

## **Postoperative Noninvasive Hemoglobin Monitoring Is Useful to Prevent Unnoticed Postoperative Anemia and Inappropriate Blood Transfusion in Patients Undergoing Total Hip or Knee Arthroplasty: A Randomized Controlled Trial.**

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### **Abstract**

**Introduction:** Postoperative nadir hemoglobin (Hb) is related to a longer length of stay for geriatric patients undergoing orthopedic surgery. We investigated whether postoperative pulse Hb (SpHb) measurement is useful for avoiding anemia and inappropriate blood transfusion after total hip arthroplasty and total knee arthroplasty.

**Material and methods:** This prospective randomized controlled study included 150 patients randomly assigned to receive blood transfusion, either guided by SpHb monitoring (SpHb group) or based on the surgeons' experience (control group). The target laboratory Hb value was set to >8 g/dL at postoperative day 1 (POD1). The primary endpoints were the product of total time and degree of SpHb <8 g/dL (area under SpHb 8 g/dL) during the period up to POD1 and the incidence of laboratory Hb <8 g/dL at POD1. The secondary endpoints were the amount of blood transfusion and inappropriate blood transfusion, which was defined as allogeneic blood transfusion unnecessary in a case of SpHb >12 g/dL or delayed transfusion in a case of SpHb <8 g/dL.

**Results:** The area under SpHb 8 g/dL was  $37.6 \pm 44.1$  g/dL-min (5 patients) in the control group and none in the SpHb group ( $P = .0281$ ). There was 1 patient with Hb <8 g/dL at POD1 in the control group. There was no difference in laboratory Hb levels and the amount of blood transfusion. Forty-one patients (19 in the control group and 22 in the SpHb group) received an allogeneic blood transfusion. Among these patients, 7 in the control group and none in the SpHb group received inappropriate blood transfusion ( $P = .0022$ ).

**Discussion:** The SpHb monitoring could reduce unnoticed anemia, which may prevent complications and be useful in avoiding unnecessary and excessive blood transfusion.

**Conclusion:** Postoperative SpHb monitoring decreased the incidence of transient, unnoticed anemia during the period up to POD1 and inappropriate blood transfusion.