

## **Effects of thermoregulatory vasoconstriction on pulse hemoglobin measurements using a co-oximeter in patients undergoing surgery**

Ken Yamaura, MD (Associate Professor); Noriko Nanishi, MD (Anesthesiologist); Midoriko Higashi, MD (Assistant Professor), Sumio Hoka, MD (Professor Chairman)

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### **Study Objective**

To validate intraoperative pulse hemoglobin (SpHb) measurements in anesthetized patients with large forearm temperature – fingertip temperature gradients.

### **Design**

prospective and observational study.

### **Setting**

Operating room of a university hospital.

### **Patients**

28 patients undergoing surgery during general anesthesia, requiring arterial blood withdrawal.

### **Interventions**

Radial arterial blood pressure, forearm and fingertip skin surface temperatures, and SpHb were monitored.

### **Measurements**

Paired SpHb and arterial hemoglobin (Hb) measurements at different skin-surface temperature gradients.

### **Main Results**

A total of 175 paired SpHb and arterial Hb measurements were analyzed. The mean SpHb to arterial Hb differences in each group were  $0.33 \pm 1.41$  g/dL in the  $< 1^\circ\text{C}$  group of the forearm temperature – fingertip temperature gradient,  $-0.31 \pm 1.24$  g/dL in the  $1 - 2^\circ\text{C}$  group,  $-0.59 \pm 1.11$  g/dL in the  $2 - 3^\circ\text{C}$  group, and  $-0.53 \pm 0.87$  g/dL in the  $> 3^\circ\text{C}$  group ( $P < 0.05$ ). The percentage of nonmeasurable SpHb due to low perfusion state was 0% (0 of 115 paired measurements) in the  $< 1^\circ\text{C}$  group, 6.7% (2 of 30 pairs) in the  $1 - 2^\circ\text{C}$  group, 16.7% (3 of 18 pairs) in the  $2 - 3^\circ\text{C}$  group, and 66.7% (8 of 12 pairs) in the  $> 3^\circ\text{C}$  group.

### **Conclusion**

SpHb measured at fingertip was significantly affected by the perfusion state, with lower perfusion associated with lower SpHb. Thermoregulatory vasoconstriction affects measurement of SpHb.