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Title: RADIATION VS CONDUCTION FOR POSTOP REWARMING OF ADULTS

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Hypothermia as a potential physiologic problem for the adult postsurgical patient recovering from anesthesia has been acknowledged.<sup>1</sup> However, no data exist to support the effectiveness of current heat application treatments. The purpose of the present study was 1) to assess whether three currently employed heat applications directed at hypothermia in adult recovery room (RR) patients are equally effective in raising body temperature and 2) to determine whether body morphology or age would influence temperature change in postsurgical patients.

**Method:** Study approval was received from the Human Subjects Committee. After signed informed consent was obtained, the patients were assigned randomly to one of four treatment groups. Three groups received external heat application as follows: Group 1 -- radiant heat lamps; Group 2 -- warmed blankets (42°C), without change; Group 3 -- warmed blankets (42°C), changed every 30 minutes; Group 4 -- served as control patients (blanket applied at RR ambient temperature and humidity). Core temperature, as assessed by tympanic membrane (TM) disposable probe\*, was taken on RR admission and every 15 minutes until RR discharge. Extraneous variables expected to influence temperature change were recorded. These variables included those related to the patient, environment, operation, and anesthetic. Statistical analysis of recorded data was accomplished using one-way analysis of variance and the Student t-test for grouped data. Significance was set at  $p < 0.05$ .

**Results:** One hundred ninety-eight adult recovery room (RR) postoperative patients were studied. The patient sample can be described as follows (mean,  $\pm$  SE): age,  $50 \pm 1.3$  years; weight,  $71.4 \pm 1.3$  kg; height,  $166 \pm 0.8$  cm; body surface area (BSA),  $1.8 \pm .02$  m<sup>2</sup>; and body mass index (BMI),  $25.9 \pm .4$  kg/m<sup>2</sup>. There was no statistical difference among treatment groups when considering RR ambient temperature ( $21.6 \pm .03^\circ\text{C}$ ) and humidity ( $55 \pm .1\%$ ), RR medications (morphine or meperidine), ASA classification, anesthetic technique, anesthesia time, operative type, or surgical time. Recovery room heat treatments (radiation vs. conduction) did not significantly ( $p > 0.1$ ) affect RR time, rate of temperature rise in the first hour, RR temperature change divided by RR time, duration of hypothermia, or the subjects' discharge temperature. With a mean RR time of  $82 \pm 3$  minutes, the rate of temperature rise in the first hour ( $^\circ\text{C}/\text{hr}$ ) was as follows: Group 1 --  $0.7 \pm .01$ ; Group 2 --  $0.6 \pm .08$ ; Group 3 --  $0.5 \pm .07$ ; Group 4 --  $0.5 \pm .09$ . TM temperature rise in adult RR postsurgical patients was not affected by type of heat

treatment. Nonobese (BMI  $< 30$ ) ( $n = 163$ ) compared with severely obese (BMI  $> 30$ ) ( $n = 32$ ) demonstrated no significant difference in TM temperatures on admission or discharge, 1st-hour rate of TM rise, or temperature readings at 15 minute intervals in the RR. However, an effect of age on temperature change in postsurgical patients was demonstrated (Figure). When comparing patients  $< 60$  years ( $n = 134$ ) with those  $\geq 60$  years ( $n = 61$ ), a statistically significant difference ( $p < .05$ ) was found in TM temperature on RR admission, every 15 minutes thereafter, and on RR discharge. However, neither the rate of temperature rise in the 1st hour nor the RR temperature change divided by RR time differed significantly between the two age groups.

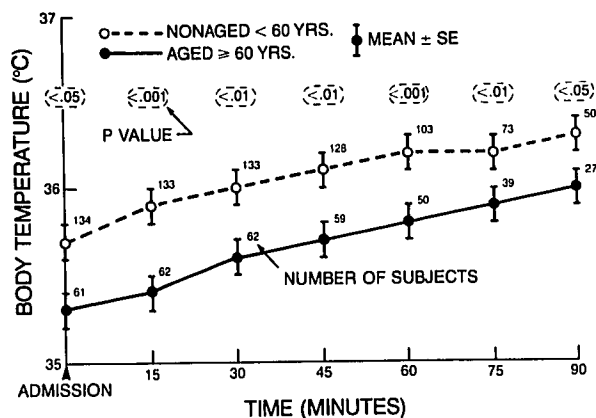
**Conclusions:**

1. Different heat transfer methods (radiation vs. conduction) were equally effective in postoperative adults in the RR.
2. Body morphology (obesity) neither prevented heat loss intraoperative nor hastened the return to normothermia.
3. Patient age was a significant variable when considering heat loss and heat gain incident to anesthesia and surgery.

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**REFERENCE**

1. Bay J, Nunn JF, Prys-Roberts C: Factors influencing arterial PO<sub>2</sub> during recovery from anesthesia. *Brit J. Anes.* 40:396-406, 1968.



\*La Barge, Inc., St. Louis, Missouri