

Pain, PONDV, Parents

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Pain

Parents

Ponv

Level of pain

Routes

Multimodal

Proactive

Stewart et al. 2012 The severity and duration of postoperative pain and analgesia requirements in children after tonsillectomy, orchidopexy, or inguinal hernia repair. Paediatr Anaesth 22(2): 136-143.

“After tonsillectomy, children experience significant pain and severe functional limitation for 7 days after surgery. For many children, pain and functional limitation persists throughout the second postoperative week.”

Tomecka et al. 2012 Substantial postoperative pain is common among children undergoing laparoscopic appendectomy. Paediatr Anaesth 22(2): 130-135

- Laparoscopic appendectomy
- Retrospective, paracetamol + nsaid + opioid postop
- 1/3 had substantial pain (vas \geq 4 for 60% of time) in PACU
- 1/6 had substantial pain through the postop hospital stay
- 1/5 had substantial pain during Pod 1
- 5% had median pain score of \geq 7 during hospital stay
- Nothing seemed to predict who had more pain

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For several refs, see: **Kokki 2003** Nonsteroidal anti-inflammatory drugs for postoperative pain: a focus on children. Paediatr Drugs 5(2): 103-123

i.v. > p.o. > p.r. > ~~i.m.~~

- i.v. when available at hospital
- p.o. is best
- p.r. absorption varies manifold
- p.r. only if no i.v. and cannot take p.o.
- NO i.m. injections! needle punctures may be the worst experience

absorbtion p.o.

- Usually good
 - Example 1: ketoprofen p.o. = i.m. = p.r.
 - Example 2: diclofenac p.o. > p.r.
- May be delayed after surgery, if PONV
 - Proven at least for tonsillectomy and paracetamol
 - CAVE! enteral coated /slow release tablets

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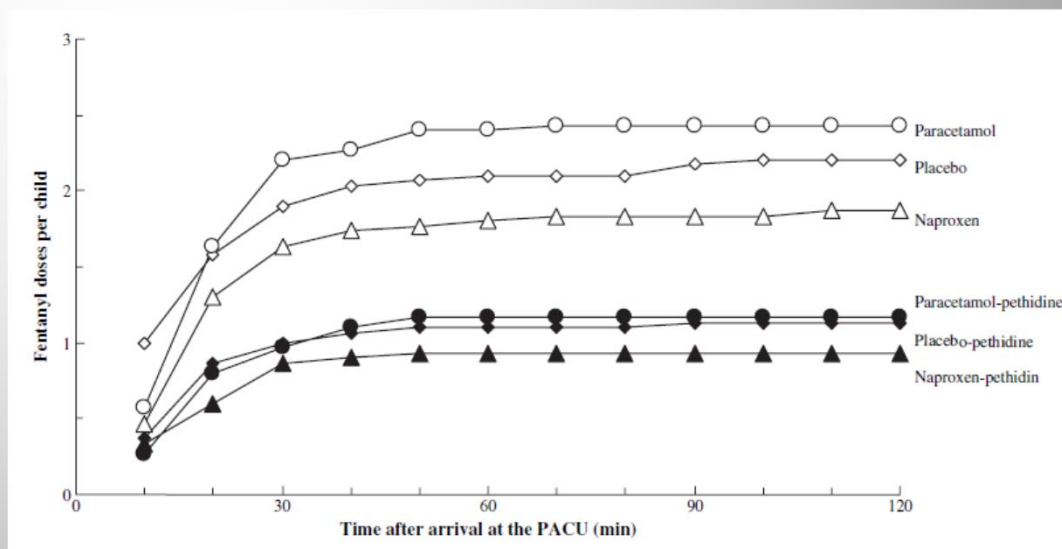
Multimodal

Proactive

Rationale: better effect, less opioids, less adverse effects

Korpela et al. 2007 Oral naproxen but not oral paracetamol reduces the need for rescue analgesic after adenoidectomy in children. *Acta Anaesthesiol Scand* 51(6): 726-730

- 180 children 1-7y
- NSAID as po premedication, pethidine at induction iv
 1. Pethidine 1mg/kg + naproxen 10mg/kg
 2. Pethidine 1mg/kg + paracetamol 20mg/kg
 3. Pethidine 1mg/kg + placebo
 4. Naproxen 10mg/kg
 5. Paracetamol 20mg/kg
 6. Placebo
- i.v. fentanyl in PACU as rescue
- Pethidine reduced the need for fentanyl but caused PONV
- Pethidine vs no-peth: fentanyl requirement 1.1 vs 2.2 doses ponv 50% vs 25%



Concept: Opioid sparing effect

Review **Wong et al. 2013** Opioid-sparing effects of perioperative paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs) in children. *Paediatr Anaesth* 23(6): 475-495

- 31 randomized controlled studies
- Opioid sparing most consistent:
 - # multiple doses of NSAID (vs. just single shot)
 - # 24h PCA requirements (vs. 'bolus as needed')
 - # in group with highest need for opioids
- Reduction in PONV clearest:
 - # groups showing greatest opioid sparing
- Effect with paracetamol:
 - # lesser, influenced by route and dose
 - # reduction in PONV with 40 or 60mg/kg loading dose (not 20mg/kg)
 - # showing also highest opioid sparing effect

Concept: Opioid sparing effect

Review: **Michelet et al. 2012** A meta-analysis of the use of nonsteroidal antiinflammatory drugs for pediatric postoperative pain. *Anesth Analg* 114(2): 393-406

- 27 randomized controlled studies
- Opioid sparing:
 - in the PACU
 - the first 24 h
- Pain intensity reduced:
 - in the PACU (not 24h)
- Reduced PONV:
 - the first 24 h (not PACU)
- Coadministration of paracetamol reduced pain the first 24 h
- Type of surgery affected PONV the first 24 h

Concept: NSAID + paracet + local anesth. to omit opioids

For several refs, see reviews:

Kokki 2003 Nonsteroidal anti-inflammatory drugs for postoperative pain: a focus on children. *Paediatr Drugs* 5(2): 103-123

Lönnqvist et al. 2005 Postoperative analgesia in infants and children. *Br J Anaesth* 95(1): 59-68.

- Often adequate to exclude opioids
- Inform & equip the parents for the local anesthesia wearing off

... but do you *really* need to omit them?

Khoury et al. 2009 Combined regional and general anesthesia for ambulatory peripheral orthopedic surgery in children. *J Pediatr Orthop B* 18(1): 37-45

- 60 pediatric orthopedic outpatients, description of procedure
- Paracetamol, ibuprofene + tramadol (+ morphine rescue)
- Epidural, caudal, plexus, popliteal
- Metoclopramide on demand

	Tramadol needed	PONV	rescue MO
PACU	11.7%	6.7%	1.7%
Op day	3.3%	8.3%	
Pod 1	31.7%	3%	
Pod 2	6.7%	0%	

Options: NSAIDs

For several refs, see reviews

Kokki 2003 Nonsteroidal anti-inflammatory drugs for postoperative pain: a focus on children. *Paediatr Drugs* 5(2): 103-123

Lönnqvist et al. 2005 Postoperative analgesia in infants and children. *Br J Anaesth* 95(1): 59-68.

- Various NSAIDs fairly similar effect if given in right doses

Table I. Suggested dosages of some NSAIDs for postoperative pain management in children >3 months of age^a

Agent	Single doses (mg/kg)	Frequency (hourly)	Maximal daily dose (mg/kg)	Comment	References
Diclofenac	1	8–12	3	Also IV preparation	18,38,51,68,72,74,80-90
Ibuprofen	10	6–8	4		66,91-96
Flurbiprofen	1	8–12	5	Also IV preparation	72,77
Ketoprofen	1–2	6–8	5	Also IV preparation	15,19,22,23,26,31,34,35,53,54,57,62-64,78,79,97,98
Ketorolac	0.3–0.5	6–8	2	Also IV preparation	25,50,75,76,99-116

a The same doses may be used intravenously, by mouth, and rectally.

IV = intravenous.

Options: NSAIDs COX-2

Survey: **Levy et al. 2010** Nonsteroidal Anti-Inflammatory Drugs: A survey of practices and concerns of pediatric medical and surgical specialists and a summary of available safety data. *Pediatr Rheumatol Online J* 8: 7-0096-8-7
Several refs: **Lönnqvist et al. 2005** Postoperative analgesia in infants and children. *Br J Anaesth* 95(1): 59-68.

- No proven benefit over standard NSAID in children
- Interest has gone down
- Small survey in 2010 in USA
 - 57% fewer prescriptions
 - 26% no longer use them.

Options: NSAIDs contraindications

- liver dysfunction, renal dysfunction, coagulation disorder, thrombopenia, hypovolemia, hypotension, bleeding

Lewis et al. 2013 Nonsteroidal anti-inflammatory drugs and perioperative bleeding in paediatric tonsillectomy. Cochrane Database Syst Rev 7: CD003591

- NSAIDs, bleeding and PONV in tonsillectomy
- The number of bleedings requiring surgical or nonsurgical intervention was not statistically significantly increased but the confidence interval does not exclude an increased risk.
- There was significantly less vomiting when NSAIDs were used

For several refs, see

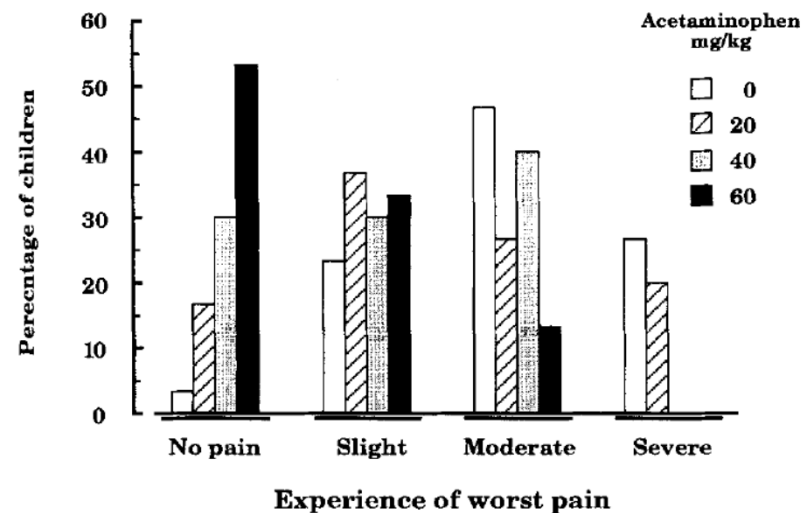
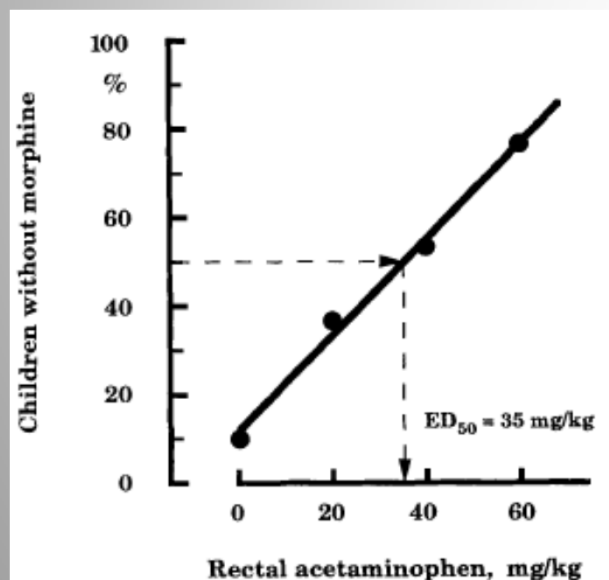
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- Asthma: NSAIDs are usually ok if mild
Best evidence of safety for ibuprofen and diclofenac
- Bone healing: No evidence on children
Consider ONLY on fusion procedures, limb lengthening, or with previous bone healing problems

Options: Paracetamol dose

Korpela et al. 1999 Morphine-sparing effect of acetaminophen in pediatric day-case surgery. *Anesthesiology* 91(2): 442-447

- 120 children 1-7y mixed day surgery (hernia, orchido, adenoid)
- paracetamol loading p.r. 0, 20, 40, 60 mg/kg
- adds to total of 80-100mg/kg first day which is ok



Options: Local anesthesia

Review: **Lönnqvist 2011** Blocks for pain management in children undergoing ambulatory surgery. Curr Opin Anaesthesiol 24(6): 627-632

- Excellent compact review of techniques, benefits, risks and limitations
- Integral part of multimodal pain control
- Ultrasound is “present day”
- Restrictions
 - Always have rescue medicine in the protocol
 - Inform & equip the parents for local anesthesia wearing of

Review: **Ansermino et al. 2003** Nonopioid additives to local anaesthetics for caudal blockade in children: a systematic review. Paediatr Anaesth 13(7): 561-573

- Tune your caudal to the max?

Concept: Keep the enemy at bay

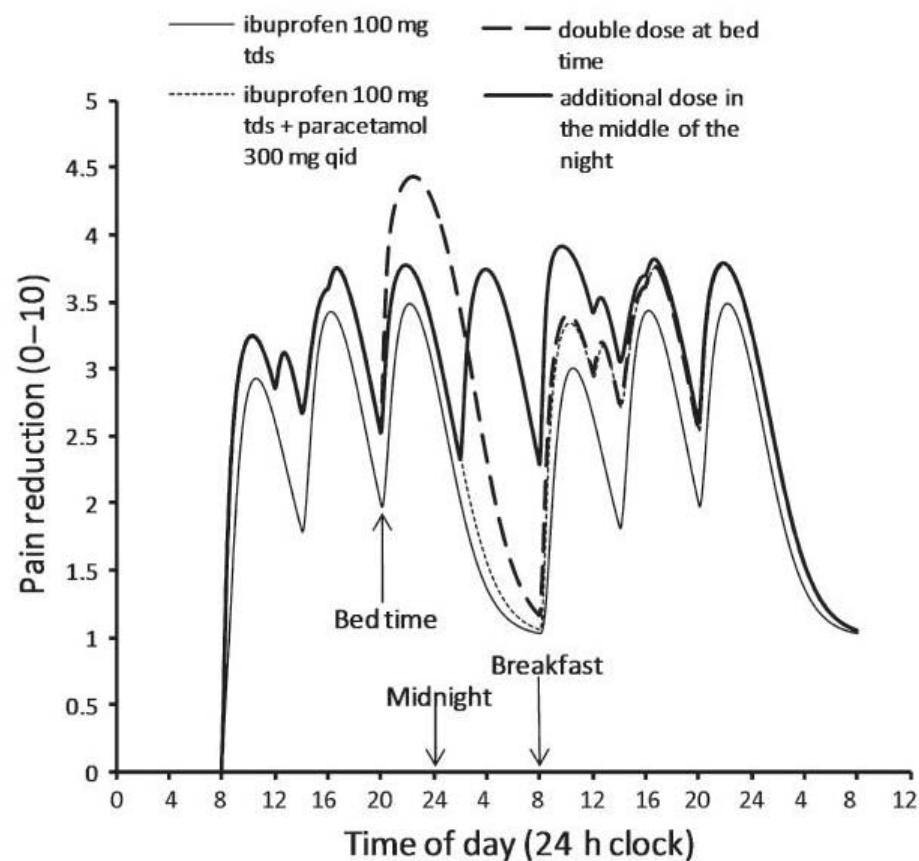
Kokki 2003 Nonsteroidal anti-inflammatory drugs for postop pain: a focus on children. *Paediatr Drugs* 5(2): 103-123

Lönnqvist et al. 2006 Paediatric day-case anaesthesia and pain control. *Curr Opin Anaesthesiol* 19(6): 617-621

Lönnqvist et al. 2005 Postoperative analgesia in infants and children. *Br J Anaesth* 95(1): 59-68

Hannam et al. 2012 Tears at breakfast. *Paediatr Anaesth* 22(4): 419

- NSAIDs better preventing than relieving pain?
- (“Pre-emptive” means drugs before CAUSING pain, concept poorly proven in children)
- Start NSAID before pain sets in
- Give regularly (=proactive) over the assumed period of worst pain



The child cannot be calmer than his/hers parents

Chahal et al. 2009 Association between parental anxiety and compliance with preoperative requirements for pediatric outpatient surgery. J Pediatr Health Care 23(6): 372-377

- Anxious parents perform poorly
- Fasting, arriving in time /in right place, filling of forms
- Risk factors: young parents, young child, only child, first surgery

Fortier et al. 2009 Pediatric pain after ambulatory surgery: where's the medication? Pediatrics 124(4): e588-95

- Analgesia at home may be insufficient
- 261 children 2-12y, ENT
- Pod 2: despite 86% significant pain, 24% received 0-1 dose
- Pod 3: 67% having significant pain, 41% received 0-1 doses

Norrington et al. 2013 Does day case pediatric tonsillectomy increase postoperative pain compared to overnight stay pediatric tonsillectomy? A prospective comparative audit. Paediatr Anaesth

- 60 children tonsillectomy, half overnight, half day surgery
- Roughly 50% gave regularly as instructed, 30% gave as needed
- Slightly higher "overall pain level" at home
- Similar max pain

The parents may have...

Bastable et al. 2005 Parents' management of their child's postoperative pain. Paediatr Nurs 17(10): 14-17

- Misconceptions about pain:
 - Child does not remember
 - Higher pain threshold
 - Needs to learn pain as integral part of life, life shouldn't be painless
- Difficulties in dealing with a child in pain
- Tendency to underestimate the pain
- Problems in administering the prescribed drug
- Misconception of drugs:
 - Fear of adverse effects
 - Fear of addiction
 - Drug is always the last resort, not for prevention

Inform the parents about...

Lönnqvist et al 2006 Paediatric day-case anaesthesia and pain control. *Curr Opin Anaesthesiol* 19(6): 617-621

- The procedure, incision, suture, dressings
- The possibility to be admitted if NOT normal:
vital signs, consciousness, airway, motor block, nausea, bleeding, pain, unexpected issues in surgery
- The possibility of behavioral changes:
prolonged reaction time (slowness) in 48h
impaired coordination (clumsiness) in 48h
attention seeking, tantrums, crying, nightmares in 8-20% for 1 wk



Give appropriate and clear instructions about..

Lönnqvist et al 2006 Paediatric day-case anaesthesia and pain control. *Curr Opin Anaesthesiol* 19(6): 617-621

- Pain management
 - signs of pain (Fig)
 - address normal vs pathological pain
 - advantage of continuous pain control
 - advantage of initiating early
 - dose, timing (as prescribed, NOT what says on the bottle!)
- General care
 - resuming activities
 - resuming eating
 - dressings
 - wound care
 - bathing and washing
- Who and how to contact if problems arise

- P.S. a follow-up isn't a bad idea at all...

Appendix 1. The parents' postoperative pain measure

Questions

Does your child...

Whine or complain more than usual?

Cry more easily than usual?

Play less than usual?

Not do the things s/he normally does?

Act more worried than usual?

Act more quiet than usual?

Have less energy than usual?

Refuse to eat?

Eat less than usual?

Hold the sore part of his/her body?

Try not to bump the sore part of his/her body?

Groan or moan more than usual?

Look more flushed than usual?

Want to be close to you more than usual?

Take medication when s/he normally refuses

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Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being talked to; distractible	Difficult to console or comfort

Note: Each of the five categories Face (F), Legs (L), Activity (A), Cry (C), and Consolability (C) is scored from 0-2, which results in a total score between 0 and 10.

From Merkel, Voepel-Lewis, Shayevitz, & Malviya (1997). The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatric Nursing*, 23(3) 293-297.

Has your child fasted as instructed? "Oh yes!"

Cantellow et al. 2012 Parents' understanding of and compliance with fasting instruction for pediatric day case surgery. Paediatr Anaesth 22(9): 897-900

- Q: What were the instructions?
A: Solids 1 - 24 h(6median) Fluids 0.5 - 24 h (3)
- Children actually fasted: solids 3 - 40 h (9.5), fluids 0.5 - 24h (5).
- During(!) the fasting, % of parents would allow:
 - 4.9% french fries
 - 22.3% toast/crackers
 - 17.5% cereals
 - 14.7% a candy
 - 14.9% a gum
 - 12.6% tea and milk

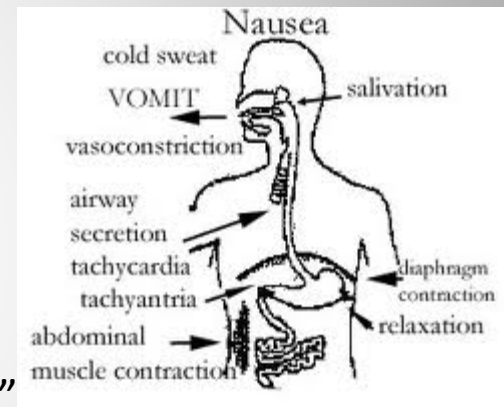


Risk factors for PONV

Lonnqvist et al 2006 Paediatric day-case anaesthesia and pain control. *Curr Opin Anaesthesiol* 19(6): 617-621

- Strabismus surgery
- G-scopia
- History of PONV
- Opioids
- Motion sickness
- Intubation
- Tonsillectomy

- if the child vomits old blood “it’s good to get it out”
- if the child vomits fresh blood “it’s time to call/go” (to hospital)
- if the child vomits, but no blood, “give medicine”



The Drugs..great variation in dosing..how do you do it?

Watcha et al. 1995 The dose-response relationship of ondansetron in preventing postoperative emesis in pediatric patients undergoing ambulatory surgery. *Anesthesiology* 82(1): 47-52

- Ondansetron less than chemotherapy dose needed?
50yg/kg as effective as 100yg/kg Our dose 50-100

Cieslak et al. 1996 The dose-response relation and cost-effectiveness of granisetron for the prophylaxis of pediatric postoperative emesis. *Anesthesiology* 85(5): 1076-1085

- Granisetron more than chemotherapy dose needed?
40yg/kg better than 10yg/kg = placebo not in use

Steward et al. 2011 Steroids for improving recovery following tonsillectomy in children. *Cochrane Database Syst Rev*

- 0.15-1mg/kg reduces PONV in 1/5
permits earlier p.o., reduces VAS by 1 Our dose dexamet 0.1mg/kg

Kymer et al. 1995 The effects of oral droperidol versus oral metoclopramide versus both oral droperidol and metoclopramide on postoperative vomiting when used as a premedicant for strabismus surgery. *J Clin Anesth* 7(1): 35-39

- Droperidol 300yg/kg alone or especially with metoclopramide 0.15mg/kg reduces ponv Our dose droperid 50-75yg/kg
metocl 0.1-.25mg/kg

Propofol i.v. anesthesia in selected cases?

Martin et al. 1993 Propofol anesthesia reduces emesis and airway obstruction in pediatric outpatients. *Anesth Analg* 76(1): 144-148

- 156 children 1-7y mixed day surgery
- inhalation vs propofol

Table 2. Vomiting during the Postanesthetic Period

	Group 1 inhaled		Group 2 propofol		P
	Yes	No	Yes	No	
Emergence (OR)	2	65	1	73	NS
PACU	5	63	0	75	<0.05
DSU	15	53	8	66	NS
Home	23	44	14	60	<0.05

NS = not significant; PACU = postanesthetic care unit; OR = operating room; DSU = day surgery unit.