Local Anesthetic Neurologic Toxicity Reversed with a Small Dose of Lipid Emulsion

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Case Report

A 54 year-old Hispanic male weighing 106 pounds, height 66" diagnosed with end stage renal disease (ESRD) was scheduled for a left upper extremity arterio-venous (A-V) fistula to be done under regional anesthesia (RA). Other health problems included hypertension, anemia, hypothyroidism, and hypoxia for which he used oxygen at 2 L per minute by nasal cannula. He was brought to the holding area in preparation for a supra-clavicular and pectoralis block (PEC II). The patient was awake and oriented but spoke little English, so a translator was used to explain the risks and benefits of RA versus general anesthesia. The patient understood and agreed to RA. The patient’s left neck and upper thorax were prepped with chlorahexidine, and with the guidance of ultrasound a 22G needle was inserted. The left supraclavicular block was accomplished by injecting 10 ml of a mixture of Ropivacaine 0.5% 20 ml and Lidocaine 2% 10 ml. The PEC II block was accomplished by injecting 20 ml of the same mixture between the left pectoralis minor and serratus anterior muscles at the level of the anterior 3rd rib. The patient’s vital signs (vs) were stable during and immediately following the procedure with good results and no obvious side effects. Twenty minutes after completion of the procedure and prior to transporting the patient to the operating room, the nurse notified us that the patient’s mental status had changed. On immediate evaluation, the patient was very slow to respond to verbal stimulation, did not remember his name and complained of numbness around his mouth. VS were stable, cardiac rate and rhythm did not change, and oxygen saturation remained at 96%. Blood pressure before procedure was 160/90 and 130/70 after. The surgeon was concerned about proceeding with the surgery. A decision was made to give 10 ml of lipid emulsion (LE) 20 % IV. The patient became alert and oriented to the same level as before the procedure in two minutes. We followed with another 10 ml of LE 5 minutes later. A mutual decision was made with the surgeon and anesthesiologist to proceed with the surgery. The surgery was accomplished under RA only without sedation to continue monitoring the patient’s mental status. The surgery lasted 2 hours with patient maintaining same mental status and stable vs. Discussion This was a very sick patient with a diagnosis of ESRD as well as other major health problems that was scheduled for an AV shunt. The plan was to do surgery under regional anesthesia because this is safer for the patient. The regional anesthesia team injected a mixture of Ropivacaine 0.5% and Lidocaine 2% for a total volume of 30 ml. The dose was 100mg of Ropivacaine and 200 mg of Lidocaine for a patient weight of 48.4 Kg. The patient was totally stable without any mental changes at the completion of the block but began to exhibit some changes 20 minutes later. The differential diagnosis was local anesthetic toxicity versus new symptoms of a more serious illness such as CVA. Mild changes in blood pressure, with stable cardiac rhythm, stable SPO2, and delayed onset of symptoms made it difficult to assert the
diagnosis of local anesthesia (LA) toxicity. We were also concerned that treating the symptoms with benzodiazepine might mask the ability to recognize more serious underlying disease. So we elected to treat with LE, initially giving 10 ml of LE 20% with complete resolution of the mental status symptoms in 2-4 minutes. We followed with another 10 ml of the same solution 5 minutes later. LE has been used for parenteral nutrition. Rosenblatt et al reported the first clinical application of LE therapy in treating LAST in a patient that failed to respond to standard cardiac arrest resuscitation shortly after a peripheral nerve block combining mepivacaine and bupivacaine. LE infusions were studied in animal models of overdoses of tricyclic antidepressants, beta-blockers, and calcium channel blockers and showed benefits. Mechanism of actions has been recently accumulated indicating several important potential sites of action. There are two effects in particular, partitioning (lipid sink) and enhanced metabolism that explain the benefit of lipid infusion during bupivacaine infusion. Pulling the drug from the target tissue can explain the reversal of both neurologic and cardiac toxicity. In our case, the logical first line of treatment is benzodiazepine since the patient was stable and only mental changes were observed. But we were concerned that benzodiazepine would not clear the mental status so that we could rule out other more serious health concerns. Since the LE infusion cleared the mental status symptoms almost immediately, we could rule out more serious problems and cleared the way to proceed with surgery, avoiding having to reschedule and also doing further work-up. We present this case as another good use of LE intravenously short of serious cardiovascular failure and cardiac arrest. Conclusion We present a case of neurologic LAT reversed completely with a small dose of LE while maintaining good regional anesthesia for a VA shunt procedure. By using LE instead of benzodiazepine we cleared the patient to proceed with surgery and avoided the delay of further testing.

References


2. Lipid Emulsion Infusion: Resuscitation for Local Anesthetic and Other Drug Overdose. Anesthesiology July 2016