Myoclonus-like involuntary movements under subarachnoid block completely subsided after midazolam administration in a patient undergoing cesarean section: a case report

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Abstract

Involuntary movement during and after neuraxial anesthesia, such as spinal and epidural anesthesia, is rarely observed. In this report, we describe a case of myoclonus-like involuntary movement of the upper extremities in a patient undergoing a planned repeat cesarean section under spinal anesthesia with bupivacaine that completely subsided after 2mg midazolam administration. The myoclonus-like movement never recurred or caused any apparent neurological side effects. No abnormal sensation or spontaneous pain of the upper extremities was observed. The patient was discharged on foot on post-operative day 3.

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Introduction

Involuntary movement during and after neuraxial anesthesia, such as spinal and epidural anesthesia, is not frequently observed. Spinal myoclonus is one of pathological states that can result in involuntary movement.

In this report, we describe a case of myoclonus-like involuntary movement of the upper extremities in a patient undergoing a planned repeated cesarean section under spinal anesthesia with bupivacaine that completely subsided after 2mg midazolam administration.

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Case report

An informed consent for case report has been obtained from the patient.

A 35-year-old female (weight 65 kg, height 159 cm) was scheduled to undergo a planned repeat cesarean section (CS). She had a previous medical history of a CS under spinal anesthesia 2 years ago. Her medical history did not reveal seizures and/or other neurological disorders during the current or previous pregnancies. Preoperative evaluation revealed no remarkable risk factors such as hypertension and glucose intolerance. Thus, the patient was considered as an American Society of Anesthesiologists physical status 1 during the preoperative consultation and combined spinal-epidural (CSE) anesthesia technique was planned. The patient was not premedicated. Monitoring consisted of electrocardiogram, non-invasive blood pressure, and pulse oximetry.

With the patient fully awake, the epidural catheter was placed at the Th12/L1 space and a spinal tap was performed at the L2/L3 space with a 25G Quincke needle in the left lateral decubitus position. After backflow of clear CSF, 2.5 ml hyperbaric 0.5% bupivacaine with 15 μg fentanyl was injected into the subarachnoid space. The patient was then placed in a supine position. Discernible sensory block to cold sensation was promptly observed. Finally, before the start of the surgical incision a sensory block to cold to T3 level with accompanying motor block was obtained. Vasopressors including ephedrine and phenylephrine were administrated to maintain systolic blood pressure to be more than 100 mmHg during the operation.

The surgical procedure proceeded uneventfully and a live male infant and placenta were delivered at 9 and 11 min after skin incision, respectively. All other surgical findings were unremarkable and routine antibiotics and uterotonic oxytocin were administrated. No drugs were administrated into the epidural space. Because no hypnotics were used for sedation, the patient was awake during the operation.

The operation was completed 1 h and 10 min after the spinal tap and at the time of completion, involuntary movements began (Fig. 1 and Supplementary movie). The movement was observed in both upper extremities, but left side movement was more pronounced (Supplementary movie). The sensory block to cold subsided to the T8 level and sensory and motor function in her upper extremities was intact.

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The patient was fully conscious, calm, and responsive. She complained that she could not stop the movement. She did not complain that she felt cold. The body temperature at her bladder was 36.8°C and no coldness of the upper extremities was observed. She was referred to a neurologist for detailed examination. After the examination, 2 mg of midazolam was administered. Immediately after administration, the involuntary movement stopped (Supplementary movie).

The patient was subsequently transferred to the ward and the involuntary movement did not recur. Five hours after the surgery, the spinal block had completely subsided. No abnormal sensation or spontaneous pain of the upper extremities was observed. The patient was discharged on foot on postoperative day 3.

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Discussion

In this report, we describe a case of involuntary muscle contraction of the upper extremities observed in a pregnant patient undergoing cesarean section under spinal anesthesia with bupivacaine. The involuntary movement immediately subsided after intravenous midazolam administration.

One of the most critical differential diagnoses in this case was eclampsia (Dennis 2012; Edlow *et al.* 2013). Eclampsia is one of the most serious complications of pregnancy and is characterized by tonic-clonic seizure. Eclampsia could be excluded because of the progress of the pregnancy and the patient's clear and calm mental state during the contraction in this case. The other differential diagnosis was shivering (Park *et al.* 2012; Sessler 2008). However, this diagnosis was ruled out by subjective and objective evidence provided by the patient and the obvious laterality of the contraction. Thus, the involuntary contraction observed here was diagnosed as spinal myoclonus subsequent to subarachnoid block by bupivacaine.

Myoclonus is an involuntary contraction of a muscle or a group of muscles (Shibasaki & Hallett 2005; Shibasaki & Thompson 2011). Spinal myoclonus is identified as myoclonus originating in the spinal cord, including segmental and propriospinal myoclonus (Cassim & Houdayer 2006). It is often excitation-induced without triggering by a variety of external events and can be induced in patients without specific neurological diseases. The specific mechanisms underlying myoclonus are not yet completely understood. The pathophysiology of spinal myoclonus seems to be abnormal hyperactivity of the local dorsal horn interneurons, with loss or impairment of inhibition of suprasegmental descending pathways (Shibasaki & Hallett 2005; Shibasaki & Thompson 2011). Furthermore, there have been several case reports of spinal myoclonus subsequent to neuraxial anesthesia (Abrao *et al.* 2011; Alfa & Bamgbade 2008; Lee *et al.* 2010; Menezes & Venkat 2006; Watanabe *et al.* 1987). According to these previous reports, onset, duration, and recurrence of spinal myoclonus are not predictable and are not related to dose and baricity of local anesthetics, and concomitant drugs in spinal anesthesia. One report described a myoclonus caused by epidural block (Menezes & Venkat 2006). The myoclonus developed at

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several time points after spinal block: immediately, 3 min, 7 h, and 1 day after beginning of the blockade. In the present case, the involuntary muscle contraction began 40 min after spinal block. In addition to local anesthetics, analgesics and contrast media administrated to intrathecal and epidural space can induce myoclonus. In the present case, 15μg fentanyl was concomitantly administrated with bupivacaine. Several previous reports have identified opioid-induced neuroexcitation by mechanisms that remain unknown (Kakinohana *et al.* 2003).

Another feature of this case is that affected location was the upper extremities. The previous reports described myoclonus of the lower extremities.

Treatment for sudden-onset myoclonus has not been established (Dijk & Tijssen 2010; Lozsadi 2012). Anticonvulsants such as sodium valproate, clonazepam, levetiracetam, and piracetam are used. In addition, barbiturates can be utilized to stop the movement (Dijk & Tijssen 2010). Benzodiazepines also can be used to treat myoclonus of the type presented. In a previous report, midazolam and diazepam were only partially effective (Lee *et al.* 2010). However, in this case, administration of 2 mg midazolam resulted in prompt and complete remission of the involuntary contraction. The involuntary movement may be psychogenic from the striking effect of midazolam.

The patient underwent CS under spinal anesthesia 2 years before the surgery described here and the involuntary movement did not occur at that time. But a report described that recurrent spinal myoclonus under spinal anesthesia exerted in 1 year. If the patient has a chance of undegoing CS or other surgical treatment with spinal anesthesia, the anesthesiologists should take the possibility of recurrence of this involuntary movement into account.

In summary, we described a case of spinal myoclonus under spinal anesthesia during repeat CS that promptly subsided after intravenous administration of midazolam.

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Figure Legend

Figure 1. Left upper extremity of the patient

Myoclonus-like involuntary movement was observed in both upper extremities.

Legend for Supplementary data

The movie of the involuntary movement is demonstrated.

The involuntary movement was observed on the both arms. The movement quitted immediate after administration of 2mg midazolam.

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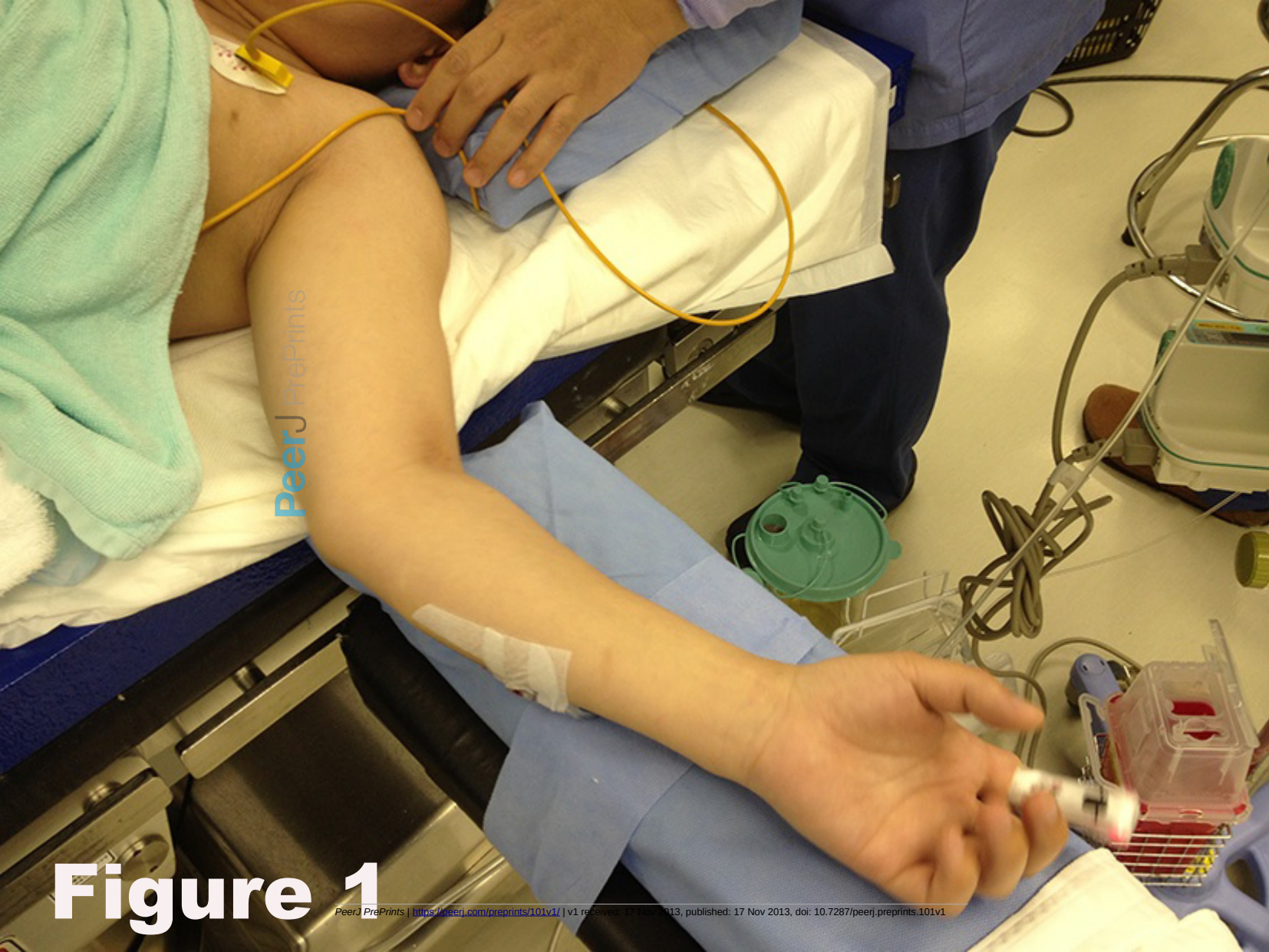

Figure 1

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