

Multicenter comparison of three intraoperative hemoglobin trend monitoring methods.

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Transfusion decisions are guided by clinical factors and measured hemoglobin (Hb). Time required for blood sampling and analysis may cause Hb measurement to lag clinical conditions, thus continuous intraoperative Hb trend monitoring may provide useful information. This multicenter study was designed to compare three methods of determining intraoperative Hb changes (trend accuracy) to laboratory determined Hb changes. Adult surgical patients with planned arterial catheterization were studied. With each blood gas analysis performed, pulse cooximetry hemoglobin (SpHb) was recorded, and arterial blood Hb was measured by hematology (tHb), arterial blood gas cooximetry (ABGHb), and point of care (aHQHb) analyzers. Hb change was calculated and trend accuracy assessed by modified Bland-Altman analysis. Secondary measures included Hb measurement change direction agreement. Trend accuracy mean bias (95% limits of agreement; g/dl) for SpHb was 0.10 (- 1.14 to 1.35); for ABGHb was - 0.02 (- 1.06 to 1.02); and for aHQHb was 0.003 (- 0.95 to 0.95). Changes more than ± 0.5 g/dl agreed with tHb changes more than ± 0.25 g/dl in 94.2% (88.9-97.0%) SpHb changes, 98.9% (96.1-99.7%) ABGHb changes and 99.0% (96.4-99.7%) aHQHb changes. Sequential changes in SpHb, ABGHb and aHQHb exceeding ± 0.5 g/dl have similar agreement to the direction but not necessarily the magnitude of sequential tHb change. While Hb blood tests should continue to be used to inform transfusion decisions, intraoperative continuous noninvasive SpHb decreases more than - 0.5 g/dl could be a good indicator of the need to measure tHb.