

24-hour blood pressure monitoring in subjects with spinal cord injury

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Background: Damage to the spinal cord disrupts autonomic pathways controlling the heart and smooth muscles in blood vessels. Consequently, subjects with spinal cord injury (SCI) show perturbed cardiovascular homeostasis and are predisposed to dramatic daily fluctuations in blood pressure (BP). Such BP instability is unique to SCI and is represented in episodes of extremely high BP, referred to as autonomic dysreflexia (AD), and low BP, referred to as orthostatic hypotension (OH).

Objectives: This study aims to investigate whether a 24-hour BP monitoring can be used to objectively quantify BP fluctuations and whether this quantification is related to self-reported frequency and severity of AD and OH.

Methods: 24-hour ambulatory BP monitoring was performed with the Meditech CardXplore ambulatory BP monitor in a group of 17 subjects with traumatic SCI (C4-L1; AIS A-C; 1 month - 30 years post-injury). The BP monitor recorded systolic and diastolic BP (SBP, DBP) and heart rate at 15-min intervals during the daytime, and at 1-hour intervals during the nighttime. BP variability was quantified using calculations of SBP and DBP coefficient of variation (CV) and the number of AD and OH events during the 24-hour period. The “Autonomic Dysfunction Questionnaire” was used to assess self-reported frequency and severity of AD and OH symptoms.

Results: SCI subjects who are aware of their AD episodes showed significantly higher SBP (16%) and DBP CV (18%) than subjects who reported to never having experienced any AD symptoms (10% and 12% respectively). BP variability (SBP and DBP CV) was related to self-reported AD score (frequency and severity) and general autonomic dysfunction (whole questionnaire score). Importantly, the number of AD events over the 24-hour period was significantly correlated with the self-reported frequency of AD symptoms during daily living ($\rho = 0.61$, $p = 0.01$). However, there were no significant correlations between assessed and self-reported OH events.

Conclusions: Ambulatory BP monitoring is a useful tool to assess the frequency of high blood pressure episodes, namely AD events, during a 24-hour period. This technique should be used more frequently in SCI subjects to detect these life-threatening events, to get insights about triggers of AD, and to make suggestions of appropriate BP medication in affected subjects.