

PRACTICE GUIDELINE

EXTRA-CORPOREAL BLOOD WARMING WITH VA ECMO

1. TARGET AUDIENCE:

This guideline is intended for the medical, perfusion, ECMO Specialist (ES) and nursing staff of the Cardiovascular Intensive Care Unit (CVICU) and Emergency Department (ED).

2. PURPOSE:

This guideline outlines the inclusion and exclusion criteria to be reviewed during the use of extracorporeal blood warming with Venous-Arterial Extracorporeal Membrane Oxygenation (VA ECMO).

3. RATIONALE:

Having an extra-corporeal blood warming guideline will assist ECMO clinicians in identifying which patients with severe hypothermia presenting, or developing cardiac arrest who may benefit from extra-corporeal warming with VA ECMO therapy. This includes known prognostic factors such as serum potassium (K+) and pH. Each patient is considered individually with respect to risks and benefits.

4. INCLUSION CRITERIA:

- Cardiac arrest patients presenting with core body temperature < 32 degrees Celsius refractory to external active rewarming methods.

5. EXCLUSION CRITERIA:

- Serum potassium K+ > 9 mEq/L
 - o Likely due to tissue ischemia prior to developing severe hypothermia.
- Central venous pH < 6.9
 - o Likely due to tissue ischemia prior to developing severe hypothermia.
- Out of hospital DNR
- Age > 75
- Cancer with predicted survival less than 1 year
- Severe dementia that could have contributed to the development of severe hypothermia.

The following should not be used as strict exclusion:

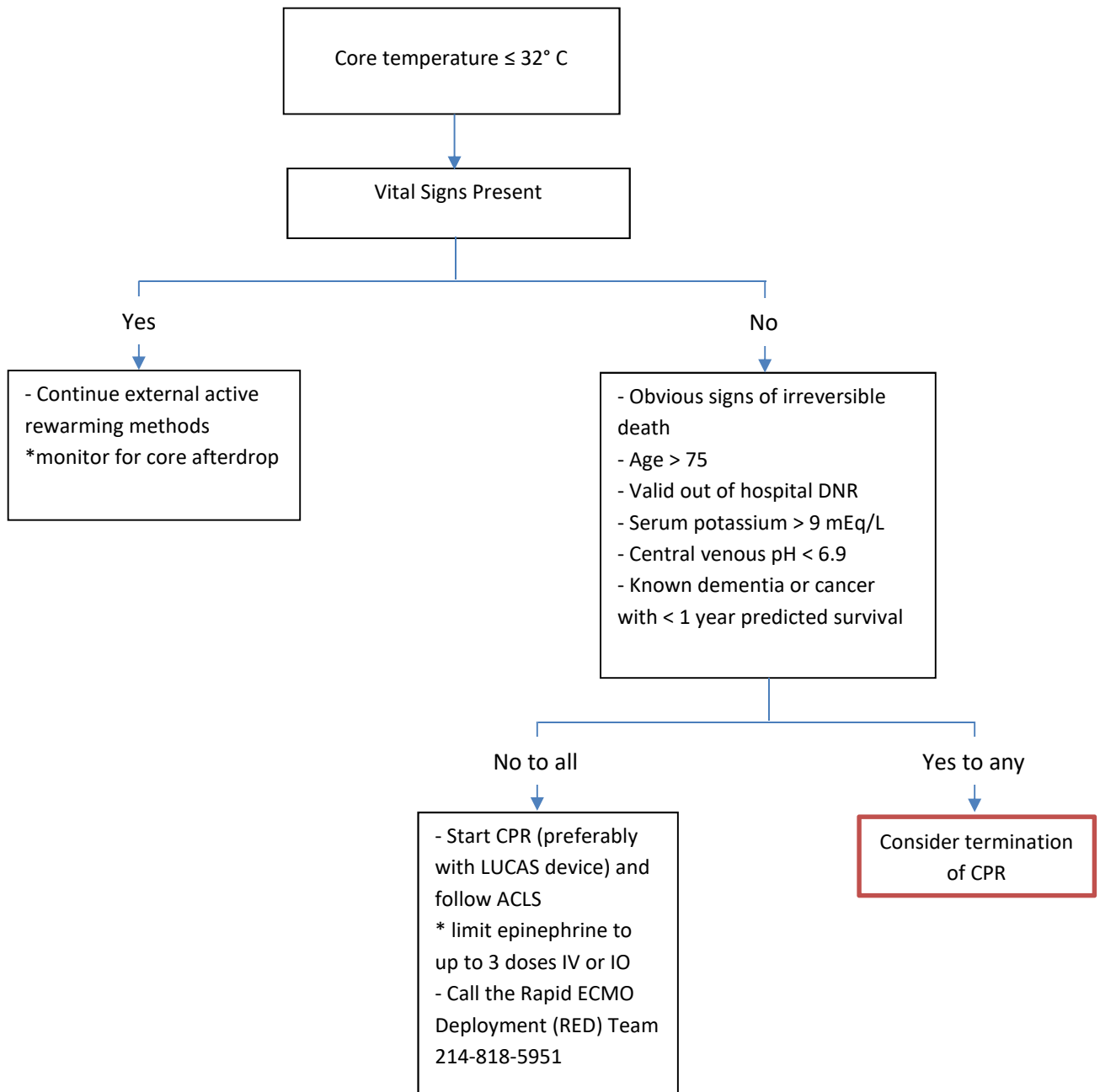
- Initial rhythm
 - o Asystole is a common occurrence in patient presenting with severe hypothermia.
- Duration of downtime
 - o Lay person witnessed arrests are unlikely in urban hypothermia.
- Absence of brain stem reflexes
 - o Hypothermia can result in reversible areflexia, rigidity, apnea and unresponsive pupils.

PRACTICE GUIDELINE

EXTRA-CORPOREAL BLOOD WARMING WITH VA ECMO

Appendix 1

VA ECMO Warming Decision Tree



PRACTICE GUIDELINE

EXTRA-CORPOREAL BLOOD WARMING WITH VA ECMO

References:

1. Vanden Hoek TL, Morrison LJ, Shuster M, et al. Part 12: cardiac arrest in special situations: 2015 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2015; 122: Suppl 3: S829-S861.
2. Brown DJA, Brugger H, Boyd J, & Paal P. Accidental hypothermia. *N Engl J Med*. 2012; 367(20): 1930-1938.
3. Walpoth BH, Walpoth-Aslan BN, Mattle HP, et al. Outcome of survivors of accidental deep hypothermia and circulatory arrest treated with extracorporeal blood warming. *N Engl J Med*. 1997; 331 (21): 1500-1505.
4. Mair P, Kornberger E, Furtwaengler W, Balogh D, & Antretter H. Prognostic markers in patients with severe accidental hypothermia and cardiocirculatory arrest. *Resuscitation J*. 1994; 27: 47-54.