COMMENTS ON 'EVALUATION OF A PULSE OXIMETER SENSOR TESTER'

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Dear Editor,

The full extent of the inaccuracy of the inaccurate probes could not be demonstrated in this evaluation [1]; as data was only collected when clinical need required blood gas analysis.

Each patient was monitored by a pulse oximeter system separate to a second pulse oximeter system used to gather trial data. The second pulse oximeter system comprised of a monitor, an accurate probe, an under-reading probe, and a high-reading probe. When the clinical need for blood gas analysis arose, the opportunity was taken to compare co-oximeter data with data obtained from the second pulse oximeter system by sequentially installing and taking readings from the accurate, low reading, and high reading probes.

Pulse oximeter monitors display a SpO₂ value that is a sophisticated average of the data collected over the preceding period. This technique reduces beat to beat variations and reduces the impact of other undesirable factors. When pulse oximeter probes are exchanged in rapid sequence the SpO₂ value displayed on the monitor is influenced by the data in the monitor memory obtained by the preceding sensor. On losing input/changing probes the monitor will have a 'memory' of the preceding readings. For sequential probes this results in the monitor displaying a SpO₂ value that is calculated partially with data from the previous probe. The change from an 'accurate' to a 'low reading probe' will result in a SpO₂ displayed on the monitor being skewed towards the initial 'accurate' data. Similarly the change from a 'low reading probe' to a 'high reading probe' will result in a SpO₂ value displayed on the monitor being skewed towards the 'low reading' data.

In aiming for 'near simultaneous' readings for blood gas and pulse oximetry the trial method could not allow for a time period long enough for full stabilisation each time a probe was changed. If blood gas analysis could have taken place for each independent fully stabilised pulse oximeter probe there would have been an even greater match between predictions and SpO₂ accuracy levels. This would have required three times as many arterial blood samples than dictated by clinical need, and was therefore not an option available to the authors.

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