Letter by Albin Regarding Article, “Local Brain Temperature Reduction via Intranasal Cooling With the RhinoChill Device: Preliminary Safety Data in Brain-Injured Patients”

To the Editor:

Abu-Chebl and coworkers are to be congratulated for reporting on a hypothermic technique that produces selective brain cooling in humans using perfluorocarbon-oxygen suffused through the nasopharyngeal pathway with apparently minimal side effects.1

From a historical perspective, 47 years ago, Brown and colleagues produced a striking brain–body temperature gradient in canines by naso-oral perfusion and head immersion using cold saline as the hypothermic medium.2 Within 20 to 38 minutes (median time, 32 minutes), intracerebral temperatures <20°C were reached with right atrial temperatures stabilizing between 30°C and 33°C. Termination of perfusion allowed for rewarming of the brain from the warmer body core without eye injuries or neurological deficits.

In 1973, Albin and coworkers3 reported on differential brain cooling using cephalic immersion similar to the method reported by Brown et al in 6 canines and 5 rhesus monkeys.2 In both species, a brain target temperature of 30°C to 31°C was reached in <15 minutes with the core temperature at or near normothermia. In 2 monkeys, cerebral blood flow was measured using 133Xe injected through a catheter placed in the common carotid artery after ligation of the external carotid with a marked decrease in cerebral blood flow occurring from preperfusion levels on reaching 30°C in brain. No behavioral or neurological deficits were noted in these 2 monkeys after 6 weeks of observation.

Although it appears that the article of Abu-Chebl et al targets the patient population in which mild hypothermia was indicated, there may be indications for a more profound sustained drop in brain temperature if the stigmata of corporeal cardiovascular and hematologic sequelae can be avoided. The authors’ remark1 that endovascular cooling of the core must be completed before cooling of the brain can begin is not entirely correct. Using differential extracorporeal hypothermia perfusion, White and coworkers4 were able to reduce brain temperature from 35.5°C to 11.8°C in 17 minutes with right atrial temperatures not going <35°C in a patient with a recent myocardial infarction and extirpated a large convexity meningioma. An important review of differential brain hypothermia can be seen in the important publication by Kristiansen.5

It is surprising that no animal data regarding safety and efficacy are given by the authors. It would be important to push the envelope to note how low brain temperature can be brought down and the concomitant changes in core temperature over a stated period of time.

It is known that intracranial volume can be decreased with decreases in brain temperature, yet no data are presented on this issue although intracranial pressure is mentioned as a monitored parameter in the section on safety monitoring.

Disclosures

None.

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