

Impact of Masimo Continuous Pulse Hemoglobin Sensor Modifications. Lee M., Dastrange M., Yao A., Fleming N. *Proceedings of WARC 2010*. Abs. A3.

Background

Masimo Lab's recent development of Rainbow Pulse CO-Oximetry which utilizes multiple wavelengths of light allows us to monitor total hemoglobin (SpHb) and SpO₂. Since introducing the Rainbow Pulse CO-Oximeter, Masimo has made several software and sensor upgrades. Our previous evaluation of Masimo Version D and Version E software systems in cardiac surgical patients showed that SpHb did not correlate consistently with measured Hgb from arterial blood gas draws and that this correlation shifted after CPB. In this current study, we examine the impact of sensor modifications (Version A, C and E) on measurement of SpHb.

Methods

After IRB approval, data was collected retrospectively. SpHb measurements were compared to concurrent arterial blood gas Hgb values. Pearson correlation, linear regression, and Bland-Altman bias were calculated with Prism statistical software to characterize the accuracy of the different sensors.

Results

Data from the Version A (9 patients, 36 data pairs), Version C (23 patients, 96 data pairs), and Version E (4 patients, 21 data pairs) sensors were analyzed. Results of the statistical analysis are summarized in the table below. Subgroup analysis was also used to compare pre- and post-bypass values. The differences in correlations post-bypass seen in our previous analysis were no longer seen with the Version A and C sensors. There was insufficient distribution of data in the Version E group to compare pre- and post-bypass values.

Conclusions

Our preliminary results show that the updated Version E sensor demonstrates improved accuracy from both Version A and C. However, there were fewer data pairs from the Version E group. Additional data from patients using the Version E sensor is needed to establish the accuracy of this sensor. Improvements in software and sensors to increase accuracy of SpHb appear to make the Masimo Rainbow Pulse CO-Oximeter a useful monitor of intraoperative bleeding.