Intraoperative neurological event during cesarean section under spinal anesthesia with fentanyl and bupivacaine: Case report and review of literature

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Abstract

Neurological events similar to transient ischemic attack in a peripartum woman are uncommon. Cerebral complications of preeclampsia, thrombo-embolic phenomena, or high spinal can mimic such situations. Spinal anesthesia with local anesthetic and opioid is an established anesthetic technique for cesarean section. Although intrathecal opioids are safe for both the mother and fetus; some unusual complications such as dysphagia alone or associated with facial numbness, aphasia, have been reported. We report a case of transient aphonia and tingling sensation over the face without any dysphagia after intrathecal administration of bupivacaine and fentanyl for cesarean section.

Key words: Cesarean section, neurological event, spinal anesthesia

Introduction

Addition of opioids as adjuvant to local anesthetic for spinal or combined spinal-epidural anesthesia (CSE) is a routine practice for cesarean section. There are few reports of unusual complications like dysphagia, facial numbness, aphasia following intrathecal opioids for labor analgesia.¹⁻⁵ We describe a case of transient aphony and facial tingling after spinal anesthesia with bupivacaine-fentanyl for cesarean section and review the relevant literature.

Case Report

A 31-year-old, 54 kg, 155 cm, gravida-3, Para-1,37 weeks gestation, woman was admitted with complaint of tenderness at the site of previous cesarean section scar. She had an uneventful cesarean section under subarachnoid block 2½ years back and no other past medical illness. Her antenatal course was unremarkable. On examination, her blood pressure (BP) was 130/74 mmHg, pulse 94/minute and respiratory rate (RR) 18/minute. Ultrasonography revealed normally beating fetal heart at 140/minute. In view of the possible impending uterine rupture, the patient was scheduled for an urgent cesarean section.

In the operating room, standard monitoring was initiated and subarachnoid block was given in left lateral position with median approach at L₂₃ interspace in the first attempt. Bupivacaine 7.5 mg (1.5 ml of 0.5% hyperbaric bupivacaine) with fentanyl 25 mcg was injected after free flow of cerebro-spinal fluid. The patient was made supine, oxygen was supplemented by facemask and Ringer’s solution was administered intravenously. Two minutes after spinal anesthesia, her pulse was 95/minute, BP 126/72 mmHg and at 5 minutes, her pulse was 103/minute, BP 109/65 mmHg, RR 20/minute and peripheral oxygen saturation (SpO₂) 99%. T₄ level of sensory block was achieved and surgery was started. A healthy female baby was delivered after 5 minutes with normal APGAR score. Three minutes after the delivery of the baby, the patient complained of weakness of voice and tingling sensation over the face, immediately followed by complete inability to speak. She was anxious but her vital signs were stable with SpO₂ 99%, pulse 104/minute, BP 110/64 mmHg and RR 16/minute. Sensory block
was reassessed and found to be fixed at T₄ level. She was conscious, alert, and able to follow commands. There was no difficulty in swallowing. The baby was shown to her and she was reassured. After 20 minutes, her aphonya resolved. The rest of the surgery was uneventful. Postoperatively, the patient was monitored in the recovery room and neurological examination revealed normal higher function, normal cranial nerve function with no sensory-motor abnormality. There was no history suggestive of preeclampsia or absence seizures. Magnetic Resonance Imaging (MRI) with diffuse weighed scan, duplex ultrasound for deep vein thrombosis, carotid artery Doppler, electroencephalography (EEG), and trans-thoracic echocardiography were all normal. Subsequent postpartum course was uneventful. She was followed up in neurology for three months without any complications.

Discussion

The differential diagnoses of such clinical presentation of sudden and transient neurological event could be transient ischemic attack (TIA), cerebral complications of preeclampsia, absence seizures and complications of spinal anesthesia. Available literature on acute cerebro-vascular syndrome in pregnancy involves mainly cases of preeclampsia complicated with cerebral edema, vasospasm, intracranial haemorrhage, or reversible ischemic neurological deficit. This patient, however, did not have any features of preeclampsia and all BP readings during antenatal period were normal.

TIA is a transient neurological event, which usually persists for minutes and can occur due to hypotension, hypoxia, or embolism. However, the patient did not have any hypoxia or hypotension. Thrombo-embolism or amniotic fluid embolism is a rare event during pregnancy with variable presentation. Duplex ultrasound and carotid artery Doppler were normal suggesting against any venous or arterial embolus. There is no report so far of amniotic fluid embolism presenting as TIA. However, in such clinical situations, when TIA is suspected, the patient should be assessed with ABCD2 score for early stroke risk (A = age>60 years [1 point]; B = blood pressure>140/90 mmHg [1 point]; C = Clinical features, including unilateral weakness [2 points] and speech disturbance without weakness [1 point]; D2 = Diabetes [1 point] and Duration of symptoms [1 point for < 60 min and 2 points for > 60 min]). Early stroke risk is high if ABCD2 score ≥ 4. The ABCD2 score in this patient was 2 (speech disturbance without weakness [1 point] and duration of symptoms <60 minutes [1 point]). Other risk factors like acute ischemic lesions on diffusion weighted MRI, carotid stenosis, atrial fibrillation, patent foramen ovale, microembolic signals on transcranial Doppler were all ruled out. MRI of this patient was normal and transcranial Doppler was not performed. However, >50% patients of TIA have normal MRI. The patient was followed-up for 3 months as there is 10-20% risk of major stroke in TIA in subsequent 3 months.

There are several reports of acute neurological events (either hemorrhagic or ischemic) like hemiparesis, dysarthria, visual defect, tinnitus, etc in term parturients with Moyamoya disease. Moyamoya disease, most common in East Asia, is characterized by steno-occlusive changes of the terminal portions of intracranial part of internal carotid artery and development of network of small collaterals in the base of the brain visualized as puff of cigarette smoke in angiography. Since MRI was normal, this was not considered. Absence seizure was not considered as there was no history of similar episodes anytime in childhood and EEG was normal. Hypotension or hypoxia following spinal anesthesia could be a possibility. However, the patient was conscious, hemodynamically stable with normal respiratory rate and SpO₂. Literature search to explain such phenomenon revealed some unusual complications following intrathecal drugs for labour analgesia (Table 1).

In a series of six parturients, difficulty in breathing, facial numbness and dysphagia were reported after administration of intrathecal sufentanil 10 mcg for labour analgesia. Similar incident was described in another patient following use of intrathecal sufentanil 10 mcg for labor analgesia. The symptoms started 3 minutes after intrathecal injection of drug and disappeared within 5 minutes. Effect of opioids on fifth and ninth cranial nerve was implicated in these cases.

Currier et al. described two cases of dysphagia after administration of intrathecal fentanyl as a part of CSE technique for labor analgesia. One patient developed dysphagia 1 hour after intrathecal fentanyl 20 mcg, which resolved in 30 minutes. The other patient developed generalized itching, dysphagia, and tingling sensation around lips 20 minutes after intrathecal fentanyl 25 mcg and bupivacaine 2.5 mg, which resolved within 60 minutes. Cephaloid spread of fentanyl was implicated as the cause. As sitting position was used in both the case for block, the relative hypobaricity of the narcotic/narcotic-local anaesthetic mixture, added by the postural effect was implicated for the rostral spread. No aphonya was reported.

A 40-year-old woman who received CSE with sufentanil 10 mcg and isobaric bupivacaine 2.5 mg in sitting position for labor analgesia, developed aphasia, altered mentation, increased salivation, and dysphagia minutes after CSE and all the symptoms resolved in 90 minutes, without any intervention. The authors attributed rostral spread of either of the opioid
or hypobaric local anesthetic affecting the speech area, as the reason of the symptoms.\textsuperscript{[4]} A case of aphonia and dysphagia lasting 20 minutes was reported after intrathecal administration of fentanyl 10 mcg with bupivacaine 2.5 mg in sitting position for labor analgesia.\textsuperscript{[5]} Cephaloid spread of fentanyl was implicated again.

Our patient had aphonia and abnormal facial sensations 13 minutes after the intrathecal injection. Rostral spread of the drugs through CSF to the cerebral cortex affecting the speech area or the cranial nerves is apropribility. Rapid rostral spread of lipophilic opioids like fentanyl had been reported.\textsuperscript{[15]} Notably, absence of other side effect of opioids (respiratory depression, pruritus) is difficult to explain. Hypoesthesia of the face is suggestive of cephalad spread of local anesthetic, but there were no characteristic of high spinal block (level was T\textsubscript{4}). The transient nature of these symptoms suggests opioid rather than local anesthetic as the culprit, as rapid clearance of fentanyl from the CSF resulted in disappearance of symptoms.

Position of the patient and baricity of the drug at the time of block had been found to affect the rostral spread of drug. Unlike other reported cases, in the present case subarachnoid block was given in a lateral position and hyperbaric bupivacaine was used. Greater cephalad spread of sensory block was found when intrathecal fentanyl and bupivacaine were administered in sitting as compared to lateral position.\textsuperscript{[16]} However, the effect of sudden change of position (from lateral to supine) on the spread of drug is not known. In pregnant women, presence of wider pelvis makes the vertebral column inclined towards the head end in lateral position, which may increase the cephalad spread of intrathecal drugs.

Baricity of the mixture of fentanyl and hyperbaric bupivacaine is not known. In an in-vitro study, addition of fentanyl to isobaric bupivacaine was found to decrease the baricity of the mixture.\textsuperscript{[17]} Cephalad spread of hypobaric solution is more that of hyperbaric solution, but studies show that density has little effect on intrathecal spread of drugs in full term pregnancy.\textsuperscript{[18,19]} Though the possibility of rostral spread of fentanyl-bupivacaine mixture is less with use of hyperbaric bupivacaine and lateral position, it cannot be excluded. However, 10° head up tilt can reduce the extent of cephalad spread.\textsuperscript{[20]}

In summary, transient neurological events like aphonia and facial tingling can occur following intrathecal administration of fentanyl and bupivacaine for cesarean section. Presence of high spinal block should be excluded and the patient reassured. Possibility of TIA, cerebral complication of preeclampsia and Moyamoya disease should be ruled out in appropriate clinical setting.

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