Lidocaine Infusion for Analgesia

MOA

1. Attenuation of proinflammatory effects:
   - Blocks polymorphonuclear granulocyte priming, reducing release of cytokines & reactive oxygen species
2. Diminish nociceptive signaling to central nervous system:
   - Inhibition of G-protein-mediated effects
   - Reduces sensitivity & activity of spinal cord neurons (glycine and NMDA receptor mediated)
3. Reduces ectopic activity of injured afferent nerves

Perioperative Use

- IV local anesthetic infusions have been used safely for pain control in the perioperative setting since the early 1950's.
- Reduce pain, nausea, ileus duration, opioid requirement, and length of hospital stay

Evidence for Specific Surgeries:

- **Strong**: Open & laparoscopic abdominal; Reduces postoperative pain, speeds return of bowel function, reduces PONV, reduces length of hospital stay
- **Moderate**: Open prostatectomy, thoracic procedures, ambulatory surgery, and major spine; Reduces postoperative pain and opioid consumption
- **Moderate**: Breast; Prevention of chronic postsurgical pain
- **No benefit**: Total abdominal hysterectomy, total hip arthroplasty, and laparoscopic renal surgery

Pharmacology

- Hepatic metabolism with high extraction ratio; plasma clearance is 10 ml/kg/min
  - Adjust dose based on hepatic function and blood flow
- Renal clearance of metabolites
- Context-sensitive half-time after a 3-day infusion is ~20–40 min
- Clinical effect of lidocaine tends to exceed the duration of the infusion by 5.5 times the half-life, supporting the putative preventive analgesia effect

Dosing

**Infusion**: 2mg/kg/hr (range 1.5-3 mg/kg/hr)

**Loading dose**: 1.5mg/kg (range 1-2 mg/kg)
- Strongly consider bolus to rapidly achieve therapeutic concentration, otherwise steady state reached in 4-8 hr
- Max dose: 4.5 mg/kg

- Consider total dose from other local anesthetics (e.g. regional anesthesia, periarticular injections, & local infiltration)
- Continuous infusions up to 3 mg/kg/hr have been shown to be safe
- Reduce infusion rate in patients with impaired drug metabolism & clearance (i.e. hepatic & renal dysfunction)
- Therapeutic level: 2.5-3.5 µg/ml
- CNS toxicity: >5 µg/ml
- Cardiovascular toxicity: >10 µg/ml

Local Anesthetic Systemic Toxicity (LAST)

- **Mild**: Paresthesias (fingers, toes, perioral), metallic taste, tinnitus, lightheadedness, dizziness, visual disturbances, confusion
- **Moderate**: Nausea, vomiting, severe dizziness, decreased hearing, tremors, BP/HR changes, confusion
- **Severe**: Drowsiness, confusion, loss of consciousness, muscle twitching, seizures, cardiac arrhythmias, cardiac arrest

ACLS*

*Reduced epinephrine dose, lipid emulsion (20%), benzodiazepines for seizures, consider ECMO

Caution

- Unstable coronary disease, recent MI, heart block, arrhythmias, heart failure
- Electrolyte disturbances
- Seizure disorders
- Liver disease (decreased metabolism)
- Renal disease (decreased clearance of metabolites)

Reviews Articles:


References