

## CORRESPONDENCE

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**In Reply:**—Werlhof has challenged Level 1's guarantee that 90% of HOTLINE® patients will wake up warm. Level 1's claim is supported by unpublished clinical data kept on file at the company. We found that, by changing only the infusion equipment during an extensive variety of elective surgical procedures, nine of ten patients ended the procedure warm, with temperatures  $\geq 36^{\circ}\text{C}$ , or losing no more than  $0.2^{\circ}\text{C}$ .

Fluid warmers are an important method of heat conservation.<sup>1</sup> During anesthesia, average heat production decreases from roughly  $70 \text{ kcal} \cdot \text{h}^{-1}$  to  $40\text{--}60 \text{ kcal} \cdot \text{h}^{-1}$  ( $1 \text{ kcal} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ ).<sup>2</sup> Because 17 kcals are required to increase the temperature of 1 l of room temperature ( $20^{\circ}\text{C}$ ) crystalloid to  $37^{\circ}\text{C}$ , administering just 3 l of room temperature crystalloid would require the equivalent of nearly 1 h of an anesthetized patient's entire energy expenditure. With the specific heat of the body being  $0.83 \text{ kcal} \cdot \text{kg}^{-1} \cdot ^{\circ}\text{C}^{-1}$ , 3 l of room temperature fluid would decrease body temperature by approximately  $0.9^{\circ}\text{C}$ .

Approximately 30 kcals are required to increase the temperature of 1 l of refrigerated blood ( $4^{\circ}\text{C}$ ) to  $37^{\circ}\text{C}$ . Therefore, approximately 0.5 h total energy expenditure is required to increase the temperature of 1 l of cold blood to  $37^{\circ}\text{C}$ . One liter of refrigerated blood would decrease body temperature by approximately  $0.5^{\circ}\text{C}$ .

A study using HOTLINE and no other intraoperative warming devices conducted with 36 adult patients undergoing major orthopaedic and gynecologic surgery confirmed, "The HOTLINE fluid warmer . . . prevented accidental hypothermia in all patients."<sup>3</sup> Nineteen patients receiving HOTLINE therapy underwent surgery that lasted approximately 4 h and received approximately 4 l of intravenous fluids. No patients receiving HOTLINE therapy finished surgery with a body temperature below  $35.5^{\circ}\text{C}$ .

Regarding the studies Werlhof cites that "demonstrate that fluid warming alone will not maintain normothermia," none involve a HOTLINE. All use old, conventional fluid-warming technologies with exposed patient tubing that fail to deliver body temperature fluids at any flow rate. Regarding the comment that "cooling at typical flow rates is trivial and of no consequence," the study referenced by Werlhof does not make, or even imply, this referenced conclusion.<sup>4</sup> Re-

garding Werlhof's statement that "intravenous fluid temperature cannot much exceed  $40^{\circ}\text{C}$  without harming blood cells," it has been demonstrated that erythrocyte integrity is not heat-compromised until a temperature of  $46^{\circ}\text{C}$ ,<sup>5</sup> and the American Association of Blood Banks' standard has allowed blood warming to  $42^{\circ}\text{C}$  since November 1994.<sup>6</sup>

Level 1 is committed to changing surgical results for the better, which is why Level 1 unconditionally guarantees HOTLINE. If any clinician is not satisfied with HOTLINE or its results, Level 1 will gladly make good on its money-back guarantee with no questions asked.

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## Neurolytic Celiac Plexus Block: Can Paraplegia and Death after Neurolytic Celiac Plexus Block Be Eliminated?

**To the Editor:**—The case report by Kaplan *et al.*<sup>1</sup> in which fluoroscopy was used to verify needle placement when attempting neurolytic celiac plexus block (NCPB) and that resulted in paraplegia and death raised a question.

The incidence of a catastrophic sequela after NCPB has been stated to be 1.0–2.0%.<sup>2-4</sup> Cases of paraplegia have been reported after NCPB

with the use of fluoroscopy to verify needle placement<sup>5,6</sup> and without the use of any type of roentgenography.<sup>2,7</sup> A Medline search revealed no complications from NCPB when needle placement was verified using computed tomography (CT).

During NCPB, CT interpreted by a radiologist, unlike fluoroscopy, which is usually interpreted by the anesthesiologist performing the