LETTER TO THE EDITOR

Cardiovascular control during head-up tilt test in spinal cord injury patients

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We read with interest the paper by Bluvshstein *et al.*¹ on hemodynamic responses to head-up tilt (HUT) after spinal cord injury. The idea of selecting specific categories of patients (tetraplegics and T4–T6 paraplegics) is interesting, as we know that cardiovascular changes directly depend on the level of lesion. They found a fall in blood pressure (BP) in tetraplegic but not in paraplegic patients, and hypothesize a mid-thoracic neural signal generator responsible for cardiovascular control. In support of this theory, they cite their former study on liquid food ingestion in paraplegics.²

Unfortunately, the authors fail to give any further evidence in favour of this putative spinal sympathetic generator. Although it is not relevant to compare cardiovascular reactions after a meal with those obtained during HUT, other evidences directly related to orthostatic manoeuvres can be found, which stress the role of cardiac sympathetic innervation, cardiovascular and peripheral reflexes.

First, we know that the T1–T5 sympathetic outflow projects to the heart and is directly implicated in the cardiovascular control.³ It is generally thought that a more pronounced rise in heart rate can (partially) compensate for the fall in BP in paraplegics, in relation with an intact cardiac autonomic control.⁴ In other experimental procedures, a BP overshoot is seen at the end of the Valsalva Manoeuvre in paraplegics and in controls, but not in tetraplegics, and is primarily related to cardiac sympathetic activity.⁵

Second, heart rate variability has considerable potential to assess the role of autonomic nervous system fluctuations in normal healthy individuals and in patients with various cardiovascular disorders. A recent study suggests that the rise in heart rate across progressive acute HUT is attained primarily through vagal withdrawal in subjects with paraplegia.⁶ Data from other studies using spectral analysis of cardiovascular parameters during orthostatic manoeuvres are also available.^{7,8}

Third, other mechanisms are activated during orthostatic manoeuvres that might account for cardiovascular control in paraplegic patients, including the activation of the renin–angiotensin–aldosterone system, spinal reflexes, plasma catecholamine release⁴ or local (myogenic) reflex activity.⁹

Finally, this theory is not supported by animal experiments, in contrast with the sympathetic spinal pattern generator for the expression of ejaculation in rats.¹⁰

Again, we thank the authors for their interesting study and hope these remarks will raise the quality of the discussion.

Conflict of interest

The authors declare no conflict of interest.

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