

patients (Fig. 4). Vasoconstriction in hypothermic patients occurred at between 50 and 165 min (84 ± 42 min) following induction of anesthesia (Fig. 4). Once vasoconstriction occurred, skin temperature gradients remained $> 4^\circ\text{C}$ for the duration of surgery. As shown in fig. 1, hypothermic patients demonstrated significant vasoconstriction at esophageal temperatures between of 34.4°C and 36.3°C ($35.2 \pm 0.7^\circ\text{C}$) (Fig. 1).

An increased skin-surface temperature gradient resulted primarily from decreased fingertip temperatures. In all hypothermic patients, forearm skin temperatures were $3.5\text{--}6^\circ\text{C}$ below esophageal temperatures. This was in marked contrast to fingertip temperatures, which frequently dropped to $9\text{--}12^\circ\text{C}$ below esophageal temperatures.

Ambient temperatures did not significantly differ in the 2 groups (control, $21.8 \pm 1.0^\circ\text{C}$ vs. warming $22.0 \pm 1.1^\circ\text{C}$) ($p = 0.7$). No blood transfusions were required in either group of patients.

DISCUSSION

Decreased heat production, exposure to a cold en-

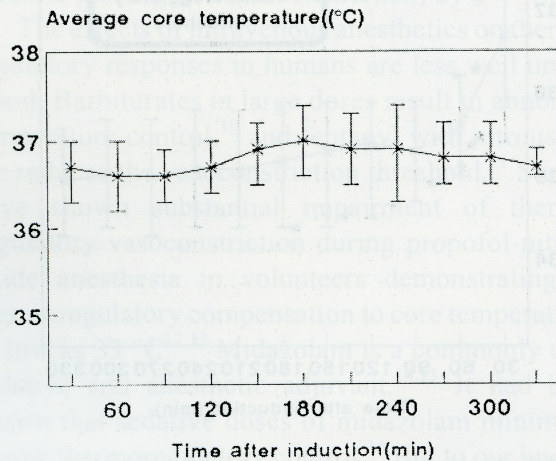


Fig. 2. Average core temperatures in 5 patients with added warming. Normothermia was maintained, and no thermoregulatory vasoconstriction was observed. The mean lowest core temperature was $36.3 \pm 0.4^\circ\text{C}$. There were no statistically significant differences as compared with the preoperative baseline temperature of $36.2 \pm 0.4^\circ\text{C}$. ($p = 0.73$). Values are expressed as the mean \pm SD.

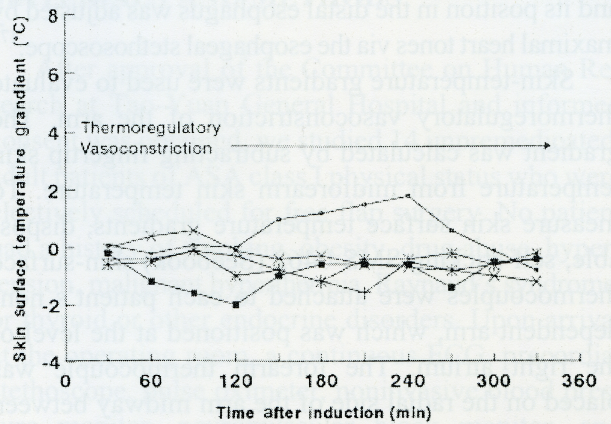


Fig. 3. Skin-surface temperature gradients (forearm-fingertip) in the 5 patients with added warming who maintained normothermia during anesthesia. Each patient is represented by a different symbol. No thermoregulatory vasoconstriction was observed, and the temperature at each time point showed no statistical differences when compared with the baseline value ($p > 0.05$). Values are expressed as mean \pm SD.

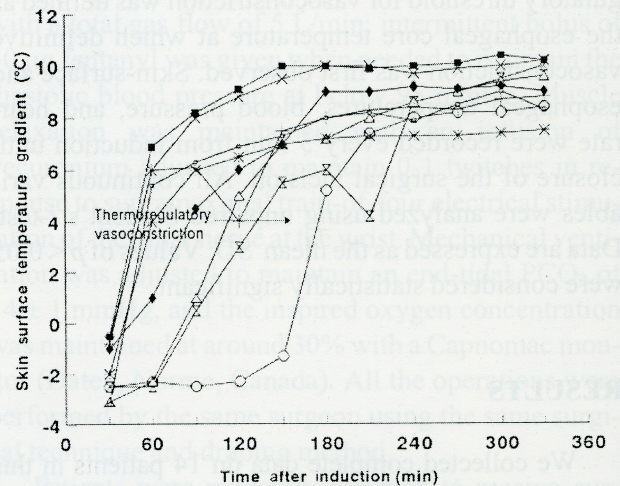


Fig. 4. Skin-surface temperature gradients (forearm-fingertip) in the 9 patients with no warming who became hypothermic during anesthesia. Each patient is represented by a different symbol. Thermoregulatory vasoconstriction (defined as a gradient 4°C) was observed in each patient at between 50 and 165 min (84 ± 42 min) following induction. The average core temperature at the time of vasoconstriction was $35.2 \pm 0.7^\circ\text{C}$. There were significant differences compared with the baseline preoperative temperature $36.3 \pm 0.4^\circ\text{C}$ ($p = 0.0008$). Values are expressed as the mean \pm SD.