Introduction

- Pulse oximetry is essential for safe clinical care
- Pulse oximeters (SpO_2) are commonly used for monitoring arterial oxygen saturation in vitro

Specific Aims

- Study the performance of three modern pulse oximeters of varying cost during hypoxemia and severe anemia utilizing a novel in vitro circulation system
- Determine if pulse oximeter performance is impacted by severe anemia in vitro

Methods

- Three study oximeters of varying cost were selected
- Rare, single donor human whole blood was mixed with normal saline to generate four desired hematocrit (Hct) levels: 40%, 30%, 20%, and 10%
- Oxygen or nitrogen was bubbled through the blood to generate various oxygen saturation levels, and the blood cycled through the circulation system

Results

- The CMS 50DL showed greater bias and A_90% values than the two other oximeters
- The Masimo Radical maintained strong correlation of the three oximeters

Discussion

- The Masimo Radical maintained strong SaO_2/SpO_2 correlation at all but the most extreme Hct levels
- The handheld lower cost device (Acare AH-M1) had decreased SaO_2/SpO_2 correlation compared to Masimo. Correlation decreased at lower Hct levels
- The consumer grade fingertip device (CMS 50-DL) had the poorest SaO_2/SpO_2 correlation of the three oximeters

References

