

Comparison Between a New Noninvasive Continuous Technology of Spectrophotometry-based and RBC Count for Hemoglobin Monitoring During Surgery with Hemorrhagic Risk

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Background

Perioperative bleeding is a frequent complication during an anaesthesia. Hemoglobin monitoring is needed in order to manage a red blood cell (RBC) transfusion decision. The measure of hemoglobin is commonly realized either in the laboratory, a relocated laboratory, or at the bedside of the patient by azide-methaemoglobin reaction (point-of-care). Recently, a new noninvasive continuous technology of spectrophotometry-based hemoglobin monitoring has been introduced. This work aims to estimate the reliability of a prototype of this technology.

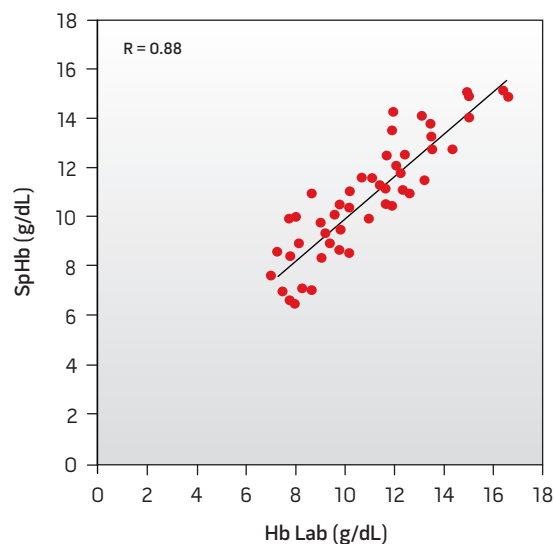
Methods

During surgery with an hemorrhagic risk, an RBC count and a spectrophotometric hemoglobin measurement were realized simultaneously (Radical-7 Rainbow, v. 7.3.0.2, Sensor rev. C, Masimo Inc, Irvine, CA, USA). The measures were performed at the beginning and at the end of intervention, before and after an RBC transfusion and every time it was considered necessary by the anaesthesiologist in charge of the patient. A correlation between laboratory and the noninvasive values was performed.

Results

20 patients subjected to an urologic surgery procedure with hemorrhagic risk were included with 54 pairs of measures. The correlation between laboratory and the noninvasive values was 0.88. The bias was 0.26 g/dL with a standard deviation of 1.11 g/dL.

Figure 1 – Scatterplot of RBC Laboratory (Hb Lab) and Noninvasive Hemoglobin Measurement (SpHb)



Conclusions

This study performed in clinical conditions confirms the first tests realized by the manufacturer. The correlation is good, suggesting the possibility of a daily use of this technology. This correlation and the standard deviation should improve with continued sensor developments. Further studies to define the indications and the limits (vasoconstriction, hypothermia) of this technology are necessary.