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Generalized Seizure Following Lidocaine Injection for Elective Circumcision: A Case Report

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Abstract **Case Report**

Lidocaine as a local anesthetic is the most effective drug for preventing and managing the pain associated wit circumcision. Adverse drug reactions reported with lidocaine use are usually moderate. However, severe complication have been reported. The potential reasons could be the needle must be placed in a small vein or the body's hypersensitivit to the lidocaine. The ability to quickly identify clinical symptoms can significantly impact the treatment process. In thi article, we report a case of lidocaine-induced generalized seizure and leading to a status epilepticus in a 6-month-old bo requiring endotracheal intubation.

Keywords: Toxicity, circumcision, lidocaine, local anesthetics, seizure.

INTRODUCTION

Lidocaine is an anesthetic widely used in newborns and infants to provide local anesthesia (nerve block) during circumcision and is among the most commonly used in routine surgery [1, 2]. The practitioners should maintain a high level of vigilance for the symptoms of toxicity after local anesthetic administration. Though negligible, toxic reactions may occur due to overdose, rapid absorption into the blood, or accidental intravascular injection leading to increased plasma levels of this drug [3]. We report a case of generalized seizures leading to status epilepticus following lidocaine administration for an elective circumcision.

PRESENTATION OF CASE

A healthy full-term 6-month-old male, (5 kg weight), with no history of epilepsy, vaccinated according to the national program, was transferred to the Pediatric Intensive Care Unit of Rabat for status epilepticus. Previously, sixty minutes before arrival in our department, he had undergone subcutaneous lidocaine 1%, (20 mg) for a dorsal penile nerve block (DPNB) during an elective circumcision at the referral hospital. Immediately following the block, the patient presented a series of generalized tonico-clonic seizures that were not stopped until arriving at the Pediatric hospital, where he had a total of four generalized tonico/clonic seizures in succession. The first line of treatment was oxygen, lateral safety position, and intravenous midazolam at a rate of 0,1 mg /kg then the seizure activity resolved. The Glasgow Coma Scale stayed at 6, with no fever or sign of meningitis or hypoglycemia with bradypnea and cyanotic. Then transferred to the intensive care unit for *status epilepticus* requiring endotracheal intubation and assisted ventilation, and received a bolus of 20 mg/Kg of phenobarbital. Electrolytes and cerebrospinal analysis were normal. The head computed tomography (CT) and MRI scan were normal. The electroencephalogram objected a trace of global suffering without epileptic grapho elements. The patient experienced ventilator-associated pneumonia treated by imipenem 350 mg and amikacin 75 mg per day. There was no recurrence of seizures, and the child was discharged ten days later in stable condition. Therefore, we estimated that the infant received 4 mg/Kg of lidocaine. Since the maximum safe dose of lidocaine is 3 mg/kg, the diagnosis of lidocaine toxicity was established.

DISCUSSION

Lidocaine is one of the most used local anesthetic agents. Its benefits include a quick recovery, reduced time in the hospital, and less postoperative pain [4]. At lower concentrations, lidocaine has anticonvulsant effects, while definite central nervous system excitation and seizure are observed between 4 to 10 ug/ml concentration. Unfortunately, a serum lidocaine concentration was not obtained in our patient. Lidocaine has a rapid onset, its half-life in children is approximately

1 hour [5] and the peak blood levels are 10–25 min after injection. Its mode of action targets the cell membrane, which prevents the generation and conduction of nerve impulses. Upon absorption into the plasma, it is distributed throughout the body to all tissues. Lidocaine is metabolized in the liver by dealkylation to active metabolites [6] which potentiate seizures produced by lidocaine. Neurotoxicity has been reported after subcutaneous, oral administration, and intravascular injection [3, 7]. It depends on factors like patient age, maximum dose, site, and speed of administration. The recommended maximum dose of lidocaine in children is 3mg/kg, the total dose used in the present case was 20 mg (4 mg/Kg). However, Ayas *et al*., (2014) reported a case of seizure in a child with lidocaine within the safe dose range [8]. Most studies indicate that symptoms of toxicity appear at venous levels of 5 mg/mL or more [9]. The first signs of local anesthetic toxicity are usually neurological with numbness of the mouth and tongue, confusion, seizures, and potentially coma. The onset of toxic symptoms usually begins within 10-20 minutes after injection. The seizures are usually generalized [10-12]. For our patient, the symptoms were observed immediately after the subcutaneous injection as a generalized seizure tonic-clonic. The management of local anesthetic toxicity primarily involves providing supportive care [13]. The airway and oxygen should be maintained. If convulsions happen, they should be controlled with antiepileptic medications along with established guidelines. Our patient was required on mechanical ventilation to protect the airways. The phenobarbital and valproate sodium were administrated at the appropriate dose.

CONCLUSION

Extra care should be taken when using lidocaine on young children, including measuring the child's weight before any procedure involving local anesthesia. Practitioners should keep in mind that any medication, even when used locally, may be highly toxic. Early recognition of neurotoxicity is crucial for patient safety.

Competing Interests: The authors have declared that no competing interests exist.

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