Pharmacologically induced hypothermia with the cannabinoid receptor agonist WIN55, 212-2 eliminates shivering in a rat model of cardiac arrest

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Results

Figure 1. Duration time and shivering in each group

EMG documented shivering was only observed in the MH group. There was no S in the WIN treated animals (Fig 1) for the 4 hour duration of the study. Temperatures for WIN and MH animals were identical (Fig 2).

Conclusions

Hypothermia induced by WIN is not accompanied by S when compared to MH. This may be beneficial in preventing post resuscitation S induced complications.

References

1. Nakamura K, Morrison SF. Physiology 2011;589(pt14):3641-3658

Disclosure

None

Background

Mechanically induced hypothermia (MH) commonly causes shivering (S) that has many unwanted clinical effects. The cannabinoid receptor antagonist WIN55, 212-2 (WIN) induces hypothermia pharmacologically by resetting the temperature point of the hypothalamus. The amount of shivering produced by WIN compared to MH is unknown. We hypothesized Hypothermia (H) induced by WIN produces less S compared to MH.

Methods

Animal Model

Ventricular fibrillation (VF) was induced in 18 Sprague-Dawley rats weighing between 450 and 550g. VF was untreated for 6 min followed by 8 min of CPR. Resuscitation was then attempted with defibrillation.

Experimental Protocol

Animals were randomized into 3 groups 5 min after resuscitation: Normothermia (N), MH, and WH. N and H were respectively defined as 37˚C and 33˚C. For WH group, WIN was administered and for the MH and N groups a vehicle (2% Tween-80 in 0.9% NaCl solution) was administered, both at (1.4ml/kg/h) for 4 hours. Animals were followed for 4 hours post ROSC. MH was produced with ice packs. Bipolar needle electrodes were inserted into the thigh muscle and electromyogram (EMG) recordings were performed beginning 5 min post ROSC for 4 hours to document shivering.