

Motion Resistant Pulse Oximetry in Neonates.

Sahni R., Gupta A., Ohira-Kist K., Rosen T.S. *Arch Dis Child Fetal Neonatal Ed.* 2003 Nov;88(6):F505-8.

Background

Pulse oximetry is widely used in neonates. However, its reliability is often affected by motion artefact. Clinicians confronted with questionable oxygen saturation (SpO₂) values often estimate the reliability by correlating heart rate (HR) obtained with the oximeter with that obtained by electrocardiogram.

Objective: To compare the effects of motion on SpO₂ and HR measurements made with Masimo signal extraction technology and those made with a Nellcor N-200.

Methods

Continuous pulse oximetry and HR monitoring were performed in 15 healthy, term infants (mean (SD) birth weight 3408 (458) g) undergoing circumcision, using Masimo and Nellcor pulse oximeters and a standard HR monitor (Hewlett-Packard). Simultaneous minute by minute behavioural activity codes were also assigned. Baseline data were collected for 10 minutes when the infant was quietly asleep and then continued during and after circumcision for a total duration of one hour. The oximeter HR and SpO₂ values were compared and related to HR values obtained by ECG during all three periods. The effect of behavioural activity on SpO₂ and HR was also evaluated.

Results

When compared with results obtained with the Nellcor, the mean SpO₂ and HR were higher and the incidence of artefact lower with the Masimo during all three periods. Masimo HR more accurately predicted HR obtained with a standard monitor, with lower residual error. SpO₂ and HR values obtained with the Nellcor were lower and more variable during all behavioural states, especially crying, when excessive motion artefact was most likely.

Conclusions

The data suggest that Masimo signal extraction technology may offer improvement in pulse oximetry performance, particularly in clinical situations in which extreme motion artefacts are likely.