

The experimental comparison of warming efficacy by three different fluid warmers at constant infusion rate



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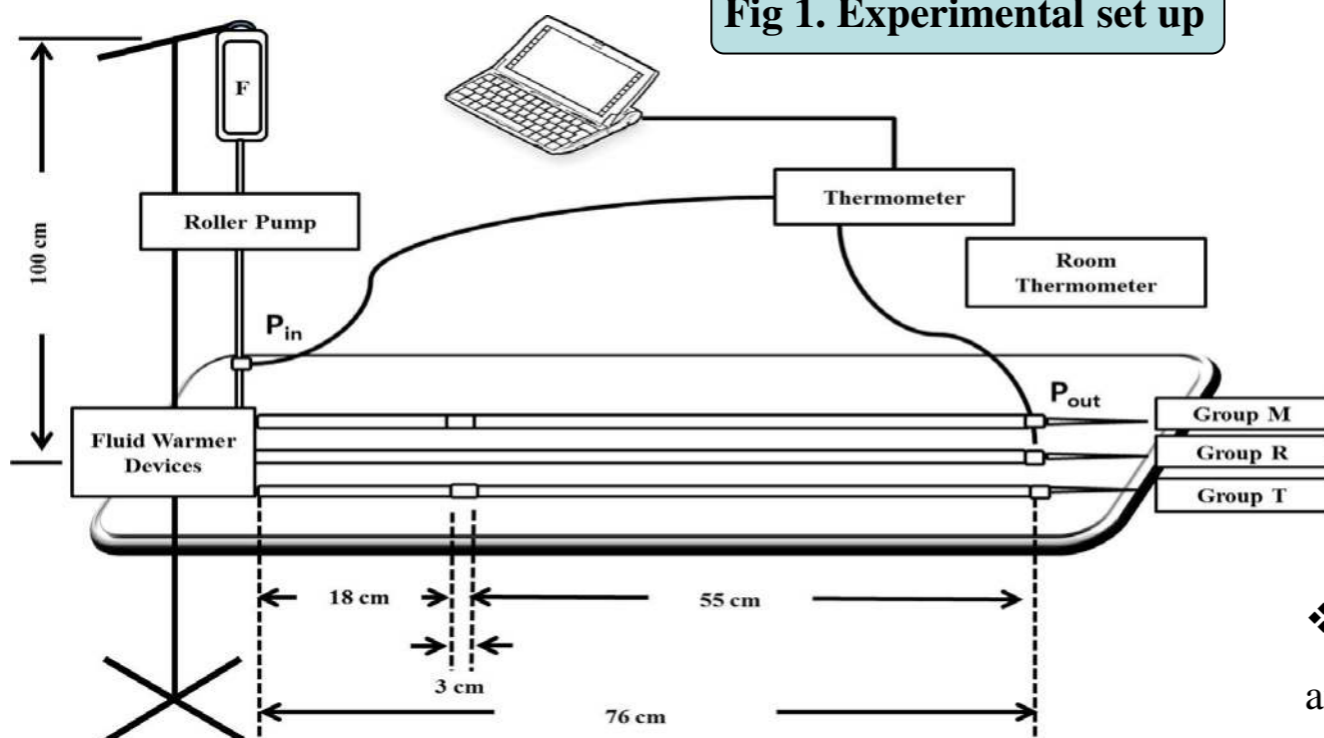
Background and goal of study

- ❖ Intraoperative hypothermia below 35°C, which can lead to postoperative hypothermia, commonly develops owing to the inhibition of normal thermoregulation.
- ❖ Guidelines recommend that intravenous fluids should be warmed to 37°C using a fluid warmer to prevent and treat inadvertent perioperative hypothermia in adults if a volumes >500 mL is infused.
- ❖ The use of warming devices, which operate based on various principles, is useful for maintaining perioperative normothermia as well as for reducing morbidity and complications.
- ❖ Most studies of these devices investigated the effectiveness of warming at flow rates above 1000 mL/h, whereas a few investigated slow to moderate flow rate.
- ❖ Therefore, in this study, we compared the fluid warming performances of Mega Acer Kit, Ranger, and ThermoSens at a flow rate of 440 mL/h.

Materials and methods

- ❖ The intravenous fluid warmers used in this study were the Mega Acer Kit® (Group M, n = 10), ThermoSens® (Group T, n = 10) and Standard Ranger (Group R, n = 10) with Set point : 41°C and Prewarming time: 10 min.
- ❖ Fluids, which had been stored in the operating room (22 ± 2°C) over the previous 24 h, were delivered at 440 ml/h through preheated warming devices.
- ❖ Recording of Fluid temperature was performed at 2 points during 1 hour each 5 min (Fig 1), and calculating ΔMBT at 1-h intervals over 4 h .

Fig 1. Experimental set up



- ❖ Artificial lung was ventilated without humidification.
- ❖ This proceeding was performed 10 times.

Results and discussion

Fig. 2. Mean of warming fluid temperatures of 10 trials

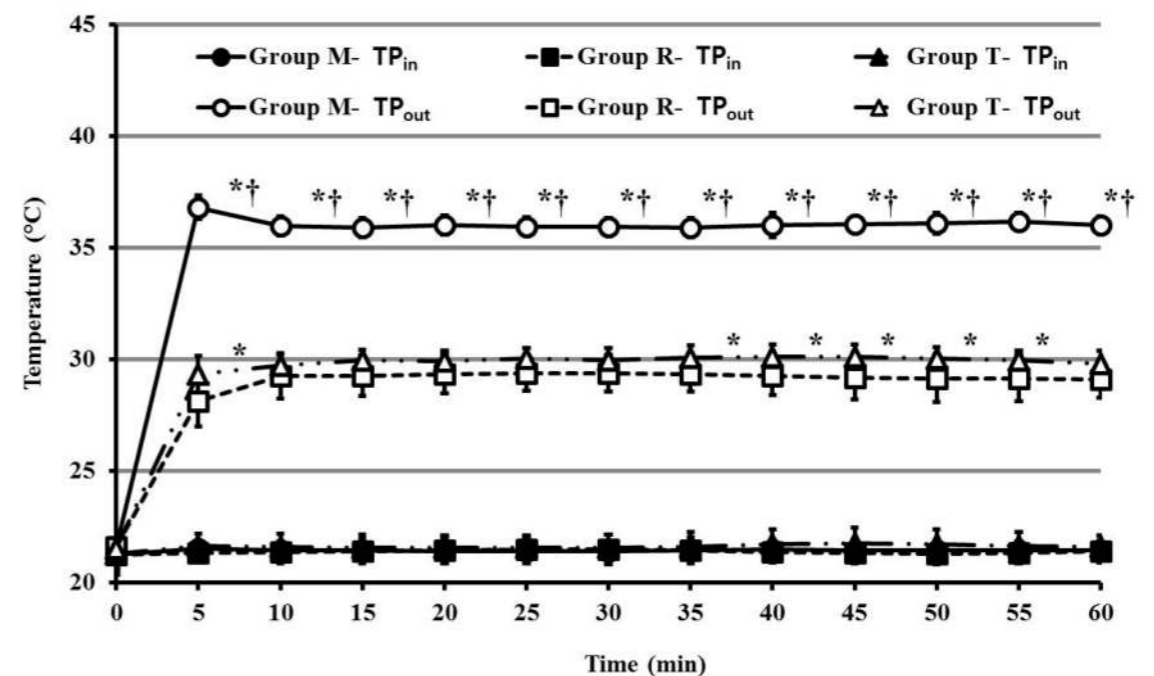


Fig. 3. Difference in temperature from previous to current results

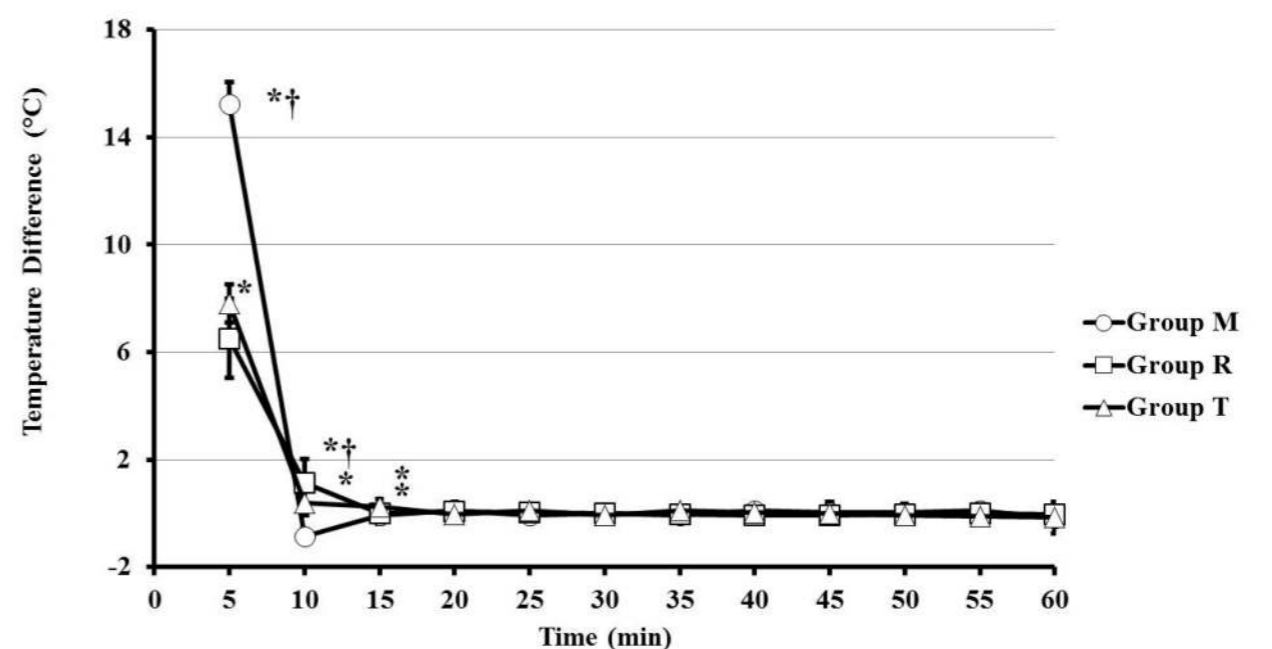
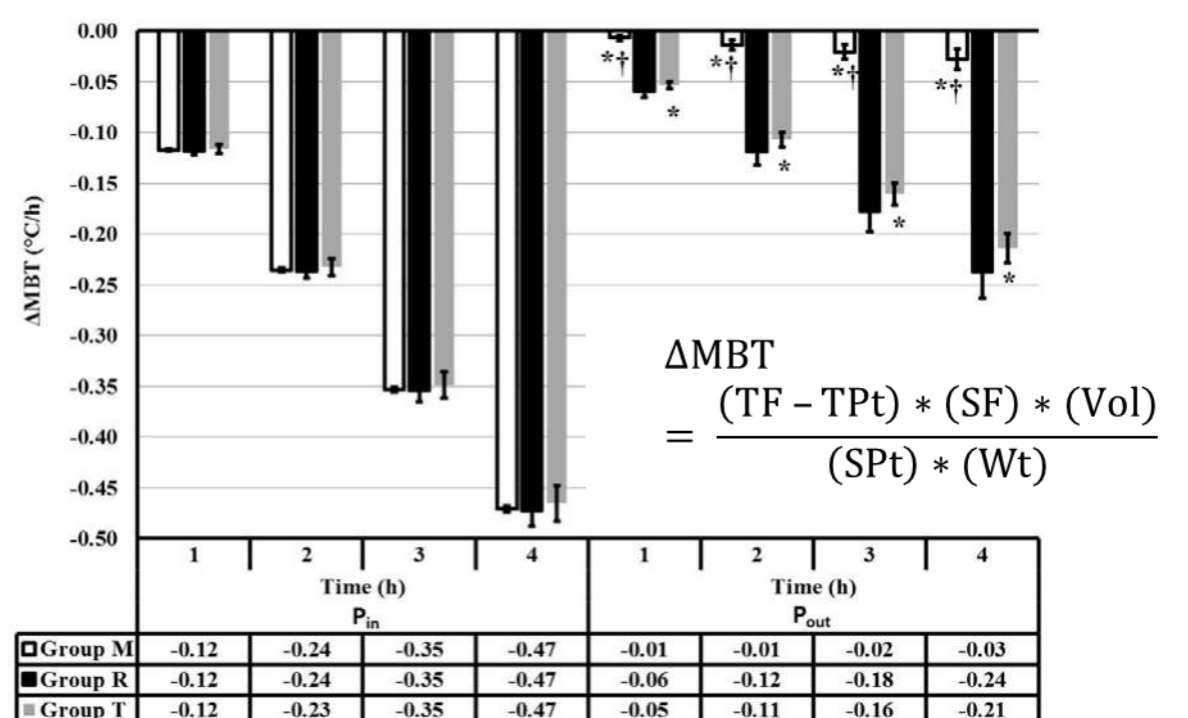


Fig. 4. Relationship between time (h) and anticipated decrease in mean body temperature (ΔMBT) at 1-h intervals over 4 h



Conclusions

- ❖ Mega Acer Kit can warm fluid more effectively compared with ThermoSens and Ranger with the smallest anticipated ΔMBT.
- ❖ Even though the infused flow rate is low, any type of fluid warmer should be applied for preventing or treating hypothermia.