INHALATION REWARMING AND COOLING DOES NOT INFLUENCE BRAIN-STEM TEMPERATURE

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Inhalation rewarming is an effective method for eliminating respiratory heat loss. Numerous studies have also proposed that it is effective in enhancing the rate of rewarming of hypothermic individuals, but this view has been challenged by studies which have demonstrated that both in laboratory and simulated field settings, inhalation rewarming provides no improvement over spontaneous rewarming. The present study tested the hypothesis that inhalation rewarming may provide a thermal increment to central neural structures adjacent to the nasopharyngeal region, specifically the brain-stem, medulla and hypothalamus. In this manner, inhalation rewarming, though not capable of enhancing the rewarming rate of body core temperature, might act to stabilise the temperature and hence the function of vital structures in the central nervous system, responsible for respiration, cardiac function and temperature regulation. This hypothesis was tested by monitoring the auditory evoked brain stem responses (AEBRs) of fourteen subjects (7 male and 7 female) inspiring room air (24°C) followed by hot air (41°C) saturated with water vapour and cold dry air. The order in which the latter two conditions were presented to the subjects was counterbalanced. The latencies of peaks I, III and V, and the inter-peak latencies (IPLs) I-III, III-V, and I-V were compared between the three conditions with a repeated measures ANOVA. Changes in IPLs are sensitive makers of changes in brain stem temperature. The total duration of each condition was 25 minutes, and AEBRs were recorded during the last 10 minutes. Prior to the measurement of AEBRs tympanic temperature (Tty) was measured with an infra-red tympanic thermometer. There were no significant differences in Tty, peak latencies I, III, and V, and IPLs I-III, III-V, and I-V. The results indicate that inhalation of hot and cold air does not influence Tty, nor does it influence the temperature of the brain-stem. We conclude that inhalation rewarming is not capable of warming the vital central neural structures adjacent to the naropharynx in any significant manner. Consequently, it appears unlikely that inhalation rewarming is an efficient means of reviving brain-stem and hypothalamic function in hypothermic victims.

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