

# Seizure Upon Induction With Etomidate

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## Citation

A Sinha, J Soliz. *Seizure Upon Induction With Etomidate*. The Internet Journal of Anesthesiology. 2001 Volume 5 Number 4.

## Abstract

Etomidate, a carboxylated imidazole, is a drug used for induction of general anesthesia.<sup>1,2</sup> Its ability to preserve cardiovascular function makes it a rational choice in surgeries with patients who are intolerant to changes in blood pressure and heart rate.<sup>2</sup> Disadvantages of etomidate include pain at injection site, laryngospasm, coughing, myoclonus, and the possibility of causing adrenocortical suppression with repeated use.<sup>1,3,4</sup> Unlike thiopental or propofol, it has a disinhibitory effect on extrapyramidal motor activity.<sup>1,4</sup> This disinhibition is responsible for the 30-60% incidence of myoclonus observed upon induction.<sup>1</sup> Even though postulated, etomidate has not been directly linked to seizure activity with its use.<sup>5</sup> Previously, seizure activity has been reported in prolonged administration of etomidate, such as in the ICU setting<sup>6</sup>, or in cases in which a combination of drugs were used.<sup>7</sup> We describe here a case in which a generalized tonic clonic seizure occurred after induction of anesthesia with etomidate.

## CASE REPORT

A 48-year-old white male with a recently diagnosed adenocarcinoma of the lung was brought to the operating room for a fiberoptic bronchoscopy, mediastinoscopy, chest wall resection, right upper lobectomy, and vertebral resection. CT of the chest revealed a mass in the right upper thorax with rib destruction and chest wall invasion. CT of the brain had revealed no evidence of metastatic disease. The patient had a history of rheumatoid arthritis, hypothyroidism, COPD, but denied having any history of epilepsy or past seizure activity.

On the day of surgery, the patient was seen in the OR holding area, the chart was reviewed and the patient interviewed. A 16-gauge IV catheter was placed in the left hand dorsum. After premedication with 1mg of midazolam, the patient was transported to the OR suite and placed supine on the OR table. Monitoring included pulse oximetry, ECG, and non-invasive blood pressure. Pre-oxygenation was begun with 100% oxygen via facemask. During IV induction of anesthesia with Etomidate 10mg and Fentanyl 150mcg, patient experienced a generalized tonic-clonic seizure. The surgeon was informed, and the surgery was cancelled. The patient was administered ativan and subsequently phenytoin. The seizure initially resolved after 3 minutes of activity. The patient suffered no loss of bowel or bladder control during the seizure episode. To protect the airway, the patient was intubated and transported to the intensive care unit and a neurology consult was obtained. In the ICU, the patient

began seizing again, with resolution after repeated dosing of ativan and a loading dose of phenytoin. An EEG was performed which revealed diffuse slowing, but no epileptic focus. An emergent MRI of the head was performed, revealing no intracranial masses or hemorrhage. Subsequently, the patient was extubated without difficulty and discharged from the hospital 3 days later.

The patient's surgery was rescheduled 6 days after the initial seizure activity. The anesthetic induction on the rescheduled date was performed with propofol and sufentanil without any complications. The surgery was completed without incident. The patient has had no other seizure activity since the initial incident, and all other clinical examinations were negative.

## DISCUSSION

The neurologic mechanism of myoclonus, though believed to be due to the disinhibition of the extrapyramidal pathways, can possibly be some sort of seizure activity.<sup>5</sup> Of patients with a history of epilepsy undergoing general anesthesia with etomidate, an increase in epileptiform activity has been shown on EEG intraoperatively.<sup>8</sup> Hansen reported a similar case of generalized seizure following short term etomidate anesthesia.<sup>9</sup> However in Hansen's case, the seizure occurred post-operatively, not during induction.<sup>9</sup> Goroszenick et al. reported generalized tonic-clonic seizure after recovery from uncomplicated fentanyl-etomidate anesthesia, though they attribute the seizure activity to fentanyl.<sup>7</sup>

In the presented case, etomidate and fentanyl were the only drugs administered. The lack of any epileptiform foci on EEG and the lack of intracranial pathology by CT or MRI provide suggestive evidence involving etomidate in the seizure activity. The possibility of myoclonus and/or seizure-like activity is a complication of etomidate induction that needs to be anticipated and recognized by the anesthesia provider. Based on our observations and the previous reports, it is probably prudent to avoid etomidate in patients with a history of seizure activity as an induction agent, unless specifically indicated due to cardiovascular instability.

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