Abstract 18

Lipid Emulsion as a Lifesaving Treatment for Local Anesthetic Systemic Toxicity (LAST)

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One of the most feared complications of regional anesthesia is local anesthetic systemic toxicity (LAST). Although serious complications secondary to local anesthetic administration are rare, adverse effects do occur and can range from mild central nervous system (CNS) involvement to life-threatening cardiac toxicity, which resists standard resuscitative methods. When such a situation arises, diagnosis is the first step to successful treatment. Once LAST is recognized, having a plan and the necessary tools readily available can save a patient's life. The 2010 American Society of Regional Anesthesia and Pain Medicine Practice Advisory recommends a plan consisting of airway management, seizure suppression, cardiac life support if indicated, and infusion of a 20% lipid emulsion. Evidence for the beneficial effects of lipid infusion in LAST were first published more than a decade ago in a rat model of bupivacaine-induced asystole.[1] Further studies in dogs confirmed the benefits of lipid in reversing bupivacaine cardiac toxicity.

Although not proven, the primary mechanism of action is believed to be a partitioning effect where offending drug is bound to an enlarged, intravascular lipid phase. The new equilibrium forces the toxic agent from the target tissues to a newly formed "lipid sink." This lipid sink is essentially a large reservoir having high affinity for the lipophilic drug which is, in effect, pulled away from the target organ, thereby reversing the toxicity. In 2006, Rosenblatt et al[2] described the first clinical report of lipid emulsion used to reverse cardiac arrest due to LAST. There have many subsequent reports of successful use of lipid emulsion infusion in reversing severe LAST, including both CNS and cardiovascular signs of toxicity.

Our goal is to make the city of Chicago the first LAST safe zone. We are working with individual hospitals to implement a protocol for effective treatment of LAST, including use of lipid emulsion infusion. An educational "toolkit" will be distributed to hospitals all over Chicago to improve knowledge about the most effective methods for prevention, diagnosis, and treatment of LAST. The overarching goal of this educational program is to decrease or eliminate entirely the morbidity and mortality associated with LAST.

1. *Weinberg GL, VadeBoncouer T, Ramaraju G, Garcia-Amaro MF, Cwik M. Pretreatment or resuscitation with a lipid infusion shifts the dose-response to bupivacaine-induced asystole in rats. Anesthesiology 1998; 88:1071–1075.*

2. *Rosenblatt MA, Abel M, Fischer GW, Itzkovich CJ, Eisenkraft JB. Successful use of a 20% lipid emulsion to resuscitate a patient after a presumed bupivacaine-related cardiac arrest. Anesthesiology 2006; 105:217–218.*