Radial artery applanation tonometry for continuous noninvasive arterial blood pressure monitoring in the cardiac intensive care unit.

Hemodynamic monitoring plays a pivotal role in the treatment of patients in the cardiac intensive care unit (CICU). The innovative radial artery applanation tonometry technology allows for continuous noninvasive arterial blood pressure (AP) measurement. By closing the gap between continuous invasive AP monitoring (arterial catheter) and intermittent noninvasive AP monitoring (oscillometry) this technology might improve CICU patient monitoring. We therefore aimed to evaluate the measurement performance of radial artery applanation tonometry in comparison with a radial arterial catheter in CICU patients. In this prospective method comparison study, we simultaneously recorded AP noninvasively with radial artery applanation tonometry (T-line 200 pro device; Tensys Medical Inc., San Diego, CA, USA) and invasively with an arterial catheter (criterion standard) in 30 patients treated in the CICU of a German university hospital. We statistically analyzed 7,304 averaged 10-beat epochs of measurements of mean AP, systolic AP, and diastolic AP by using Bland-Altman analysis for repeated measurements. Our study revealed a mean difference ± standard deviation (95% limits of agreement; percentage error) between radial artery applanation tonometry and the
criterion standard method (radial arterial catheter) of +2 ± 6 mmHg (-10 to +14 mmHg; 17%) for mean AP, -6 ± 11 mmHg (-28 to +15 mmHg; 20%) for systolic AP, and +4 ± 7 mmHg (-9 to +17 mmHg; 23%) for diastolic AP. In CICU patients, continuous noninvasive measurement of AP using radial artery applanation tonometry is feasible. The technology showed reasonable accuracy and precision in comparison with radial arterial catheter-derived AP values.