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NEUROCRITICAL CARE SOCIETY

RESPONSE TO LETTER TO THE EDITOR

Commentary: Feasibility and Safety of Transnasal High Flow Air to Reduce Core Body Temperature

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Dear Editor:

We appreciate comments regarding our study of *Feasibility and Safety of Transnasal High Flow Air to Reduce Core Body Temperature* [1]. Several important issues influencing efficacy of transnasal cooling are noted by Harris and Andrews. Most important are questions of tolerable, yet effective nasal airflow rates and mechanism of delivery. As correctly stated above, Harris et al. [2] delivered maximum airflow of 24 L/min (mean 17.7 L/min) without humidification for 15 min to intubated patients. They documented significant reduction in both brain and esophageal temperature (not selective brain cooling), although there was less reduction in core body temperature than in brain temperature. Mellergard [3] tested humidified oxygen at 5–10 L/min and reported no, or very little (maximum 0.2 °C) reduction in intraventricular temperature after at least 2 h. Chava et al. [4] delivered mean air flow rate of 33 ± 18 L/min with relative humidity 20 ± 6% for 1 h to patients without neurological injury (under general anesthesia) and observed significant reduction in esophageal temperature. Finally, the RhinoChill device utilizing oxygen flow rates of 40–50 L/min with the addition of nebulized coolant for 12–24 h was effective in reducing core temperature in cardiac arrest survivors [5, 6]. These observations, together with our study (60 L/min with relative humidity levels of 32 ± 8% for 2 h), suggest that at least in intubated patients, air flow rates well above normal minute ventilation volumes and optimally with minimal humidification are required to achieve core temperature reduction.

Previously utilized devices include Foley catheters and nasal cannulae with nasal continuous positive airway pressure masks used in our previous studies. Further technological advances currently under study will pump the air across a desiccant material to extract moisture from the incoming air stream. A custom nasal mask induces an evaporative cooling energy exchange in the turbinates and upper airway. The patient's lungs are isolated from overpressure via the intubation seal preventing contact between the delivered air and the patient's lungs. Finally, the device delivers isotonic saline solution via a peristaltic pump directly to the nasal mucosa to reduce drying and to facilitate improved evaporative cooling. This type of system is targeted toward intubated patients, and we agree that high airflows without adequate humidification may not be tolerated for long durations in non-intubated patients.

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