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Local Anesthetic Systemic Toxicity (LAST) Protocol

PREVENTION:

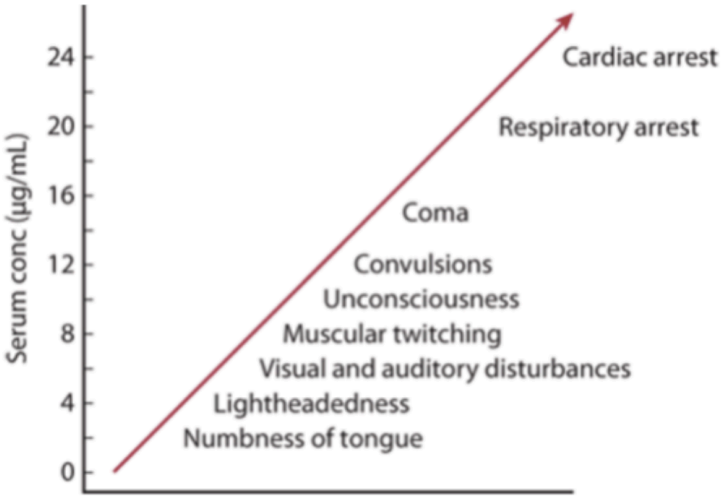
1. Utilize the minimal dose necessary
2. Toxicity with local anesthetics is cumulative and all forms of concomitant administration (e.g. wound infiltration, IV, epidural) should be monitored. Simultaneous administration of different local anesthetic formulations further reduces the minimum toxic dose of each formulation of local anesthetic. Utilize clinically appropriate agents, not exceeding minimum toxic dose as outlined below:
    a. Chloroprocaine
        i. Max dose= 11 mg/kg
        ii. Max total dose= 800 mg
    b. Chloro + Epi (1:200,000)
        i. Max dose= 14 mg/kg
        ii. Max total dose= 1,000 mg
    c. Lidocaine
        i. Max dose= 4-5 mg/kg
        ii. Max total dose= 300 mg
    d. Lido + Epi (1:200,000)
        i. Max dose= 5-7 mg/kg
        ii. Max total dose= 500 mg
    e. Bupivicaine
        i. Max dose= 2.5 mg/kg
        ii. Max total dose= 175 mg
    f. Ropivacaine Max dose- 3mg/kg Max total dose -225mg
    Ropivacaine max dose is not affected by the presence or absence of epinephrine.
3. Use special caution in populations at increased risk, including patients with:
    a. Heart disease (CHF, arrhythmia, ischemic disease, low or high CO states)
    b. Liver disease
    c. Pregnancy
    d. Beta blocker, digoxin, calcium channel blocker, cyp P450 inhibitors
    e. Acidosis
    f. Low plasma protein
    g. Mitochondrial disease

4. Aspirate prior to spinal, epidural and wound infiltration
5. Administer test dose: 2-3 ml of 1.5% lidocaine with 1:200,000 epinephrine or 2-3 ml of 0.5% bupivacaine with 1:200,000 (monitor for increase in HR 10 bpm or SBP 15 mmHg)
6. Utilize incremental injections of 3-5ml every 30-45 seconds

MONITORING FOR SPINAL OR EPIDURAL ADMINISTRATION:

Monitoring to take place during injection and for up to 30 minutes after:

1. Oxygenation: pulse oximetry
2. Ventilation: clinical
3. Circulation: BP and HR q 5min, ECG telemetry



Relationship of signs and symptoms of toxicity to serum lidocaine concentrations.

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PROCEDURE FOR SUSPECTED LAST:

1. Assess for bradycardia, cardiovascular collapse, contractile dysfunction, ventricular dysrhythmias, hypotension
2. Notify anesthesia personnel immediately if any of these symptoms are noted.
3. Discontinue anesthesia infusion.
4. Initiate emergency response and cardiopulmonary resuscitation as indicated.
    a. For dysrhythmia, consider:
        i. Modified ACLS:
            1. Reduced Epinephrine dose: 10-100mcg titrated to effect (<1mcg/kg)
            2. Amiodarone for persistent ventricular dysrhythmia
            3. AVOID: vasopressin, calcium channel blocker, beta blocker, lidocaine
            4. Administer sodium bicarbonate for life-threatening wide complex tachycardia associated with local anesthetic toxicity
            5. Administer atropine for life threatening bradycardia associated with LAST
            6. Monitor ABG for acidosis and hypoxia
            7. Expect prolonged resuscitation
        ii. Lipid emulsion protocol
        iii. ECMO (if available)
    b. For hypotension, consider:
        i. Lipid emulsion protocol
    c. For seizures, consider:
        i. Lipid emulsion protocol
        ii. Medication treatment:
            1. Benzodiazepines
            2. Low dose paralytic (to minimize acidosis and hypoxemia, and administered in the context of airway management)

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LIPID EMULSION PROTOCOL:

1. Patient < 70 kg:
    a. Administer 20% lipid emulsion, 1.5 mL/kg (300 mg/kg) IV bolus over 1-3 minutes
    b. Follow bolus with a continuous IV infusion of 0.25 mL/kg (50 mg/kg) per minute.
    c. IV bolus may be repeated every 3-5 minutes up to 3 mL/kg (600 mg/kg) until circulation is restored.
2. Patient > 70 kg:
    a. Administer 20% lipid emulsion, 100 ml (20 g) bolus over 2-3 minutes
    b. Follow bolus with a continuous IV infusion of 250 ml (50 g) over 15-20 minutes.
    c. IV bolus may be repeated every 3-5 minutes up to 3 mL/kg (600 mg/kg) until circulation is restored.
3. Continue infusion until patient is hemodynamically stable
4. A maximum total dose of 8mL/kg (1600 mg/kg) during total resuscitation is recommended.
5. Use benzodiazepines to treat seizure activity.
6. Avoid beta blockers, vasopressin, calcium channel blockers

REFERENCES

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