

Acute Severe Autonomic Dysreflexia during Spinal Cord Intramedullary Tumor Resection

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Abstract

Background & Importance: Acute autonomic system impairment can be dangerous and life-threatening, and a clinician should be aware of its occurrence possibility. According to the anatomy of this system, spinal cord lesions could disturb its function. There are many reports of autonomic dysreflexia in spinal cord injuries especially spinal cord trauma.

Case Presentation: A 28 year-old man with an eight month history of gradual numbness in his extremities referred to our university hospital. Neurologic examination revealed mild spastic motor weakness in all limbs and increased deep tendon reflexes.

Conclusion: Acute and dangerous autonomic dysreflexia during spinal cord surgery is a rare condition that neurosurgeons and anesthesiologists should be ready for immediate diagnosis and treatment of this condition.

Keywords: Autonomic Dysreflexia; Intramedullary Tumor

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Introduction

Acute autonomic system impairment can be dangerous and life-threatening, and a clinician should be aware of its occurrence possibility. According to the anatomy of this system, spinal cord lesions could disturb its function. There are many reports of autonomic dysreflexia in spinal cord injuries especially spinal cord trauma (1). Acute and dangerous autonomic dysreflexia during spinal cord surgery is a rare condition that neurosurgeons and anesthesiologists should be ready for immediate diagnosis and treatment of this condition.

Case Presentation

A 28 year old man with an eight month history of gradual numbness of his extremities referred to our university hospital. Neurologic examination revealed mild spastic motor weakness in all limbs and increased deep tendon reflexes. Plantar reflexes were extensor, and Hoffman's sign was found in both hands. There were no symptoms related to urethral or anal sphincters' functions.

Brain and cervical cord Magnetic Resonance Imaging (MRI) was performed to rule out the existence of structural lesions in these areas. Neuroimaging demonstrated severe enlargement of the cervical spinal cord at the level of C2-C6 with an ill-defined region of slightly high signal intensity at T1-weighted imaging. The lesion demonstrated a mild heterogeneous enhancement after contrast injection. Myelography revealed blocking of the perimedullary subarachnoid spaces (Figures 1,2). The brain imaging findings were normal.

Surgical Procedure

Laminectomy was performed from C1 to C5. After incision of the dura, an enlarged spinal cord was exposed. Myelotomy was done under sensory and motor tracts monitoring by our intraoperative neuromonitoring team. The tumor was resected by ultrasonic aspirator, and attempts were made to perform total resection of the tumor. During the first attempt to do dissection of tumor, the patient's heart rate dropped sharply and heartbeat stopped within a few seconds. The patient's heart rate and blood pressure returned to normal level, after a few seconds of stopping surgery and spinal manipulation and injecting atropine. The surgery continued with the agreement of anesthetic team, but the patient's blood pressure suddenly went up from 120/80 to 230/130 mmHg during the second attempt to remove the tumor. Therefore, the surgery was stopped for a few minutes, and the patient's blood pressure was controlled with drugs, and cardiac monitoring continued. After stabilizing the patient's hemodynamic condition, the surgery resumed with great caution. Fortunately, it continued without hemodynamic compromise.

In the final minutes of surgery, MEP amplitude on the right side significantly decreased. Homeostasis was achieved after near total resection of the tumor, and the dura was repaired. Postoperative paresis with strength of 3/5 occurred in the right leg that improved to 4/5 after one week, and he had very mild weakness in his leg after 3 months.



Figure 1. Cervical T1 MRI



Figure 2. Cervical T2 MRI

Discussion

Autonomic dysreflexia has long been recognized in the spinal cord injury. Diagnosis and treatment of autonomic dysreflexia is important in patients with spinal cord injury, so the healthcare team needs to have the skills to deal with these problems.

There are numerous articles and reports in the medical literature that explained the mechanisms of these disorders. Autonomic dysreflexia can be asymptomatic, but it can present with various signs and symptoms including fluctuating blood pressure, heart rate disturbances, anxiety, blurred vision, headache, flushing, and sweating above the level of injury. Autonomic bladder and gastrointestinal problems could result in important complications. However, acute autonomic dysreflexia is of special importance. In serious cases, the severe hypertension crisis can result in loss of consciousness due to cerebral hemorrhage, seizures, and pulmonary edema (2). Cardiovascular function disturbances are potentially life-threatening and demanding more attention (3).

Although autonomic dysreflexia is often seen with spinal cord trauma, nontraumatic lesions such as spinal cord tumors, spinal cord infarction and multiple sclerosis plaques can cause autonomic dysreflexia and its complications (4). On the other hand, it may also be seen during surgery. Surgeon and anesthesiologist must remain vigilant, as the case may be quite severe and without warning.

According to reports, episodic hypertension could develop in 50–90% of people who suffered tetraplegia or high thoracic

cord lesions (5). This reflex could be seen in patients with complete or incomplete injury to the T6 or higher levels of cord (6), although autonomic dysreflexia has been reported with injuries to T8 level of spinal cord. (7). It could be noted that sometimes the spinal cord injury may not be suspected without a complete history because incomplete spinal cord injury may allow the patient to walk. This condition could be caused by spinal reflex mechanisms because they remain intact despite the patient's spinal cord injury (8).

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