

## **LOCAL ANAESTHESIA SYSTEMIC TOXICITY (LAST)**

### **Etiology:**

Intravascular injection or absorption of local anesthetics.

### **Pathophysiology:**

Local anesthetics bind to voltage gated sodium channels and inhibit conduction across fibers leading to cardiac conduction defects, contractile dysfunction and arrhythmias.

Multiple theories have been proposed to Central nervous system toxicity.

### **Incidence:**

In a recent French study by Schweitzer-Chaput et al, of 512 cases reported LAST was seen in 64 cases. 30 % in infants. Lidocaine was involved in 47% and ropivacaine in 14% cases.

### **Risk factors:**

- Patients at extremes of ages. More commonly reported in neonates and infants
- Penile block,) caudal analgesia and dental procedures
- Hepatic, renal or cardiac dysfunction

### **Signs of severe toxicity:**

- Initially it presents with sudden alteration in mental status, metallic taste, tinnitus, severe agitation or loss of consciousness, with or without tonic-clonic convulsions. Minor signs are difficult to detect in children. In nonverbal children crying maybe the first sign.
- Cardiovascular signs: sinus bradycardia, conduction blocks, asystole and ventricular tachyarrhythmias leading to CVS collapse.
- Local anaesthetic toxicity may occur immediately or up to 60 minutes following the initial administration after an initial injection.

## **Management:**

Several non-specific guidelines are available. Association of Anaesthetist guidelines 2023 are one of the recent available guidelines. Link is available in references. An Infomatic more specific to children was published in Reg Anesth Pain Medicine 2021(revised 2023)

Key points are

STOP injecting the local anaesthetic

- Call for help
- Call for cardiac arrest trolley and LAST cart, if available
- Give 100% oxygen and ensure adequate lung ventilation
- Confirm or establish intravenous access
- Control seizures (small incremental doses of benzodiazepines,
- If circulatory arrest, follow CPR guidelines in addition give IV lipid emulsion
- If no circulatory arrest treat hypotension, brady- and tachyarrhythmia and give IV lipid emulsion
- Lipid emulsion. See protocol below.

### **LIPID EMULSION 20%**

Bolus: 1.5 mls/kg over 2 – 3 minutes

Continuous infusion: 0.25 mls/kg/min (15 mls / kg / hr.), for a minimum of 10 and up to 60 minutes after ROSC is achieved.

### **DO NOT USE PROPOFOL AS A SUBSTITUTE FOR LIPID EMULSION**

If hemodynamic stability not achieved in 3 minutes repeat bolus dose or double infusion rate

It is recommended to administer lipid emulsion at the first sign of arrhythmia, rapid clinical deterioration or prolonged seizure.

## **Post Event Care**

- Regular clinical review, daily amylase or lipase to rule out pancreatitis

*References:*

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2. Haskins SC, Tanaka CY, Boublik J, Wu CL, Sloth E. Focused Cardiac Ultrasound for the Regional Anesthesiologist and Pain Specialist. *Reg Anesth Pain Med.* 2017 Sep/Oct;42(5):632-644.
3. Association of Anaesthetists Quick Reference Handbook 2023. Available at: <https://anaesthetists.org/Home/Resources-publications/Safety-alerts/Anaesthesia-emergencies/Quick-Reference-Handbook>. Accessed on April 27, 2024.
4. Gupta RK, Schwenk ES. *Reg Anesth Pain Med* 2021;**46**:915. Local anesthetic systemic toxicity in children: a review of recent case reports and current literature - an infographic. <https://doi.org/10.1136/rapm-2021-102993>. (site accessed September 24)
5. Schweitzer-Chaput, A., Callot, D., Bouazza, N. *et al.* Local anesthetics systemic toxicity in children: analysis of the French pharmacovigilance database. *BMC Pediatr* **23**, 321 (2023). <https://doi.org/10.1186/s12887-023-04126-7> (site accessed September 24)
6. Dontukurthy S, Tobias JD. Update on Local Anesthetic Toxicity, Prevention and Treatment During Regional Anesthesia in Infants and Children. *J Pediatr Pharmacol Ther.* 2021;26(5):445-454. doi: 10.5863/1551-6776-26.5.445. Epub 2021 Jun 28. PMID: 34239395; PMCID: PMC8244955.