Radial artery applanation tonometry technology can be used for continuous non-invasive measurement of arterial pressure (AP). The purpose of this study was to evaluate this AP monitoring technology in intensive care unit (ICU) patients in comparison with invasive AP monitoring using a radial arterial catheter. In 24 ICU patients (German university hospital), AP values were simultaneously recorded on a beat-to-beat basis using radial artery applanation tonometry (T-Line system; Tensys Medical, San Diego, CA, USA) and a radial arterial catheter (contralateral arm). The primary endpoint of the study was to investigate the accuracy and precision of the non-invasively assessed AP measurements with the Bland-Altman method based on averaged 10 beat AP epochs (n=2993 10 beat epochs). For mean AP (MAP), systolic AP (SAP), and diastolic AP (DAP), we observed a bias (±standard deviation of the bias; 95% limits of agreement; percentage error) of +2 mm Hg (±6; -11 to +15 mm Hg; 15%), -3 mm Hg (±15; -33 to +27 mm Hg; 23%), and +5 mm Hg (±7; -9 to +19 mm Hg; 22%), respectively. In ICU patients, MAP and DAP measurements obtained using radial artery applanation tonometry show clinically acceptable agreement with invasive AP determination with a
radial arterial catheter. While the radial artery applanation tonometry technology also allows SAP measurements with high accuracy, its precision for SAP measurements needs to be further improved.