

Evaluation of the Non-Invasive Spot Check for Hemoglobin in the Trauma Intensive Care Unit

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Introduction

Advancement in technology has allowed for non-invasive hemoglobin measurements. Previous studies have reported the use of continuous non-invasive hemoglobin device in trauma patients. The use of Spot check non-invasive hemoglobin measurements in trauma Intensive Care Unit (ICU) has not been described. Hypothesis: The aim of our study was to assess the concordance in Hemoglobin (Hgb) levels obtained non-invasively with Spot check Pronto-7(R) Pulse Co-Oximeter against invasive method in severely injured Trauma ICU patients.

Methods

We performed a prospective cohort analysis of severely injured trauma patients admitted to the ICU of our level 1 trauma center. Invasive (IHgb) and Spot check hemoglobin measurements were obtained simultaneously within first 24 hours of admission to ICU. Each Spot check was measured three times per invasive Hgb value. The Intra-class correlation coefficient (ICC) between the two methods was estimated. Sensitivity, Specificity, Positive Predictive value (PPV), and Negative Predictive values (NPV) were also calculated.

Results

Spot check Hgb measurements were attempted in 89 patients and had a success rate of 87% (n=78). A total of 78 invasive and 234 Spot check Hgb measurements were obtained. The mean age was 41±21 years, 74% were male, and mean Injury Severity Score (ISS) 21±14. The mean IHgb was 12.44 ± 2.36 g/dL and mean Spot check Hgb 12.28 ± 1.60 g/dL. The difference in mean was 0.14 ± 1.53 g/dL p-value=0.43. Spot check Hgb values had strong correlation with invasive Hgb measurements (ICC=0.93; CI: 0.89-0.94) and within the repetitive Spot check Hgb values (ICC=0.70; CI: 0.57-0.80). Accuracy was 86%, Sensitivity 97%, PPV 88%, NPV 67%, and Specificity 33%.

Conclusions

Spot check Hgb monitoring has excellent correlation with invasive Hgb measurements. Application of Spot check has better clinical use compared to its previous continuous Hgb monitoring counterpart. This new technology will allow for immediate and accurate Hgb measurements in critically ill trauma patients.