

~~/SUP>) controls body temperature better than convective air warming in major surgery.">~~

A-386

October 16, 2000

2:00 PM - 3:30 PM

Moscone Convention Center, Room 301

Maintenance of *Normothermia* in Surgical Patients: New Technology Evaluated

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A new device to maintain *normothermia* has been developed that circulates warm water through a special garment worn by patients during surgery. A three-element system employs core temperature, a heat pump and the garment, to control temperature to a manual set-point using a microprocessor. In this study, we compare the new technology with convective air warming in patients undergoing major abdominal surgery.

METHODS: In this IRB approved, prospective and randomized study, 53 patients were enrolled to one of two temperature management groups. Subjects underwent open abdominal procedures under general anesthesia lasting more than 120 minutes. **Group A** received warming using the AllonTM system with a core temperature set-point of 36.8⁰C. **Group B** received warming therapy using a convective air warming system. All intravenous fluids were warmed with standard devices in both groups. Rectal, forearm and fingertip temperatures were continuously recorded intraoperatively and for 2 hours post surgery. The incidence of postoperative shivering, subjective thermal comfort and the use of additional warming devices was noted.

RESULTS: There were no statistically significant differences (ChiSq, $p > 0.05$) in the demographics (age, weight, height, sex, ASA status, types of surgical procedures, medical history) and no statistically significant differences in the length of the procedure and ambient room temperature between the two groups.

Patients in **Group A** maintained more consistent *normothermia* intraoperatively (Fig.1). The mean core temperature at incision, 1 hour after incision and during the skin closing was significantly higher ($p < 0.01$) in **Group A** compared with **Group B**. In addition, the core temperatures immediately after admission to the PACU, at 1 hr and after 2 hrs, were significantly higher in **Group A** compared to **Group B**. Patients in **Group A** shivered less, maintained higher thermal comfort and required less use of additional warming devices in the PACU ($p < 0.01$).

CONCLUSION: While previous attempts to warm patients during surgery with water filled blankets or mattresses have been unsatisfactory, the new device tested proved superior to the widely-used convective air warming in the subjects studied. The feedback control resulted in higher temperature and in much less variation about the mean throughout the perioperative period. Markers of postoperative hypothermic stress were also reduced.

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2000 ASA Meeting Abstracts.

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Core temperatures (C) at selected perioperative times

