

A Comparison of the Failure Times of Pulse Oximeters during Blood Pressure Cuff-Induced Hypoperfusion in Volunteers.

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Important information may not be obtained if the pulse oximetry signal is lost during inflation of a cuff for blood pressure measurement, particularly in patients with hemodynamic instability. In the present study, we compared the failure times of pulse oximeters during cuff-induced hypoperfusion in volunteers.

A pulse oximeter sensor was attached to the index finger, and a blood pressure cuff was attached to the same arm of each volunteer. Masimo SET Radical (Masimo), Nellcor N-395 (N-395), Nellcor N-20PA, and Nellcor D-25 were tested. To evaluate the failure time of each pulse oximeter, time to peak of cuff pressure, time to loss of signal, time to recovery of signal, and failure interval were measured. All measurements were performed three times for each pulse oximeter and were averaged.

There were no differences in hemodynamic measurements among the groups. Time to loss of signal was longer in Masimo than the other pulse oximeters. Masimo and N-395 showed significantly shorter times to recovery of signal than those of the other two pulse oximeters. Failure interval was in the order of Masimo \ll N-395 $<$ Nellcor D-25 = Nellcor N-20PA. Masimo did not lose a signal as rapidly as the other oximeters studied. Masimo was similar in performance to the N-395 at providing useful data sooner than conventional technology after a loss of the signal.

These observations suggest that data will be more available with fewer false-positive alarms when using the Masimo oximeter followed by the N-395 when compared with conventional oximeters.