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Magnesium Sulphate as an Adjunct to Manage Intraoperative Autonomic Dysreflexia in a Case with C3-C7 Cervical Myelopathy: An Experience

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Case Report
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Abstract

Our case report includes a 40 year old male patient who had C3-C7 cervical myelopathy and was planned for surgical procedure. Intraoperatively the patient went into an episode of autonomic dyresflexia with shooting blood pressure and heart rate. The dysreflexic episode was successfully managed with Inj Magnesium Sulphate in addition to other measures. The patient was discharged later without any post-operative complications.

Keywords: Myelopathy; Magnesium Sulphate; Surgical Procedure; Autonomic Dysreflexia

Highlights

- Autonomic dysreflexia is a commonly encountered clinical emergency in patients with spinal cord injuries.
- The treating doctor should always be aware of this entity and should be prepared to timely manage this condition.
- Magnesium sulphate can be used as an adjunct to treat this condition.

Introduction

Autonomic dysreflexia is a well-recognized entity in patients with spinal cord injury, especially in cases where the level of injury is at T6 or above [1]. It is a potentially life threatening situation which can be disastrous if not managed properly and every clinicians should be prepared for this emergency. We present a case of C3-C7 cervical myelopathy who had intraoperative autonomic dysreflexia which was fortunately managed well with good outcome.

Case Report

A 40 year old healthy male with no known comorbidities presented with chief complaint of acute onset of inability to move his bilateral upper and lower limbs for 45 days. On the day of incident, he was sitting in a bed when he suddenly lost his consciousness and fell down in the ground. He regained his consciousness on his own after around ten minutes but he was unable to move his four limbs. There is no history of head injury, tongue bite, abnormal body movements, urinary or stool incontinence, frothing from mouth, facial deviation and slurring of speech.

On examination, he was drowsy with Glasgow Coma Scale of 13/15 (E4V4M5). Neurological examination revealed reduced motor power in bilateral upper and lower limbs. Power in right upper limb was 1/5 and in left upper limb was 3/5 whereas power in right lower limb was 3/5 and 2/5 in left lower limb. Perianal sensation was intact but anal tone

was found to be lax. Biceps jerk and triceps jerk were +++ in bilateral upper limbs and supinator jerk was + in bilateral upper limbs. Ankle and knee jerk were +++ in bilateral lower limbs. Plantar reflex was up going in both lower limbs with rigidity in movement of all four limbs. Rest of the systemic examination revealed no abnormalities.

MRI Neck was done which showed C3 - C7 Cervical Myelopathy for which laminectomy was planned.

In the operation theatre, 18 G IV cannula was secured and base line vitals was recorded to be normal. Midazolam 1.5 mg, Fentanyl 100 mcg, Propofol 80 mg and Rocuronium 50 mg was injected for induction and muscle relaxation. He was intubated with 7.5 mm ID ETT with video- laryngoscope using bougie, strictly maintaining the neutral position of neck. He was kept under intermittent positive pressure ventilation with tidal volume of 400 ml, Positive end-expiratory pressure (PEEP): 5 mm of Hg, respiratory rate: 14 per minute and anesthesia was maintained with isoflurane gas 1. 5%. End tidal carbon dioxide (ETCO2) monitoring was done. An arterial line was secured at left radial artery with 20 gauge cannula and 7 French triple lumen central venous catheter was inserted at right internal jugular vein under ultrasound guidance.

The patient was proned after care of the pressure points and eyes. Abdomen was kept free for excursion of diaphragm. Morphine 10 mg was topped prior to initiation of surgery. In about 10- 15 minutes after the skin incision blood pressure rocketed to 210/ 180 mm of Hg with heart rate of 125/ min. The surgery was advised to be put on hold. Injection glycerol trinitrate 100 mcg bolus was given thrice in addition to multiple bolus of fentanyl injection. But, the blood pressure was persistently on higher side with systolic blood pressure of 200-220 and diastolic blood pressure of 110-120 mm of Hg. The clinical diagnosis of autonomic dysreflexia was made and 4 gm of Magnesium sulphate was injected as bolus diluting in 50 ml 0.9% Nacl. Arterial Blood Gas (ABG) analysis was done which showed pH:7.45, partial pressure of carbon dioxide (pCO2): 37 mm of Hg, magnesium:0.44, calcium:0.99, Lactate:1.4, bicarbonate (HCO3): 26.4. Injection morphine 10 mg and vecuronium 4 mg was also given. After ten minutes of the event is blood pressure and pulse rate settled down. His blood pressure was 110-130/70-80 mm Hg and pulse rate was 65-75 beats per minute. Expect for that event, there was no major intraoperative event. Laminectomy was performed from C3 to C7 vertebrae. Following the surgery, the patient was extubated in supine position after reversing the paralytic agent with Neostigmine and Glycopyrolate. He was monitored in recovery room for 4 hours and later shifted to High Dependency Unit.

He was discharged home after 15 days of operation without any post-operative complications.

Discussion

Autonomic dysreflexia is being increasingly acknowledged nowadays and is believed to be occur in upto 90% of patients with upper thoracic and cervical cord injuries [2,3]. Autonomic dysreflexia is characterized by acute rise in blood pressure and bradycardia, though tachycardia might also be present. An increase in blood pressure of 20-30 mm Hg from baseline blood pressure is well-thought-out to be an episode of autonomic dysreflexia [4]. AD is caused by the loss of descending inhibitory spinal signals to sympathetic ganglia resulting in sympathetic over activity. The release of sympathetic mediators causes significant vasoconstriction which results in rise in blood pressure. This rise in blood pressure is sensed by the baroreceptors and as an effect reflex bradycardia, flushing and sweating occurs above the level of spinal cord injury [5]. If not managed timely, AD can cause life threatening events such as intra cerebral hemorrhages, seizures and myocardial infarction.

An episode of AD is found to be more severe in cases with higher level of spinal cord injury and complete spinal cord injury in comparison to the ones in which the injury is at lower level and is partial [6]. Our patient had injury at C3-C7 level and intraoperatively he had acute elevation in blood pressure and tachycardia. Immediately, considering the possibility of AD, the surgery was kept in hold. Surgery is believed to be one of the most common trigger of AD [7,8]. Non pharmacological management of autonomic dysreflexia includes elimination of the stimuli such as stopping the ongoing surgery and decompression of a hollow viscus. Positioning the head end of the bed up also can help by inducing orthostatic hypotension. Pharmacological management includes increasing the depth of anaesthesia by increasing the anaesthetic agent and use of short acting antihypertensive such as glyceryl trinitrate, nifedipine. In our case, even after using glyceryl trinitrate, fentanyl and giving the bolus of anaesthetic agent, blood pressure could not be controlled. However, a bolus dose of magnesium sulphate was found to be helpful in alleviating the dysreflexic episode. A case study by N.A. Jones reported a 37 year old male who had autonomic dysreflexia and its severity and frequency was immediately controlled by magnesium Sulphate bolus [9]. Another report by T Maehama reported significant beneficial effects of magnesium sulphate on autonomic dysreflexia during labour in patient with spinal cord injury. Magnesium sulphate controls hypertensive crisis primarily by calcium antagonism. Magnesium inhibits release of catecholamine from adrenal medulla and adrenergic nerve endings by

competing with calcium ions, by virtue of this vasodilation occurs and systemic vascular resistance is reduced [9,10].

Conclusion

Autonomic dysreflexia is a commonly encountered phenomenon in patients with spinal cord injury. The treating doctors should always keep in mind about the possibility of this entity and should be prepared to tackle this life threatening condition. Various methods are implicated in the treatment of autonomic dysreflexia. But, very few cases of its treatment with magnesium sulphate have been reported in the literature. This case study reports the successful treatment of autonomic dysreflexia with magnesium Sulphate. However, more promising trials are needed to prove its efficacy and it is a field of further researches.

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