SAFETY ISSUES IN SEDATION AND LOCAL ANAESTHESIA

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Safety Issues in Sedation and Local Anaesthesia

• Background
• Healthy Young Woman – Cardiac Arrest
• Sedation and Local Anaesthesia
• Toxicity and Safe Practice
• Take Home Messages
• Questions ???
Background – Mine and Yours

- Reno-Vascular Anaesthetist
- ANZSIN
  - PD catheters
  - Hickman Lines
  - AV Fistulas/’grams/’plasties/stents …
  - Renal Biopsies
Safety Issues in Sedation and Local Anaesthesia

Case Report

- Fit young woman - hand surgery under LA
- 20mls Bupivacaine ("Marcaine")
- Cardiac Arrest
- Outcome
- (PLUS: Intralipid 20% 1.5mls/kg/1 min)
Safety Issues in Sedation and Local Anaesthesia

How Safe is Sedation???

• We don’t know
• GA 1:10,000 (’82) – 1:56,000 (’02)
• Procedural Sedation
  – “pretty safe” but case reports keep coming in
  – your experiences/problems???
Safety Issues in Sedation and Local Anaesthesia

• What is sedation?
  – how long is a piece of string?

• Joint College Guidelines on “Sedation +/- or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures”
  – Anaesthetists, GI, Surgeons (including Dental) Radiologists and Emergency Medicine
Safety Issues in Sedation and Local Anaesthesia

Joint College Guidelines

• “Conscious” v “deep” sedation (GA)
• Fasting + patient assessment (?high risk)
• Staffing for CS – 3 minimum with “sedationist” ideally medical OR trained in observation, monitoring and resus of CS patients AND primarily doing this
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Joint College Guidelines ...

- Facilities and equipment (incl. resus.)
- iv access, monitoring (clinical) + records
- Oxygen + SaO$_2$
- Midazolam +/- Fentanyl
- Propofol only with 2nd Med. Practitioner
- Recovery, Discharge + Training
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Sedation Drugs

• Midazolam – (cardio)-resp depression
  • titration the key
  • Flumazenil to hand

• Fentanyl – potent (cardio)-resp depressant esp with Midaz
  • Naloxone to hand

• Other drugs you use???
Local Anaes. - Mode of Action

- Sodium Channel Blockers
- Action seen in Nerves, CNS and Heart
- Differential effects dose dependent
  - eg Lignocaine
    - 2-4 mcg/ml “therapeutic” level
    - 5-6 mcg/ml circumoral numbness/lightheadedness
    - 8 mcg/ml twitching
    - 10-12 mcg/ml unconsciousness/convulsions
    - 20mcg/ml respiratory arrest
    - 25mcg/ml CVS depression
Local Anaes. - Current Drugs

- **Lignocaine** - widely used since 1943
  - most useful LA for minor ops.
  - antiarrhythmic (1.5mg/kg) and anticonvulsant
  - medium onset/duration/toxicity
  - 0.5%, 1%, 2% with/without Adrenaline
  - 200mg (?400) plain and 500mg with vasoconstrictor
Local Anaes. - Current Drugs

• **Bupivicaine** - (‘‘Marcaine’’) - from 1963
  • potent LA suited to **major** regional blockade
  • slower onset, longer duration, more toxic
  • 0.25%-0.5% with/without Adrenaline
  • 150mg plain and 200mg with Adrenaline
Local Anaes. - Current Drugs

- **Ropivicaine** - “Naropin”
  - analogue of Bupivacaine
  - “S” isomer gives less toxicity, less mtr block
  - marketed as **safer drug** for major blockade
  - 2mg/ml, 7.5mg/ml and 10mg/ml
  - vasoconstriction at clinical concentrations hence vasoconstrictor not used
  - 200mg (~3mg/kg)
Safe Practice and Toxicity

- **SIDE EFFECTS of LA**
  - Toxicity - Vasovagal - Allergy - Nerve Trauma

- **Toxicity - largely related to blood levels**
  - usu. follow appropriate dose iv OR excessive dose
  - circumoral numbness, tinnitus, lightheadedness
  - convulsions
  - cardiac depression to arrest (Bupiv. VF)
  - oxygen/thio/diaz/CPR

- **PATIENT - BLOCK - DRUG**
Safe Practice and Toxicity

- **Patient** - Fit, well and 70kg
  - Weight - poor correlation wrt kinetics
  - Age - sl. decr. in clearance with incr. age
  - **Cardiac Disease** - CHF produces decr. Vd + Cl
  - Liver and Renal Disease - yes and “no” …however
    - “high risk”/ASA 3/DM +IHD
  - **WATCH**: young, old or debilitated.
    Specifically: CHF, heart block, liver dysfunction + renal patients
Safe Practice and Toxicity

• Block Performed and Procedure
  • Intercostal > Epidural > Subcutaneous/Infiltration
  • Excessive Dose - Extravascular
  • Intravascular - Venous, Arterial (NB neck)
  • Aspiration and moving needle
  • Appropriate needles…slow/careful injections
Safe Practice and Toxicity

- **Drug**
  - **Lignocaine** safer than Bupiv./Ropiv.
    - (CC:CNS ratio Lig:Bup. is 7.1:1 v. 3.7:1)
  - **Prilocaine** safer still
    - 40% less systemic tox.
  - **Ropivicaine** safer than Bupivicaine
  - **Adrenaline** - prolong effect/ reduce toxicity (esp. Ligno.)
Safety Issues in Sedation and Local Anaesthesia

- Consider patient, procedure and drugs
- Sedation – easily becomes GA
- Monitoring is key – training essential
- Lignocaine >> Ropivicaine > Bupivicaine
- “max. doses” - guide only
  - Lignocaine 200-300mg plain/500mg with Adr.
  - Ropivicaine 200mg
  - Bupivicaine 150mg plain/200mg with Adr.
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ANY QUESTIONS?