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Management of Orthostatic Hypotension with Complete Cervical Spinal Cord Injury: A Case

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Introduction

In patients with cervical and upper thoracic spinal cord injury, some autonomic dysfunctions may occur. Orthostatic hypotension is one of the factors that interfere with comprehensive rehabilitation and result in a decrease of the activities of daily life. We experienced a case of cervical spinal cord injury with orthostatic hypotension in our rehabilitation setting and report it.

Case

A 26-year-old man has visited an emergency room for upper and lower limb weakness. On Magnetic resonance image, he was diagnosed epidural hematoma from C4 to T2. At hospital days 7, he had got laminectomy C5-T1, epidural hematoma removal, and posterior fixation. Finally, he got C4 spinal cord injury with AIS A. He measured 3/5 of both elbow flexors and wrist extensors in the manual motor test. However, he was completely paralyzed in the other limbs and lost his sensation below C4 dermatome area. He could not maintain sitting because he fainted and decreased his blood pressure. He had a third degree of pressure ulcer in coccyx for a long time with a bedridden state. At the initial day of rehabilitation, resting blood pressure was measured 130 / 80mmHg, but when he trained tilt table standing exercise at 40 degrees, he fainted, and his blood pressure dropped to 80 / 40mmHg. He could not use a wheelchair because of severe hypotension when sitting up more than 40 degrees. We administered proper salts and hydration, and applied an abdominal bandage and lower limb compression stockings. As pharmacological treatments, Fludrocortisone (0.1mg), mineralocorticoid for blood volume expansion and midodrine (2.5 mg), an alpha-adrenergic agonist for peripheral vasoconstriction were administered. However, it gave no effect to his function. When he did a tilt table exercise, he had a sudden drop in blood pressure and dizziness. So he could not do tilt table exercise at even 50 degrees. We gave him a passive range of motion exercise using motomed sitting in a wheelchair supporting his back by 45 degrees. He continued to motomed exercise with a gradually increasing angle within the tolerable range. At day 20 of rehabilitation, and starting motomed exercise after 14 days, tilt table exercise still resulted in blood pressure drop and dizziness at 50 degrees, however, during the motomed exercise, he could tolerate sitting up 80 degrees for more than 30 minutes. At ordinary times, he could ambulate wheelchair with sit up position more than 30 minutes.

Conclusion

We experienced a patient with cervical spinal cord injury with severe orthostatic hypotension. In our experience, passive range of motion exercise using motomed was the most effective treatment, rather than any kinds of medication. Larger sized

prospective studies would be required to set up comprehensive rehabilitation programs for a patient with uncontrolled orthostatic hypotension with high cervical spinal cord injury.

Table 1. Results of Manual Muscle Test

	At Admission		20 th Day after Admission	
	Right	Left	Right	Left
Elbow flexor	3	3	3	3
Wrist extensor	3	3	3	3
Elbow extensor	0	0	2	2
Finger flexor	0	0	0	0
Finger extensor	0	0	0	0

**Lower extremities motor grade were all 0.*

Table 2. Summary of Orthostatic Hypotension Management

		Day 1	Day 6	Day 10	Day 20
Medication for OH		Fludrocortisone 0.1mg qd	Fludrocortisone 0.1mg qd Midodrine 2.5mg qd	Fludrocortisone 0.1mg qd Midodrine 2.5mg tid	Fludrocortisone 0.1mg qd Midodrine 2.5mg tid
Resting BP (mmHg)		130/80	134/72	124/72	134/76
Tilt table	Angle (degree)	40	40	50	50
	BP (mmHg)	80/40	84/40	98/48	88/48
motomed	Angle (degree)	Not try	45	60	80
	BP (mmHg)	Not try	98/50	107/40	110/52
Functional Ability		Bedridden state	Bedridden state	Wheelchair ambulation with sit- up 45 degree	Wheelchair ambulation with sit- up 80 degree

* OH = Orthostatic hypotension

