

Spinal Myoclonus Following Intrathecal Anesthesia with Bupivacaine for Elective Appendicectomy

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Abstract

Involuntary movements under anesthesia are a less recognized phenomenon. In this report, we describe a case of myoclonus in a 22 years female patient undergoing elective appendicectomy under spinal anesthesia with 0.5% hyperbaric bupivacaine. Surgery was uneventful and completed in approximately 45 min from the start of surgical incision. Myoclonic movement that appeared in the lower extremities in the early post-operative period was controlled with intravenous midazolam. Despite all biochemical and imaging tests performed, an apparent cause was not detected. After ruling out all possible causes, the diagnosis of spinal myoclonus after spinal anesthesia with bupivacaine was made by exclusion. She was finally discharged on 4th post-operative day. The patient was followed up for 3 months during which she remained asymptomatic. The case warrants awareness about its occurrence, and anesthetists must watch out for and recognize it.

Keywords: American Society of Anesthesiologists 1, Bupivacaine, Spinal myoclonus

INTRODUCTION

Spinal myoclonus is defined as involuntary, rhythmic or dysrhythmic movements characterized by rapid contractions in the extremities, developing as a result of the stimulation of medulla spinalis.^{1,2} The onset of myoclonus can be shortly after the stimulus of the spinal cord or after hours or days.³ Restricted to a few somatic regions, it is usually caused by diseases including the spinal cord such as spinal cord compression, tumors, vascular myelopathy, infections, demyelinating diseases, paraneoplastic syndromes, and trauma to the spinal cord.⁴ Spinal myoclonus has been reported in studies following intrathecal administration of local anaesthetics,²⁻¹¹ opioids,¹²⁻¹⁴ radiocontrast agents,^{15,16} tranexamic acid,¹⁷⁻¹⁹ and even placement of intrathecal

catheter²⁰ though the incidence is relatively uncommon. We report a case of spinal myoclonus in a patient following hyperbaric bupivacaine subarachnoid anesthesia for elective appendicectomy.

CASE REPORT

A 22-year-old unmarried female patient scheduled for elective appendicectomy was categorized as American Society of Anesthesiologists physical status 1 during pre-anesthetic checkup. With a weight of 49 kg and height of 161 cm, she had no previous history of hypertension, diabetes mellitus, chronic obstructive pulmonary disease, seizure disorder or any other major medical disease. There was no previous history of any major operative procedure carried out on her nor any exposure of general or neuraxial anesthesia. There was no history suggestive of allergy to any specific food or drugs. Her menstrual cycle was regular. On examination, central nervous system, peripheral nervous system, respiratory system and cardiovascular system showed no obvious abnormalities. She had a good effort tolerance. Institutional based routine investigations were carried out. A written consent was taken.

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The patient was advised to be nil per orally after 10 pm on the previous night as per our institutional protocol. Alprazolam 0.5 mg was prescribed to her at bedtime. On the day of operation, no premedication was given. Monitoring consisted of non-invasive blood pressure, pulse oximetry, electrocardiogram and temperature recording. Preloading with 500 ml of balanced salt solution was done. Spinal puncture was performed using a 25G quincke needle in the L3/L4 space with the patient in the left lateral position. 3 ml (15 mg) of 0.5% hyperbaric bupivacaine was injected in the subarachnoid space after backflow of clear cerebrospinal fluid (CSF). The injection was easily administered without discomfort. She was then placed in horizontal dorsal decubitus. Maximum height of sensory block achieved was T6 dermatome with accompanying motor block. Surgery was uneventful and completed in approximately 45 min from the start of surgical incision. Patient was shifted to post anesthesia care unit. After an hour, she was shifted to ward. After about 30 min following her shifting to ward, she developed involuntary contractions in the muscles of the lower limbs that recurred every 45-60 s and lasted for 5-10 s. These jerky myoclonic movements were accompanied with unbearable pain in the pelvic region. The patient became agitated and started crying. She complained that she could not stop the movements. No such movements were noted in the upper extremities. Her mental functions were intact and muscle power was normal in all the four limbs. Her hemodynamic status also did not show many alterations except a slight increase in the heart rate. An arterial blood sample was drawn and analyzed, which almost showed normal acid-base status and electrolytes. We then administered 2 mg intravenous midazolam followed by another 1 mg after 15 min. Finally, after about 25 min, the involuntary movements stopped. She was referred to a neurologist for detailed examination. Magnetic resonance imaging (MRI) of the brain and spinal column that were done subsequently were also normal. Unexpectedly, CSF reports and electroencephalogram (EEG) examinations were also within normal limits. During her stay in hospital for next 3 days, no such involuntary movement recurred. She was finally discharged on 4th post-operative day. The patient was followed up for 3 months during which she remained asymptomatic.

DISCUSSION

Spinal myoclonus that includes both segmental and propriospinal myoclonus seems to be due to abnormal hyperactivity of the local dorsal horn interneurons, with the loss of inhibition of suprasegmental descending pathways. Contractions are repetitive, usually restricted to a muscle or a group of muscles. They appear in varied time intervals, always corresponding to specific spinal innervation. The

most striking characteristic is that the patient remains conscious. The episodic rhythmic nature of the movements in our patient was diagnostic of myoclonus. The frequency of attack, occurrence only during the waking hours, normal EEG, normal MRI scan of brain and spinal column and absence of neurological deficit pointed towards the diagnosis of spinal myoclonus.

We have gone through various literatures pertaining to spinal myoclonus following spinal anesthesia. According to these previous reports, onset, duration, and recurrence of spinal myoclonus are not predictable and are not related to the type of local anesthetic, dose, baricity and concomitant drugs in spinal anesthesia. Spinal myoclonus have been reported following spinal anesthesia with tetracaine,¹⁰ prilocaine⁶ and bupivacaine.^{2-5,7-9,11} Regarding baricity, all the three forms of bupivacaine have been reported to produce spinal myoclonus. There is also no predilection for any specific age group, sex or the type of operation. Spinal myoclonus has also been reported to occur in the upper extremities⁵ though majority of the reports have reported its occurrence in lower extremities. Even the severity is not fixed. In the case report by Abrão *et al.*,³ patient was intubated and kept under mechanical ventilation for 2 days, whereas in other case reports, spinal myoclonus either resolved spontaneously or with benzodiazepines or other anticonvulsants. However, the question that arises in our mind is whether spinal anesthesia can be safely re-administered subsequently to the same patient for any other procedure. In the case report by Lee *et al.*,¹¹ spinal myoclonus recurred after two episodes of spinal anesthesia with bupivacaine at a 1-year interval in a 35-year-old woman. They recommended that spinal anesthesia should not be repeated in a patient having previous history of spinal myoclonus under spinal anesthesia.

CONCLUSION

- Anesthesiologists and surgeons must be aware of the potential for this very rare phenomenon to occur as a result of spinal anesthesia
- Also, anesthesiologists should carefully take past anesthetic histories and consider the recurrence when planning anesthetic technique for the patients who had an episode of spinal myoclonus
- More awareness regarding this event is needed since there is a possibility of the anesthesiologist being blamed of a faulty technique.

REFERENCES

1. Brown P. Spinal myoclonus In: Marsden CD, Fahn S, editors. Movement Disorders. Vol. 3. Cambridge: Butterworth-Heinemann; 1994. p. 459-76.

2. Panigrahi B, Samaddar DP, Mahapatra BC, Varghese K. Spinal myoclonus following bupivacaine spinal anaesthesia for varicose vein stripping. *Indian J Anaesth* 2008;52:331-3.
3. Abrão J, Bianco Mde P, Roma W, Krippa JE, Hallak JE. Spinal myoclonus after subarachnoid anesthesia with bupivacaine. *Rev Bras Anesthesiol* 2011;61:619-23, 339.
4. Celik Y, Bekir Demirel C, Karaca S, Kose Y. Transient segmental spinal myoclonus due to spinal anaesthesia with bupivacaine. *J Postgrad Med* 2003;49:286.
5. Hirota K. Myoclonus-like involuntary movements under subarachnoid block completely subsided after midazolam administration in a patient undergoing cesarean section; 2013. Available from: <https://www.peerj.com/preprints/101>. [Last accessed on 2014 Jul 25].
6. Fores Novales B, Aguilera Celorrio L. Spinal myoclonus following intrathecal anaesthesia with prilocaine. *Anaesth Intensive Care* 2009;37:498-9.
7. Zamidei L, Bandini M, Michelagnoli G, Camprostrini R, Consales G. Propriospinal myoclonus following intrathecal bupivacaine in hip surgery: A case report. *Minerva Anesthesiol* 2010;76:290-3.
8. Lin CS, Wei-Hung C, Lee YW. Transient spinal myoclonus after spinal anaesthesia with bupivacaine in the perioperation period. *Anaesthesist* 2008;57:518.
9. Alfa JA, Bamgbade OA. Acute myoclonus following spinal anaesthesia. *Eur J Anaesthesiol* 2008;25:256-7.
10. Fox EJ, Villanueva R, Schutta HS. Myoclonus following spinal anesthesia. *Neurology* 1979;29:379-80.
11. Lee JJ, Hwang SM, Lee JS, Jang JS, Lim SY, Hong SJ. Recurrent spinal myoclonus after two episodes of spinal anesthesia at a 1-year interval - A case report. *Korean J Anesthesiol* 2010;59 **Suppl**: S62-4.
12. Glavina MJ, Robertshaw R. Myoclonic spasms following intrathecal morphine. *Anaesthesia* 1988;43:389-90.
13. Parkinson SK, Bailey SL, Little WL, Mueller JB. Myoclonic seizure activity with chronic high-dose spinal opioid administration. *Anesthesiology* 1990;72:743-5.
14. Cartwright PD, Hesse C, Jackson AO. Myoclonic spasms following intrathecal diamorphine. *J Pain Symptom Manage* 1993;8:492-5.
15. Sam MC, Gutmann L. Spinal myoclonus following intrathecal administration of diatrizoate meglumine. *J Neuroimaging* 1996;6:256-8.
16. Leede HV, Jorens P, Parizel P, Cras P. Inadvertent intrathecal use of ionic contrast agent. *Eur Radiol* 2002;12:S86-93.
17. Mohseni K, Jafari A, Nobahar MR, Arami A. Polymyoclonus seizure resulting from accidental injection of tranexamic acid in spinal anesthesia. *Anesth Analg* 2009;108:1984-6.
18. Sabzi F, Teimouri H, Zokai A. Myoclonus, seizure and ventricular fibrillation after intrathecal injection of tranexamic acid. *J Tehran Univ Heart Cent* 2009;4:253-5.
19. Butala BP, Shah VR, Bhosale GP, Shah RB. Medication error: Subarachnoid injection of tranexamic acid. *Indian J Anaesth* 2012;56:168-70.
20. Ford B, Pullman SL, Khandji A, Goodman R. Spinal myoclonus induced by an intrathecal catheter. *Mov Disord* 1997;12:1042-5.

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