

# PRINCE (Pre-ROSC Intra-Nasal Cooling Effectiveness): A Randomized Study

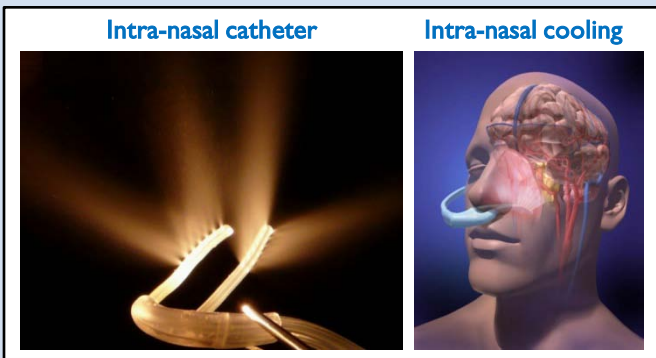
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**Introduction:** Intra-nasal cooling during CPR has been shown to ease the resuscitation effort and to improve resuscitation rate, survival and neurologic outcome in porcine models of both prolonged VF and PEA arrest.

**Aim:** To determine whether intra-nasal cooling initiated during resuscitation improves resuscitation rate (ROSC), survival and neurologic outcome.

**Method:** The study is on-going. Cooling was performed using a novel device (RhinoChill, BeneChill, Inc.) which sprays a volatile coolant into the nasal cavity. Patients were randomized to intra-nasal cooling during resuscitation or no cooling in the field, followed by cooling for all patients in hospital. All patients with witnessed arrest and a down time less than 20 minutes deemed eligible for resuscitation were included. Nasopharyngeal cooling was initiated either before or after defibrillation and continued until systemic cooling could be initiated. Patients who had achieved return of spontaneous circulation (ROSC) were excluded. Resuscitation was continued until ROSC was achieved or for AT LEAST 30 minutes.



## Results

### Patient Demographics

	RhinoChill	Control	p
<b>Patients (n=84)</b>			
Excluded (n)	5	2	0.251
Analyzed (n)	37	40	0.869
<b>Baseline Characteristics</b>			
Age (yrs)	67.1	67.2	0.973
Male gender (%)	81.8	75.0	0.558
Bystander CPR (%)	37.5	37.5	1.000
Cardiac Cause (%)	93.8	87.1	0.426

### Event Timing (Elapsed time from collapse (minutes)) Median (IQR)

	RhinoChill	Control	p
CPR Initiation	7.5 (5.0-10.0)	8.5 (4.8-10.3)	0.479
First DF Shock*	11.0 (7.5-13.8)	14.5 (9.8-20.8)	0.079
ALS arrival	11.5 (9.8-15.3)	13.0 (9.0-17.5)	0.411
Randomized	20.5 (17.0-24.3)	19.0 (15.8-21.8)	0.420
Cooling Start	23.0 (19.0-26.0)	--	--
ROSC	29.0 (26.0-32.0)	35.0 (30.8-40.8)	0.059
ER Arrival	57.0 (51.5-78.0)	64.0 (43.5-72.5)	0.906

\* VF patients only; N = 10 RhinoChill, 8 Control

### Time to CPR (Elapsed time from collapse (minutes)) Median (IQR)

	Non- Asystole	Asystole	p
Time to CPR	6.0 (4.0-9.5)	9.0 (5.0-12.0)	0.019

### Rhythms and Defibrillation

	RhinoChill	Control	p
<b>Rhythm at presentation (%)</b>			
VF	29.7	20.5	0.297
PEA	13.5	17.9	0.753
Asystole	54.1	53.8	1.000
Cooling prior to 1st Shock (%)	19.2	--	--
Number of shocks to ROSC*	2.5	5.5	0.012

\* VF patients only; N = 6 RhinoChill, 4 Control

### Temperatures (°C, Mean)

	RhinoChill	Control	p
Tympanic, at ROSC	35.3	35.8	0.381
Tympanic, at ER	34.0	35.6	0.003
Core, at ER	35.0	35.7	0.128

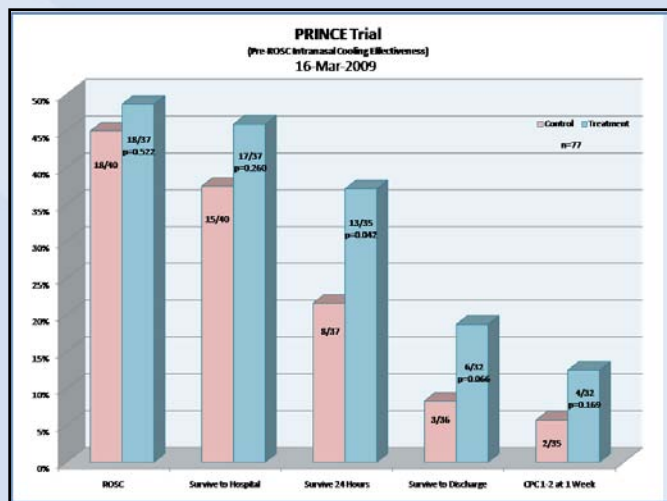
### Adverse Events

	RhinoChill
White Nose*	4
Severe Epistaxis**	1

\* 3 were non-resuscitated patients

\*\* Underlying hepatic failure & coagulopathy

### Outcomes



**Conclusions:** Intra-nasal cooling initiated during resuscitation is feasible. This method of cooling shortens the resuscitation process and improves patient survival.