

SAFETY ISSUES IN SEDATION AND LOCAL ANAESTHESIA

Dr Simon Maclaurin
Anaesthetic Dept.
Royal Perth
Hospital



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

Safety Issues in Sedation and Local Anaesthesia

Joint College Guidelines ...

- Facilities and equipment (incl. resus.)
- iv access, monitoring (clinical) + records
- Oxygen + SaO₂
- Midazolam +/- Fentanyl
- Propofol only with 2nd Med. Practitioner
- Recovery, Discharge + Training

Safety Issues in Sedation and Local Anaesthesia

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 unconciousness/convulsions**
 - 20mcg 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

- **Bupivacaine** - (“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. $V_d + Cl$
 - **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/200mgwith Adr.

Safety Issues in Sedation and Local Anaesthesia

Dr Simon Maclaurin
Dept. of Anaesthesia
Royal Perth
Hospital

ANY QUESTIONS?

