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SM Journal of Case Reports

Case Report

A Case Report: Recurrent Aphasia after IVRA with Prilocaine in a Patient with Hand Trauma

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Article Information

Received date: Aug 04, 2017
Accepted date: Aug 28, 2017
Published date: Aug 31, 2017

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Keywords Aphasia; Prilocaine; Toxicity; IVRA

Abstract

Intravenous Regional Anaesthesia (IVRA) is most commonly used for distal upper extremity operations. A patient was scheduled for the removal of a foreign body after trauma to her left hand under IVRA. A double-cuffed tourniquet applied and a dose of 15 ml 2% prilocaine was injected IV with 15ml with 0.9% NaCl via cannula. Within seconds of accidental cuff deflation, the patient developed nystagmus and aphasia and later developed seizure-like activity affecting her upperlimbs. The patient was treated with 60 mg propofol IV and ventilated with 100% oxygen. After 10 minutes she became alert and responsive to verbal commands and started speaking normally.

Aphasia and difficulty in swallowing developed again after approximately 30 minutes and continued for two hours, after which symptom disappeared in less than five minutes. The serious risk of local anaesthetics systematic toxicity which may occur due to tourniquet problems or overdosage of the local anaesthetic.

Introduction

Intravenous Regional Anaesthesia (IVRA, Bier Block) is accepted as an alternative to general and brachial plexus anaesthesia especially for short ambulatory hand operations. Generally, it is accepted as a safe method except local anaesthetic toxicity related complications [1]. In this paper, we are presenting a case of recurrent aphasia after IVRA where the patient was admitted under emergency conditions.

Case Report

A patient (44 years old, 56 kg female) was scheduled for the removal of a foreign body after trauma to her left hand under IVRA. She had no history of a systemic disease or any allergy. Preoperatively, 3 mg of midazolam was administered IV via cannula on the right hand for premedication. Following of basic monitorization (BP, electrocardiogram and pulse-oximetry), iv cannula was inserted on the dorsum of the left hand. Following the placement of a double-cuffed tourniquet on the upper arm, the arm was elevated for 3 minutes and wrapped with an Esmarch bandage for exsanguination. The proximal tourniquet cuff was inflated to a pressure of 250 mm Hg. A dose of 15 mL 2% prilocaine was injected IV with 15 mL 0.9% NaCl via cannula. After 5 minutes, the distal cuff was inflated and proximal cuff was deflated. The surgical procedure took 35 minutes and the tourniquet was accidentally deflated once due to a misunderstanding among the surgical team.

Within seconds of cuff deflation, the patient developed nystagmus and aphasia and later developed seizure-like activity affecting her upper limbs. The patient was immediately injected with 60 mg propofol iv and ventilated with 100% oxygen while her vital signs remained stable (SpO_2:99%, BP: 110/70 mm Hg, HR: 78/min). The patient became alert and responsive to verbal commands and started speaking normally after 10 minutes. She expressed that he felt good. Aphasia and difficulty in swallowing developed again after approximately 30 minutes. However, she was calm and oriented. The recurrence of the symptoms continued for two hours. In less than 5 minutes, the patient was fully alert and speaking oriented. At the same day, she was discharged from the hospital without any sequel.

Discussion

IVRA is an easy, simple, reliable, cheaper, effective, relative safe and popular technique employed by anaesthesiologist and especially emergency department surgeons for upper distal extremity operations including fracture reduction in forearm fractures in emergency clinics [1-3].

The advantages of this method are its high rate of success, quick time of onset, simplicity, and fast return to normal motor function of the extremity. The disadvantages of the method, on the other hand, are the short analgesia time, time-limiting tourniquet pain, the need for exsanguinations and the possibility of systemic local anaesthetic toxicity [1-4].

A number of local anaesthetics can be used to apply IVRA. In our case, we used prilocaine (Citanest 2%, Astra) which has rapid onset of action, good surgery conditions, safe and short duration of action and reported very low (0.011%) complication rate [1,2,5]. The recommended dose of prilocaine varies widely in the literature (2-7 mg/kg). We used a dose of 300mg prilocaine, in line with some literature, though this dosage is considered high by others, who advise not to exceed 3 mg/kg [2]. The volume and the speed of the anaesthetic solution volume administered are also important. The proposed volume is 40-50 mL, and the time of injection should take at least 90 seconds. Personal features and surgical procedures should be considered in practice to determine the dose to be administered [6].

The serious risk of local anaesthetics systematic toxicity (LAST), which manifests symptoms like tinnitus, perioral tingling, metallic taste on the tongue, tremor, excitability, seizure, coma and cardiac arrest occurs very rarely in IVRA. The manifestations of these may change according to the patient's characteristics, the type and dose of the local anaesthetic used, and the speed with which the drug passes to blood [4]. Complications generally appear towards the end of the procedure after tourniquet deflated, but may also develop while the tourniquet is still inflated. Literature review shows that reported complications during an operation may occur due to [2] leakage from inflated tourniquet [7] leakage from unintended release of the tourniquet during or end of the operation [5], over dosage of the local anaesthetic [3].

Guay also states that the gradual increase of arterial pressure may exceed the tourniquet pressure resulting in leakage, and hence, toxicity [3]. Generally it is known that the risk of local anaesthetic toxicity substantially subsides after 20 minutes [5]. In fact, the medical staff should watch out for such complications until 30 minutes after the tourniquet is deflated. After the release of the tourniquet, the limbs should stay immobile for 15-20 minutes [2,3].

Guay investigated such adverse reactions during 1964-2005 in the literature and reported 64 cases related to IVRA. Local anaesthetic toxicity was the main problem in 39 of these cases. Aphasia and bilateral temporary blindness is among these adverse effects. Among 24 cases of seizures reported, 12 occurred while the tourniquet was inflated, nine occurred after the deflation of the tourniquet; two had cardiac arrest, and one death [3].

In our case did not need any intervention except the ventilation of 100% oxygen and propofol administration. Aphasia, as a symptom of local anaesthetic toxicity, has been reported rarely in the literature. Aphasia is a type of brain dysfunction that results in motor and language impediments; the mechanism of local anaesthetics-induced motor aphasia is unknown [3,8].

There is no reported case of recurrent aphasia after IVRA with prilocaine in the literature. We can assume that the observation of aphasia twice could be the result of redistribution of LA between the brain tissues and blood. A lipid rescue treatment right after the first aphasia attack could have prevented the second aphasia attack. We do not know why, in certain cases reported, aphasia remain while other symptoms of toxicity subside. Possibly, local anaesthetics affect various parts of the brain differently [8].

Conclusion

A major technique to reduce the risk of LAST in tourniquet deflation is the deflate-reinflate technique.

To prevent the adverse effects of toxicity due to local anaesthetics, the presence of emergency medicine and equipment necessary for resuscitation, and following the guidelines are of utmost importance. In recent years, it has commonly been reported that 20% lipid solutions are virtually used as antidotes for LAST and therefore should be present in medical units, which render emergency service and use local anaesthetics. Related information is available in the guidelines of American Society of Regional Anaesthesia (ASRA).

Appendix: ASRA's Basic Guidelines for Local Anaesthetic Toxicity (LAST)

First: Get help

Initial Focus: airway management - ventilate with100% oxygen

Seizure suppression: benzodiazepines are preferred

Basic and Advanced Cardiac Life Support: may require prolonged effort

Infuse 20% lipid emulsion: 100 mL 1.5 mL/kg as bolus, continue as infusion 0.25 mL/kg/min.

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