

On the effectiveness of airway heat donation.

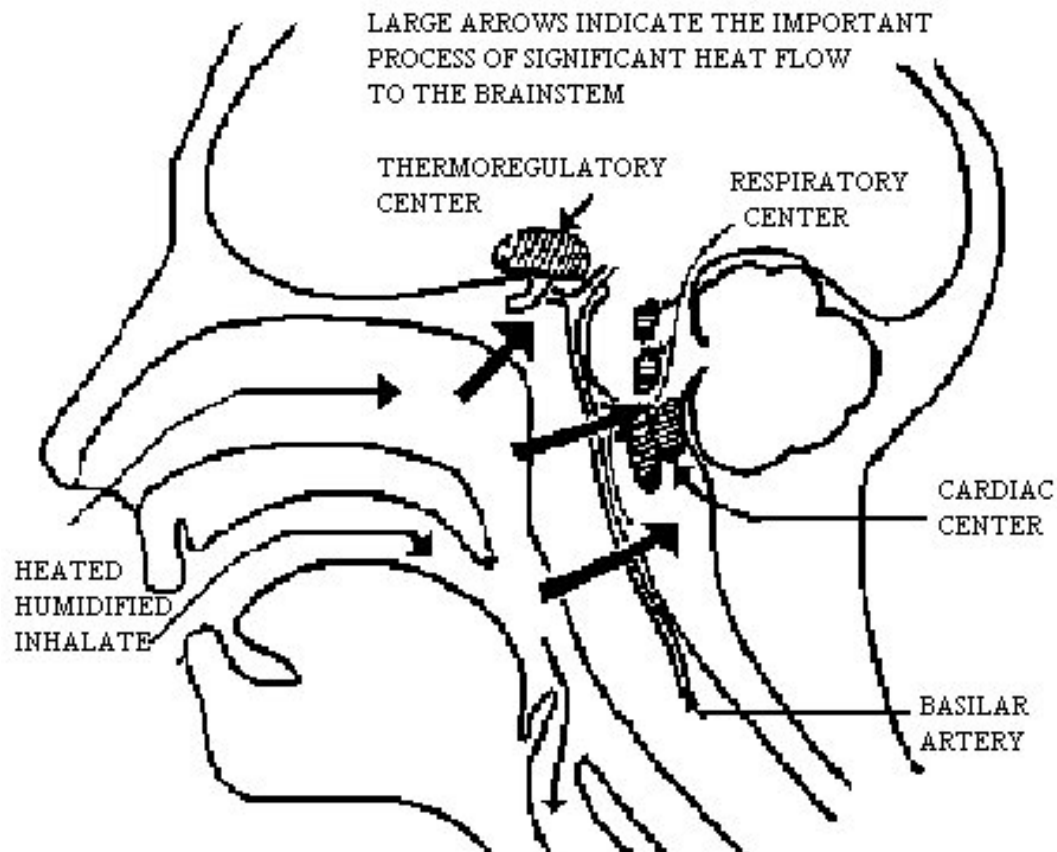
There is no doubt that the amount of heat that can potentially be donated to a hypothermic victim by airway heat donation is relatively small, certainly not enough on its own to significantly increase the temperature of the whole "body" or even the "core" as it is usually conceived.

Then why does this method of heat donation appear to "work" in helping to save the lives of hypothermic victims?

The answer may lie in its probable effect on specific "critical tissues" for maintenance of vital functions, such as the brainstem, cervical sympathetics, and the pacemaker region of the heart.

Logical deduction predicts that when a hypothermic victim receives heated inhaled air by oronasal mask, the heat available will mostly be absorbed in the nasopharyngeal region.

Much of that heat will be transferred the short distance to the brainstem (hypothalamus and medulla oblongata) where thermoregulatory, ventilatory and circulatory control centers are located. Their small mass could be significantly influenced thermally, by conduction and/or convection mechanisms of these vital sites and providing for some slow rewarming.



Such stabilization and increase of the temperature of these centers would maintain or restore drive for shivering, ventilation and cardiac output, thereby facilitating rewarming by endogenous heat production. Also, heat absorbed via the nasopharyngeal region would warm the nearby arteries (e.g. basilar) that lead to the Circle of Willis.

Even slight warming of such blood, which is then distribute to the cerebral cortex, could have salutary effects on the level consciousness of a severely hypothermic person.

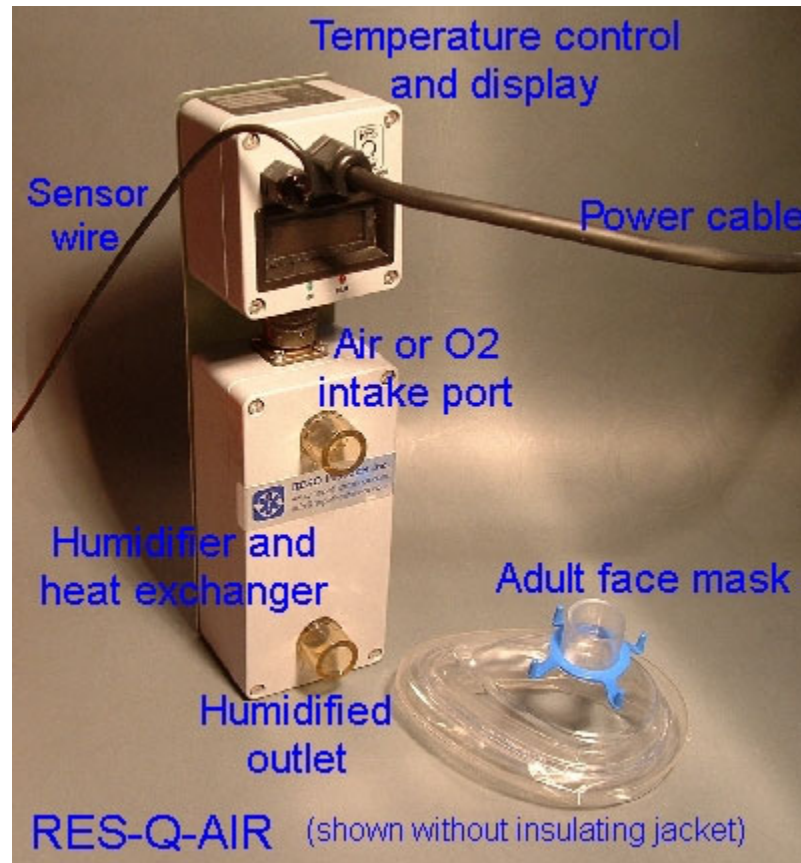
Most of the remaining heat in the inhalate would be absorbed in the cervical region (there is scientific evidence of this) via the larynx and trachea. Critical sympathetic and parasympathetic tissues would benefit thermally, as would blood in the carotids and major veins concentrated in this region.

The abundant venous drainage would deliver any heat absorbed directly to the heart via the right atrium, with possible thermal benefit for the pacemaker tissue located there, making ectopic beats and fibrillation less likely.

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