

Anaesthetic considerations in patients with transverse myelitis

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Abstract

Transverse myelitis is an acute or subacute inflammatory disorder involving the spinal cord. Clinical signs are due to the involvement of the ascending and descending tracts in the transverse plane of the spinal cord. The most common cause is autoimmune. These patients may present with various clinical findings with which it is important for the anaesthesiologist to be familiar in order to manage such cases during the intraoperative and postoperative period. This report discusses issues relating to management of such cases.

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Introduction

Acute transverse myelitis is an inflammatory disorder of the spinal cord, resulting in motor, sensory and autonomic dysfunction. This disorder usually involves the spinothalamic tract, pyramidal tracts, posterior columns and anterior fasciculi, at one or more adjacent levels. The incidence is very low, ranging from 1-5 per million per year, and it has a wide range of aetiology.¹ We present a paediatric case of transverse myelitis. The patient was posted for debridement of a trophic ulcer on the left foot. A literature search showed limited information on the anaesthetic management of such patients.²

Case report

A 13-year-old boy, diagnosed as a case of transverse myelitis, presented to us with a trophic ulcer on the left foot, following a thorn-prick injury four months previously. Motor power in the right lower limb was grade 5 at all joints, with intact sensory function. However, in the left lower limb, the motor power was grade 5 at the hip and knee joint, and grade 2 at the ankle joint, together with complete loss of sensation below the L5 level. The patient also had urinary incontinence. He described a history of a sudden onset of lower limb weakness (right to left), with associated bowel and bladder incontinence two years previously. Initially, he was managed with intravenous steroids, and later with oral steroids which were tapered and stopped. There was a gradual improvement in power in both lower limbs, but the

foot drop in the left limb persisted. The bladder incontinence also continued, although he had regained bowel control.

The patient was posted for debridement of the ulcer over his left foot. General anaesthesia was preferred over regional in this case to avoid any potential exacerbation of the condition following regional anaesthesia.^{3,4} General anaesthesia was induced with propofol 1.5 mg/kg and fentanyl 2 µg/kg. A ProSeal™ laryngeal mask airway was used to maintain the airway with spontaneous ventilation to avoid muscle relaxants during surgery. Sevoflurane, in a mixture of oxygen and nitrous oxide (1:2), was used for maintenance of the anaesthesia. Standard-of-care monitoring was carried out throughout the surgery. The haemodynamic parameters remained stable during the procedure. At the end of the surgery, anaesthetic gases were discontinued and the patient was awakened. Immediately following surgery, a neurological examination of the patient was performed to evaluate the motor and sensory functions which were identical to the preoperative findings. The patient was continuously monitored for another 12 hours for any haemodynamic alterations and deterioration of neurological function. The postoperative period remained uneventful and the patient was discharged home after two days.

Discussion

Transverse myelitis, a disorder caused by inflammation of the spinal cord is characterised by symptoms and signs of neurological dysfunction. The involvement of

motor and sensory tracts frequently produce altered sensation, weakness or paralysis, and urinary and/or bowel dysfunction. Depending on complete or partial transverse involvement of the cord, the distribution of signs and symptoms may be symmetric or asymmetric below the affected level. However, the functions above the affected level remain normal. The patient may experience varying degree of weakness in the lower limbs, or both upper and lower limbs, depending upon the cord level involved, which may sometimes progress to complete paralysis over weeks. There may be altered sensation, such as burning, tingling and numbness. A few patients report heightened sensitivity to touch (allodynia). Pain is a common symptom which may be confined to the lower back or may radiate to the limbs. Some patients develop bowel and bladder dysfunction. Changes in sensation, such as numbness, loss of ability to experience pain and temperature, or neuropathic pain, often occur in patients with transverse myelitis.

In 15-36% of cases of transverse myelitis, the aetiology remains unidentified and is termed idiopathic.⁵ In others, it may be associated with autoimmune or infectious disorders, like multiple sclerosis, neuromyelitis optica (Devic's disease), systemic lupus erythematosus, Sjögren's syndrome, parainfectious myelitis or sarcoidosis, and rarely owing to vascular aetiology that affects the blood supply of the spinal cord segment. A patient with acute transverse myelitis and rapid loss of spinal cord function requires a prompt diagnostic and therapeutic intervention. Magnetic resonance imaging of the spinal cord and cerebrospinal fluid analysis are helpful in diagnosing the condition. In addition, a blood and serological examination is useful in ruling out the autoimmune (aquaporin-4-specific autoantibodies) and infectious aetiology. A high dose of intravenous methylprednisolone remains the usual initial treatment of transverse myelitis, although the evidence supporting it is thin. There is insufficient evidence in favour of other treatments, such as plasmapheresis, mitoxantrone, rituximab, azathioprine, cyclophosphamide, and intravenous immunoglobulin.

Patients with transverse myelitis may present for surgery in the acute or chronic stages. Preoperative documentation of the motor function, sensory level and autonomic dysfunction, if any, is mandatory. History should also be elicited regarding drug therapy as patients on steroids may need preoperative and intraoperative replacement of steroids, depending upon the duration of the drug therapy and the severity of the surgery. Some patients may be on immunosuppressive agents. Preoperative tests should include a complete blood count and liver and renal function tests, as the drug therapy can alter these tests.

In the acute stage of transverse myelitis, the patient may present with spinal shock and haemodynamic alterations, like hypotension. In the later stages, he or she may present with autonomic dysreflexia which presents with exaggerated hypertension, reflex bradycardia, and other arrhythmias secondary to cutaneous and visceral stimuli. Awareness

of these complications is necessary, as well as vigilance, both during the intraoperative and postoperative periods, while appropriate drugs should be to hand for emergency management of these haemodynamic alterations.

Choice of anaesthetic technique in these patients remains debatable. In the literature, transverse myelitis has been attributed to the use of spinal and epidural anaesthesia.^{6,7} Some reports suggest that both spinal⁴ and epidural⁸ anaesthesia may worsen the disease course in patients with pre-existing central nervous disorders, while others claim it to be safe.^{9,10} Thus the decision to perform regional anaesthesia in patients with pre-existing neurological deficits should be based on the risks and potential benefits of each individual case.¹¹ Use of succinylcholine has been found to be associated with severe hyperkalaemia and its consequences. These patients have also been found to be extremely sensitive to non-depolarising muscle relaxants. Therefore, avoidance of muscle relaxants or the use of relaxants guided by neuromuscular monitoring is recommended.

Postoperative documentation of motor and sensory function is essential for these patients and they should be monitored for any haemodynamic alterations in a high-dependency unit. Our case serves as a reminder of this rare condition and its anaesthetic implications.

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