Accuracy of the Masimo SET® LNCS neo peripheral pulse oximeter in cyanotic congenital heart disease.

Cardiol Young. 2015 Oct 16:1-4. [Epub ahead of print]

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Introduction: Non-invasive peripheral pulse oximeters are routinely used to measure oxyhaemoglobin saturation (SpO2) in cyanotic congenital heart disease. These probes are calibrated in healthy adult volunteers between arterial saturations of ~75 and 100%, using the gold standard of co-oximetry on arterial blood samples. There are little data to attest their accuracy in cyanotic congenital heart disease. Aims We aimed to assess the accuracy of a commonly used probe in children with cyanotic congenital heart disease.

Methods: Children with cyanotic congenital heart disease admitted to the Paediatric Intensive Care Unit with an arterial line in situ were included to our study. Prospective simultaneous recordings of SpO2, measured by the Masimo SET® LNCS Neo peripheral probe, and co-oximeter saturations (SaO2) measured by arterial blood gas analysis were recorded.

Results: A total of 527 paired measurements of SpO2 and SaO2 (using an ABL800 FLEX analyser) in 25 children were obtained. The mean bias of the pulse oximeter for all SaO2 readings was +4.7±13.8%. The wide standard deviation indicates poor precision. This mean bias increased to +7.0±13.7% at SaO2 recordings <75%. The accuracy root mean square of the recordings was 3.30% across all saturation levels, and this increased to 4.98% at SaO2 <75%.

Conclusions: The performance of the Masimo SET® LNCS Neo pulse oximeter is poor when arterial oxyhaemoglobin saturations are below 75%. It tends to overestimate saturations in children with cyanotic congenital heart disease. This may have serious implications for clinical decisions.