

Digital Regional Nerve Block and Accuracy of Non-invasive Hemoglobin Monitor

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Introduction

Blood hemoglobin levels (Hb) can be continuously monitored by noninvasive spectrophotometric sensors (Masimo SpHb). While this sensor often correlates well with invasively obtained blood samples analyzed by standard laboratory Co-Oximetry (tHb), SpHb sometimes may not be as accurate as is clinically necessary. (1) Because the accuracy of SpHb is perfusion dependent, we proposed that increasing finger perfusion (PI) by a lidocaine digital nerve block (DNB) would improve the accuracy of SpHb.

Methods

After approval from our Committee on Human Research and written patient consent, 16 adult patients received general anesthesia for spine surgery and received a DNB (1% lidocaine) of one finger. Initial SpHb – tHb measurements were determined before surgical incision and approximately every hour thereafter. Primary outcomes were based on differences between SpHb – tHb. These patients were compared to a group of patients (N=20) previously studied who did not undergo DNB. (1) The SpHb – tHb difference was defined as “very accurate” if it was < 0.5 gm/dl, “accurate” if it was between 0.5 – 1.5 gm/dl and “inaccurate” if the difference was > 2.0 gm/dl. PI was also identified for both groups of patients.

Results

Data consisted of 46 paired measurements of SpHb – tHb which were compared to the 78 measurements in our previous study. (1) Overall, 48% of the SpHb – tHb measurements were very accurate in the DNB patients as compared to 24% of the patients without a DNB. (Table, p=0.01) Before surgical incision, the SpHb – tHb differences were initially inaccurate 25% of the time in both groups of patients. Subsequently, only 7% of the measurements (N=32) in DNB patients versus 20% of those (N=58) in the patients without a DNB (1) had SpHb – tHb measurements which were inaccurate. In patients with a DNB, 50% were very accurate as compared to only 26% in patients without a DNB. (1) (Table, p=0.02) The PI was both higher and less variable in the patients with a DNB.

Conclusion

A DNB significantly increased the number of measurements that were very accurate (ie. SpHb – tHb < 0.5 gm/dl) and decreased measurements which were inaccurate (ie. SpHb – tHb > 2.0 gm/dl). (Table) Presumably the DNB increased blood flow to the finger as evidenced by the improved PI. We conclude that a DNB or alternative method for increasing finger blood flow (eg. topical vasodilator or hand warming) would increase the accuracy of SpHb during critical times (eg. blood loss) in the perioperative period.

1. Miller RD, Ward TA, Shiboski SC, Cohen NH. Comparison of three methods

of hemoglobin monitoring in patients undergoing spine surgery. *Anesth Analg* (In Press)