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CEA Cool, Cooling during **C**arotid **E**nd**A**rterectomy: a pilot study

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BACKGROUND

Carotid Endarterectomy (CEA) is of proven benefit in stroke prevention, but the procedure carries a perioperative risk of stroke. Mild hypothermia (34-35°C) is probably the most effective approach to protect the brain from ischemic insult (1). It is therefore a substantial hypothesis that the hypothermia lowers the risk of ischemic brain damage potentially associated with CEA.

OBJECTIVE

Purpose of our study is to test whether systemic cooling, to a target of 34,5-35°C, initiated before and maintained during CEA, is feasible and safe.

Fig. 1
QUATTRO® Intravascular Heat Exchange Catheter Kit with central venous infusion capabilities, 3 lumens. Femoral vein insertion only.

METHODS

Inclusion criteria: patients referred to the Vascular Surgery Unit and judged eligible for CEA

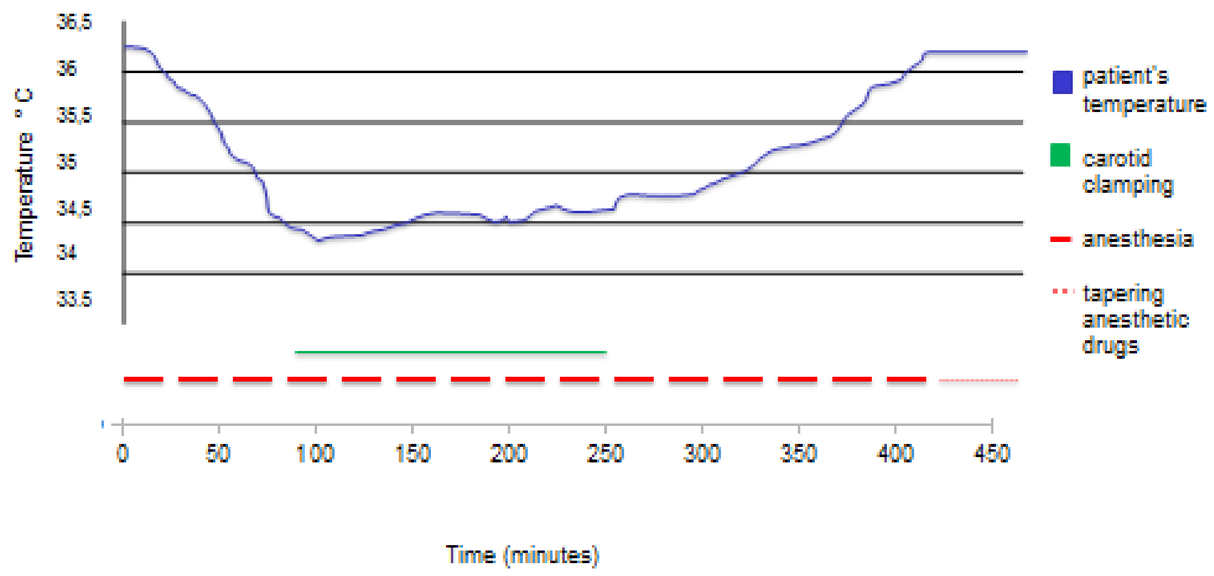
Before and within 30 days from CEA: brain Magnetic Resonance Imaging (MRI), with Diffusion Weighted (DWI) and Gradient Echo (GRE) sequences; general cognitive function (Montreal Cognitive Assessment), neurological assessment (NIHSS score, mRS)

Treatment: Hypothermia was initiated just before the beginning of CEA, by endovascular cooling (Zoll system, Fig. 1), to the target 34,5-35°C (assessed by urinary bladder temperature). The target temperature was maintained until the release of clamping, followed by passive, controlled rewarming (0.4 °C/h) (Fig. 2 shows a representative graphic). The cooling procedure was carried out under general anesthesia, as required by the surgical intervention

OUTCOME

Primary **safety** outcome was the **incidence of severe adverse events at 1 month**. Severe adverse events were defined as any life-threatening event, including pneumonia, myocardial infarction and parenchymal hemorrhage.
Secondary safety outcomes of interest included the incidence of bradycardia (<40 beats per minute), cardiac arrhytmia, hypertension, hypotension and any coagulation disorders.

Fig. 2 Representative time course of the body temperature



RESULTS AND CONCLUSIONS

All the 7 patients enrolled had **no adverse events, except for two cases of bradycardia** during hypothermia, successfully treated with atropine and dopamine. Pre- and post-CEA MRI showed no difference in terms of new areas of altered signal. Neurological status assessment remained unchanged before and after CEA.
Our results show that systemic cooling to a target temperature of 34-35°C, initiated before, and maintained during CEA, is feasible and safe. Mild hypothermia could be an effective and widely available method for prevention of perioperative risk of stroke during CEA.

1. Yenari MA, Han HS, Neuroprotective mechanisms of hypothermia in brain ischaemia, Nat Rev Neurosci, 2012. 22;13(4):267-78.