

# Recognizing and Responding to Local Anesthetic Systemic Toxicity (LAST): Championing System Best Practices

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## Background and Scope

- LAST is a **low volume, high risk event** <sup>1-12</sup>
  - also known as Local Anesthetic Toxicity
- The estimated incidence of LAST events is variable and likely underreported <sup>2</sup>: it may occur as common as **1 in 500 peripheral nerve blocks** <sup>4</sup>
- Pathophysiology: the **action of local anesthetics on cerebral neurons and cardiac sodium channels** <sup>3, 4</sup>
- Research shows up to **84% of nurses are unsure of LAST treatment protocol**, including symptoms, treatment, lipid dose calculation, the location of the related treatment kit, and pulling emergency meds <sup>6, 7</sup>

## Recognizing

Early S/S <sup>1-7, 9-12</sup> (Signs/Symptoms)	Onset <sup>7, 8</sup>	Risk Factors <sup>2,3,9</sup>
Ringing in ears Metallic taste Tachycardia Hypertension	Reports vary, LAST may begin from 30 sec. to 1+ hours after admin. Most common onset is <b>1-5 min.</b> Best practice is 30+ min. of monitoring after admin.	Hypoxia, Acidosis, Female, Age Extremes (Peds/Geri), Small Size. Heart/Liver/Kidney Disease, Pregnancy, Long acting: <b>Bupivacaine</b> <sup>12</sup> , <b>CC:CNS ratio</b> <sup>3</sup> , <b>LA additives</b> (epi, bicarb)
CNS S/S <sup>1-7, 9-12</sup>		Preceding Events <sup>2</sup>
Agitation/Confusion, Lethargy/Obtundation, Tremor/Seizures, Coma		At ~20% each, <b>extremity blocks, penile blocks, and local infiltration</b> precede the majority of LAST occurrences
CV S/S <sup>1-7, 9-12</sup>		
Tachy → Bradycardia, Hyper → Hypotension, VTach / VFib, Asystole		
Often, CNS S/S occur <b>before</b> CV	<sup>1, 2, 4</sup>	

## Responding

- Find and follow facility and system policy
- **Treatment best practice upon recognizing LAST:** <sup>14</sup>
  - Stop LA administration, **Hyperoxygenate** w/100%
  - Administer an **IV lipid emulsion 20%** to bind to and excrete LAs: For patients > 70 kg: give 100 mL over 2-3 minutes, followed by 250 mL over 15-20 minutes. Follow algorithm relating to weight-based administration for <70kg
  - For cardiac arrest: **Use lower-than-ACLS epi doses**
  - **Avoid** BBs, CCBs, Vasopressors, and more LAs
  - Treat symptoms - for seizures, use benzodiazepines
- Read **published reports of LAST** in references 4, 10 and anecdotal reports at [lipidrescue.squarespace.com](https://lipidrescue.squarespace.com) <sup>15</sup>

## Poster Objective

- Provide an **overview** of Local Anesthetic Systemic Toxicity
- Define **LAST treatment** and current best practice
- Summarize research on nursing **safety and education**
- Empower nurses to **recognize, respond to, and advocate for** LAST best practices and education in their career

## Key Points

**LAST** can occur with **all local anesthetics** (LAs) and **all routes of administration** <sup>1-7, 9-12</sup>

Recognizing: Affects the **nervous (CNS)** and **cardiovascular (CV) systems** <sup>1-7, 9-12</sup>

Responding: **Treat signs/symptoms and administer a lipid emulsion infusion** <sup>14</sup>

Championing: Advocate for LAST **policy, practices, and education** to be **present, tailored, and effective** <sup>6, 8-14, 16</sup>

## Championing System Best Practices

- Review LAST policy, and **frequency of review/update**
- Assess: **who oversees and tracks** suspected or actual incidents of LAST and its treatment?
- Tailor and diversify **education for varied practice areas**
  - OR, PACU, ER <sup>9</sup>, Obstetrics <sup>10</sup>, and more
  - Varied **education**: modules <sup>8, 11</sup>, in-services <sup>8</sup>, videos <sup>8</sup>, simulation <sup>8, 16</sup>, with knowledge assessments
- Research and implement methods to promote **patient safety and awareness**, especially with long-acting LAs
  - Evaluate the consistency of safe and accurately documented LA **medication administration**, such as the use of 5+ rights and integrated EHR scanning <sup>12</sup>
  - Utilize **wristbands** to alert staff to high-risk LA use <sup>12</sup>
  - Tailor patient **education upon discharge** <sup>5, 6</sup>
- Provide **accessible and frequent** exposure to education
  - **Badge buddies** with system-specific steps for LAST <sup>8</sup>
  - Place **treatment algorithms** and rescue kits in administration areas <sup>8</sup>
  - **EHR notifications** for LAs with increased risk factors
- Feature opportunities for **Continuing Education** activities on LAST - journal articles, posters, and more

## Ask These Questions On Your Unit

- ☐ Is your facility's **LAST policy** **accessible** and up to date?
- ☐ Are lipid emulsions **included in crash carts** across units?
- ☐ Are staff in different areas, including the PACU, OR, ER, and OB, **trained** to recognize and respond to LAST?
- ☐ Is education reviewed for **accuracy and efficacy**?
- ☐ Are high-risk patients/LA use clearly **flagged or labeled**?
- ☐ Is there a designated **responder or review** process for suspected or actual LAST events?
- ☐ Are **open discussions** on LAST facilitated on your unit?

## References and Acknowledgements



Scan the QR code with your phone camera to find the list and PDFs of references

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Scan the QR code for a 3 minute poster overview video

How I became curious about LAST:  
I found the **2020 LAST checklist** by the **American Society of Regional Anesthesia and Pain Medicine** <sup>14</sup>  
by the PYXIS on the PACU unit while I was a senior nursing student completing my preceptorship in spring 2024.  
I asked the staff if they recognized and knew about the subject, and got uncertain responses or vague recollections of past modules.

