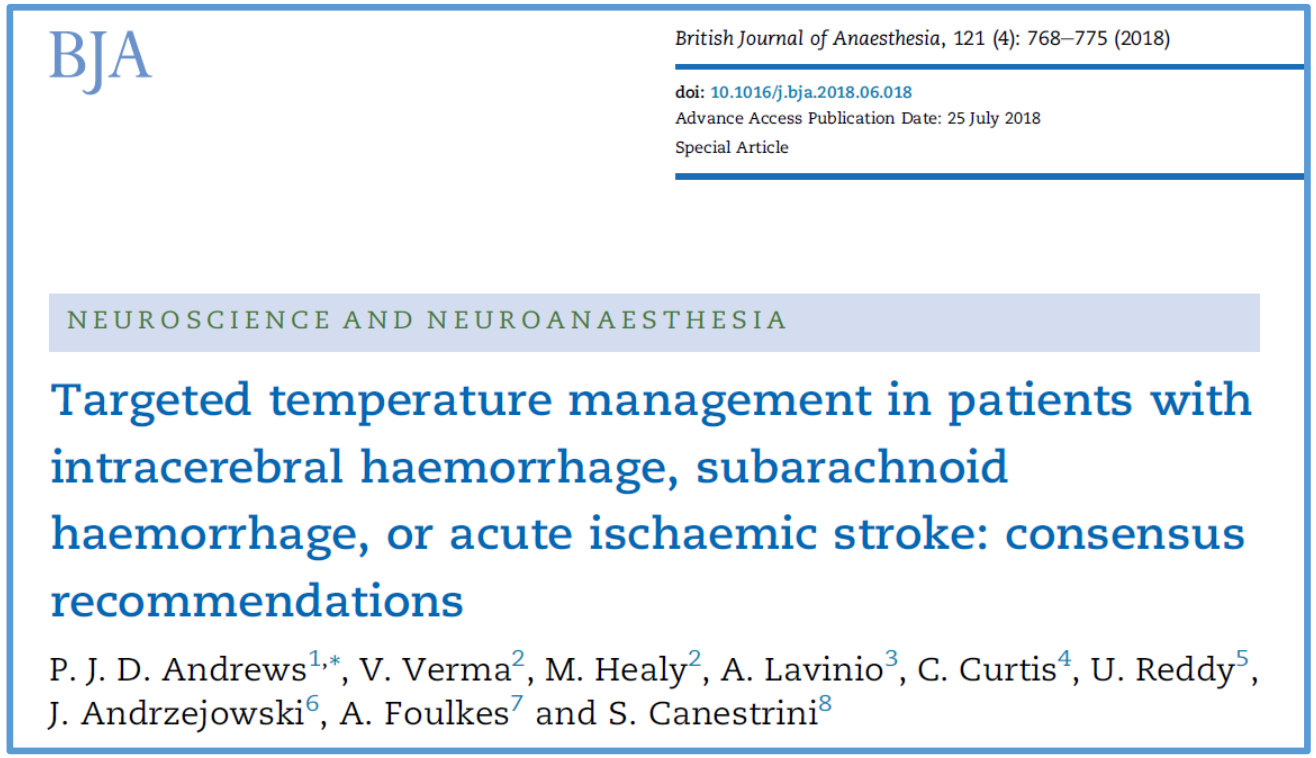
- **Higher infection rate**
- Shivering (and side effects of preventative measures)
- **Rebound hyperpyrexia**

- **Lower seizure threshold**
- Increased CO2 production
- Increased ri**sk of ICP crisis / herniation**
- Reduced ischemic time
- **Secondary brain injury**

Targeted Temperature Management

- Aims to minimise brain injury
- Improve functional outcomes
- Controls body temperature at specific level
- Prevent fever, maintain normothermia, induce hypothermia

Establishing Consensus in Health Outcomes (ECHO) for TTM



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NEUROSCIENCE AND NEUROANAESTHESIA

Targeted temperature management in patients with intracerebral haemorrhage, subarachnoid haemorrhage, or acute ischaemic stroke: consensus recommendations

P. J. D. Andrews[1,*], V. Verma[2], M. Healy[2], A. Lavinio[3], C. Curtis[4], U. Reddy[5], J. Andrzejowski[6], A. Foulkes[7] and S. Canestrini[8]

Neuroprotective Therapy Consensus Review 2023 - approach

- Larger panel
- International (though mainly UK based)
- Focusing on Critical Care Environments
- Modified Delphi method- ideal when opinion
- Aim to improve the quality of TTM after AIS, ASAH and ICH
- Highlight the need for further research in this setting

Neuroprotective Therapy Consensus Review – the process

Modified Delphi

- Round 1 – Online Survey
- Round 2 – Face to Face – London October 2022 - 10 in person
  - 9 via Teams
  - Electronic anonymous voting
  - Consensus >80% agreement
- Round 3 – Recommendations and manuscript review and comments – 18+2

NTCR Recommendations – fever/detection

- Neurogenic fever can adversely affect patient
- It is important to prevent, treat, or both, neurogenic fever in the acute setting
- Temperature should be measured in patients managed in a critical care setting continuously, or at least hourly
- In the absence of direct measurements, core temperature is the most useful surrogate measure of brain temperature

NTCR Recommendations - How

- It is important for neurogenic fever to be treated with a single local TTM protocol
- The target temperature should be between 36.0^{o}C and 37.5^{o}C
- An automated device for TTM is indicated for high-quality temperature control for the treatment of neurogenic fever
- The maximum temperature variation that a patient should experience during normothermia/ TTM is less than or equal to plus or minus 0.5^{o}C per hour and <=1^{o}C per 24-h period
- An automated TTM device that enables precise temperature control is desirable for maintaining temperature

NTCR Recommendations - When

- TTM should be used reactively and using an automated device to maintain normothermia
- When used reactively once fever is detected, TTM should be initiated with an automated device in these patients at 37.5°C
- Once fever is detected, controlled temperature management should be initiated with an automated device as soon as possible, ideally within 1 h
- In a critical care setting, temperature control should be used for as long as the brain is at risk

NTCR Recommendations - Shivering

- It is important to manage shivering in these patient groups during temperature control
- Which first-line therapeutic option should be included in a protocol to manage shivering? – No consensus
- Controlled but passive rewarming should be used to rewarm shivering patients, as opposed to spontaneous, uncontrolled rewarming
- Controlled rewarming should take place at a speed of <=1oC per day
- Normothermia should be applied in a slow and controlled fashion for as long as the brain is at risk once the patient is rewarmed

NTCR Recommendations – Outcome

What is a valid metric for measuring the quality of TTM delivery in patients with pathology severe enough to be admitted to critical care?

- No consensus

NTCR - Summary

- Complex area
- Need for clarity
- Need for further research

Thank you for listening

Thank you to Andrea Lavinio & Jonathan Rhodes

Questions?