

AUTONOMIC DYSREFLEXIA – AN UNDERESTIMATED PHENOMENON DURING URODYNAMIC INVESTIGATION?

Hypothesis / aims of study

Autonomic dysreflexia (AD) is a severe and potentially life-threatening condition in patients with neurogenic lower urinary tract dysfunction (NLUTD) due to spinal cord injury (SCI). This phenomenon, characterized by extreme systolic blood pressure (SBP) increase, heart rate (HR) decrease, and corresponding clinical symptoms, requires immediate medical intervention to avoid severe complications, which can even lead to death. Symptoms can be of general type including headache, feeling of anxiety, blurred vision, and nasal congestion or more specific such as piloerection, profound sweating, and flushing above the lesion level or dry and pale skin below the lesion level. Common trigger factors are stimulation of the lower urinary tract and/or distension of the bowel. Urodynamic investigation (UDI) is the gold standard to assess SCI but this may induce AD. Thus, the aim of the present study was to investigate the incidence of AD during UDI in patients with SCI.

Study design, materials and methods

A consecutive series of 192 patients (53 females, 139 males, mean age 54±17 years) with SCI who underwent continuous non-invasive cardiovascular monitoring during UDI was prospectively investigated at a single university spinal cord injury center. SBP, diastolic blood pressure (DBP), and HR were recorded continuously during UDI. We defined AD according to the joint committee of the American Spinal Injury Association and the International Spinal Cord Society [1]. Uni- and multivariate analyses (including age, gender, duration of injury, lesion level, ASIA score, and video-urodynamic parameters) were performed and clinical symptoms were documented in order to identify predictors for AD.

Results

Overall, there was a mean SBP increase of 31±26 mmHg during UDI resulting in an incidence of AD of 58% (111/192, i.e. 30 females, 81 males, mean age 55±17 years) and in those, SBP increase was significantly higher than in the remaining (81/192) patients (46±24 vs. 10±7 mmHg, p<0.001).

Of the 111 patients with AD, SBP increase (mean 52±27 vs. 38±19 mmHg, p=0.008) and HR decrease (mean -9±15 vs. 0±12 beats/min, p=0.007) were significantly different in patients with spinal cord lesion at or above Th6 (55%, 61/111) versus those with a lesion below Th6 (45%, 50/111). Patients suffering from a complete lesion (ASIA A, 30%, 33/111) compared to those with an incomplete lesion (ASIA B-D, 70%, 78/111) showed a trend for a higher SBP increase (mean 55±31 vs. 42±20 mmHg, p=0.09) and the HR decrease was significantly different (mean -11±17 vs. -2±12 beats/min, p=0.004).

Remarkably, only 22% (24/111) of the patients with presumed AD were symptomatic (defined as SBP increase, HR decrease, and clinical symptoms) and these demonstrated a significantly higher SBP increase (mean 73±24 vs. 37±18 mmHg, p<0.001) and HR decrease (-24±10 vs. 0±10 beats/min, p<0.001) compared to the asymptomatic patients (78%, 87/111). In the subgroup of the 24 symptomatic patients with AD, there was no significant difference for SBP increase or HR decrease regarding completeness of injury (complete [16/24] vs. incomplete [8/24]) and lesion level (at or above Th6 [21/24] vs. below Th6 [3/24]).

Interpretation of results

The unexpectedly high incidence of AD in almost 60% of our SCI patients with NLUTD where only a fifth were symptomatic raises the question, if increase of SBP is a sufficient criterion to define AD. On the other hand, there may be risks involved with such sudden hypertension even without clinical signs. Considering the pathomechanisms involved, we suggest the diagnosis of AD should not be based on SBP increase only, but also on simultaneous HR decrease or clinical symptoms. The only independent predictor for AD in our patients was the level of the spinal cord lesion.

Concluding message

We highly recommend continuous cardiovascular monitoring during UDI in SCI patients, especially in those with a spinal cord lesion at or above Th6.

References

1. Krassioukov AV, Karlsson AK, Wecht JM, Wuermsler LA, Mathias CJ, Marino RJ; Joint Committee of American Spinal Injury Association and International Spinal Cord Society: Assessment of autonomic dysfunction following spinal cord injury: Rationale for additions to International Standards for Neurological Assessment. *J Rehabil Res Dev.* 2007;44(1):103-12

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