**Case Report**

**Successful Resuscitation With Intralipid After Marcaine Overdose**

David M. Whiteman, MD, FRCS(C); and Stephen I. Kushins, MD

**Abstract**

The authors present the case of a 32-year-old woman who underwent concomitant abdominoplasty and mastopexy. Before discharge from the recovery room, she experienced cardiac arrest and seizures resulting from an accidental overdose of Marcaine, caused by failure of an intramuscular pain pump. The anesthesiologist initiated a rescue protocol with an Intralipid 20% bolus (1.5 mg/kg), followed by continuous intravenous infusion of 0.25 mg/kg for 60 minutes. The Intralipid intervention resulted in a successful outcome. This case emphasizes the importance of ensuring the availability of Intralipid 20% infusion in the operating room. Plastic surgeons who place postoperative pain pumps must be aware of this method of resuscitation and its effectiveness in treating possible cases of local anesthetic overdose or toxicity.

**Level of Evidence: 5**

**Keywords**

Intralipid, bupivacaine overdose, Marcaine, pain pump failure, abdominoplasty, mastopexy, complications

Accepted for publication November 6, 2013.

Bupivacaine pain pumps are used to manage pain after many plastic surgery procedures, ranging from breast reconstruction and augmentation to abdominoplasty. On behalf of the Plastic Surgery Educational Foundation DATA Committee, Pu issued a report on pain pumps in 2006 and concluded that these devices provide a safe, effective preemptive system for postoperative pain management in comparison to traditional techniques (such as patient-controlled analgesia and oral narcotic medications). The maximum bupivacaine dosage is considered to be 2.5 mg/kg without epinephrine and up to 3.5 mg/kg with epinephrine. Rarely has local anesthetic toxicity been reported outside the realm of anesthesiology complications.

The authors report on a patient who experienced cardiac arrest after combination abdominoplasty-mastopexy when her intramuscular pain pump failed, resulting in an accidental overdose of bupivacaine. She was successfully resuscitated with Intralipid 20% infusion in combination with evacuation of the local anesthetic.

**CASE PRESENTATION**

A 32-year-old female (weight, 67 kg; height, 168 cm) presented for abdominoplasty-mastopexy at an outpatient surgery center attached to an inpatient hospital. No significant findings were revealed from her medical history. She had no history of seizures and had not been taking any medications prior to surgery. During surgery, the patient received 24 mL of Marcaine 0.5% (Hospira, Lake Forest, Illinois) with epinephrine, via a priming mechanism comprising 2 catheters (placed deep to the anterior rectus sheath), with connections to two 150-mL reservoirs filled with a total of

From the Gwinnett Medical Center, Duluth, Georgia.

**Corresponding Author:**

Dr David M. Whiteman, Gwinnett Medical Center, 3855 Pleasant Hill Rd, Suite 370, Duluth, GA 30096, USA.

E-mail: drwhiteman@southernplasticsurgery.com
300 mL bupivacaine 0.5% (GOPump Dual Infusion Pump Kit; Symbios, Indianapolis, Indiana).

Shortly before the patient was to be discharged, she became confused, agitated, and combative. She stood up and then collapsed, suffering a generalized tonic-clonic seizure. At this time, it was noted that the reservoir of 1 of the pain pumps was completely devoid of its contents (150 mL of Marcaine 0.5%). Approximately 20 to 30 minutes earlier, the recovery room nursing staff had observed that the pump was full. The patient then experienced cardiac arrest. Cardiopulmonary resuscitation (CPR) was initiated, followed by intubation. The code team and anesthesiologist responded; the anesthesiologist initiated a rescue protocol with a 1.5-mg/kg bolus of Intralipid 20% (Sigma-Aldrich, St Louis, Missouri), followed by continuous intravenous infusion of 0.25 mg/kg for 60 minutes.

During the resuscitation effort, the patient had several additional seizures and cycled through multiple cardiac arrhythmia events. In addition to the medical therapy, cardiac defibrillation was required twice. Her surgeon arrived during the resuscitation effort and opened the abdominal incision, evacuating approximately 60 mL of fluid from the right rectus sheath. The patient returned to spontaneous circulation and normal heart rhythm after 45 minutes of CPR and then was transferred to the intensive care unit (ICU). An electrocardiogram obtained later that evening showed sinus tachycardia and ST depression in leads II, III, and aVL. Results of cardiac enzyme testing revealed normal levels of creatine kinase (256 IU/L; reference range, 22-269 IU/L) and troponin I (0.05 ng/mL; reference range, 0.01-0.07 ng/mL). A transthoracic echocardiogram obtained the following morning showed no abnormalities and an ejection fraction of 55% to 60%. The patient was extubated and transferred from the ICU later that day. After an additional day of observation, she was discharged. She did not sustain any neurologic or cardiovascular deficits.

**DISCUSSION**

As with any cardiac arrest or code situation, early goal-directed therapy is essential for a successful outcome. For this patient, identifying the cause of cardiac arrest was crucial, as was directing treatment at the local anesthetic toxicity during resuscitation. Infusion of lipid emulsion as an antidote to local anesthetic systemic toxicity has been reported several times in the literature since its efficacy was demonstrated by Weinberg et al.\(^5^7\) in rat and dog models. Although Intralipid’s exact mechanism of action for treating local anesthetic overdose has not been identified, the concept of a “lipid sink” has been suggested by Weinberg et al and Kou et al.\(^7^9\) In such a model, Intralipid reduces the amount of highly lipophilic Marcaine present in its aqueous form, thereby decreasing its availability to cardiac myocytes and, as a result, its toxicity.

Most reported cases of Intralipid as an antidote to anesthetic overdose have occurred in the setting of accidental intravascular injection of anesthetic during peripheral nerve blocks or epidurals. The successful outcome for our patient expands the relevance of this treatment to plastic surgery procedures that involve placement of pain pumps postoperatively. Our case emphasizes the need to ensure the availability of lipid 20% infusion during surgery, in both inpatient and outpatient settings. In many institutions, Intralipid is available only in the pharmacy. However, we recognize the value of keeping at least 1 dose in the regional anesthesia block cart. Moreover, our anesthesiologist advises against performing nerve blocks unless Intralipid therapy is readily available. According to Weinberg et al, recommended dosing for rescue treatment with lipid 20% emulsion is 1.5 mL/kg as an initial bolus, followed by 0.25 mL/kg/min for 30 to 60 minutes.\(^6\) We believe that it is safe to repeat the bolus 1 or 2 times for persistent asystole; the infusion rate could be increased if blood pressure declines.

In our case, the surgeon knew that the local anesthetic would be slowly absorbed from the rectus sheath and, accordingly, suggested evacuation of the medication to reduce the potential for toxicity. The patient had received 5 times the toxic dose of bupivacaine, and it is not known whether recovery from such a profound overdose would have been possible without the combined efforts of the surgical, anesthesiology, and internal medicine teams.

**CONCLUSIONS**

Undoubtedly, the placement of indwelling pain medication catheters is an advancement in the postoperative management of plastic surgery patients, particularly in the outpatient setting. However, it is imperative that physicians be aware of possible side effects and proper management of anesthetic overdose. The lipid rescue protocol can be very effective for this purpose. In any setting where a patient is even remotely at risk of exposure to toxic doses of local anesthetic, Intralipid 20% therapy, and other appropriate medications necessary to respond to complications as outlined by Neal in 2012 should be available and clinicians should know how to use them.\(^8\)

**Disclosures**

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

**Funding**

The authors received no financial support for the research, authorship, and publication of this article.

**REFERENCES**

1. Pacik PT, Nelson CE, Werner C. Pain control in augmentation mammoplasty: safety and efficacy of indwelling...


