

Trans-nasal cooling during CPR: a single-center experience

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Introduction Trans-nasal cooling started during cardiopulmonary resuscitation (CPR) has shown to improve the return to spontaneous circulation (ROSC) and survival rate in an experimental prolonged cardiac arrest model. A multicenter randomized trial (PRINCE) has also suggested an improved neurological outcome in patients receiving trans-nasal cooling during CPR in the prehospital setting when compared with those treated by conventional hypothermia on hospital arrival, provided a delay between collapse and CPR of less than 10 minutes.

Methods Patients with witnessed cardiac arrest and a downtime less than 20 minutes were randomized to prehospital intra-arrest cooling versus standard ACLS care. Trans-nasal cooling (RhinoChill, BeneChill Inc., CA, USA) was initiated using a mixture of volatile coolant fluid with oxygen delivered into the nasopharynx for rapid evaporative heat transfer. Cooling was continued during CPR and, for patients who achieved ROSC, until initiation of systemic cooling at hospital. Resuscitation was continued for at least 30 minutes. All patients were then cooled at the hospital.

Results Twenty-four patients were included, but one in the treatment group was excluded from the per protocol analysis because of DNR orders. Patients randomized to treatment group ($n = 9$) or standard care ($n = 14$) had similar demographics, initial rhythm, time from collapse to CPR and ALS arrival. Median time from collapse to cooling initiation was 19 minutes. In total, 6/9 (66%) treated and 6/14 (42%) control patients achieved ROSC. Three patients (33%) in the treatment group survived to hospital discharge with CPC 1 to 2, while only one (7%) of the control group patients had good neurological outcome. No serious adverse events occurred in treated patients.

Conclusions Trans-nasal cooling seems to be safe and feasible in a prehospital setting. These single-center data confirm that trans-nasal cooling may improve the ROSC rate as well as good neurological outcome if started in patients with a short delay between collapse and CPR.