Local Anesthesia Toxicity

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Signs and symptoms

- Local anesthesia (LA) provides a way to relieve temporary pain in a small part of the body and has been used for over 100 years (Fencl, 2015).
- LA prevents the passage of surgical stimuli into the central nervous system (CNS) making a surgical procedure less painful for the patient (Noble, 2015).
- Anesthesia achieved through the injection of stimulants to a confined area with lower drug dosages is called LA around a surgical incision (Noble, 2015, p.235).
- When performing LA administration one must be aware of the risk of local anesthetic toxicity (LAST) (Fencl, 2015).
- It is a very serious and sometimes fatal complication to administration. It can result from the patient’s lack of knowledge, current medications/treatment injection directly into the vascular system—resulting in immediate absorption of the anesthetic agent into an exceptionally vascular area (Fencl, 2015).
- According to St Clair (2013), LA can occur on both peripheral nerve blocks (PNBs) and in over 10,000 procedures each year in the U.S.
- PNBs improve short and long-term recovery and reduce hospital length of stay (Noble, 2015). Local anesthetic systemic toxicity.

Pathophysiology

- The early signs are caused by blocking inhibitory pathways in cerebral cortex—which allows for dilatation of facial arteries resulting in exacerbating cell damage to the brain (Noble & Patil, 2012).
- Tachycardia and hypertension can occur after injection with epinephrine (Weinberg, 2002).
- Cardiovascular manifestations: Dyssrhythmias and conduction delays (from prolonged PR interval to asystole), chest pain, shortness of breath, palpitations, light-headedness, diaphoresis, hypotension, and syncope.
- Systemic toxicity from local anesthetic (LA) occurs due to accidental intravascular injection, absorption from the tissues or repeated doses without balanced elimination (Neal et al., 2012).
- A checklist was developed by the American Society of Regional Anesthesia and Pain Medicine (ASRA) for the management of LAST (Neal et al., 2012).
- Stage 1: Initial Focus
  - Airway management: ventilate with 100% oxygen
  - Ventilation with 100% oxygen: initial management: hypoventilation preferred, AVS
  - Propofol in patients with cardiovascular instability
  - Stage 2: Carbohydrate Abnormalities
  - Initiates ACLS if needed
  - Avoid vasopressors, calcium channel blockers, beta blockers or LA
  - Decrease epinephrine dose to < 1 mcg/kg

Stage 2: Central Cardiovascular Abnormality

- **Stage 3: Lipid Emulsion Management**
  - Inject 15 mg/kg over 2 minutes
  - Continuous infusion may repeat bolus
- The lipid emulsion creates a lipid phase that extracts the lipid soluble medications and decreases toxicity potentially reversing LAST (Nicholas & Thornton, 2016).
- Proposed by 
  - By educating all staff, effective management of this emergent situation will help influence a positive patient outcome.
- **Stage 4: Stabilization**
  - ASA Risk factors: prepare
  - Risk reduction
  - Treatment (Neal et al., 2012).

Table 1. Checklist created by ASRA. Image provided by Neal, Mulroy & Weinberg, 2012.

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References