Case Report

Super refractory status epilepticus in a parturient with preeclampsia undergoing cesarean delivery under spinal anesthesia

Anil Kumar Thakur[1], Kritika Rathour[2], Ritu Lall[3], Shilpi Satija[2], Soumya Gupta[4]

From [1]Professor and Head (Academic), [2]Senior Resident, [3]Specialist and Head (Administrative), [4]Postgraduate Student, Department of Anaesthesia, Employees' State Insurance Post Graduate Institute of Medical Sciences and Research, Basaidarapur, New Delhi, India

ABSTRACT

Super refractory status epilepticus (SRSE) is a rare but serious neurological emergency. This case report aims to highlight the challenges faced during the diagnosis and management of SRSE in a 36-year-old preeclamptic patient taken for cesarean delivery under spinal anesthesia. The patient developed a seizure episode minutes after administration of intrathecal bupivacaine, necessitating administration of general anesthesia. Postoperatively, SRSE developed which did not respond to multiple anti-epileptics and thiopentone sodium infusion. Although the clinical picture and magnetic resonance imaging findings supported the diagnosis of posterior reversible encephalopathy syndrome, the role of intrathecal bupivacaine in causing SRSE could not be ruled out due to the temporal association of events. The patient had a prolonged and complicated hospital stay and despite a multimodal approach to the treatment, suffered neurological sequelae.

Keywords: Posterior reversible encephalopathy syndrome, Preeclampsia, Seizures, Spinal anesthesia, Super refractory status epilepticus

Super refractory status epilepticus (SRSE) is defined as status epilepticus (SE) that continues for 24 h or more after the use of anesthetic therapy, including cases that recur on weaning of the anesthetic agent [1]. Limited information is available regarding the epidemiology of SRSE in relation to pregnancy. The high maternal and fetal morbidity and mortality and the lack of treatment protocols make peripartum SRSE difficult to treat [2].

In the following case report, along with difficulty in treating the patient, the onset of seizures soon after spinal anesthesia in a preeclamptic parturient added a diagnostic challenge as well.

CASE REPORT

A 36-year-old primigravida at 38 weeks of gestation was planned for emergency cesarean delivery in view of pathological cardiotocography. The patient was a diagnosed case of preeclampsia and was on tablet labetalol 100 mg twice daily since the 8th month of gestation. Preoperatively, the blood pressure (BP) was 150/100 mmHg, premonitory symptoms were absent and the urine albumin was 1+.

In the operation theatre, urinary catheterization was done with 2% lignocaine jelly. Subarachnoid block was administered using 2 ml of 0.5% bupivacaine (heavy). After 3 min, the patient complained of severe perineal discomfort despite pinprick sensation being absent up to T8 level and Bromage score being 4. She progressively developed decreased responsiveness, uprolling of eyes with nystagmus, rigidity, and generalized tonic-clonic seizures (GTCS). General anesthesia was induced with propofol and succinylcholine. Endotracheal intubation was done and the surgery was started. Invasive BP monitoring was instituted. Anesthesia was maintained with sevoflurane, nitrous oxide, and oxygen along with fentanyl and atracurium. Intraoperatively, 2 mg midazolam, 25 units oxytocin, and 250 mcg carboprost intramuscular were also administered.

Postoperatively, the patient was shifted to the intensive care unit (ICU) in the intubated state for elective mechanical ventilation. Nitroglycerin infusion was started to control BP and levetiracetam 1 g loading dose was given. A second episode of GTCS occurred which was terminated with midazolam 2 mg bolus followed by an infusion of midazolam 1.5 mg/h. Another episode of GTCS was treated with midazolam 2 mg and the magnesium sulfate was initiated as per the Pritchard regimen. In the following hours, the patient developed generalized rhythmic jerky movements which persisted despite phenytoin 1 g, diazepam 10 mg, and midazolam infusion of up to 5 mg/h. Since seizures remained refractory to antiepileptics, thiopentone sodium 250 mg loading dose was given and an infusion of

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Correspondence to: Dr. Kritika Rathour, BL- 61, Second Floor, L Block, Harinagar, South West Delhi, 110064, India. E-mail: krumkritika@gmail.com

3–5 mg/kg/h was titrated to maintain bispectral index value between 40 and 60. However, intermittent seizure activity could still be observed. Vecuronium was given as needed to facilitate mechanical ventilation and prevent complications of sustained convulsions. Levetiracetam and phenytoin were continued at maintenance dose. To limit cerebral edema hydrocortisone, furosemide and mannitol were administered. Citicoline was started for cerebral protection.

The BP normalized by the 1st post-operative day and nitroglycerin was stopped. Seizures stopped on the 3rd post-operative day. Midazolam and thiopentone infusions were tapered and stopped. Cerebrospinal fluid (CSF) analysis was normal. Magnetic resonance imaging (MRI) brain showed bilaterally symmetrical ill-defined hyperintensities in the deep white matter of parietal and occipital lobes, medial temporal lobe, medial globus pallidus, and posterolateral thalamus in T2 and fluid-attenuated inversion recovery (FLAIR) sequences (Fig. 1).

The patient was tracheostomized and weaned while the Glasgow coma scale gradually improved. During the ICU stay, the patient developed secondary complications such as dyselectrolytemia, anemia, derangement of hepatic and renal function tests, and sepsis which were successfully treated. By the 11th post-operative day, the patient was fully conscious and maintaining on room air. Subsequently, decannulation was done. An EEG was carried out which was normal. In the following days, the patient developed anterograde amnesia which persisted during discharge on post-operative day 31. All antiepileptics were stopped except levetiracetam. Repeat MRI carried out after discharge showed bilaterally symmetrical FLAIR hyperintensities in the hippocampus and dorsal thalamus which indicated partial resolution from the previous scan. The patient continued to have residual amnesia at the time of writing the case report.

DISCUSSION

Posterior reversible encephalopathy syndrome (PRES) is the most common cause of refractory SE in relation to pregnancy [3]. In our patient, most findings were compatible with PRES. The patient had a background of preeclampsia, which can cause cerebral hyper-perfusion and endothelial dysfunction which are central to the pathogenesis of PRES. The onset of seizures was abrupt [4]. The MRI lesions were suggestive of vasogenic edema with a distribution typical of PRES [5]. There was a partial clinical and radiological resolution which is also suggestive of PRES [4].

Alibas *et al.* has reported a similar case of PRES induced SRSE in which EEG abnormality persisted despite multiple antiepileptics, propofol, thiopental infusion, and methylprednisolone [6]. The temporal association of subarachnoid block with seizures raised a doubt regarding the role of intrathecal bupivacaine. Seizures and SE have been reported as rare complications of spinal anesthesia with bupivacaine [7-9].

Akıl *et al.* have suggested that cephalad intrathecal migration of neurotoxic bupivacaine can lead to refractory SE. They also suggested that bupivacaine-induced vasodilation of spinal cord blood vessels and systemic absorption of the drug could be responsible [7]. Kim *et al.* have also implicated proximal intrathecal movement of bupivacaine in causing seizures [8]. There is no way to reasonably exclude these mechanisms in the current case.

Local anesthetic neurotoxicity has been reported after simultaneous use of intrathecal bupivacaine and intraurethral lignocaine but in our case, a minimal amount of lignocaine was used for catheterization which could not have crossed toxic thresholds [9]. Kaur *et al*. described aseptic meningitis as a cause of recurrent GTCS post-cesarean delivery [10]. CSF and imaging findings in the current case did not support the diagnosis of meningitis.

In the case presented, a parturient with preeclampsia developed a seizure episode minutes after the administration of subarachnoid block for cesarean delivery which evolved into post-operative SRSE. The clinical scenario and investigations suggested PRES but the occurrence of seizures just after spinal anesthetic posed a diagnostic dilemma. Treatment was mainly aimed at controlling BP, seizures, and brain edema. Due to the complicated nature of the case, the management required a multi-modal approach. The patient was discharged after a prolonged hospitalization with a residual neurological deficit.

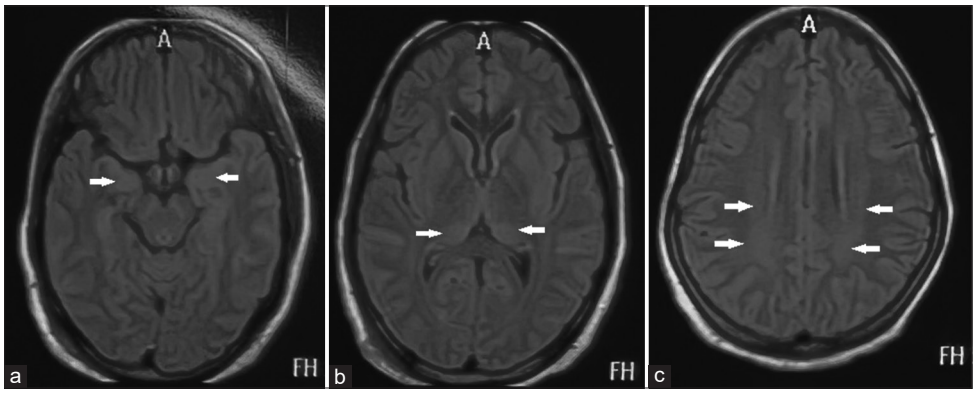

Figure 1: Fluid-attenuated inversion recovery axial image showing (a) ill-defined hyperintensities (shown by white arrows) in bilateral medial temporal lobes; (b) thalami; and (c) deep occipital and parietal lobes

CONCLUSION

The main issues faced during the management of this case were ruling out differential diagnoses and limiting complications. Further research is needed to understand the role of spinal bupivacaine in causing or worsening seizures or SE. To improve outcomes after SRSE, the development of a well-established management protocol is essential.

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