Psychogenic Non-Epileptic Spells During the Peri-Operative Period of a Cesarean Section

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ABSTRACT

We present a case of 37 year old female developing new onset seizures during the cesarean section which continued in the immediate and early postpartum period. All possible causes of seizure were ruled out by respective diagnostic imaging studies and electroencephalogram (EEG). Diagnosis of psychogenic non-epileptic spells (PNES) was concluded by the neurologist. We emphasize on the importance of having the knowledge of PNES to prevent any iatrogenic injury and increased morbidity due to endotracheal intubation, antiepileptic drugs and prolonged hospital stay. Delayed diagnosis of PNES in obstetric population may adversely affect the newborn because of antiepileptic drugs or premature delivery. To our knowledge, this is the first case of PNES reported during the cesarean section.

Keywords: Seizures; Psychogenic non epileptic spells; Anesthesia; Pregnancy

INTRODUCTION

PNES, also termed as psychogenic seizures or pseudo seizures, is the term used for episodes that do appear to be an epileptic seizure but are not a result of excessive synchronous cortical activity [1]. Prevalence of PNES in general population is 2 to 33 per 100,000 persons [2]. There is limited data available regarding the prevalence of PNES among parturients, though cases have been reported during pregnancy [3]. It is often difficult to clinically distinguish it from seizures but simultaneous video and EEG recordings are most helpful for the diagnosis. Clinical patterns more consistent with PNES are tightly closed eyes with resistance to opening, wild thrashing, side to side movements, yelling verbal phases and retained papillary responses. Patients with PNES have higher mortality and suicide rates as compared to general population, especially in younger patients [4]. Episodes of PNES during peri-operative period can pose unique challenges for anesthesiologist due to concerns for anesthetic toxicity or life threatening medical conditions leading to interventions which may be detrimental and potentially avoidable especially if PNES is suspected and diagnosed early.

CASE DESCRIPTION

A 37 year old 39 weeks pregnant female with history of gestational hypertension (mild and controlled without medications), asthma, restless leg syndrome, and a prior cesarean section presented for repeated elective cesarean section. Patient denied any anesthetic related complications in the past. She was 62 inches tall and weighed 119 kilograms. Her vital signs were stable as BP 133/70 mmHg, HR 99/min and SpO2 99% on air. After connecting standard ASA monitors, epidural anesthesia was attempted in sitting position. Epidural space was confirmed with loss of resistance technique using normal saline at L3-4 level and epidural catheter was inserted. Test dose was given with 3 ml of lidocaine 1.5% with epinephrine 1:200,000. Patient remained hemodynamically stable and epidural was further dosed up with 300 mg of 2% lidocaine with 100 µg of fentanyl. Patient was laid supine and after a few minutes, she developed seizure like activity with head extension and closure of eyes. Preparation was made for intubation but within a few seconds patient was fighting to remove the face mask. It was associated with a brief period of hypotension without changes in the heart rate or desaturations. Hypotension was treated with intravenous fluids and vasopressors. Sensory block level was checked and was found to be at T2 dermatome. Thereafter, no such episode was observed and she remained hemodynamically stable. She was given 3 mg of morphine in the epidural and the catheter was taken out at the end of the surgery. An hour later, in the recovery room she had three witnessed seizure like episodes lasting 1-2 minute (generalized tonic clonic, bilateral
upper extremity shaking, more on right side) with lucid interval in between the episodes. Tongue biting and incontinence were not reported and vital signs remained stable. By this time, her sensory block level had regressed and she was able to move her legs.

Due to concerns of eclampsia, magnesium loading dose was given and she was transferred to the intensive care unit. Blood tests showed hemoglobin of 9.8 gm/dL, WBC count of 14.5 × 10^3/mm and platelet count of 229 × 10^6/mm. Chemistries were unremarkable with normal renal and liver function, normal creatine kinase (CK), glucose and sodium levels. There was no proteinuria on urine analysis and urine toxicology was negative for illicit drugs. Intravenous anti-epileptic as levetiracetam was also initiated after neurology consultation. Brain imaging such as CT/MRI/MRV were done which were all unremarkable. She continued to have many seizures like episodes for following two more days with variable presentations like staring, right leg shaking, right arm shaking, tight closure of eyes, lasting for few minutes without any residual neurological deficit. 24 hour video EEG was performed which was normal as well. Finally, these episodes were diagnosed as PNES. She was evaluated by a psychiatrist and supportive psychotherapy was offered. Patient did not experience similar episodes during observation for two more days and was discharged home.

**DISCUSSION**

Seizures in obstetric population are often considered to be due to eclampsia, though there are many other causes which can lead to seizures such as epilepsy, cerebral venous sinus thrombosis, complications due to epidural anesthesia (local anesthetic systemic toxicity, meningoencephalitis, postdural puncture headache, pneumoencephalus), intracranial hemorrhage, metabolic causes including electrolyte disturbances, drug or alcohol withdrawal, intracranial tumor and rarely as PNES [5]. Table 1 summarizes the sign and symptoms and diagnosis of peri-operative seizures during pregnancy.

**Table 1:** Peri-operative seizures in a pregnant female.

<table>
<thead>
<tr>
<th>Causes</th>
<th>Signs and Symptoms</th>
<th>Diagnosis</th>
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<tbody>
<tr>
<td>Eclampsia</td>
<td>Seizures, high blood pressure, headache, epigastric pain, visual changes</td>
<td>Hemolysis, low platelet count, elevated liver enzymes, proteinuria</td>
</tr>
<tr>
<td>Local anesthetic systemic toxicity (LAST)</td>
<td>Dizziness, lightheadedness, tinnitus, disorientation, unconsciousness, generalized seizures, respiratory arrest, hemodynamic compromise</td>
<td>Clinical</td>
</tr>
<tr>
<td>PNES</td>
<td>Seizure like motor activity</td>
<td>Video EEG</td>
</tr>
<tr>
<td>Dural puncture</td>
<td>Positional headache, nausea, photophobia</td>
<td>Clinical</td>
</tr>
<tr>
<td>Cerebral venous sinus thrombosis</td>
<td>Headache, papilledema, focal deficit, seizures, coma</td>
<td>MRI/MRV of brain.</td>
</tr>
<tr>
<td>Pneumoencephalus</td>
<td>Sudden severe headache, nausea, altered sensorium, seizures</td>
<td>MRI Brain, Usually resolves in a few days.</td>
</tr>
<tr>
<td>Meningoencephalitis</td>
<td>Pyrexia, headache, neck stiffness, altered sensorium, seizures</td>
<td>CT/MRI Brain, CSF analysis</td>
</tr>
<tr>
<td>PRES syndrome</td>
<td>Altered sensorium, seizures, visual disturbances, headache</td>
<td>CT/MRI Brain, Usually resolves within days or weeks.</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>Seizures</td>
<td>EEG</td>
</tr>
<tr>
<td>Metabolic disturbance/Alcohol or Drug withdrawal</td>
<td>Altered sensorium, Seizures</td>
<td>Urine toxicology, alcohol level, Serum glucose, Serum sodium</td>
</tr>
<tr>
<td>Intracranial/Subarachnoid hemmorhage</td>
<td>Headache, seizures, focal deficits, coma</td>
<td>CT Brain, MR angiography to r/o Aneurysm and AV malformations</td>
</tr>
<tr>
<td>Intracranial tumor</td>
<td>Headache, seizures, altered sensorium</td>
<td>MRI/CT brain, Pathologic examination of Brain tissue</td>
</tr>
</tbody>
</table>

From anesthesiologist perspective, toxicity of local anesthetics is a major concern. Parturients have reduced levels of binding proteins like alpha-1-acid glycoprotein and increased cardiac output, which can lead to rapid local anesthetic (LA) absorption and high peak free LA concentrations. Also, epidural venous engorgement may further increase drug absorption. Due to these reasons, there is an increased risk of local anesthetic systemic toxicity (LAST) during pregnancy [6]. Brown et al. reported an incidence of LAST of 1.2 per 10,000 epidural anesthetics where epinephrine test doses were commonly used.
LAST occurs due to inadvertent intravascular injection or vascular uptake from local spread. It happens after a large volume of LA has been administered via epidural catheter or during peripheral nerve block, and only rarely after spinal anesthesia where small volume is given. Since our patient developed her first seizure like activity associated with momentary hypotension immediately after the epidural anesthesia, LAST was our first clinical suspicion. Her first seizure like activity resolved after a few seconds without any treatment. Subsequent short lasting episodes which continued for next two to three days were unlikely to be due to LAST as she received only single injection of LA rather than continuous infusion and those episodes were not associated with any hemodynamic instability. High spinal anesthesia was another possible cause for seizures because of the lower cerebral perfusion due to associated sympathetomy. But patient continued to exhibit similar episodes for next 2-3 days which would not be a result of high spinal anesthesia. As our patient had history of gestational hypertension, eclampsia was the next possible diagnosis. But due to her repeated seizures despite being on magnesium infusions and lack of other signs and symptoms of severe preeclampsia, normal platelet count, biochemistry and absence of proteinuria, eclampsia was essentially ruled out. Treatment for eclampsia during pregnancy is delivery of the fetus along with intravenous magnesium sulfate infusion. PNES can be easily mistaken for eclamptic seizures resulting in premature delivery of the fetus. In fact, a case of stillborn delivery to a mother with pseudostatus epilepticus has been reported [8]. Postdural puncture headache (PDPH) can also be associated with seizures, mechanism being unclear, but most likely secondary to low cerebrospinal fluid pressure and vasospasm [5,9]. But PDPH was unlikely in our patient, as she did not exhibit any signs like headache, visual disturbances or neurological deficit. Brain imaging had ruled out other causes like cerebral venous sinus thrombosis, intracranial hemorrhage/infarction, intracranial tumor. Her urine toxicology screen and serum electrolytes remained normal. Finally, video EEG was also reported to be unremarkable. Hence, patient was diagnosed with PNES by consulting neurologist.

PNES have been reported after anesthesia [2,3] and also in the postpartum period [3]. Most of the cases reported in the past include patients with history of epilepsy or psychiatric illness. Risk factors associated with PNES are female sex, young age (20’s and 30’s), physical/sexual/emotional abuse, history of head injury, epilepsy and low intelligence [10]. Unresponsive behavior with motor manifestations mimicking a generalized tonic clonic seizure or a focal seizure with impaired awareness is the most common manifestation of a PNES. Before being identified with PNES, around 10% of patients may have had epileptic seizures or had concurrent epileptic seizures also [11]. Diagnosing PNES can be challenging with some cases taking years to diagnose. Video EEG is the gold standard for diagnosis. Serum prolactin and CK levels are normal after the pseudo seizures and can also help differentiate it from epileptic seizures. It is important to have knowledge of PNES to avoid iatrogenic injury and to reduce morbidity due to prolonged hospital stay and endotracheal intubation. It will also help in preventing erroneous diagnosis of seizures and associated need for long term anti-epileptics and their side effects. Moreover, delay in psychiatric interventions may lead to risk of injury to self. Early diagnosis of PNES in pregnancy will further prevent unnecessary exposure of fetus to anti-epileptic medications and premature delivery of fetus in case of pseudostatus epilepticus [12].

Treatment of PNES includes multidisciplinary team involving primary care physician, neurologist, psychiatrist and psychotherapist. Mainstream of treatment consists of psychotherapy and cognitive behavior therapy. Markers for poor prognosis include delay in diagnosis, patient in denial, coexisting psychiatric illness/personality disorder and poor socioeconomic status [13,14].

CONCLUSION

Seizures during peri-operative period can pose significant diagnostic and therapeutic dilemma. PNES can be difficult to diagnose and requires high degree of clinical suspicion. It should be considered among the differential diagnosis of seizures especially in young females. Early diagnosis is important to start appropriate therapy. As anesthesiologist is involved in the care of parturients during labor and peri-operative period, it is important for them to be aware of this rare diagnosis, so that unnecessary interventions can be avoided.

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CONFLICTS OF INTEREST

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INFORMED CONSENT

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AUTHORS CONTRIBUTIONS

CM wrote the manuscript. JY helped in writing, reviewing and editing the manuscript.

DATA AVAILABILITY

Not applicable.

REFERENCES