

Ketamine Induced Seizures

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Citation

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Abstract

10 year old, 25 kg boy posted for tonsillectomy had no past history of convulsions to him or any other of his family member. He was administered Inj. Ketamine 100mg along with Inj. Glycopylrorate 0.2mg IM pre-operatively in pre-op room as premedication. In less than 5minutes patient developed Generalized tonic and clonic seizures. His airway was maintained along with oxygen supplementation and IV line secured to administered Inj. Midazolam 1mg IV bolus. Seizures abolished and Endotracheal intubation was done. Intraoperative and Post operative course including extubation was uneventful. Ketamine has been implicated as having proconvulsant as well as anti-convulsant activity. Our experience prompted us to believe that ketamine may not be a safe drug as premedication outside Operation theatre and an alternative anesthetic drug may be considered. Seizures in the perioperative period can be due to a number of factors. Various clinical reports described both proconvulsant and anticonvulsant properties for many anesthetic agents. We report a case of perioperative Generalised Tonic Clonic seizure with the use of intramuscular ketamine given as premedication in a case of tonsillectomy.

CASE REPORT

A 10 year old boy weighing 25kg with chronic tonsillitis was posted for tonsillectomy under general anesthesia. Patient was NBM since 6 hours with no significant finding in pre-anesthetic check-up including no past history of convulsions to him or any other of his family members. Patient was not given any pre-operative antibiotics since 7 days. Inj. Ketamine 100mg along Inj. Glycopylrorate 0.2mg IM was given in preoperatively. Patient shifted to operating room within 5 minutes with monitoring by anesthesiologist. On reaching Operating room, patient developed hypertonia of all 4 limbs. Immediately Oxygen supplementation with face mask was done and 20G IV line secured and sample collected for stat bedside hemogluco test showing glucose level as 88mg%. Patient developed generalized tonic clonic seizures. Inj. Midazolam 1mg IV bolus was given and Convulsions stopped following which patient was induced with Inj. Thiopenthol 150mg and nasotracheal intubation was done. IV fluid DNS was used with anesthesia being maintained with oxygen 40%,Nitrous oxide 60%, Isoflurane with spontaneous ventilation and intermittent assistance. Intra-operatively SpO₂, ECG, EtCO₂ and pulse rate were monitored. Surgery proceeded with no other event and the observed parameters including EtCO₂ were maintained. Post operative course including extubation was uneventful. Patient was kept in recovery ward for 24 hours with no other problems.

A detailed clinical and laboratory neurological evaluation including cranial computed tomography scan and EEG, performed on the day after the event, they did not reveal any abnormality. Patient's parents were counseled about the event.

DISCUSSION

Perioperative seizures have numerous potential etiologies and can be of major concern to patient's relatives and treating surgeon. In general, when seizures occur perioperatively, their onset may coincide with the drug administration of various anesthetic and non anesthetic agents (antibiotics). A conflicting variety of reports describe both proconvulsant and anticonvulsant action for virtually every anesthetic drug (1).

One possible factor for seizures is an inherent pharmacodynamic variability in the responsiveness of inhibitory and excitatory target tissues in the central nervous system. Furthermore, biological variation in the individual patient responsiveness to could be an additional contributory factor. Differing structure-activity relationships might also explain why some anesthetics have both proconvulsant and anticonvulsant properties. Relatively minor modifications in a drug's structure can influence its affinity for a specific receptor site and its intrinsic pharmacological activity(2,3).

IV/ IM ketamine may cause seizure activity either in the

form of cortical electroencephalograph (EEG) or clinical seizure activity in epileptics in whom the drug activates subcortical activity (4,5). This difference in EEG patterns may be because of racemic ketamine which has two optical isomers(6). The S isomer of ketamine is more potent and produces a progressive decrease in EEG amplitude and frequencies whereas less potent R isomer is unable to produce the same degree of EEG suppression. However, the excitatory amino acid N-methyl-d-aspartate receptors inhibition may be the mechanism of anticonvulsant property of Ketamine(7,8). Nutritional, environmental factors (smoking, alcohol use, diet) and drug interactions may influence the metabolic and pharmacokinetic patterns of ketamine(9) contributing proconvulsant activity.

In the present case, in absence of any known predisposing factors of convulsion (History, EEG, CT); IM premedication of racemic Ketamine administered in a case of tonsillectomy resulted in Generalised tonic clonic seizure activity. Hypoglycemia could be contributing factor in a starving child but was ruled out by Hemogluco test and DNS infusion.

In management of such cases, initial drugs recommended are Benzodiazepines (both short and long acting) which are also routinely administered along with Ketamine to reduce hallucinations(10). Here midazolam was not used to restrict the drug volume for IM administration; although that was the first drug used after IV access. Although, the patient responded to administration of midazolam; Thiopentone could have been a reasonable choice, given in perioperative scenario. The other drugs which can be used are Phenytoin, Phenobarbital, valproate etc. .

Use of muscle relaxant was avoided to be able to continue clinical monitoring for reappearance of seizure activity intraoperatively. EtCO₂ was monitored as a routine and as a monitor with potential for detection of seizures. Halothane, was not used due to its epileptogenic and shivering potential with suspected clinically occult intracranial pressure abnormality being exaggerated.

Post operatively, extubation continues to be a high risk period with lighter planes of anesthesia, stimulation of oropharyngeal suction with appearance of pain precipitating seizure. All the causes were attempted to be ruled out by investigating the patient before discharging.

CONCLUSION

Therefore, with this case report, we suggest, the need for caution while administering Ketamine as premedication even in healthy individual.

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