CHILL OUT!
Induced Hypothermia:
Challenges & Successes in the ICU

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Objectives

- Review benefits of and recommendations for therapeutic induced hypothermia
- Discuss management techniques of cooling and re-warming patients
- Identify the potential complications of hypothermia and associated treatment risks
The Evidence

- Early Research in 1950’s inconclusive

- 1960-1990 Animal Research

- 2002 ILCOR ALS Task Force Recommendation after 2 randomized trials: The European Study and The Australian Study (Nolan, 2003)
Unconscious adult patients with ROSC after out-of-hospital cardiac arrest should be cooled to 32 to 34 degrees celsius for 12 to 24 hours when the initial rhythm was VF.

Such cooling may also be beneficial for other rhythms or in-hospital cardiac arrest.
Mechanisms of Action

- Hypothermia reduces cerebral metabolic rate for oxygen
- Reduced normal electrical activity
- Suppressed chemical reactions associated with reperfusion injury
Potential Adverse Effects:

- Arrhythmias
- Infection/Sepsis
- Coagulopathy
- Electrolyte abnormalities
- Skin Breakdown
Criteria

Inclusion

- Within 6 hrs post cardiac arrest
- ROSC < 60 min
- Maintaining BP with or without pressors
- Patient Comatose

Exclusion

- Head Trauma
- Surgery within 14 days
- Coma from other causes
- Systemic infection/sepsis
- Bleeding
Cooling Techniques

- External cooling blankets
Cooling Techniques

- Ice packs to axillae, groin, and neck
- IV infusion of cold solutions
- Irrigate body cavities (NG/foley)
Protocol

- Prior to the initiation of hypothermia
  - Rule out other causes for comatose state
  - Studies completed (CT scan, echo)
  - Have baseline labs drawn
  - Thorough skin assessment
  - Place Foley (temperature monitoring device)
  - Central line, A-line
  - No heating circuit on ventilator
Protocol

- **Monitoring during therapy:**
  - Serial labs,
  - electrolytes, coag studies, CBC, ABGs, Cardiac enzymes,
  - cultures, toxicology
  - MAP goal >90 and CVP>8
  - Continuous temperature monitoring
Protocol

- Cardiac monitoring: bradycardias, QT intervals
- Cool to 32-34°C over 4-6 hrs
- Mineral oil to skin every 2 hr with diligent skin assessment
- Use NMB or sedation for shivering
Protocol

- Insulin drip (keep BS <140)
- Re-warm over 12 hours
  - (0.5-1 degree C/hr or 1-2 degree F/hr)
- Watch for hypotension
- Watch for shivering
- Wean sedation and paralytics off when temp 98.6
Data Summary

2011
- 32% Cardiac arrest survival rate
- 3 met hypothermia criteria
  - 3 died

2012 (Jan-July)
- 44% Survival rate with routine use of therapeutic induced hypothermia
- 11 met criteria
  - 7 died, 3 d/c’d neuro intact, 1 w/ anoxic brain injury

Data collected from retrospective chart review
Case Study

- 62 female had witnessed ventricular fibrillation arrest and received multiple shocks prior to ROSC. EMS transported her to the local ER where she was intubated and stabilized for transport to CVPH.

- Hypothermia started en route to CVPH, upon arrival brought to Cath Lab.

- Upon arrival to ICU, GCS 5 and unresponsive. Decorticate posturing noted.
Case Study (con’t)

- Cooling process initiated with the “Kool Kit”,
- Temp maintained at 90.9F to 94F
- Despite a versed drip uncontrollable shivering was noted at hypothermic hour 23.
- Re-warming initiated
Case Study (con’t)

- Pt. successfully extubated day 2 after cardiac arrest
- Alert but confused initially
- AICD placed
- At discharge, alert and oriented
Summary: lessons learned

- Cool early
  - Maintain consistent therapeutic temperature for 24 hours

- Goal to cont data collection for cardiac arrest and Hypothermia outcomes (larger study size)

- Have a standardized measurement of neurologic status upon discharge

- Consistent data collection
CONCLUSION

Cerebral ischemia from cardiac arrest frequently leads to severe neurologic disabilities. Therapeutic Induced hypothermia is a promising method that increases the rate of favorable neurologic outcome.
References

References
