

Accuracy of Pulse Oximeter Readings from Probe Placement on Newborn Wrist and Ankle.

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Objective

To compare the accuracy of pulse oximetry oxygen saturation (SpO₂) measured on the wrist compared with the ipsilateral palm, and SpO₂ measured on the ankle compared with the ipsilateral sole.

Study Design

In this prospective observational study, neonates admitted to the neonatal intensive care unit were enrolled. We recorded SpO₂ (Masimo Radical-7 pulse oximeter) detected at the palm and ipsilateral wrist initially, then at 30 s, and at 1 min, and we repeated the same procedure over the sole and ipsilateral ankle. We recorded the time to obtain the SpO₂ readings from all these sites. Regression analysis was performed to determine the relationship between paired SpO₂ measurements. The mean difference (bias) and standard deviation of the paired SpO₂ differences (precision) were calculated (Bland-Altman plots).

Results

A total of 150 patients (birth weight 2381±1020 g, gestational age 34.3±4.3 weeks, median postnatal age 3.5 days (25th-75th percentile 1-16 days)) were enrolled. There was a good correlation between SpO₂ measured at the palm versus the wrist ($r=0.95$, $P<0.001$ (right); $r=0.97$, $P<0.001$ (left)) and between SpO₂ measured at the sole versus the ankle ($r=0.92$, $P<0.001$ (right); $r=0.91$, $P<0.001$ (left)). There was also a good agreement between paired SpO₂ measurements from these sites. The bias and precision for SpO₂ at the right palm and right wrist was $0.08\pm0.94\%$ and for the left palm and left wrist $0.22\pm0.87\%$. Similarly, the bias and precision for SpO₂ at the right sole and right ankle was $-0.03\pm0.93\%$ and for the left sole and left ankle was $-0.01\pm0.93\%$.

Conclusion

Our results show that the wrist and ankle can be used as alternative sites to measure SpO₂ in newborn infants in place of the routinely used palm or sole.