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Title

Transcranial electrical stimulation improves orthostatic hypotension secondary to traumatic cervical spinal cord injury.

Abstract

Study Design: A case report

Objective: To investigate the effect of transcranial electrical stimulation (TES) on blood pressure during orthostatic challenge in a patient with cardiovascular dysfunction secondary to traumatic cervical spinal cord injury (SCI).

Setting: GF Strong Rehabilitation Center, Vancouver, Canada.

Methods/Results: A 20-year old man admitted for rehabilitation of C6 AIS B (American Spinal Injury Association Impairment Scale) SCI presented with symptomatic orthostatic hypotension (OH) confirmed on passive sit-up test. He had incomplete autonomic injury as evidenced by partial preservation of sympathetic skin responses. On testing day, continuous blood pressure recording, plasma catecholamines and orthostatic symptoms were collected while supine and during sit-up test first without and then with application of TES. The orthostatic drop in blood pressure at 3 minutes of sit-up without TES was -29.4/11.4 mmHg versus -18/3.2 mmHg with TES. Plasma norepinephrine was slightly higher both supine and on sit-up with TES compared to without. Symptoms of OH were abolished with TES. Conclusion: This novel application of TES demonstrates its ability to eliminate OH in an individual with traumatic SCI. Activation of partially preserved descending autonomic pathways and stimulation of catecholamine release during TES procedure could be responsible for the mechanism of action of TES in this case. Further comprehensive evaluation of TES for the management of OH is needed.