

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: Prehospital IV Bolus-dose NTG for Pulmonary Edema

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Clinical Scenario:

Paramedics arrive at a 40 year old male in cardiac arrest. There is no sign of trauma and his rhythm is VF. He has been down for only 10 minutes and in an effort to preserve neurologic function post resuscitation, they apply a new "cooling collar" instead of the traditional C-collar. This collar is intended to cool the blood supplying the brain via surface cooling over the carotid triangle.

PICO (Population – Intervention – Comparison – Outcome) Question:

- In pts with acute pulmonary edema, does prehospital administration of intravenous bolus-dose nitroglycerin versus standard care improve clinical outcomes for patients?

Search Strategy:

PubMed: (Out-of-hospital OR Prehospital OR EMS OR paramedic OR Emergency OR Field OR EMT OR ambulance OR Paramedical) AND ("bolus" OR "push" OR "high-dose" OR "intravenous" OR "IV") AND nitroglycerin AND ("edema" OR "CHF" OR "failure" OR "respiratory")

Search Outcome: 226 results

Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Skulec. R	Adults resuscitated from OOHCA with any rhythm	Prospective observational with a retrospective control group -LOE 2	1* decrease in tympanic temp (TT) 2* favourable neurologic condition at discharge and adverse post resuscitation events	TT of no more than 35°C=52.5% 45% TH group had favourable neuro function at discharge vs. 27.5 in the control group (in-hospital)	-Could have used a bigger sample size +well done data collection and analysis + well matched treatment and control groups. +CPC scale used to determine neuro outcome

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Bernard. S.	234 adult pts resuscitated for OOHCA with an initial rhythm of VF	Prospective RCT -LOE 1	Functional status at hospital discharge (eg: home or rehab)	Prehospital cooling had 47.5 % favourable discharge vs. 52.6 % of the in hospital cooled group.	+Large sample +Good blinding +Effective randomization -8 in the treatment group received no cooling due time to ER
Bruel, C.	33 Adult comatose pts with non-traumatic OOHCA with any rhythm	Prospective observational study	Esophageal temp Neuro outcome after 6 months	Temp was reduced in all 33 pts by a median of 2.1 *C 4 pt discharged 3 had a favorable neurological CPC score	-no randomization -no comparison group -small sample size + well executed protocol +used CPC scale to determine neuro outcome

- Comments:**
- most pts also received in-hospital cooling
 - VF as an initial rhythm is noted in each study to be an important determinant of favourable outcomes
 - Pulmonary edema is a potential side effect of induced hypothermia.
 - These pts were paralysed during the extent of their hypothermia

Consider: Why would you NOT change practice, based on this article?

In reference to the initial question there was a fair amount of drift. All these prehospital studies used cold infusions as opposed to surface cooling. With this available evidence I cannot support a proposed change in protocol to include cooling collars.

Lowering the pts temperature to hypothermic levels took ice-cold saline in considerable amounts over time. It is difficult to imagine that a simple cooling collar would achieve similar results.

There is currently no evidence on the cooling collar.

Inducing hypothermia has potential side effects of pulmonary edema and the protocol must include the use of paralytic

Clinical Bottom Line:

Although, some of this data has intriguing results, there is currently not enough quality evidence to show that OOHCA cooling, in any capacity, is of definite neurologic benefit.

References:

- Roman Skulec., Anatolij Truhlár., Jana Seblová., Pavel Dostál., Vladimír Cerný., (2010) Pre-hospital cooling of patients following cardiac arrest is effective using even low volumes of cold saline, *Critical care*, (14) R231
- Stephen A. Bernard, MD; Karen Smith, BSc, PhD; Peter Cameron, MD; Kevin Masci; David M. Taylor, MD; D. James Cooper, MD; Anne-Maree Kelly, MD; William Silvester, MB, BS. (2010) Induction of Therapeutic Hypothermia by Paramedics After Resuscitation From Out-of-Hospital Ventricular Fibrillation Cardiac Arrest: a Randomized Controlled Trial, *Circulation*, 737-742
- Cédric Bruel¹, Jean-Jacques Parienti², William Marie¹, Xavier Arrot³, Cédric Daubin¹, Damien Du Cheyron¹, Massimo Massetti⁴ and Pierre Charbonneau., (2008) Mild hypothermia during advanced life support: a preliminary study in out-of-hospital cardiac arrest. *Critical care*. (12) R31