Comparison of Two New Generation Pulse Oximeters during Emergency Ambulance Transportation.

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Introduction

We wanted to test whether there is a difference between the total number and duration of malfunctions and a correlation between the oxygen saturation and pulse rate values of two new generation pulse oximeters (Masimo Radical-7 and Nellcor N 600) during emergency ambulance transportation.

Methods

Patients were monitored with two pulse oximeters (Radical-7 and N 600) on different randomly selected fingers of the same hand during transportation. Data of both devices were recorded continuously by a laptop computer.

Results

Fifty-two patients with signs of peripheral vasoconstriction (including 22 patients with a blood pressure $\leq100/60$) were included. There were 0.21 ± 0.72 (0-4) malfunctions per patient lasting for a mean 113.55 ± 272.55 s in the Radical-7 and 0.13 ± 0.49 (0-3) malfunctions per patient with a mean duration of 301.0 ± 426.58 s in the N 600. Oxygen saturation and pulse rate values correlated significantly [$r^2 = 0.9608$ (SpO_2), $r^2 = 0.9608$ (pulse rate)] between the devices and showed a bias of -0.177770 (SpO_2) and 0.310883 (pulse rate) with a standard deviation of 1.68367 (SpO_2) and 4.46532 (pulse rate) in a Bland-Altman test.

Conclusion

Although number and duration of malfunctions did not differ significantly between the devices, they showed a very low number of malfunctions even in hypotensive patients with peripheral vasoconstriction. Oxygen saturation correlated significantly in the two devices investigated at 49,409 time points. In addition, pulse rate also correlated significantly.