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Eine neue Methode zur nichtinvasiven Messung des Blutdruckes unter Verwendung der Pulslaufzeit.

A new method for noninvasive blood pressure measurement using pulse transition time

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Night time blood pressure measurements using conventional methods affect the sleep of the patient and consequently the blood pressure. Furthermore, these methods do not allow continuous registration of the blood pressure. Pulse transition time (PTT), which is the interval between the R-wave of the electrocardiogram and the arrival of the pulse wave in the periphery, has been reported to be useful as an indirect, continuous measure of blood pressure (BP) changes. In the present study, we evaluated the correlation of BP values calculated from a new PTT-based method with BP values measured by a cuff device.

A laboratory device (SOMNOscreen^{TM}) was used to obtain the PTT from the ECG and the plethysmographic curve of pulse oximetry of the finger. The pulse wave velocity (PWV) was calculated from the PTT taking the body height and a body correlation factor into consideration. A formula was created for the relationship between PWV and blood pressure by non-linear fitting of the data. After individual correction for the offset, this formula was used for the calculation of systolic PB values.

Patients underwent a cycle ergometer test with increasing loads (0-150 W, 25 W increments every 2 min), which results in a wide range of BP values. Correlation coefficients for systolic BP (n=13) varied between r=0.75 and r=0.99 in the patients. The mean correlation coefficient was r=0.87.

Systolic BP values calculated using the PTT-based method and BP values measured by the cuff device correlated significantly. The study suggests that the indirect method based on the PTT can be useful for continuous monitoring of blood pressure, when performing an individual correction of the offset of the PWV-BP relation.

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