

# NONINVASIVE PREHOSPITAL BRAIN COOLING OF OHCA SURVIVORS USING THE EXCEL CRYO COOLING DEVICE

Skulec R<sup>1-3</sup>, Kucera K<sup>1</sup>, Knor J<sup>1</sup>, Callerova J<sup>1</sup>, Seblova J<sup>1</sup>

<sup>1</sup>*Emergency Medical Service of the Central Bohemian Region, Czech Republic,* <sup>2</sup>*Dept. of Anesthesiology, Perioperative Medicine and Intensive Care, J.E. Purkinje University, Masaryk Hospital Usti nad Labem, Czech Rep.,* <sup>3</sup>*Department of Anesthesiology and Intensive Care, Faculty of Medicine in Hradec Kralove, University Hospital Hradec Kralove, Czech Rep.*

**Background:** While prehospital initiation of targeted temperature management (TTM) by large volumes of ice-cold intravenous fluid should be abandoned, local noninvasive cooling may be indicated. The novel Excel Cryo Cooling Device (ECCD) was designed for cooling the brain by cooling blood in the carotid arteries and consists of a patented cervical collar and an removable cooling element (Excel Cryo Cooling System, Cryothermic Systems Inc., OH, USA; figures). We performed a pilot study to determine if pre-hospital cooling the neck of successfully resuscitated out-of-hospital cardiac arrest (OHCA) by this device decreases tympanic temperature (TT).

**Methods:** Ten consecutive successfully resuscitated OHCA patients indicated for TTM were placed in the ECCD (ECCD group). Cooling elements were changed every 20 minutes until arrival at the hospital. The effect on body temperature was compared with the results of PRE-COOL study (prehospital intravenous cooling of 40 resuscitated OHCA patients, PRE-COOL TH group).<sup>1</sup>

**Results:** In both groups, we identified analogous baseline TT (ECCD A: 36.2±0.7, PRE-COOL TH group: 36.2, p=0.857). Subsequently, cooling of patients in group A using the ECCD induced comparable prehospital decrease of TT as intravenous administration of 12.6±6.4 ml/kg of 4°C of cold normal saline in PRE-COOL TH group patients (1.5±0.4 vs. 1.4±0.8, p=0.7821). There were no differences in sex, age and presence of shockable initial rhythm (table). Frequency of favourable neurological outcome at hospital discharge was comparable in both groups (ECCD group: 40.0, PRE-COOL TH group: 43.6 %, p=0.838). During transport, no recurrence of cardiac arrest, no other arrhythmias and no local complications were observed in ECCD group.

**Conclusions:** Initial experience using the Excel Cryo Cooling Device in successfully resuscitated OHCA patients showed satisfactory and safe prehospital cooling efficiency assessed by prehospital decline of tympanic temperature. Randomized clinical study is in preparation.

**References:** 1. Skulec R et al. Crit Care 2010;14:R231.



|                               | PRE-COOL TH GROUP | ECCD GROUP | p     |
|-------------------------------|-------------------|------------|-------|
| Number of pts (n)             | 40                | 10         |       |
| Age (years)                   | 61.4±18.1         | 61.7±22.0  | >0.05 |
| Male sex (%)                  | 85.0              | 70.0       | >0.05 |
| Body weight (kg)              | 83.6±17.0         | 82.6±23.8  | >0.05 |
| Shockable initial rhythm (%)  | 52.5              | 40         | >0.05 |
| Time collapse-ROSC (min)      | 26.8±16.9         | 23.2±14.0  | >0.05 |
| Any bystander CPR attempt (%) | 65.0              | 80.0       | >0.05 |