

Comparison of New Generation Motion-Resistant Pulse Oximeters.

Townshend J., Taylor B.J., Galland B., Williams S. *J Paediatr Child Health*. 2006 Jun;42(6):359-65.

Aim

To compare the performance of pulse oximeters during movement and brachial artery occlusion.

Methods

Three machines (Masimo SET, using Masimo SET LNOP Pdt pediatric sensor, Mars 2001 using Novametrix paediatric sensor no. 6455 and Nellcor 595 using Nellcor 595 Oximax-P pediatric sensor and Nellcor 595 MAX-FAST adhesive forehead reflectance sensor) were used simultaneously on the left hand and forehead. The subjects were 18 healthy children aged 6-10 years. Interventions were 20 sequential 90 degrees body turns from mimicking normal movements while asleep followed by step increases in brachial artery occlusion. Mean heart rate (HR) from the four machines was compared with ECG HR. Hemoglobin O₂ saturation was compared with a baseline saturation and the proportion of epochs with false (low) saturation values.

Results

The mean difference from ECG HR was not clinically significantly different for any machine but the limits of agreement were such that the Mars Model 2001 and Nellcor 595 (forehead) could have clinically important differences from ECG-derived HR (-20.04-15.00 and -14.95-14.04, respectively). Only the Nellcor 595 with finger probe had limits of agreement within the a priori set value of 4%. The prevalence of epochs with an hemoglobin O₂ saturation of greater than 4% below baseline values was lowest for the Nellcor 595 finger probe (1.59%) and highest for the Nellcor forehead probe (20.45%). During brachial artery occlusion, all machines performed well up to within 20 mmHg of total occlusion.

Conclusions

Current motion-resistant pulse oximeters performed well but only the Nellcor 595 with finger probe achieved our a priori set standards.