Paediatric Analgesia
- an update

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Overview

- Assessment
- Non pharmacological pain
- Common analgesics
- Other analgesics
- Misconceptions
Pain assessment tools

- Assessment tools in neonates do not work
- Pain is best assessed by an experienced neonatal nurse
- Scoring systems are artificial
  - E.g FLACC, CHEOPS, NIPS, IBS, TIPPS
Pain assessment in children

- What is the reason for assessment tools
  - Education of staff (especially new)
  - The child is visited by staff
    - The quiet child
  - Reassessment
- Early warning system for other problems
  - E.g. compartment syndrome
Non-pharmacological pain

- Management
- Play Therapists
- Family centred care
- Child friendly environment
- Virtual reality scenarios
This won't hurt a bit.

Ouch! Ouch! Ouch!

Pain Management
Analgesics

- Paracetamol
- NSAIDS
- Codeine
- Morphine
  - Tramadol, entonox, sucrose, diamorphine,
  - ketamine, gabapentin
- Generic, effective and synergistic
Analgesics

- When one analgesic is not enough

  - ADD another
Paracetamol

- Paracetamol is excellent as a premedicant as it is rapidly absorbed from the stomach within one hour of ingestion.
Paracetamol

- IV paracetamol
  - Perfalgan/Propacetamol
  - 15mg/kg.
  - But 500ml bottle
  - Ten minute onset,
  - Four hour duration
  - Avoids variations in absorption and bioavailability
Paracetamol

- Nitroparacetamol
  - Nitric oxide releasing paracetamol
  - 3-20 x potency of normal paracetamol
  - No hepatotoxicity (in fact hepatoprotective)
  - Just finished stage 3 trials.
NSAIDS

- **Ibuprofen**
  - 5mg/kg  6 hourly
  - Safest NSAID
  - Best tolerated by children, but no rectal preparation

- **Diclofenac**
  - 1mg/kg  8 hourly
  - ‘The Pepsi Challenge’
NSAIDS

- **Tenoxicam**
  - Intravenous NSAID
  - Useful in older children as an alternative to suppositories as o.d.
  - Now discontinued

- **Ketorolac**
  - 0.5-1mg/kg 8 hourly

- **NitroNSAIDS**
  - Less gastric irritation, increased anti-inflammatory and analgesic effects
NSAIDS

- COX-2 inhibitors
  - Less gastric irritation
  - Less antiplatelet activity
  - So little antiplatelet activity is actually prothrombotic
  - Result in myocardial infarction
  - Increased incidence of renal failure compared with ibuprofen
NSAIDS

- All paed studies with rofecoxib.
- No recent paed studies with cox-2 as worries about side effects
- ? Place in analgesic regimens
NSAIDS

- Contraindications
  - Platelet/clotting abnormalities
  - Renal/Hepatic insufficiency
  - Aspirin hypersensitivity

- NOT ASTHMA

- Use of diclofenac in children with asthma.
  - Short JA, Barr CA, Palmer CD, Goddard JM, Stack CG, Primhak RA.
  - No decrease in respiratory function of asthmatic patients associated with NSAIDS
  - Anaesthesia. 2000 Apr;55(4):334-7
NSAIDS

- Tonsillectomy and NSAIDs
  - Cochrane review 2005
    - NSAIDs do not increase number of perioperative bleeding events requiring surgical intervention
    - NSAIDs do not increase number of perioperative bleeding events not requiring surgical intervention
    - NSAIDs decrease nausea and vomiting
Tonsillectomy

- Dexamethasone
  - Decreases pain by 23% after tonsillectomy
  - Facilitates early discharge by 67% lower incidence of nausea and vomiting
  - 0.15mg/kg
  - No emergence phenomena reported
Opiates

- **Intranasal diamorphine** (0.1mg/kg)
  - Well tolerated
  - Onset 5 minutes
  - Max effect at one hour
  - Duration 4 hours
  - Similar side effect profile to intramuscular morphine
Morphine

- Patient Controlled Analgesia
- Over 7? years of age
- 1ml bolus, 5 min lockout, 0.2mls/hr background
- Max dose 400µg/kg/4 hours
- No benefit over morphine infusion under 9 years of age
Nurse Controlled Analgesia

- NCA
- Under 5 years of age
- 1ml bolus, 30 min lockout. 0.5-1ml/hr background
  - Max dose 400µg/kg/4 hours
PCA/NCA

- Obese patients
  - Respiratory depression with normal doses
- Parent controlled analgesia?
- Antiemetics
  - Co-infusion no benefit
  - Cyclizine is very sedating
  - We use ondansetron +/- dexamethasone
- Ketamine
  - Variable results, but worth a try!
Morphine

- Side effects
  - Higher incidence of nausea/vomiting in children
  - Pruritus
  - Urinary retention
  - Miosis
- Therefore polypharmacy
- The ‘analgesic package’
Fentanyl

- Great anaesthetic
- Terrible analgesic
  - Studies comparing analgesia with NSAIDs+/- fentanyl, no improvement in analgesia, but significant increase in nausea
- Transdermal fentanyl
- RemiFentanil
Tramadol

- Useful.......but
- Not as potent as morphine
- Variable effect in children
- High incidence of nausea and vomiting
  - studies post tonsillectomy;
    - Morphine 60%, tramadol 40%, NSAID 5%
Gabapentin

- Systematic review has demonstrated a reduction in postoperative pain with preoperative gabapentin, but no studies yet in children

- Useful in burns patients
  - We routinely give gabapentin to children with burns >15%
Entonox

- Effective analgesia for procedural pain
- Well tolerated in older children
- Does not require prescription
- Requires education and training
- Occasional nausea
- Very useful in A+E.
Sucrose

- A spoonful of sugar helps the medicine go down......
- 25% sucrose
  - Very effective, produces release of endogenous endorphins
  - Breast feeding has same but lesser effect
  - Safe
  - Usable up to 3 months of age
  - No rise in blood sugars
Some caveats

- Endoscopy is painful
- Fractures are not painless when reduced
- Abscesses are still painful when drained
- Most Appendicectomy patients require PCA morphine
- Joint injections are very painful
Sickle cell disease

- Standard analgesia regimen
- Paracetamol/NSAIDs
- +/- oral or IV morphine
- Morphine requirements are often twice normal due to level of pain and tolerance
- Addiction is no more common in SCD than normal
Local Anaesthetics

- Which local anaesthetic
  - Chirotcaine vs ropivacaine
  - Ropivacaine is vasoconstricting which accounts for clinical/MLAC variability
  - Ropivacaine not as safe as chirotcaine in bolus as slower absorption and higher peak plasma values
  - Ropivacaine safest therapeutic index by infusion
Local Anaesthetics

- Ultrasound guided nerve blocks
  - Good for occasional user
  - Good for peripheral nerve blocks
    - Sciatic, femoral, brachial plexus, rectus sheath
  - Allows lower volumes to be used

- Nb. Regional blocks safer than central blocks
Caudal analgesia

- High volume, low concentration produces longer duration and lower incidence of motor block than low volume, high concentration solutions
Caudal analgesia

- Additives to caudal analgesia
  - Ketamine
  - Clonidine
  - Adrenaline
  - Neostigmine
  - Midazolam
  - Fentanyl
  - Diamorphine
Caudal analgesia

- Ketamine
  - 0.5mg/kg
  - Effective no side effects at this dose
  - Needs to be preservative free?
  - Not used under 3 months as theoretical risk of oversedation and apoptosis
Caudal analgesia

- Clonidine
  - In doses that are analgesic, clonidine results in postoperative sedation
  - 1-2 µg/kg
  - No haemodynamic effects at this dose
Caudal analgesia

- **Opioids**
  - Fentanyl.
    - No increase in duration of analgesia
    - Increases PONV
  - Diamorphine
    - 30µg/kg
    - Very effective at increasing duration -24hours
    - Not usable in day case surgery
    - Useful for club foot, major hypospadias surgery
Caudal analgesia

- Neostigmine
  - Effective, but PONV+++ 
- Midazolam
  - More variable in effect but very sedating
Epidural analgesia

- National audit of complications
  - 10,000 children with EIA
  - No deaths
  - 5 serious complications
    - Epidural abscess x2, Meningitis, recurrent PDPH, respiratory arrest
  - 6 moderate complications
    - Usually drug errors, local anaesthetic toxicity, peripheral nerve injuries.
  - One patient with residual insult after one year
Epidural analgesia

- National Audit
  - Findings
    - Epidurals in children lower incidence of complications than adults
    - Neonates have higher incidence of complications, but due to management not technique
    - Safe to insert epidurals while children asleep
    - Multiple attempts at insertion associated with increased incidence of complications
Be careful of some children