A guide to local anaesthetic agents for peripheral nerve blockade

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Contents

- Brief overview of structure & mode of action of LA’s
- Different types of local anaesthetic
- Safe dosage calculations
- Complications of peripheral nerve blocks
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How do LA’s work?

- Modern LA’s are amides supplied in a water soluble weak acid solution
- The unionised base diffuses into nerve cells and causes reversible blockade of Na+ channels in excitable neural tissue, preventing action potential propagation
- They are less effective in infected tissue due to the relative acidity of the tissue
Maximum safe dosages

- No such thing as a safe dose
- Depends on vascularity of injection site
- Depends on health of patient
- Cautiously increased in presence of adrenaline (vasoconstrictor)
Which local anaesthetic?

- Lignocaine (lidocaine)
  - Fast onset (< 10 minutes)
  - Duration of action 2 hours
  - Max. safe dose: 3 mg/kg
  - Cautious dose increase to 5 mg/kg with vasoconstrictor
Local Anaesthetic dosing for a 70 kg man

- **ALWAYS** consult the anaesthetist before administration as they may have already performed a regional technique such as a femoral nerve block

- The following is a guide for appropriate maximum dosing for lignocaine and bupivacaine
Maximum safe dosing

- **Lignocaine**
  - Max. safe dose = 3 mg/kg
  - 5 mg/kg if combined with adrenaline
  - Available in 1% or 2% solution

- **Bupivacaine**
  - Max. safe dose = 2 mg/kg
  - Available in 0.25% or 0.5% solution

- **Remember:** a 1% solution = 10 mg/ml and sums are easy!
How much 1% solution can I give to a 70kg man?

- Max. safe dose = 3mg/kg = **210mg**
- 1% solution = 10mg/ml so 210 ÷ 10 = **21mls**

- With adrenaline = 5mg/kg
- 350mg ÷ 10 = **35mls**
2% Lignocaine Example

- How much 2% solution can I give to a 70kg man?
  - Max. safe dose = 3mg/kg = 210mg
  - 2% solution = 20mg/ml so 210 ÷ 20 = 10.5mls

- With adrenaline = 5 mg/kg
  - 350mg ÷ 20 = 17.5 mls
How much 0.5 % solution can I give to a 70kg man?

- Max. safe dose is 2mg/kg = 140mg
- 0.5% = 5mg/ml
- 140mg ÷ 5 = 28mls
How much 0.25 % solution can I give to a 70kg man?

Max. safe dose is 2mg/kg = 140mg

- 0.25% = 2.5mg/ml
- 140mg/2.5 = 56mls
Complications of peripheral nerve block

**Technique**
- Neural damage
- Bleeding/haematoma
- Intravascular injection of LA
- Infection
- Undesired effects e.g. temporary nerve palsy

**Drug**
- Toxicity
- Anaphylactoid response (v.rare)
- Methaemaglobinaemia (prilocaine)
Causes of toxicity

- Immediate = due to intravascular injection

- Delayed = due to absorption from vascular site, accumulation, repeated injection, relative overdose
Signs of LA toxicity

- CNS:
  - Agitation
  - Sleepiness
  - Perioral numbness/tingling
  - Slurring of speech
  - Fitting
Signs of LA toxicity

- CVS:
  - Hypotension
  - Arrhythmias, often VT/VF
  - Bradycardias
  - NB May be masked by addition of adrenaline to LA
Management of LA Toxicity

- Call for help
- STOP INJECTING
- Remember A B C
- Administer oxygen, support airway
- Ventilate with bag & mask if necessary
- Ensure iv access, give fluids
- Begin CPR if necessary