ToxTidbits

Maryland Poison Center
UNIVERSITY OF MARYLAND SCHOOL OF PHARMACY
50 YEARS 1972-2022

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The Maryland Poison Center's Monthly Update: News, Advances, Information

Local anesthetic systemic toxicity (LAST)

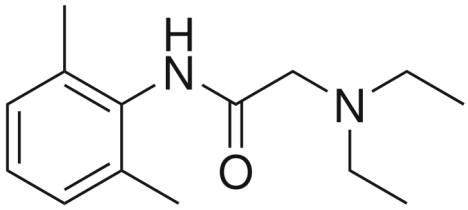
The poison center was called about a 50-year-old female who presented to the hospital with dizziness, nausea, bilateral lower extremity numbness, aphasia, and left sided weakness. Initial evaluation ruled out a stroke and her symptoms are improving. Pertinent history includes liposuction performed about 12 hours ago. Are these symptoms related and what treatment is recommended?

Lidocaine is a common medication used in hospitals and is included in the World Health Organization's list of essential medications (WHO, 2022). Lidocaine is a local anesthetic used to decrease pain from injuries and prevent pain from surgeries and minor interventions. Lidocaine is a potent sodium channel blocker that results in neurologic and cardiac toxicity as serum concentrations rise. Established maximal doses are well-known to emergency department staff (4.5 mg/kg alone or 7 mg/kg when combined with epinephrine). These dose limits are intended to prevent local anesthetic systemic toxicity (LAST) which can result in seizures, cardiac arrest, and death.

Over the last 30 years, cosmetic surgeons have pushed the doses of lidocaine higher during tumescent liposuction. Tumescent liposuction involves administration of large volumes of dilute lidocaine and epinephrine solution into the fatty tissue, followed by prompt removal of the tissue. Recent cases and published guidelines recommend using doses up to 55 mg/kg (*Dermatol Surg* 2006;32:709-16). In a very small crossover study (n=14) Klein and Jeske reported that a dose of 45 mg/kg results in serum lidocaine concentrations less than 4.5 mg/L with a peak of 8-16 hours (*Anesth Analg*. 2016;122(5):1350-9). The toxic range is generally accepted to be 6 mg/L or greater. The only reported adverse effect was nausea occurring 12 hours after administration. Multiple studies have been published and report low rates of serious adverse effects, but most authors acknowledge significant bias in these studies (*Dermatol Surg*. 2019;45:171-82). Most of these were retrospective, observational studies from databases not designed to determine all adverse effects and it is likely that LAST is both underdiagnosed and underreported. Some authors call for mandatory registries of all surgeries with prospective monitoring for signs and symptoms of LAST.

LAST is a life-threatening emergency. Case reports and series describe cardiac arrest within 30 minutes of injection of lidocaine during tumescent liposuction (*Clin Toxicol (Phila)*. 2022;60(7):884-90). Initial management consists of standard Advanced Cardiac Life Support (ACLS) along with administration of intravenous lipid emulsion (ILE). ILE is recommended for cardiac arrest or other manifestations of life-threatening toxicity (*Clin Toxicol (Phila)*. 2016;54(10):899-923). Prompt recognition of toxicity and readily available ILE for administration may reduce deaths from accidental LAST.

Case resolution: The patient was experiencing mild symptoms of LAST. Her symptoms improved before intervention, and she was observed for about 12 hours before discharge. Contact your local poison center at 1-800-222-1222 for treatment recommendations for LAST, guidance for when to administer ILE, and locally accepted ILE dosing.



The structure of lidocaine is similar to most local anesthetics

Did you know?

Cocaine was the original local anesthetic used in clinical practice.

Coca leaves were brought to Europe for analysis in the mid-19th century and cocaine was eventually isolated. Sigmund Freud brought it into clinical practice, then in 1884, Carl Koller demonstrated the local anesthetic properties on eyes. Cocaine has effects on multiple receptors and a low toxicity threshold. About 40 years after introduction into clinical practice, clinicians in the United States identified that 50% of local anesthetic deaths were due to cocaine. Cocaine was controlled by the Harrison Narcotic act in 1914 then eventually classified as a Schedule II drug by the Controlled Substances Act of 1970. Use in clinical practice today is very limited.

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