

CORRESPONDENCE

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Mechanism of Action of Nifedipine on Intraoperative Hypothermia

To the Editor:—Anesthesia increases cutaneous heat loss and decreases metabolic heat production. The core temperature especially decreases during the 1st hour of anesthesia. This decrease is explained by internal body heat redistribution and not only negative heat balance. Thus, Just *et al.* have shown that preinduction skin-surface warming reduces core-to-peripheral tissue temperature gradient and so reduces the body heat redistribution and the core temperature decrease after induction.¹ Peripheral heat storage capacity is also an important factor to be considered.² Thus, preinduction skin-surface warming reduces core-to-peripheral tissue temperature gradient but also increases peripheral heat storage capacity. Vassilief *et al.* study the effect of nifedipine on body heat redistribution during the 1st hour of anesthesia.³ A previous study had shown that patients who took nifedipine a few days before surgery exhibited a smaller decrease of core temperature after induction.⁴ However, no explanation could be provided, because of the absence of mean skin temperature monitoring. The study by Vassilief *et al.* confirms these results.³ The authors advocate a decrease in core-to-peripheral temperature gradient. Nifedipine first increases cutaneous heat loss but leads to internal heat redistribution and promotes a new thermal equilibrium. The data of Vassilief *et al.* surprisingly do not show a significant difference between initial mean skin temperature and initial core temperature between patients taking nifedipine and control subjects. An alternative mechanism to the intraoperative preservation of core temperature may be a change in the volume of the peripheral compartment induced by vasodilatation, which then would increase the heat storage capacity without significant mean cutaneous temperature variation. Should this assumption be verified, the primary mechanism would be an increase of peripheral heat storage instead of a change in temperature gradient.

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In Reply:—Guillaume *et al.* are mistaken when they state that induction of general anesthesia increases cutaneous heat loss: the increase is trivial.¹ General anesthesia does decrease metabolic heat production,² but the decrease is only about 20%, which is insufficient to explain the typical rapid onset of core hypothermia after anesthetic induction. It is for this reason that we proposed core-to-peripheral redistribution of body heat as a primary force reducing core temperature in the immediate postinduction period.^{1,4} Consistent with the importance of redistribution, we have shown that peripheral tissue warming before induction of general⁴ and epidural⁵ anesthesia minimizes core hypothermia.

Pre-induction cutaneous warming is assumed to reduce redistribution hypothermia by increasing peripheral tissue heat content. However, in contrast with the statement of Guillaume *et al.*, peripheral tissue temperature was not measured in our prewarming studies^{4,5} or that of Just *et al.*⁶ However, we have recently measured arm and leg tissue temperature during prewarming; from these values we were able to estimate that heat content increases 77 ± 18 kcal in just 30 min and 133 ± 30 kcal in 1 h (table 1, unpublished data). These values are consistent with established rates of cutaneous heat transfer during forced-air warming^{7,8} and the heat capacity of the peripheral thermal compartment (about 150 kcal).⁹ The large in-