

## **Prospective Trial of Noninvasive Hemoglobin Monitoring for Outpatient Total Joint Arthroplasties**

Evan Michael Dugdale<sup>1</sup>, Benjamin David Mallinger, Nicholas Bedard<sup>1</sup>, Cory Gene Couch, Tad M Mabry<sup>1</sup>, Kevin I Perry<sup>1</sup>, Rafael Jose Sierra<sup>1</sup>, Michael J Taunton<sup>1</sup>, Robert T Trousdale, Matthew Philip Abdel<sup>1</sup>

<sup>1</sup>Mayo Clinic

**INTRODUCTION:** Total joint arthroplasty (TJA) is increasingly being performed as an outpatient (i.e., same-day discharge) procedure. Postoperatively, orthostatic hypotension or lightheadedness can lead to questions regarding the patient's hemoglobin level prior to discharge. The purpose of this study was to prospectively assess the reliability, accuracy, and patient and nurse satisfaction of postoperative noninvasive hemoglobin (nHgb) monitoring compared to invasive serum hemoglobin (iHgb) lab draw in the outpatient TJA setting.

**METHODS:** We prospectively enrolled 200 outpatient unilateral TJAs (122 hips, 78 knees). Postoperatively, both nHgb and iHgb values were obtained at a mean of 35 minutes apart. Surveys were completed by patients and nurses. The strength of agreement between the two hemoglobin monitoring methods was evaluated using the Bland and Altman 95% limits of agreement.

**RESULTS:** The mean preoperative serum hemoglobin was  $14.2 \pm 1.1$  g/dL. The mean postoperative iHgb and nHgb values were  $13.3 \pm 1.2$  g/dL and  $13.3 \pm 1.5$  g/dL, respectively. The Bland-Altman 95% limits of agreement were -3.2 and +3.1, indicating that 95% of patient iHgb values are expected to fall between these two limits relative to the patient's nHgb value. Among the 136 patients with nHgb >11.5 g/dL, 98% had an iHgb value  $\geq 11$  g/dL. Patients reported less pain for the nHgb test compared to the iHgb test (1.0 vs. 2.8;  $p < 0.001$ ) and 96% of patients preferred the nHgb test. Following the nHgb test, 73% of patients and 81% of nurses were somewhat to significantly more reassured about same-day discharge.

**DISCUSSION AND CONCLUSION:** Routine nHgb testing can rapidly screen outpatient TJA patients for acute anemia prior to discharge. With nHgb >11.5 g/dL, iHgb was almost always  $\geq 11$  g/dL. Most patients and nurses felt more reassured about same-day dismissal after nHgb monitoring.