The Old Story: High Dose Lidocaine Infiltration: Case Report

Eski Bir Hikaye: Yüksek Doz Lidokain İnfiltrasyonu

Tuba Berra ERDEM, MD,[a]
Jale Bengi ÇELİK, MD,[a]
Nazım KARALEZLİ, MD,[b]
Hale BORAZAN, MD,[a]
Metehan AKARSU, MD,[a]
Naime YALÇIN, MD[a]

Departments of
[a]Anesthesiology and Reanimation,
[b]Orthopedics and Traumatology,
Selçuk Üniversitesi
Meram Faculty of Medicine, Konya

Geliş Tarihi/*Received:* 05.03.2009
Kabul Tarihi/*Accepted:* 08.05.2009

This case report was presented as a poster at TARK 2007.

Yazışma Adresi/*Correspondence:*
Tuba Berra ERDEM, MD
Selçuk Üniversitesi
Meram Faculty of Medicine,
Department of Anesthesiology and Reanimation, Konya,
TÜRKİYE/TURKEY
tberdem@selcuk.edu.tr

ABSTRACT Acute intoxications are one of the most common reasons of medical emergencies. Only few of the factors have specific antidote treatment so supportive treatment and interventions against symptoms are essential. Wrong drug application during anesthesia care is a common problem. It is not enough to choose the right drug because drugs are packaged in various concentrations. At the same time it is necessary to be careful about right drug concentation and right application route. Lidocaine is a rapid onset and wide safety margin, amide type local anesthetic therefore it is used common in clinics. We report a case that is scheduled for femoral tumour biopsy by orthopedics and traumatology department because of leg pain and infiltrated 20 mL of 10% lidocaine erroneously in the operation room.

Key Words: Lidocaine; poisoning

ÖZET Akut zehirlenmeler en sık karşılaşılan tıbbi acillerdendir. Etkenlerden çok azına yönelik özgül antidot bulunur, bu yüzden genel tedavi yaklaşımları ve belirtilere yönelik tedaviler esastır. Anestezi uygulaması sırasında yanlış ilaç uygulaması oldukça sık karşılaşılan bir sorundur. Sadece doğru ilacı seçmek yetmez çünkü ilaçlar çeşitli konsantrasyonlarda kullanıma sunulmaktadır. Aynı zamanda ilaçların doğru konsantrasyonda ve doğru kullanım yoluyla uygulanmasına da dikkat etmemiz gereklidir. Lidokain hızlı başlayan etkisi ve geniş güvenlik aralığı nedeniyle kinikte sık kullanılan amid tipi bir lokal anesteziktir. Biz ortopedi ve travmatoloji bölümünce bacak ağrısı nedeniyle femur tümör biyopsisi için hazırlanan ve ameliyathanede yanlışlıkla 20 mL %10'luk lidokain infiltre edilen bir olguyu sunuyoruz.

Anahtar Kelimeler: Lidokain; intoksikasyon

Turkiye Klinikleri J Anest Reanim 2010;8(1):72-4

Acute intoxication is one of the most common reasons of medical emergencies.[1] Only few of the factors have specific antidote treatment so supportive treatment and interventions against symptoms are essential.[1] Errors in administration of drugs in anesthesiology practice are common problems. It is not enough to choose the right drug, the right concentration and route is also necessary. Lidocaine is a popular drug, because of intermediate potency with regard to the dose required to produce convulsive activity, rapid onset, moderate duration of action and topical activity. We present a case report of a patient, developed acute mental status changes and generalized seizure after local infiltration of 20 mL 10% lidocaine erroneously for femur mass biopsy.

CASE REPORT

A 22 year old, 78 kg male presented to Orthopedics and Traumatology Department with mild pain in the upper third of the left thigh. The physical examination had revealead tenderness in the same part of the body. The X- ray showed a central osteolytic area, with sharp borders rimmed by a thin rind of bone sclerosis Magnetic resonance imaging demonstrated the lesion having features of fat tissue. The patient was scheduled for biopsy from the lesion under local anesthesia. He was not using any drugs and had no known drug allergy, taken into local operation room. He was monitorized with noninvasive blood pressure, electrocardiography and pulse oxymeter. The surgeon prepared the patient for the biopsy, he infiltrated 20 mL of lidocaine prepared by the nurse. After 5 minutes patient complained about perioral numbness and speech difficulty. The patient was immediately treated with supplemental oxygen and 3 mg intravenous midazolam At that time the broken lidocaine ampuls were examined and it was seen that the preparation was 10%. Ten minutes after injection the patient developed headache, tinnitus, visual disturbances. Muscle twitching over the mouth angles and feet, trismus and rigidity of extremities were also noted. Later in the course he became restless, agitative, hallucinative and talkative, this was immediately followed by a generalized tonic-clonic seizure lasting 2 minutes. The patient was treated with thiopental to control the seizure and was subsequently intubated for airway protection. After stabilization, the patient was transported to the Anesthesia Intensive Care Unit for further care. The patient had a hypotensive episode that did not respond to bolus fluids and dopamine infusion was started. For sedation midazolam and fentanyl infusion was instituted. His physical examination was between normal ranges except one seizure activity immediately after transportation. Cardiac monitoring revealed normal cardiac activity, no arrythmias or prolongation of QRS and QT intervals. Initial laboratory studies were unremarkable. Serum lidocaine level could not be measured because of the insufficient conditions of the hospital. The patient was extubated without any incident 5 hours after the event. The patient had a normal neurologic examination at discharge. His written concent was taken for his case report. At six month follow up, his mental and cardiac status remained normal and he had suffered no sequelae. His written concent was taken.

DISCUSSION

Lidocaine has become the most widely used local anesthetic in the world because of its inherent potency, rapid onset, tissue penetration, effectiveness during infiltration, peripheral nerve block, and both epidural and spinal blocks.[2] Unfortunately, systemic intoxication and psychotic reaction associated with its use often occur because of its popularity and wider safety margin.[2] Lidocaine toxicity classically manifests with central nervous system disturbances, such as dizziness, ataxia, and seizures, and cardiac dysrhythmias leading to ventricular fibrillation.[3]

Lidocaine crosses the blood brain barrier rapidly and has long been recognized as a proconvulsant drug.[4] Cardiac toxicity is more common in those whom with cardiovascular disease history.[5] Our patient had no cardiac disease though he was injected very high dose of lidocaine, no cardiac side effect had reported. Zuberi and coworkers reported a 21 year old oesophagogastroduodenoscopy case died because of asystole after gargling with 20 mL 4% lidocaine solution (800 mg of the drug) for 60 seconds, and he has no known cardiac disease, either.[6]

The therapeutic level of lidocaine is relatively narrow (1.5 to 5.0 μg/mL), with systemic toxicity occurring unpredictably above this range. Management of acute lidocaine toxicity is purely supportive. Seizures are best controlled with short-acting barbiturates or benzodiazapines, and transvenous pacing may be considered for severe bradycardia. Lidocaine has a fairly brief half-life of approximately 100 minutes and is rapidly metabolized by hepatic microsomal oxidases and its toxic effect duration was limited.[7]

Lidocaine is minimally excreted in the urine, making hydration and diuresis ineffective in the

management of acute toxicity. Circumoral numbness, tinnitus, visual disturbances and mental status decline are early warning signs of lidocaine toxicity.[8] Patients should be informed about early symptoms of lidocaine, toxicity and the doctor should communicate with him/her throughout the procedure. Lidocaine toxicity causes very rare complications such as complete reversible loss of brainstem reflexes, acute reversible aphasia and temporal bilateral blindness.[9-11] Despite the risk of lidocaine induced toxicity, most of the physicians and nurses are unable to accurately perform lidocaine dose calculations.

Intravenous medication errors are a common type of error identified in hospitals and can lead to considerable harm. Errors in medication administration can easily occur when drugs are marketed in similar packaging.[12] Lidocaine overdosing by syringe is one of more common drug errors, owing to its packaging in both bolus and concentrated forms.[13]

Medicine has always put patients at risk of side effects.[14] Pharmacotherapy in anesthesiology is complex and susceptible to errors. Medication errors like overdosage and wrong route often have serious effects. Blendon and colleagues reported that many physicians (35%) and members of the public (42%) reported errors in their own or a family member's care, but neither group viewed medical errors as one of the most important problems in health care today.[15] 100 patients will die in hospitals in the United States today because of injuries from their care, not from their diseases.[16]

This shows how big the problem is. Typical medications and procedures susceptible to errors are such as confusion of total and single dose, errors of calculation and preparation. Drug knowledge of health staff should be checked regularly by exams. And all of the patients should be informed about drug side effects by their physicians. In conclusion, suitable prevention strategies must be developed such as standardisation, separation of intrathecal and intravenous injections, different coloured ampules manufacturation for different consentrates of drugs and multiple controlling at every step of drug preparation. The goal should be extreme patient safety.

REFERENCES

1. Utku T. [Acute poisonings]. Türkiye Klinikleri J Int Med Sci 2006;2(14):52-4.
2. Brown DL. Local anesthetics and regional anesthesia. Brown Atlas of Regional Anesthesia. 2nd ed. Philadelphia, Pennsylvania: WB Saunders Company; 1999. p.3-4.
3. Bigger JT, Hoffman DF. Antiarrhythmic drugs. In: Gillman AG, Rall TW, Nies AS, et al. Goodman and Gillman: The Pharmacological Basis of Therapeutics 8thed. New York: Pergamon Press; 1990. p.857-61.
4. DeToledo JC. Lidocaine and seizures. Ther Drug Monit 2000;22(3):320-2.
5. Alfano SN, Leicht MJ, Skiendzielewski JJ. Lidocaine toxicity following subcutaneous administration. Ann Emerg Med 1984;13(6): 465-7.
6. Zuberi BF, Shaikh MR, Jatoi NU, Shaikh WM. Lidocaine toxicity in a student undergoing upper gastrointestinal endoscopy. Gut 2000;46 (3):435.
7. Del Negro AA. Lidocaine and related compounds. In: Haddad LM, Winchester JF, eds. Clinical Management of Poisoning and Drug Overdose. Philadelphia: WB Saunders; 1983. p.863-8.
8. Scott DB. Toxic effects of local anesthetic agents on central nervous system. Br J Anesth 1986;58(7):732-5.
9. Richard IH, LaPointe M, Wax P, Risher W. Non-barbiturate, drug-induced reversible loss of brainstem reflexes. Neurology 1998;51(2): 639-40.
10. Cherng CH, Wong CS, Ho ST. Acute aphesia following tourniquet release in intravenous regional anesthesia with 0.75% lidocaine. Reg Anesth Pain Med 2000;25 (2):211-2.
11. Sawyer RJ, von Schroeder H. Temporary bilateral blindness after acute lidocaine toxicity. Anesth Analg 2002;95(1):224-6.
12. Hanisak J. Similar packaging for heparin, potassium chloride, and 1% lidocaine by one drug manufacturer causes concern. J Emerg Nurs 1991;17(6):367-8.
13. Patient care threatened by presence of concentrated lidocaine syringes. Pa Nurse 1991; 46(8):1.
14. Berwick D. Not again. BMJ 2001;322(7281): 247-8.
15. Blendon RJ, DesRoches CM, Brodie M, Benson JM, Rosen AB, Schneider E, et al. Views of practicing physicians and the public on medical errors. N Engl J Med 2002;347(24):1933-40.
16. Berwick DM. Errors today and errors tomorrow. N Engl J Med 2003;348(25):2570-2.