

Propofol induced severe neuroexcitatory symptoms during emergency laparotomy

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Received: 1 July 2013

Accepted: 21 July 2013

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ABSTRACT

Propofol is a widely used intravenous agent for general anesthesia and sedation. Propofol is associated with a variety of neuroexcitatory events including: opisthotonus, muscle rigidity, myoclonus, and seizures collectively termed as seizure-like phenomenon (SLP). We report a rare case of propofol induced severe neuroexcitatory symptoms at the time of induction in a young male presenting for emergency laparotomy. He developed generalized tonic-clonic seizures which resulted in dislodgement of intravenous cannula. Immediately a new intravenous cannula was inserted with difficulty during convulsions and injection thiopentone 200 mg bolus was given. Convulsions subsided within a minute. Patient remained hemodynamically stable and surgery was uneventful. He developed emergence agitation which was treated with injection midazolam. Patient recovered with no neurologic sequelae.

Keywords: Propofol, Seizures, Neuroexcitatory symptoms

INTRODUCTION

Many anesthetic drugs have been reported to induce seizures clinically, but most of these drugs also have anticonvulsant properties.^{1,2} Despite the claims of proconvulsant activity of propofol, there is also evidence of its anticonvulsant action.³⁻⁵ Severe neuroexcitatory symptoms are rare side effect of propofol which can occur during the induction, maintenance or emergence from anesthesia.⁶ We present one such case of severe neuroexcitatory symptoms after induction with propofol which was managed with injection thiopentone and midazolam. This report stresses on the importance of rare and serious complication associated with propofol with an incidence of less than one percent.

CASE REPORT

A 30 year old male presented to emergency department with abdominal pain. The patient had no previous

medical, surgical history, no history of epilepsy and drug abuse. His routine blood and urine investigations were within normal limits. A diagnosis of perforation peritonitis was made on the basis of abdominal X-ray and ultrasonography. An emergency laparotomy was planned. In the operating room monitoring included ECG, pulse oximetry, noninvasive blood pressure and capnography. Patient was preoxygenated and injection fentanyl 100 µg was administered slowly. Anesthesia was induced with injection propofol 120 mg slowly (contain preservative free lidocaine). Immediately he developed generalized tonic-clonic seizures with increased tone in extensor muscle of neck leading to hyperextension of head. Intense jerky movements resulted in dislodgement of intravenous cannula. Patient was about to fall from the operation theatre table. Operation theatre assistants had to hold the patient to stabilize him during seizures and we inserted a new cannula with difficulty. Immediately injection thiopentone 200mg was administered. Seizures subsided within a minute. Then trachea was intubated

after achieving neuromuscular blockade with injection vecuronium bromide. Throughout the surgery patient remained hemodynamically stable. Neuromuscular blockade was reversed and trachea was extubated when he became conscious. Patient developed emergence agitation which was treated with intravenous injection of 2 mg midazolam. He became normal within ten minutes. Postoperative blood investigation, neurological examination and computerized tomographic scanning of head were normal.

DISCUSSION

Propofol is a rapid onset and short acting intravenous anesthetic agent. It has been widely used for anesthesia and sedating patients in intensive care units. Common side effects of propofol are hypotension, dose dependent respiratory depression and burning pain during injection. Neuroexcitatory symptoms including generalized tonic-clonic seizures, focal motor seizures, increased muscle tone, myoclonus and opisthotonus are rare and potentially harmful side effect of propofol.^{7,8} These neuroexcitatory symptoms can dislodge laryngeal mask airway,⁹ intravenous cannula and may injure the patients. Insertion of new cannula is difficult at the time of seizures in these patients and can pose a problem to give intravenous drug to control seizures. These symptoms occur mostly at the time of induction and during emergence. Rapid change in the propofol concentration in the brain may be crucial for the generation of seizures. Delayed onset seizures have also been reported following propofol anesthesia and after sedation with propofol in intensive care.¹⁰ These side effects seldom produce neurologic sequelae.

Pathophysiological mechanisms underlying the neuroexcitatory symptoms associated with propofol are unknown but several theories have been proposed. Propofol induces an imbalance between excitatory and inhibitory pathway in brain. Neuroexcitatory symptoms can be caused by an imbalance between cortical and subcortical structures as well as decreased inhibitory output from the formatio reticularis. Propofol has strychnine like effect on glycenergic and GABAergic pathways. Animal model suggest that antagonism of glycine receptors for strychnine to the cerebral cortex evokes epileptiform phenomena.

As combination of drugs were administered during anesthesia, so there is a possibility of other co-administered drugs to produce seizures. Reports of generalized tonic-clonic seizures after use of fentanyl are there but patients treated with higher dose of fentanyl may fail to produce seizures. Lidocaine can produce seizures in toxic dose. But the dose of lidocaine which is given with propofol is much less. However the frequent reported association between seizures and propofol, with normal serum electrolytes and neurological assessment in

our case probably made the propofol the most likely cause.

Despite several case reports and systemic review, there is no clear consensus regarding risk factors, prevention and management of such adverse events. Uses of injection thiopentone and benzodiazepines have been reported for its management. We have also used injection thiopentone, a well known anticonvulsant drug, to control the seizures.

Since propofol is routinely used intravenous agent for induction and sedation, especially in day care surgery and in the future probably will be even more common, we would like to stress on the rare and serious complication of propofol - "severe neuroexcitatory symptoms" which needs high vigilance during perioperative period.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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doi:10.5455/2319-2003.ijbcp20131024

Cite this article as: Banga PK, Dadu S, Sharma M. Propofol induced severe neuroexcitatory symptoms during emergency laparotomy. *Int J Basic Clin Pharmacol* 2013;2:645-6.