

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!

m-m

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 premedicant as 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
 - Chirocaine vs ropivacaine
 - Ropivacaine is vasoconstricting which accounts for clinical/MLAC variability
 - Ropivacaine not as safe as chirocaine 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 $\mu\text{g}/\text{kg}$
 - 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

