

# Repetitive Focal Seizures after Sevoflurane Anesthesia

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## Abstract

**Purpose:** Sevoflurane induced seizure during emergence from anesthesia that have been described were mainly generalized tonic-clonic in nature. This is the first time a case of focal seizure like activity during emergence from sevoflurane anesthesia is being reported. **Clinical features:** We describe a patient who developed several episodes of focal seizures like activity during emergence from sevoflurane anesthesia. The seizures subsided after treatment with intravenous propofol, midazolam and phenytoin and patient required intensive care management. **Conclusion:** The report emphasizes that sevoflurane is capable of producing both generalized and focal seizures during emergence from anaesthesia.

## INTRODUCTION

Sevoflurane has gained popularity as a inhalational agent of choice because of its rapid induction and emergence from anesthesia. We report a rare and serious adverse effect of sevoflurane i.e. sevoflurane induced seizures and that too during emergence from anesthesia. Till date all the seizure like activity reported during emergence with sevoflurane have been generalized tonic-clonic in nature. There has been no reports of focal seizure like activity with administration of sevoflurane during emergence from anesthesia with all the available literatures. This is the first time, we are reporting sevoflurane induced focal seizure during emergence from anesthesia in a previously healthy female. Sevoflurane-induced seizures are most often described during mask induction of anesthesia when high concentrations of the volatile agent are administered concomitant with alveolar hyperventilation [1,2,3]. The occurrence of seizure like activity during emergence from sevoflurane anesthesia has been rarely reported [5,6,7,8,9,10].

## CASE REPORT

A 20-year-old female was admitted to the plastic surgery unit with a hyperpigmented

naevus over the bridge of the nose with extension on both side cheek. She was planned

for excision of the naevus and forehead rotation flap. A thorough pre-operative

evaluation was done prior to the surgery. During the preoperative evaluation, the patient

denied any history of previous anesthesia, drug allergies, neurological disease, or a

seizure disorder. Preoperative investigations were within normal limits.

The patient was premedicated with Inj. Glycopyrolate 0.2mg, Inj. Pentazocine 0.5

mg/kg, Inj. Midazolam 1mg and Inj. Diclofenac 75mg i.m. The patient was preoxygenated and

anesthesia was induced with Inj. Propofol 2mg/kg and Inj. Vecuronium 0.1mg/kg till the

loss of eyelash reflex.. The patient was ventilated with oxygen, nitrous oxide and sevoflurane

1% for five minutes and intubated orally with 7.0mm flexometallic cuffed endotracheal

tube. Anesthesia was maintained with sevoflurane at an inspired concentration of

approximately 1% with mixture of N<sub>2</sub>O/O<sub>2</sub> 50:50 (3 liters/min). The intraoperative

monitoring included NIBP, ECG, SPO<sub>2</sub> and EtCO<sub>2</sub>.

Ventilation was adjusted to maintain

normocarbia. The surgery lasted for three hours. All the vitals parameters were normal

throughout the surgery. Arterial oxygen saturation determined using pulse oximetry

remained greater than 98% during the intraoperative course. No episodes of hypoxemia

occurred.

Sevoflurane and nitrous oxide was discontinued upon completion of the procedure and neuromuscular blockade was reversed. Suddenly the patient started having focal seizures involving the left upper extremity and left side face lasting 30- 40seconds. Inj.Propofol 20mg IV was administered with immediate cessation of seizure activity. Patient blood pressure dropped to 80/40 mmHg. 6mg of inj. Ephedrine was given with restoration of blood pressure. The patient was shifted to intensive care unit (ICU). During transportation she had another episode of similar seizure lasting around 30seconds. The patient was awake, confused and slow in responding to oral commands in between the convulsive episodes. On arrival in the ICU she had another episode of similar seizures with hypotension. A bolus dose of midazolam 2mg i.v was given to suppress the seizures. Inj. Noradrenaline was started to correct the hypotension. She was put on assisted ventilation. After half hour the blood pressure stabilized and she was given a loading dose of phenytoin 10 mg • kg<sup>-1</sup> i.v and maintenance phenytoin therapy (1 mg • kg<sup>-1</sup> every eight hours) initiated. An initial arterial blood gas analysis was normal with adequate oxygenation. Laboratory analysis revealed normal plasma electrolyte (Na<sup>+</sup> = 135 mEq • L<sup>-1</sup> ; K<sup>+</sup> = 4.8 mEq • L<sup>-1</sup> ; Cl<sup>-</sup> = 105 mEq • L<sup>-1</sup> ), blood glucose (110 mg • dL<sup>-1</sup> ), and creatinine (0.9 mg • dL<sup>-1</sup> ) concentrations. Patient history was reconfirmed with her parents who gave no history of seizure activity earlier neither any family history of seizure disorder. No further seizure like activity occurred and she was haemodynamically stable. She was weaned from mechanical ventilation the following morning. After extubation, the patient displayed normal mental and neurological status and reported no recollection of perioperative events. An EEG was done the next morning, which showed normal electrical activity. Oral Phenytoin was continued in the postoperative period and continued for four

weeks. She underwent flap revision under local anesthesia, which was uneventful. The patient was discharged on the 20<sup>th</sup> postoperative day. The patient has experienced no further seizure-like activity to date. She was also given a medical alert card regarding avoidance of sevoflurane for future anesthetics.

## DISCUSSION

Sevoflurane propensity to cause epileptiform EEG activity and produce clinical evidence of seizures (e.g., isolated clonus with or without tremor, frank tonic-clonic motor activity) in patients with or without a history of epilepsy has been recognized increasingly [23]. Jaaskelainen et al concluded that sevoflurane consistently produces epileptiform discharges and is dose dependently epileptogenic at surgical level of Anesthesia [2]. Rewari and Sethi reported a recurrence of focal seizure activity in an infant with past history of focal seizures during induction of anesthesia with Sevoflurane [4].

Seizures like activity have been rarely reported during emergence from sevoflurane anesthesia. Mohanram et al reported a case of repeated generalized seizure-like activity without any haemodynamic changes during emergence from anesthesia which subsided after phenytoin therapy [9]. Hilty and Drummond reported two consecutive episodes of tonic-clonic activity during emergence from sevoflurane anesthesia lasting 30 seconds that was abolished after phenytoin therapy [5]. Terasako and Ishii reported a generalized clonic and tonic seizures like movement lasting 40 sec during emergence which necessitated no therapy [8]. Singh M et al reported postoperative myoclonic seizures lasting 20-30 seconds that was abolished after sodium valproate [10]. Many of the features associated with our patient presentation were similar to those earlier reported in that the seizure like activity was recurrent in nature and occurred on emergence. The focal nature of seizure like activity and associated haemodynamic collapse was the novel feature of our case. Our patient had no previous history of seizure disorder and there were no peri-operative events such as hypoxia, hypocarbia, hypoglycemia or electrolyte imbalances, neither any pro-convulsive drug was given intraoperatively which could have lowered the seizure threshold. The focal seizure like activity associated were observed during emergence from anesthesia and therefore were attributed to sevoflurane. The current case report and those reported earlier warrant a thorough investigation into the etiology of seizure like activity during emergence from sevoflurane anesthesia.

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