Noninvasive continuous versus intermittent arterial pressure monitoring: evaluation of the vascular unloading technique (CNAP device) in the emergency department.

Abstract:

Monitoring cardiovascular function in acutely ill patients in the emergency department (ED) is of paramount importance. Arterial pressure (AP) is usually monitored using intermittent oscillometric measurements with an upper arm cuff. The vascular unloading technique (VUT) allows continuous noninvasive AP monitoring. In this study, we compare continuous AP measurements obtained by VUT with intermittent oscillometric AP measurements in ED patients. In addition, we aimed to investigate whether continuous noninvasive AP monitoring allows detection of relevant hypotensive episodes that might be missed with intermittent AP monitoring. In a German university hospital, 130 ED patients who required AP monitoring were analyzed in this prospective method comparison study. Continuous AP monitoring was performed using VUT (CNAP technology; CNSystems Medizintechnik AG, Graz, Austria) over a 2-hour period. The oscillometric AP values were recorded simultaneously every 15 minutes for the comparison of both methods. For statistical evaluation, Bland-Altman plots accounting for repeated AP measurements per individual were used. The mean difference (±standard deviation) between AP measurements obtained by VUT and oscillometric AP measurements was -5 mmHg (±22
mmHg) for systolic AP (SAP), -2 mmHg (±15 mmHg) for diastolic AP (DAP), and -6 mmHg (±16 mmHg) for mean AP (MAP), respectively. In the interval between two oscillometric measurements, the VUT device detected hypotensive episodes (>=4 minutes) defined as either SAP<90 mmHg or MAP<65 mmHg in 30 patients and 16 patients, respectively. In 11 (SAP<90 mmHg) and 6 (MAP<65 mmHg) of these patients, hypotension was also detected by the subsequent intermittent oscillometric AP measurement. VUT using the CNAP system for noninvasive continuous AP measurement shows reasonable agreement with intermittent oscillometric measurements in acutely ill ED patients. Continuous AP monitoring allows immediate recognition of clinically relevant hypotensive episodes, which are missed or only belatedly recognized with intermittent AP measurement.

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