"Considering what your child is up against, what are you hoping for?"

Practicing opioid prescribing by using case examples

Stefan J. Friedrichsdorf, MD, FAAP
Medical Director, Department of Pain Medicine, Palliative Care & Integrative Medicine
Children’s Hospitals and Clinics of Minnesota, Minneapolis/St. Paul, MN

Associate Professor of Pediatrics, University of Minnesota Medical School

stefan.friedrichsdorf@childrensMN.org Twitter: @NoNeedlessPain

Morphine

„Among the remedies which it has pleased Almighty God to give to man to relieve his sufferings, none is so universal and so efficacious as opium."

Thomas Sydenham, MD 1624-1689

Laudanum: Mixture of opium in sherry

Small Group work, please
Case Example 1: Andrea

- 10-year-old girl in severe acute pain (e.g. metastasized osteosarcoma, sickle cell crisis); weight 20 kg
- PCA pump currently not available
- Choice of opioid?
  - Immediate release morphine
  - ...unless...

Case Example Morphine

- Route of administration?
- Per kg dosing: Maximum 50 kg (!)
- Lean weight for obese children
- Please write the order (small group work)

<table>
<thead>
<tr>
<th>Opioid Analgesics Commonly Used for Moderate to Severe Pain (WHO 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>These represent starting doses only, children may require higher doses.</td>
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<table>
<thead>
<tr>
<th>Drug</th>
<th>Route</th>
<th>Initial Pediatric Dose</th>
<th>Initial Adult Dose</th>
<th>Dosing Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>IV, SC, PO, DL, PK</td>
<td>0.05 - 0.1 mg/kg</td>
<td>0.15 - 0.3 mg/kg</td>
<td>5 - 10 mg 10 - 15 mg</td>
</tr>
</tbody>
</table>

Case Example Morphine (Immediate Release)

**Scheduled (round-the-clock) dose**
- IV: 0.1 mg x 20 kg = 2 mg Q4h (= 12 mg/day)
- PO: 0.3 mg x 20 kg = 6 mg Q4h (= 36 mg/day)

**Breakthrough (rescue) dose** = 1/10 - 1/6 of daily dose (Q1-2h)
- IV: (1.2 - 2 mg) 1.2 mg Q1h PRN
- PO: (3.6 - 6 mg) 3.6 mg Q1h PRN

if pain score > ...?..../10 and no signs of over sedation
Case Example Morphine

- **0300 hrs:** Pain Score 10/10  ->  2 mg IV  
  [or 6 mg PO]
- **0400 hrs:** Pain Score 8/10  ->  1.2 mg IV  
  [or 3.6 mg PO]
- **0500 hrs:** Pain Score 7/10  ->  1.2 mg IV  
  [or 3.6 mg PO]
- **0600 hrs:** Pain Score 6/10  ->  1.2 mg IV  
  [or 3.6 mg PO]
- **0700 hrs:** Pain Score 5/10  
  ............???

- Do I need to increase the dose?
- Crystal clear answer: ...It depends...!

Opioid Dose Escalation for Acute (!) Pain

- **How to increase the dose?**
  - 50 per cent rule!
  - ...However, depends on clinical scenario...
  - 2 mg IV Q4h  ->  3 mg IV Q4h
  - 1.2 mg IV Q1 (-2)h PRN  ->  1.8 mg IV Q1 (-2)h PRN

- **or...add breakthrough dose to regular dose...? [not initial 12-24 hours]**
- “It Depends” -Socrates

Andrea, 3 Days Later....

- **Scheduled oral immediate release morphine:**
  - 13 mg Q4h  (= 78 mg/day)
- **Breakthrough (rescue) dose** for incidence pain (PT) only
  - 10 mg x 3 / day
  - She doesn’t like to be woken up Q4h...
- **Change to extended-release morphine:**
  - 40 mg twice per day
  - [occasionally end-of-dose failure: then Q8h]
- **Continue breakthrough dose 10 mg Q1-2H PRN**
Extended (Sustained) Release Opioids

- USA: Morphine, Oxycodone, Hydromorphone [oxymorphone, hydrocodone, tramadol]
- Do not cut nor crush tablets/capsules
- Do not store in liquids
- However, outside USA: Morphine extended-release "sachets" (powder) to be dissolved in liquid

Case Example 2: Sean

- 10-year-old boy in severe acute (!) pain (e.g. metastasized osteosarcoma, sickle cell crisis); weight: 20 kg
- PCA pump now available
- Question: PCA bolus only or continuous infusion plus PCA bolus?


PCA with a CADD can be used to manage pain in the home setting. Dose adjustments and opioid switches were performed with no adverse incidents. Mherekumombe MF, Collins JJ. Patient-controlled analgesia for children at home. J Pain Symptom Manage. May 2015;49(5):923-927.

PCA on NICU

PCA-Pumps in Infants, Children and Teenagers

- WHO Principle 1: Dosing at Regular Intervals
- Rule of thumb: Management of acute medium-severe (!) pain in children with PCA pumps: USUALLY start continuous infusion PLUS on-demand PCA bolus.
- However, PCA only:
  - Part of multimodal postoperative analgesia (e.g. nerve block, scheduled acetaminophen / NSAIDs, dexmedetomidine etc...)
  - Incidence pain only
  - Weaning opioid / rotating to oral administration
  - Unclear pain pathophysiology...
  - Other...?

Please write PCA Order

- Morphine (and Plan B: Fentanyl and Plan C: Hydromorphone)
- Patient (or nurse-) controlled analgesia: PCA
  1. Continuous Infusion
  2. PCA- Dose
  3. Lock-Out Time
  4. Maximum number of boluses per hour

Continuous Infusion / PCA Dose

- (1) Background (continuous) infusion i.v./s.c.:
  - Morphine: 15-20 mcg x 20 kg = 0.3-0.4 mg/hr
  - Fentanyl: 0.5-1 mcg x 20 kg = 10 - 20 mcg/hr
  - Hydromorphone: 2-5 mcg x 20 kg = 40 - 100 mcg
- (2) PCA- Dose
  - Same as above / hourly dose (e.g 0.4 mg morphine)
  - Unless there is a good reason not to...
PCA Order Set

- (3) Lockout time:
  - (5) - 10 minutes

- (4) Maximum number of boluses per hour:
  - 4 (-6) however, depends on the clinical scenario

- Loading dose? depends... (hourly dose x 1-4...)

- Lower starting dose? depends... age... if multimodal analgesia...

- How to increase the dose?
  - 50 per cent rule

Why Lockout of 5-10 minutes?

- Onset of Pain Relief: OTFC vs. i.v. Morphine.

Example for 50% titration orders:

- Patient (or nurse-) controlled analgesia: PCA
- Background infusion i.v./s.c.: 0.4 mg/hr
- Bolus i.v./s.c.: 0.4 mg (max 6 per hour); Lockout time: 5 (-10) minutes

Example for 50% titration orders:

- If receiving > ___ boluses/hour for > ___ consecutive hours AND if unrelieved pain AND no over sedation or dose limiting side effects, increase PCA by 50% as follows:

  - Step 1: Continuous infusion 0.6 mg/hr, PCA dose 0.6 mg, max. 6 boluses/hr
  - Step 2: (if again) Continuous infusion 0.9 mg/hr, PCA dose 0.9 mg, max. 6 boluses/hr
  - Step 3: (if again) Continuous infusion 1.35 mg/hr, PCA dose 1.35 mg, max. 6 boluses/hr
Andrea & Sean would like to thank you for your excellent pain therapy

Choice of Analgesics: Step 1

Mr. Strong Pain

Mr. Acetaminophen (Paracetamol)

Mr. Ibuprofen

Choice of Analgesics: Step 2

Mr. Strong Pain

Mr. Morphine