CASE REPORT

Anesthetic management of a patient with multiple sclerosis undergoing cesarean section with low dose epidural bupivacaine

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ABSTRACT

A 32-year-old Indian female 38 weeks pregnant, with a history of multiple sclerosis since 2008 was admitted in obstetric ward for safe confinement. She had a history of diminution of vision in both eyes and limb weakness, relapsing — remitting type with movement-induced muscle spasms, in all the four limbs. Her symptoms were usually diplopia, difficulty in vision and ataxic gait. Sh was then treated with methylprednisolone. She was on oral dimethyl fumarate trial, which was stopped at the beginning of pregnancy. Presently, she was completely asymptomatic. Epidural anesthesia with an indwelling catheter was administered with 15 ml of 0.25% bupivacaine in 5 ml increments. A total of 3 mg of epidural morphine was given for post-operative analgesia. The surgery evolved without any intercurrences and patient was discharged from the hospital 72 h after surgery without worsening of her symptoms. We report a safe anesthetic management of a patient with MS undergoing cesarean section with low dose epidural bupivacaine with the addition of morphine for post-operative analgesia.

Key words: *Cesarean section, epidural anesthesia, multiple sclerosis, opioid*

INTRODUCTION

Multiple sclerosis (MS) is an acquired disease of the central nervous system characterized by inflammation and demyelination in the brain and spinal cord.[1-3] It is an autoimmune disease that seems to affect genetically susceptible patients after exposure to the environmental factors[2,4-6] with a greater incidence in women.[2,4] The disease evolves with periods of exacerbations and remissions at the unpredictable intervals[4,7,8] and when only the pregnant patients are taking into consideration, more than half of the exacerbations happen after delivery[4,9] especially in the first 3 months.[4] Prevalence, increases with latitude, is rare in Asian countries, highest in North Scotland, Northern Europe and Northern United States and in Canada.[1] We report a safe anesthetic management of a patient with MS undergoing cesarean section with low dose epidural bupivacaine with the addition of morphine for post-operative analgesia.

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CASE REPORT

A 32-year-old Indian female 38 weeks pregnant, weighing 50 kg with a history of MS since 2008 was admitted in obstetric ward for safe confinement. She had a history of diminution of vision in both eyes and limb weakness, relapsing — remitting type with movement-induced muscle spasms, in all the four limbs. Her symptoms were usually diplopia, difficulty in vision and ataxic gait. Bowel and bladder function was normal. There was no history of seizures, difficulty in speech, swallowing and breathing. She was then treated with methylprednisolone. She was on oral dimethyl fumarate trial which was stopped at the beginning of pregnancy. Presently, she was completely asymptomatic. Her respiratory system and blood gas analysis was normal. Autonomic system was tested with heart rate response to deep breathing and was found to be normal. Laboratory investigations (routine hematological, liver and kidney function, serum electrolytes), chest X-ray and electrocardiogram were normal. Magnetic resonance imaging scan showed patchy bright signals within the cord on T_2-weighed images from C_1 to T_{10} vertebral levels suggesting demyelination.

Patient was preloaded with 500 ml of normal saline. Epidural anesthesia (EA) with an indwelling catheter was administered with 15 ml of 0.25% bupivacaine in 5 ml increments. Anesthesia up to T6 level was confirmed and surgery was started. 3 mg of epidural morphine was given for the post-operative pain. The surgery evolved without any intercurrences and patient was discharged from the hospital 72 h after delivery without worsening of her symptoms.

She was followed-up for 4 months and during that period she had no remission of the disease.

DISCUSSION

MS is characterized by periods of exacerbation and remission. The disease may usually remain quiescent during pregnancy, but the incidence of recurrence is 3 times higher than in non-pregnant women, in the first 3 months after pregnancy.

Other factors, which have been implicated in the exacerbation of the disease are emotional stress, trauma, surgery, water and electrolyte balance, fever and infection.[6,7,10]

General anesthesia (GA)[9] and anesthesia of the neuroaxis[11] can induce recurrences although it is still a matter of controversy.[5,7,12-15] Perlas and Chan[5] and many other recent data[10,13-15,16] stated that although the post-operative and post-partum recurrences are controversial, they are not affected by the choice of the anesthetic technique and all the techniques can be safely used in these patients.

Perioperative stress or anesthesia and post-operative pain are often implicated as causes of exacerbation of a disease.[13,17] Pre-operative counseling of patient for post-operative exacerbations should be done.

The pre-operative anesthetic assessment in a patient should involve pre- operative documentation of the neurological deficit, respiratory system involvement, autonomic nervous system dysfunction, potential drug interactions. The anesthetic personnel must carefully choose the anesthetic technique, anesthetic drugs (inhalational/intravenous [IV]). Apart from the routine monitoring of the patient intraoperative neuromuscular monitoring and temperature monitoring should take precedence.[18]

Due to the motor weakness and cervical cord involvement leading to diaphragmatic paralysis some authors recommend pulmonary function tests.[19,20] The test was not carried out in our patient as it was an emergency lower segment caesarean section and the clinical assessment did not indicated any respiratory system involvement.

Care of the pregnant patient with MS is challenging because of multiple physiological changes associated with pregnancy and the need to consider the impact of any intervention on fetus.[16]

Regarding the relationship between pregnancy and MS, the incidence and frequency of MS relapses are same in multipara as well as in nullipara. Fertility is not altered in early stages. In mild cases or in remissions, the pregnant patient does well. Pregnancy has no untoward effect on the course of disease and the incidence of obstetric complication is not increased and the method of delivery depends entirely on the obstetric considerations.[16]

The literature regarding anesthetic management contains use of GA, spinal and epidural techniques. GA and epidural with low concentrations of local anesthetic (LA) are considered safe.[2,5,17]

Until a decade ago, subarachnoid anesthesia has been implicated in post-operative exacerbation,[4,11] so also epidurals with higher concentrations and longer duration,[2,14] but the recent data suggests that it is safe in these patients[3,13-15]

EA can also be successfully administered to those patients[21,22] It has been considered the most innocuous technique[8] because the concentration of the LA in the white matter of the spinal cord is 3-4 times lower than with subarachnoid anesthesia.[7,9,11,23] and the reports of relapses after EA may be related to higher concentrations of bupivacaine (>0.25%)[24] administered for longer periods of time.

Pasto *et al.* conducted a prospective study in 423 pregnant patients with MS and concluded that there was no significant correlation in the EA and post-partum exacerbation of the disease. There was no information on the type and dosage of anesthetic used for EA.[22]

The addition of opioid to EA is useful for post-operative pain control, which can be helpful in limiting the stress response due to pain and surgery and thus minimizing the chances of relapse. In our patient, we used epidural morphine for post-operative analgesia.

The obstetric patient seems to be more resistant to late post-operative respiratory depression after the administration of hydrophilic opioids to the neuroaxis.[3] This protective effect is due to the increased minute ventilation observed

during pregnancy secondary to the direct stimulation of the respiratory centers and/or to the increased sensitivity to carbon dioxide caused by progesterone.[3] Most cases of severe depression affect patients who received concomitant parenteral opioids or sedatives. The addition of opioids to the neuroaxis favors anesthesia in patients with MS.[25] In the context of patients with MS, the side-effects of morphine do not seem to be exacerbated.[1,3]

Adequate preloading prior to EA was performed as the involvement of autonomic nervous system makes these patients more prone to marked hypotension[17] and reduced response to IV fluid and vasopressor therapy.

Medications used to treat MS may have anesthetic implications. Recent steroid use must be elicited and supplemental steroids should be given per operatively to avoid adrenal insufficiency.[17] Our patient was not on any steroid so we did not administer supplementary steroid.

Chronic steroid use may lead to muscle wasting and osteoporosis and increase the risk of injury during positioning.

GA can also be used in these patients[10] and there is no preference as regards to the induction agent (inhalational/IV). The use of nitrous oxide is avoided owing to its inhibition of vitamin B_{12} and relation to myopathy. On the contrary, neuromuscular agents should be used carefully. Succinylcholine seems to be a relative contraindication due to the risk of hyperkalemia as a result of denervation sensitivity by upregulation of acetylcholine receptors.[4]

Denervation with upregulation of acetylcholine receptors may increase resistance to non-depolarizing neuromuscular blockers as seen with patients receiving anticonvulsants such as carbamazepine or phenytoin. On the other hand, muscle weakness and decreased muscle mass in patients on baclofen may be associated with increased sensitivity.[26] So dose titration must be performed with neuromuscular monitoring.

Temperature monitoring must be done and care must be done to prevent hyperpyrexia as even an increase of 0.5°C in body temperature is capable of reducing temporarily the neurological function.[2,17,18] Use of IV fluids at room temperature should be done.[27] Maintenance of operation theater temperature and temperature monitoring was done in our patient. We used IV fluids at room temperature in the perioperative period and 1 g IV paracetamol was given round the clock to prevent any hyper-pyrexia in the post-operative period.

Deep vein thrombosis must be considered as one of the post-operative risk factor in a patient with MS who has to stay for a longer period in bed because of leg paralysis. The preventive measures such as use of anticoagulants, wearing compression stockings, intermittent external pneumatic compression and early ambulation after surgery must be taken.[28] Our patient was completely asymptomatic and we ensured early ambulation of patient.

Our patient did not show any post-operative exacerbation of the symptoms following EA. Thus, EA with careful preoperative assessment and care can be successfully used in patients with MS.

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