


# Local Anesthetic Systemic Toxicity 1.5 [www.aornjournal.org/content/cme](http://www.aornjournal.org/content/cme)

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### Purpose/Goal

To provide the learner with knowledge of best practices related to recognizing and treating local anesthetic systemic toxicity (LAST).

### Objectives

1. Discuss how local anesthetics work.
2. Describe local anesthetic composition.
3. Discuss LAST.

### Accreditation

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Diana L. Wadlund, MSN, ACNP-BC, FNP-C, CRNFA, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

The behavioral objectives for this program were created by Helen Starbuck Pashley, MA, BSN, CNOR, clinical editor, with consultation from Susan Bakewell, MS, RN-BC, director, Perioperative Education. Ms Starbuck Pashley and Ms Bakewell have no declared affiliations that could be perceived as posing potential conflicts of interest in the publication of this article.

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## ABSTRACT

Local anesthetics are commonly used in the perioperative environment to facilitate surgical procedures or to provide postoperative pain management for patients. The use of local anesthetics, however, introduces the risk of complications resulting from local anesthetic systemic toxicity and the risks of increased morbidity and mortality for the surgical patient. Systemic toxicity from the injection or overdose of local anesthetics is a rare but potentially fatal complication that occurs in less than 1 in 1,000 patients. This article provides the perioperative nurse with information about local anesthetics, the signs and symptoms of local anesthetic systemic toxicity, and the information needed to manage a patient experiencing this complication. *AORN J* 106 (November 2017) 367-377. © AORN, Inc, 2017. <http://dx.doi.org/10.1016/j.aorn.2017.08.015>

Key words: *local anesthetic, anesthetic complications, local anesthetic systemic toxicity, amino amides, amino esters.*

Approximately 70 million surgeries are performed annually in the United States; nearly 53 million of these are performed on an outpatient basis.<sup>1,2</sup> Today, clinicians use local and general anesthesia extensively to eliminate pain from surgery. For example, dentists in the United States use approximately 100 million carpules of local anesthetic per day.<sup>1</sup> Although the widespread use of local anesthetics makes painless surgical procedures possible, the use of such anesthetics carries the risk for local anesthetic systemic toxicity (LAST).<sup>3</sup> To manage and prevent LAST in patients undergoing operative and other invasive procedures, perioperative nurses should be aware of the range of local anesthetics available and the signs of, symptoms of, and treatments for this potentially fatal complication.

## HISTORY OF LOCAL ANESTHETICS

Less than 200 years ago, elective surgery was virtually nonexistent. When surgery was performed, it was undertaken without the benefit of anesthesia and was considered a last-resort attempt to save a life.<sup>4</sup> The earliest form of anesthesia has been described as a sharp blow to the jaw that rendered the patient unconscious.<sup>4</sup> Over time, clinicians began using

various plant-based alternative therapies (eg, marijuana, belladonna) in an attempt to dull sensation and make surgical procedures less painful. Mesmerism, hypnosis, and distraction also were attempted to improve the patient's surgical experience.<sup>4</sup>

The use of injectable local anesthetics began more than 100 years ago when surgeons started injecting cocaine, the first local anesthetic, into the oral cavity for wisdom tooth extraction. Dr William Halsted used cocaine as a peripheral nerve block in 1884 when he injected it into a patient's surgically exposed brachial plexus.<sup>5</sup> During the same decade, Dr Carl Koller used cocaine as a topical anesthetic during ophthalmic surgery.<sup>6</sup> The euphoria, potential for addiction, and mortality associated with the use of cocaine, however, pointed to a need for a less toxic local anesthetic. In 1904, procaine, the first synthetic derivative of cocaine, became available; it dominated the local anesthetic market for nearly 40 years.<sup>6</sup>

Lidocaine was created in 1943.<sup>7</sup> Lidocaine is nonaddictive and is generally well tolerated by most patients. For these reasons, lidocaine quickly became the standard by which we currently compare all anesthetic medications.<sup>7</sup> By the mid-1960s,

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