

# Intra-arrest intranasal cooling improves success of resuscitation in a porcine model of prolonged cardiac arrest

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**Purpose.** The present study investigated the effects of intra-arrest intranasal cooling on resuscitation in a porcine model of prolonged cardiac arrest.

**Methods.** In 16 domestic male pigs weighing  $40 \pm 2$  kg, VF was electrically induced and untreated for 15 minutes. Animals were then randomized to either intranasal cooling or control. CPR was initiated and continued for 5 minutes before defibrillation was attempted. Coincident with starting CPR, the intranasal cooling group was cooled with a device which produces evaporative cooling in the nasal cavity of the pigs (BeneChill, Inc., San Diego, CA). No cooling was administered to the control animals. If spontaneous circulation was not restored after a defibrillation shock, CPR was resumed for 1 minute prior to the next defibrillation attempt until either successful resuscitation or a total of 15 minutes had passed.

**Results.** Seven of eight animals in the cooled group (87.5%) and two of eight animals in control group (25%) ( $p=0.009$ ) were successfully resuscitated. At ROSC, brain temperature was increased from baseline by 0.3 degrees in the control group, and decreased by 0.1 degrees in the cooled animals. Pulmonary artery temperature was unchanged in both groups.

**Conclusion.** Intra-arrest intranasal cooling significantly improves the success of resuscitation in a porcine model of prolonged cardiac arrest.

Table 1 Characteristics and resuscitation events of the two groups

	Control	Hypothermia	P
	N=8	N=8	
Initial CPP (mmHg)	11.9±9.6	15.9±5.6	0.33
CPP before initial electric shock (mmHg)	16.4±3.7	25.6±7.0	<b>0.005</b>
No. of electric shocks	6.9±2.0	7.0±3.8	0.935
Initial electric shock success (%)	12.5%	50.0%	0.120
Total electric shock success (%)	10±16%	58±23%	<b>&lt;0.001</b>
CPR duration (min)	12.9±4.0	7.3±3.4	<b>0.01</b>
Epinephrine dosage (µg/kg)	79±22	50±33	<b>0.047</b>
Brain temperature before shock (change from baseline)	+0.3 ±0.15	-0.21±0.17	<b>0.01</b>
ROSC	2(25%)	7(87.5%)	<b>0.009</b>

CPP: coronary perfusion pressure; CPR: cardiopulmonary resuscitation; ROSC: return of spontaneous circulation