



## Anaesthetic Management of a Patient with Multiple Sclerosis – A Case Report

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**About the Author:** Dr. Teena Bansal did her DA and DNB in Anaesthesia from Postgraduate Institute of Medical Sciences, Rohtak (Haryana) and is presently working as a Senior Resident at the same place which is a 1500 bedded super specialty teaching and research institute. Special interest: Emergency Anaesthesia and Critical Care.



**Abstract:** Multiple sclerosis (MS) is an uncommon autoimmune demyelinating disease of central nervous system characterized by periodic attacks of varied neurological symptoms eventually progressing to fixed neurological deficits and disability. The symptoms may get worsen with surgery, anaesthesia, emotional instability and increased body temperature. The anaesthesiologist must pay careful attention in selecting the most appropriate method and drug for anaesthesia, as well as in providing a safe recovery from anaesthesia and postoperative pain control. We present a case report of a patient with MS who underwent haemorrhoidectomy under general anaesthesia uneventfully.

**Key words:** Multiple sclerosis, Anaesthetic management, surgery.

**Introduction:** Multiple sclerosis is a disease of temperate climate. It is rare amongst Asian and African races. Its overall incidence is 0.1-0.4%. It is primarily a disease of young adults with the onset of symptoms between the ages of 15 and 40 years and often present with a single neurological deficit, usually via a single lesion in the optic nerve, brain stem and spinal cord<sup>1</sup>. It is an autoimmune demyelinating disorder of the central nervous system with genetic predisposition characterized by a wide variety of neurological impairment and symptoms due to multifocal areas of inflammation and demyelination in brain and spinal cord<sup>2,3</sup>. Exposure to viral illness and infections may trigger relapses. Only a few reports of anaesthetic management of multiple sclerosis are available in literature.

**Case Report:** A 50 year old male, weighing 60 kg was scheduled for haemorrhoidectomy. He was diagnosed as a case of multiple sclerosis 16 years back. He had weakness of both lower limbs with spasticity. There was no history of seizures, difficulty in speech, swallowing and breathing. Bladder and bowel functions were normal. His preoperative cardiopulmonary assessment was unremarkable.



Central nervous examination (CNS) revealed a conscious patient with normal higher mental functions. Power in bilateral lower limbs was 3/5. Deep tendon reflexes were exaggerated with bilateral upgoing plantar response. Power, muscle tone and reflexes in both upper limbs were normal. His sensory system, cranial nerves and brain stem functions were normal. Heart rate response to deep breathing was normal. Also valsalva maneuver did not reveal any impairment of autonomic nervous system. Laboratory investigations like haemoglobin (Hb), bleeding time (BT), clotting time (CT), urine examination, blood urea, blood sugar, chest x ray and electrocardiography (ECG) were normal. He was receiving oral baclofen and methylcobalamin.

General anaesthesia was planned for haemorrhoidectomy. The anaesthetic procedure was explained to the patient and written informed consent was obtained. The patient was premedicated with tablet alprazolam 0.25 mg and tablet ranitidine 150 mg orally on the night before and two hours prior to surgery. On arrival in the operating room, intravenous line was secured. Monitoring of non invasive blood pressure (NIBP), heart rate, electrocardiography (ECG), arterial oxygen saturation (SpO<sub>2</sub>), end tidal carbon dioxide (EtCO<sub>2</sub>) and temperature was carried out and basal readings were noted. The patient was given 0.2 mg glycopyrrolate at the onset of anaesthesia. After preoxygenation for 3 minutes, anaesthesia was induced with injection fentanyl 1µgkg<sup>-1</sup> iv, injection thiopentone sodium 5 mgkg<sup>-1</sup> intravenously and intubation of trachea was facilitated using atracurium 0.5 mgkg<sup>-1</sup> intravenously. Anaesthesia was maintained with sevoflurane and 67% nitrous oxide (N<sub>2</sub>O) in oxygen. Intraoperative analgesia was provided with fentanyl 1µgkg<sup>-1</sup> intravenously. Blood pressure, heart rate, ECG and SpO<sub>2</sub>, EtCO<sub>2</sub> and temperature were monitored throughout the intraoperative period. At the end of surgery, residual neuromuscular blockade was reversed with neostigmine 0.05mgkg<sup>-1</sup> and glycopyrrolate 0.01 mgkg<sup>-1</sup> intravenously. Postoperatively SpO<sub>2</sub>, NIBP, ECG and temperature were monitored. There was a rise of temperature by 1°C six hours postoperatively which was treated with intravenous paracetamol 10 mgkg<sup>-1</sup> and cold sponging promptly. There was no neurologic exacerbation of the disease postoperatively. The patient was discharged after 5 days from the hospital uneventfully.

**Discussion:** Patients with multiple sclerosis coming for surgery should be assessed thoroughly, regarding its onset, progression and relapse, so that postoperative complications could be interpreted. During examination, particular attention must be paid to the degree of paresis. Kyphoscoliosis may be present and detailed respiratory function testing is indicated if a severe degree of restrictive lung disease is suspected. Examination of autonomic nervous system including response to valsalva manoeuvre is of particular importance since many of these patients may have labile autonomic nervous system. Infections are relatively common, particularly UTI. All except the most urgent surgery should be postponed until the patient is free from infection<sup>4</sup>. Anaesthesiologists must explain to the patient before the anaesthesia that operation, emotional instability, anaesthesia and increased body temperature can worsen the symptoms<sup>5</sup>. They also must carefully pay attention to selecting the most appropriate method and drug for the anaesthesia and monitoring the need for anaesthesia, as well as providing a safe recovery from anaesthesia. It is of great importance to inject anxiolytics and antibiotics during the perioperative period and maintain the body temperature in the proper range in order to prevent postoperative exacerbation and recurrence. In addition, since the



anxiety caused by severe postoperative pain can worsen the symptoms of multiple sclerosis, control of pain is an important part of the management.<sup>6</sup>.

General anaesthesia is considered safe for multiple sclerosis. The medication used for the treatment of multiple sclerosis can affect the general anaesthesia. Although baclofen, which was used for the patient in this case report, is an effective drug for tetany, it may cause weakening of the muscles resulting in the increased sensitivity to muscle relaxants<sup>5</sup>. Care must be taken in selecting the muscle relaxants for general anaesthesia. Succinylcholine, a depolarizing muscle relaxant, should be avoided since it can cause hyperkalemia due to denervation sensitivity by upregulation of acetylcholine receptors. Nondepolarising muscle relaxants may have altered or exaggerated response so intraoperative neuromuscular monitoring should be used<sup>7</sup>. For general anaesthesia, no particular anaesthetic agent is preferred<sup>3,5</sup>. We used sevoflurane, which has a low blood/gas distribution coefficient. However, there is no direct evidence that any of the currently used volatile anaesthetics have deleterious effect on the course of the disease. Autonomic dysfunction may exaggerate the hypotensive effects of volatile anaesthetics. Acute arterial hypotension is known to impair the blood brain barrier particularly in association with the use of halothane. N<sub>2</sub>O has been used without any sequelae<sup>8</sup>. The implication of N<sub>2</sub>O in neurological damage arises both from its role in the inhibition of vitamin B12 and its known link with myelopathy and immune suppression. It is preferable to avoid N<sub>2</sub>O in multiple sclerosis except for short procedures<sup>9</sup>. We used nitrous oxide as it was a short procedure.

Spinal anaesthesia is reported to cause exacerbation of multiple sclerosis, though epidural anaesthesia or peripheral nerve block does not cause exacerbation<sup>10,11</sup>. In the case of spinal anaesthesia, the spinal cord becomes more sensitive to the neurotoxicity of local anaesthetics due to demyelination, but epidural anaesthesia is safer compared to spinal anaesthesia because the concentration of local anaesthetics in the white matter of the spinal cord is lower than that of spinal anaesthesia.

Hyperthermia during the perioperative period can be one cause of the postoperative recurrence and exacerbation of multiple sclerosis. Even a 0.5<sup>o</sup> C rise of temperature can slow the conduction along the demyelinated segment resulting in relapse, hence maintenance of O.T. temperature and temperature monitoring is essential<sup>3,5</sup>. When hyperthermia develops during surgery, measures such as operation room temperature control, cooling blanket, icepack and fluid treatment need to be taken immediately. Postoperatively we promptly treated the 1<sup>o</sup>C rise of body temperature to prevent relapse in our patient.

Cerebral venous thrombosis has been reported in multiple sclerosis exacerbation patients who underwent lumbar puncture and were receiving IV methylprednisolone. Following lumbar puncture, High dose corticosteroids are considered as risk factors for cerebral venous thrombosis and prophylactic anticoagulant treatment may be warranted when other risk factors for cerebral venous thrombosis also exist<sup>12</sup>.

Elective surgery must be delayed if the symptoms are being exacerbated<sup>13</sup>. However, in the case of an emergency, perioperative anaesthesia management should be planned so as to prevent



exacerbation and recurrence of the symptoms. Postoperative neurological examination must be carried out and documented.

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