

Comparison of Two New Generation Pulse Oximeters: The Masimo Radical and the Philips Viridia

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Introduction

"Next generation" pulse oximeters claim motion and low perfusion tolerance. In the NICU, where pulse oximetry has been useful in preventative protocols, as well as, for the detection of life-threatening oxygenation events, the combined effects of low perfusion, motion, and unpredictable interference levels still challenge some pulse oximeters' abilities to accurately and continuously monitor. These researchers tested two next generation pulse oximeters - the Masimo SET Radical v4 and the Philips Viridia Rev C1 - for the performance of each manufacturer's algorithms in detecting and maintaining difficult to read signals.


Methods

Nineteen (19) neonates were studied for a total of 6811 minutes. ECG readings were used to corroborate pulse rate data. Oximeter probes were placed according to manufacturer specification. The criteria for the evaluation were as follows:

1. False desaturation - A reading of <85% saturation with no corroborating physical findings or any corroborating reading from the other pulse oximeter constituted a "false desaturation."
2. Drop Out - An oximeter that gave no SpO₂ and pulse rate reading was considered to have "dropped out."
3. Changes in heart rate - A displayed heart rate differing by more than 25 beats per minute from the value reported by the ECG was considered erroneous.

Results

The Philips Viridia zeroed out and gave no signal for more than 10 times as many instances, and for more than 25 times as long, as the Masimo Radical. There were significant differences in the false desaturations of the two devices, as well as significant differences between the devices in erroneous pulse rate as compared to the ECG. In false desaturations and erroneous pulse rate, the Philips Viridia exceeded the Masimo Radical by greater than twofold instances and threefold duration.

Comparison of the Masimo Radical and the Philips Viridia						
	Signal Dropouts (events)	Signal Dropouts (minutes)	Changes in HR>25 BPM (events)	Changes in HR> 25 BPM (minutes)	False Desaturations <85% (events)	False Desaturations <85% (minutes)
	19	8	7	5	56	15
Philips Viridia C1	194	201	26	11	176	31

*p<0.0001

Authors' Conclusion

"The importance of the evaluation of the device in the at risk population cannot be over-emphasized. Although the newer pulse oximetry technologies are not able to generate a valid pulse oximetry reading in all clinical circumstances, technological advances are not uniform among the different models available. **The Masimo Radical appears to have an advantage in monitoring the at risk neonate.**"