



# THE EFFICACY OF RESISTIVE HEATING COVERS VERSUS AIR FORCED WARMING: A RANDOMIZED CONTROLLED TRIAL

ANDREA FANELLI, MD, ELISA MOSCHINI, MD, SIMONE DI CIANNI, MD, DANIELA GHISI, MD AND ANDREA ORTU, MD

DEPT. OF ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE, UNIVERSITY OF PARMA, ITALY

## INTRODUCTION

Intraoperative mild hypothermia has been related to serious adverse outcomes (Tab. 1). Perioperative normothermia is associated with improved outcomes in patients undergoing all types of surgery. Consequently, warming systems are now routinely used during surgery. The aim of this prospective, randomized, controlled study was to compare the efficacy of steam sterilizable resistive carbon fibers heating under blanket (Fig. 1) versus air forced warming system to prevent intraoperative hypothermia in major orthopedic surgery.

CONSEQUENCE	AUTHOR
Surgical wound infection	Kurz et al
Duration of hospitalization	Kurz et al
Intraoperative blood loss	Schmied et al
Allogenic transfusion requirement	Schmied et al
Morbid cardiac events	Frank et al
Postoperative ventricular tachycardia	Frank et al
Urinary excretion of nitrogen	Carli et al.
Duration of vecoronium	Heier et al
Duration of atracurium	Leslie et al
Postoperative shivering	Just et al
Duration of postanesthetic recovery	Lenhardt et al
Plasma concentration of norepinephrina	Frank et al
Thermal discomfort	Kurz et al

TABLE 1. MAJOR CONSEQUENCES OF PERIOPERATIVE HYPOTHERMIA

## PATIENTS

50 patients, ASA I-III, undergoing elective total hip replacement.

## INTERVENTIONS

Patients were randomly allocated to receive intraoperative warming either with resistive covers (Group 1, n = 25) or air forced system (Group 2, n = 25). Intraoperative anesthetic regimen was the same in all studied patients, consisting of continuous lumbar plexus block with ropivacaine 0.5%, 20ml, and spinal anesthesia with levobupivacaine 0.75%, 15mg. Infusions were totally administered through a hot line at 37°C.

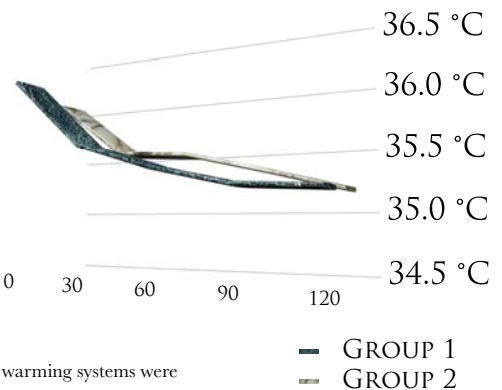


## MEASUREMENT

Core temperature was measured at the tympanic membrane using an aural probe. The baseline temperature was measured before spinal anesthesia was performed (time 0). Active warming systems were applied immediately after anesthesia was performed. Temperature was measured every 15 minutes till the end of surgery using the tympanic probe. We collected the following data intraoperatively: vital signs, crystalloid

and colloid i.v. infusions, blood loss, urine output, ambient temperature, surgical duration. The two groups were compared using one-way ANOVA and Student-Newman-Keuls tests.

## MEAN TEMPERATURES OVER TIME



## MAIN RESULTS

We enrolled 50 patients, 25 for each group. No

complications related to any warming systems were observed. The anthropometric characteristics of the patients were similar in each group, as well as surgical factors, ambient temperature, fluid balance and vital signs. The duration of surgery was 90±31 min in Group 1 and 90±24 min in Group 2. Baseline and final core temperature were, respectively, 36.1±0.4°C in Group 1 and 36.0±0.6°C in Group 2 before spinal and 35.1±0.6°C in Group 1 and 35.3±0.5°C in Group 2 at the end of surgery; these values did not differ significantly. None of the core temperatures measured at any time during surgery was significantly different between the two groups (Fig. 2).

## CONCLUSION

These results suggest that core temperatures were comparable with forced-air and steam sterilizable resistive carbon fibers heating under blanket during total hip replacement. Further studies are needed to examine the possible advantages of resistive covers in pre-warming patients and in terms of economical savings when routinely used.

## REFERENCES

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