Postoperative treatment

What’s the evidence, - and how to use it?

Ole Mathiesen, MD, PhD
Section for Acute Pain Management
Rigshospitalet, Denmark
The challenge

• Effective postop pain (POP) treatment: a pre-requisite for convalescence

• International surveys*: 
  • 75%: has postoperative pain
  • 30%: moderate to severe pain

• “lack of real breakthrough’ in pain treatment - no new drugs in 50 yr’s”  Kissin (A&A 2010)

*Benhamaou PAIN 2008; Apfelbaum A&A 2003; Fletcher PAIN 2008
Postoperative pain

- Nociceptive pain
- Neuropathic pain
- Visceral pain

Intersection: Inflammation
Consequences from peripheral inflammation and central sensitization → increased POP
The Value of “Multimodal” or “Balanced Analgesia” in Postoperative Pain Treatment

Henrik Kehlet, MD, PhD, and Jørgen B. Dahl, MD

Single analgesic

Pain relief
Adverse effects (significant)

Different analgesics

Pain relief (synergistic / additive effect)
Adverse effects (non-significant)

Opioid reduction
# Paracetamol / Acetaminophen

- **Remy (BJA 2005)**
  - Opioid reduction: 20% / 24h

- **Toms Cochrane 2008**
  - 51 RCT & 5762 pt’s
  - Pain at rest: NNT 3.6

- **Apfel PAIN 2013**
  - Reduced PONV

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## Paracetamol: effective, safe & cheap

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### Single dose oral paracetamol (acetaminophen) for postoperative pain in adults

*2008 The Cochrane Collaboration*

#### Table 3: Forest plot of comparison: 5 Paracetamol 975-1000 mg versus placebo, outcome: % Participants with at least 50% pain relief over 4 to 6 hours.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Paracetamol 975-1000 mg</th>
<th>Placebo</th>
<th>Risk Ratio M-H Fixed, 95% CI</th>
<th>Risk Ratio M-H Fixed, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bentley 1997</td>
<td>14/41 4/17</td>
<td>17/41 21/17</td>
<td>1.97 [0.79, 4.89]</td>
<td></td>
</tr>
<tr>
<td>Berry 1975</td>
<td>63/76 18/76</td>
<td>66/76 18/76</td>
<td>1.50 [0.81, 2.77]</td>
<td></td>
</tr>
<tr>
<td>Bjune 1996</td>
<td>12/43 0/21</td>
<td>13/43 0/21</td>
<td>1.30 [0.74, 2.28]</td>
<td></td>
</tr>
<tr>
<td>Cooper 1996</td>
<td>20/38 3/22</td>
<td>23/38 3/22</td>
<td>1.20 [0.78, 1.86]</td>
<td></td>
</tr>
<tr>
<td>Cooper 1999</td>
<td>27/59 9/64</td>
<td>30/59 9/64</td>
<td>1.20 [0.78, 1.86]</td>
<td></td>
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<tr>
<td>Cooper 1998</td>
<td>17/50 3/26</td>
<td>20/50 3/26</td>
<td>1.20 [0.78, 1.86]</td>
<td></td>
</tr>
<tr>
<td>Edwards 2002</td>
<td>45/100 25/100</td>
<td>60/100 35/100</td>
<td>1.80 [1.20, 2.69]</td>
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<tr>
<td>Hargland 2006</td>
<td>19/40 0/17</td>
<td>21/40 0/17</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Hersh 2000</td>
<td>35/63 5/27</td>
<td>38/63 5/27</td>
<td>1.00 [0.78, 1.28]</td>
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<tr>
<td>Heich 1994</td>
<td>21/92 3/45</td>
<td>24/92 3/45</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Kühlthor 2003</td>
<td>45/78 7/64</td>
<td>52/78 7/64</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Laska 1993 (Study 3)</td>
<td>49/91 22/57</td>
<td>52/91 23/57</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Leitner 1990</td>
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<td>29/49 5/40</td>
<td>1.00 [0.78, 1.28]</td>
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<tr>
<td>McCusker 1988</td>
<td>10/30 3/30</td>
<td>13/30 3/30</td>
<td>1.00 [0.78, 1.28]</td>
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<tr>
<td>Mehlich 1984</td>
<td>16/58 0/55</td>
<td>17/58 0/55</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Mehlich 1999</td>
<td>131/306 9/85</td>
<td>140/306 10/85</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Mehlich 1996</td>
<td>35/101 1/40</td>
<td>40/101 1/40</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Moller 2000</td>
<td>15/60 0/60</td>
<td>17/60 0/60</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Moller 2000</td>
<td>12/60 0/62</td>
<td>14/60 0/62</td>
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<td>Moller 2005</td>
<td>21/60 4/26</td>
<td>25/60 6/26</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
<tr>
<td>Olson 2001</td>
<td>41/66 5/39</td>
<td>46/66 5/39</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
<tr>
<td>Ruben 1984</td>
<td>86/123 52/109</td>
<td>98/123 54/109</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Salanta 1986</td>
<td>17/30 3/27</td>
<td>20/30 4/27</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
<tr>
<td>Santos Pereira 1986</td>
<td>22/28 22/29</td>
<td>24/28 23/29</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
<tr>
<td>Schachter 1989</td>
<td>20/37 13/38</td>
<td>23/37 15/38</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
<tr>
<td>Seemaur 1998</td>
<td>21/41 10/41</td>
<td>23/41 11/41</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Winnem 1981</td>
<td>9/20 3/20</td>
<td>12/20 4/20</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
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<tr>
<td>Winter 1979</td>
<td>20/41 9/41</td>
<td>29/41 18/41</td>
<td>1.00 [0.78, 1.28]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 876. Placebo events: 241. Test for overall effect: Z = 15.72 (P < 0.00001).
Paracetamol and selective and non-selective non-steroidal anti-inflammatory drugs for the reduction in morphine-related side-effects after major surgery: a systematic review

E. Maund*, C. McDaid, S. Rice, K. Wright, B. Jenkins and N. Woolacott

Table 1 Pairwise comparisons for primary morphine-related outcomes. The first treatment is the intervention and the second is the control. A negative mean difference indicates that the intervention was more effective than the control treatment. An OR < 1 indicates that the intervention has performed better than the control. *Adjusted for baseline morphine consumption

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Morphine consumption, unadjusted, mean difference, mg (95% CrI)</th>
<th>Morphine consumption, adjusted,* mean difference, mg (95% CrI)</th>
<th>Nausea and PONV, pairwise OR (95% CrI)</th>
<th>Sedation, pairwise OR (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol vs placebo</td>
<td>-6.34 (-9.02, -3.65)</td>
<td>-8.68 (-11.43, -5.94)</td>
<td>1.00 (0.60, 1.53)</td>
<td>1.62 (0.32, 5.02)</td>
</tr>
<tr>
<td>NSAID vs placebo</td>
<td>-10.18 (-11.65, -8.72)</td>
<td>-9.45 (-10.90, -8.01)</td>
<td>0.70 (0.53, 0.88)</td>
<td>0.53 (0.20, 1.01)</td>
</tr>
</tbody>
</table>

- Opioid reduction 30 (- 50) %
- NNT 2-3
- Reduction of opioid related adverse effects
Systematic reviews and metaanalyses of single dose dexamethasone in POP

- Early and late pain + opioid consumption reduced
- Marginal effects
- OBS: mostly low dose use DEXA (4-8 mg)!

24 RCTs & 2751 pt’s
45 RCTs & 5796 pt’s
Effect of high-dose preoperative methylprednisolone on pain and recovery after total knee arthroplasty: a randomized, placebo-controlled trial

T. H. Lunn1,2*, B. B. Kristensen1,2, L. Ø. Andersen1,2, H. Husted2,3, K. S. Otte2,3, L. Gaarn-Larsen1,2 and H. Kehlet2,4


• 48 pt’s: 125 mg methylprednisolone vs. placebo
  • Multimodal POP: PCM + Celecoxib + Gabapentin
  • PONV + Zofran + CRP + fatigue reduced
What about side effects?

Well-known adverse effects from **long term** GCC treatment

Side effects of single dose GCC?

- Waldron BJA 2012
  - 9 RCT & 1020 pt’s: NS for late healing
  - 14 RCT & 1449 pt’s: NS for infection
RCT & blinded multicenter study / 4494 pt’s
Dexamethasone 1 mg/ kg vs. placebo

Table 2. Primary Study End Point and Components of the Primary Study End Point in the Dexamethasone and Placebo Groups

<table>
<thead>
<tr>
<th></th>
<th>No. (%) of Patients</th>
<th>Relative Risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dexamethasone (n = 2235)</strong></td>
<td><strong>Placebo (n = 2247)</strong></td>
<td></td>
</tr>
<tr>
<td>Primary study end pointa</td>
<td></td>
<td>0.83 (0.67-1.01)</td>
</tr>
<tr>
<td>Components of the primary study end point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>31 (1.4)</td>
<td>34 (1.5)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>35 (1.6)</td>
<td>39 (1.7)</td>
</tr>
<tr>
<td>Stroke</td>
<td>29 (1.3)</td>
<td>32 (1.4)</td>
</tr>
<tr>
<td>Renal failure</td>
<td>28 (1.3)</td>
<td>40 (1.8)</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>67 (3.0)</td>
<td>97 (4.3)</td>
</tr>
</tbody>
</table>

aPrimary study end point was a composite of death, myocardial infarction, stroke, renal failure, or respiratory failure, within 30 days after surgery.

P < 0.07
Secondary outcome:
  – Reduction of
    • Respiratory problems & need for ventilator
    • Infection (!)
    • LOS at ICU & department
    • Kidney failure

NB:
  – No outcome worsened !!

'Safety-studie’we needed!
Single dose GCC

• Dose – intermedium-large
• Reduced
  • Pain
  • PONV
  • Fatigue
  • Surgical stress response
• Potentially: ideal perioperative drug??
Large variety of surgical procedures:

- Hysterectomy
- Ortophedics (THA, artroscopy, ACL, Handsurgery, wounds, spine)
- Spinal surgery (lumbal disc, lumbal fusion)
- Mastectomy
- Lap. Chol.
- ENH (tonsillectomy, septumplastic)
- Thyroidectomy
- Neurosurgery (plexus brachialis, craniotomy)
- Nefrectomy
- Hernie inguinalis
- Various (Litotomy, varicocele, thoracotomy, CABG, keratotomy, sectio)
Systematic reviews 2006-2007

• N= 16-23 RCT (1100-1900 pts)
• Morfin reduction: 14-32 mg/24h
• VAS-pain reduced (rest + mobilisation)
• Opioid related side-effects:
  • Vomiting (NNT 6-8)
  • Itching (RR 0.3)
  • Nausea (NNT 7-25)
  • Urinary retention (NNT 7)
• Increased risc of:
  • Sedation (NNH 35)
  • Dizziness (NS 12)
Table 2. Incidence of Maternal Adverse Reactions During the First 48 Postoperative Hours

<table>
<thead>
<tr>
<th></th>
<th>Gabapentin group (n = 21)</th>
<th>Placebo group (n = 23)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>12 (57)</td>
<td>8 (34)</td>
<td>0.14</td>
</tr>
<tr>
<td>Severe nausea</td>
<td>2 (9)</td>
<td>0 (0)</td>
<td>0.22</td>
</tr>
<tr>
<td>Vomiting</td>
<td>5 (24)</td>
<td>3 (13)</td>
<td>0.35</td>
</tr>
<tr>
<td>Severe vomiting</td>
<td>1 (5)</td>
<td>0 (0)</td>
<td>0.47</td>
</tr>
<tr>
<td>Pruritus</td>
<td>16 (76)</td>
<td>22 (96)</td>
<td>0.09</td>
</tr>
<tr>
<td>Severe pruritus</td>
<td>2 (10)</td>
<td>4 (17)</td>
<td>0.66</td>
</tr>
<tr>
<td>Sedation</td>
<td>17 (81)</td>
<td>17 (74)</td>
<td>0.58</td>
</tr>
<tr>
<td>Severe sedation</td>
<td>4 (19)</td>
<td>0 (0)</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Clinical relevance ??
What about pregabalin?

Efficacy of pregabalin in acute postoperative pain: a meta-analysis
J. Zhang¹, K.-Y. Ho²* and Y. Wang¹
BJA Advance Access published February 26, 2011

Efficacy and safety of perioperative pregabalin for post-operative pain: a meta-analysis of randomized-controlled trials
E. Engelman and F. Cateloy
Department of Anaesthesia, CUB Hôpital Erasme, Brussels, Belgium
ACTA 2011

Impact of pregabalin on acute and persistent postoperative pain: a systematic review and meta-analysis
B. M. Mishriky, N. H. Waldron and A. S. Habib*
BJA Advance Access published September 10, 2014

11 RCT
18 RCT
55 RCT
Overall picture - PREGABALIN:

- Reduced
  - Pain at rest and mobilization
  - 24h morphine consumption
  - Opioid related adverse effects

- Side-effects like gabapentin
- BUT high risk for visual disturbances

CONCLUSION (for now): Use GABAPENTIN
Peripheral nerve block

- Superior analgesia
- OBS:
  - Succès ratio
  - Motor pareses
  - Duration – ward pain at night..?
  - Exces rebound pain?

Macfarlane: Clin Orthop Relat Res 2009
Ilfeld: Anesthesiology 2008
What do we know?

Post-operative analgesic effects of paracetamol, NSAIDs, glucocorticoids, gabapentinoids and their combinations: a topical review

Department of Anaesthesia 4231, Centre of Head and Orthopaedics, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark

Adverse effects of perioperative paracetamol, NSAIDs, glucocorticoids, gabapentinoids and their combinations: a topical review

O. Mathiesen¹, J. Wetterslev², V. K. Kontinen³, H.-C. Pømmergaard⁴, L. Nikolajsen⁵, J. Rosenberg⁶, M. S. Hansen⁶, K. Hamunen⁷, J. J. Kjer⁸, J. B. Dahl⁹ and Scandinavian Postoperative Pain Alliance (ScAPAlli)

Acta Anaesthesiologica Scandinavica 2014
Paracetamol + NSAID for POP

- **Hyllested BJA 2002 + Rømsing BJA 2002:**
  - PCM + NSAID > PCM
  - PCM + NSAID **may be** > NSAID

- **Ong A&A 2010:**
  - 21 RCT’s with 1909 pt’er
  - PCM + NSAID > PCM *(17 of 20 RCT)*
  - PCM + NSAID > NSAID *(9 of 14 RCT)*
  - PCM + NSAID: 30-40% better **pain relief** & reduced **analgetic consumption** compared to PCM or NSAID alone
A placebo-controlled randomized clinical trial of perioperative administration of gabapentin, rofecoxib and their combination for spontaneous and movement-evoked pain after abdominal hysterectomy

Ian Gilron\textsuperscript{a,\textordmasculine}, Elizabeth Orr\textsuperscript{b}, Dongsheng Tu\textsuperscript{c}, J. Peter O’Neill\textsuperscript{d}, Jorge E. Zamora\textsuperscript{e}, Allan C. Bell\textsuperscript{f}

Gabapentin and other analgesics?
### Opioid-sparing pain treatment

<table>
<thead>
<tr>
<th>Analgesic</th>
<th>Opioid-sparing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>~ 20%</td>
</tr>
<tr>
<td>NSAID</td>
<td>~ 30%</td>
</tr>
<tr>
<td>Ketamine</td>
<td>~ 15%</td>
</tr>
<tr>
<td>Dextromethorphan</td>
<td>~ 10%</td>
</tr>
<tr>
<td>Epidural nerveblock</td>
<td>&gt; 15%</td>
</tr>
<tr>
<td>Infiltrations anaesthesia</td>
<td>&gt; 40%</td>
</tr>
<tr>
<td><strong>Multimodal</strong></td>
<td></td>
</tr>
<tr>
<td>Paracetamol + NSAID</td>
<td>&gt; 30%</td>
</tr>
<tr>
<td>Paracetamol + NSAID + gabapentin</td>
<td>&gt; 35%</td>
</tr>
<tr>
<td>+, +, +??</td>
<td>&gt; ??%</td>
</tr>
</tbody>
</table>

Lack of good evidence for additive effect of more than 2 (3?) drugs

Urgent need for large RCTs
Need for improved treatment of postoperative pain

Ole Mathiesen, Berit Ahlmann Thomsen, Birgitte Kitter, Jørgen Berg Dahl & Henrik Kehlet

Cross sectional study - 121 patients at 1100 bed University Hospital

Guidelines for the staff:
- PONV: 7%
- Pain: 14%

TABLE 2

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>97</td>
</tr>
<tr>
<td>Paracetamol + NSAID</td>
<td>44</td>
</tr>
<tr>
<td>Paracetamol + gabapentin</td>
<td>12</td>
</tr>
<tr>
<td>Paracetamol + NSAID + gabapentin</td>
<td>7</td>
</tr>
<tr>
<td>NSAID = non-steroidal anti-inflammatory drug.</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 3

<table>
<thead>
<tr>
<th>Nausea</th>
<th>POD 1</th>
<th>POD 2</th>
<th>POD 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>23</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>No</td>
<td>75</td>
<td>58</td>
<td>52</td>
</tr>
<tr>
<td>No data</td>
<td>2</td>
<td>24</td>
<td>28</td>
</tr>
</tbody>
</table>

POD = postoperative day.
Quality Assurance investigation:
1 week patient data from orthopedic ward

- EPM not checked in the morning
- Medication not given
- Double prescriptions
- Old prescriptions not deleted
- No plan for POP at PACU
- Morphine doses not adjusted
- EPI-bolus not used, instead morphine
- Etc, Etc
What are we facing?

• Randomness & lack of common goals

• Guided by local traditions and individual undocumented preferences

• Logistical challenges related to IT-systems

• Lack of documentation
What should we do?

• Pain treatment guidelines - covering the patient course fra A to Z – 90% of patients
• Interdisciplinary collaboration
• Organizational changes/effort
• A coordinating project unit (APS..)
• Key words:
  • Implementation
  • Documentation
  • Teaching

(White  A&A 2010)
Exampel from EAS-project at Rigshospitalet:
Optimization of POP in multi-level instrumentation spine surgery

- Chronic pain patients
- Large opioid consumption
- Pain
- PONV
- Difficult mobilization
- POP: PCM + EPI + Opioid
Work method

PLANNING (3 mth.)
- Contact
- Collect basis data
- Initial report
- New pain and nausea treatment plan
- Unity and agreement

FINALIZATION (1 mth.)
- Data handling and final report
- Information to all involved staff, hospital, Quality Organization, Homepage
- Publication?

INTRODUCTION (2 mth.)
- Implementation
- Who does what?
- Data guarantee
- Electronic patient medicine plan
- Education

IMPLEMENTATION & EXECUTION (6 mth.)
- Pilot-period with pain rounds
- New guideline
- Collection and on-going evaluation of data
- Regular interdisciplinary and cross sectional status meeting with problem solving and information

44 pt’s

41 pt’s
<table>
<thead>
<tr>
<th>Major spine surgery &gt; 3 levels of instrumentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-operative</strong></td>
</tr>
<tr>
<td>• Paracetamol R 2 g</td>
</tr>
<tr>
<td>• Gabapentin 900 mg</td>
</tr>
<tr>
<td>• Celecoxib 400 mg</td>
</tr>
<tr>
<td><strong>Peri-operative</strong></td>
</tr>
<tr>
<td>• Dexamethasone 24 mg</td>
</tr>
<tr>
<td>• Ketamin – low-dose</td>
</tr>
<tr>
<td>• Propofol / remifentanil</td>
</tr>
<tr>
<td>• Epidural</td>
</tr>
<tr>
<td>• Morphine</td>
</tr>
<tr>
<td>• Ondansetron</td>
</tr>
<tr>
<td><strong>Post-operative</strong></td>
</tr>
<tr>
<td>• Paracetamol</td>
</tr>
<tr>
<td>• Ibuprofen</td>
</tr>
<tr>
<td>• Gabapentin</td>
</tr>
<tr>
<td>• Epidural</td>
</tr>
<tr>
<td><strong>Pain?</strong></td>
</tr>
<tr>
<td>1. Morphine</td>
</tr>
<tr>
<td>2. Chlorzoxazone</td>
</tr>
<tr>
<td>3. Increase gabapentin</td>
</tr>
<tr>
<td><strong>PONV</strong></td>
</tr>
<tr>
<td>1. Ondansetron, DHB, Dexamethasone</td>
</tr>
</tbody>
</table>
## Smertplan for Elektiv Non-Malign Røgkygurgi på Mere End 3 Niveauer

### Pæ-Operativt

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilget opioid</td>
<td>2 g</td>
<td>tbl</td>
<td>2 g</td>
</tr>
</tbody>
</table>

### Per-operativt

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexametason</td>
<td>24 mg</td>
<td>iv</td>
<td>24 mg</td>
</tr>
<tr>
<td>Ketamin</td>
<td>0.5 mg/kg</td>
<td>iv-bolus</td>
<td>0.5 mg/kg</td>
</tr>
<tr>
<td>S-ketamin</td>
<td>0.3 mg/kg</td>
<td>int</td>
<td>0.3 mg/kg</td>
</tr>
<tr>
<td>Propofol</td>
<td>int</td>
<td>int</td>
<td>int</td>
</tr>
<tr>
<td>Ufotra</td>
<td>int</td>
<td>int</td>
<td>int</td>
</tr>
<tr>
<td>Zoentrin</td>
<td>int</td>
<td>int</td>
<td>int</td>
</tr>
</tbody>
</table>

### EPI

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
</table>
| Lidokain 2% m/a | Test dosis 3 ml | PCA-morfin int | 1 mg/tisk | PCA & LA

### Post-operativt

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilget opioid</td>
<td>1 g</td>
<td>tbl</td>
<td>1 g</td>
</tr>
<tr>
<td>Morfin</td>
<td>tbl</td>
<td>tbl</td>
<td>tbl</td>
</tr>
<tr>
<td>Supraikalin 1/4 %</td>
<td>50 mg</td>
<td>tbl</td>
<td>50 mg</td>
</tr>
</tbody>
</table>

### 4. Døgn

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilget højdosis opioid &gt;100 mg peroral</td>
<td>100 mg</td>
<td>tbl</td>
<td>100 mg</td>
</tr>
<tr>
<td>Morfin</td>
<td>tbl</td>
<td>tbl</td>
<td>tbl</td>
</tr>
</tbody>
</table>

### 5. Døgn

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilget opioid</td>
<td>1 g x 4</td>
<td>tbl</td>
<td>1 g x 4</td>
</tr>
<tr>
<td>Morfin</td>
<td>tbl</td>
<td>tbl</td>
<td>tbl</td>
</tr>
</tbody>
</table>

### 6. Døgn

<table>
<thead>
<tr>
<th>Smertmiddel</th>
<th>Dosis</th>
<th>Form</th>
<th>Tidspunkt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilget opioid</td>
<td>1 g x 4</td>
<td>tbl</td>
<td>1 g x 4</td>
</tr>
</tbody>
</table>

### Godt at vide

**Ved udskrivelse**

- Pamol, PN opioid og individuel nedtræningsplan til vanilget opioid over 14 dage
- Morfin ækv.døgn

**Korrespondensstabel** [www.medicin.dk](http://www.medicin.dk)

**Ved smerten**

1. Check Epi/PCA funktion
2. Bupivakalin 1/4 % bolus 5 ml (max x 6) evtl øge Epi int. hastighed
3. Morfin iv + PN
   - Hvis behov for muskulafslappning kan gøes PN/fos Fludiazepam, tbl 500 mg (Max x 3)

**PONV**

1. Zoentrin, iv 1 mg, hvis ingen effekt
2. DHB, iv 0,025 mg/kg (max x 2), hvis ingen effekt
3. Fortecortin, iv 8 mg (mål ikke gives før 2. Døgn og max x 1/døgn)

**Ved CAVE Morfin bruges i stedet for preaperater**

- Fentanyl/Bolus preoperativt: iv 3-4 mikrogram
- Epidural Naropin 2 mg/ml
- PCA pumpe med Fentanyl
- I stedet for contiguous 20 mg i 2 giver Oxycodin 10 mg i 2

**OxyNorm**

- iv 2.5-10 mg
- Oxynorm tbl 5-15 mg

**BRUGERVEJLEDNING**

- **HVID** Basis behandling til ALLE patienter
- **LYSEØR** Tilpasset morfin doser og lav dosis-ketamin til patienter med opioid fortog over 100 mg morfin ækv.døgn
- **KONTAKT** Basis behandling + PCA og peroperativt infusions anæstesi

Godkendt April 2011 i ortopædikurgisk afd. på RF 1. Fysiotræning (U), A-næsestesi og casp

Enhed for akut smertebehandling og palliation

PVI: Postoperativ smertebehandling - elektiv non-malign røgkygurgi > 3 niveauer.
Work method

**PLANNING (3 mth.)**
- Contact
- Collect basis data
- Initial report
- New pain and nausea treatment plan
- Unity and agreement

**FINALIZATION (1 mth.)**
- Data handling and final report
- Information to all involved staff, hospital, Quality Organization, Homepage
- Publication?

**INTRODUCTION (2 mth.)**
- Implementation
- Who does what?
- Data guarantee
- Electronic patient medicine plan
- Education

**IMPLEMENTATION & EXECUTION (6 mth.)**
- Pilot-period with pain rounds
- New guideline
- Collection and on-going evaluation of data
- Regular inter-disciplinary and cross sectional status meeting with problem solving and information
Andel af patienter med smertedata i hvile på postoperative dag 1

Audit 1 (2009-2010) (30pt)
Audit 2 (sept-okt 2010) (14pt)
Audit 3 (jan-marts 2011) (18pt)
Audit 4 (april-maj 2011) (16pt)
Status group

• All involved staff of the course of the patient
  • Anaesthesia (nurse / doctor)
  • PACU
  • Surgeon
  • Ward staff
  • Physiotherapist
  • Acute Pain Unit – project koordinator and lead
  • Quality koordinator

• Regular meeting every (2-)4 weeks
• Problems – information - planning
Work method

PLANNING (3 mth.)
- Contact
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44 pt's

41 pt's
Results

- (Cohort study with historic control group)
- **PACU**
  - Maximal pain levels reduced
  - Morphine consumption reduced
  - LOS at PACU reduced with 1 h (18%)
Morphine on POD 1-6

Morphine consumption

Postoperative day (POD)

24-hour morphine (oral, eq) consumption (mg)

0
100
200
300
400
500

Preintervention group
Postintervention group

POD1 POD2 POD3 POD4 POD5 POD6

P=0.024
P=0.048
**Mobilization**

- **Level of mobilization**
- **Postoperative days**
  - 0
  - 5
  - 10
  - 15
  - 20
  - 25

<table>
<thead>
<tr>
<th></th>
<th>Preintervention group</th>
<th>Postintervention group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization from bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Begin walk with highwalker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walk without highwalker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **P=0.003**
- **P=0.027**

**Length of stay reduced from median (range):**
- 9 (3-29) to 7 (3-22) days

**One year....!**
Basic recipe for postoperative pain treatment

• Analgesic elements:
  1. Paracetamol (1g x 4)
  2. NSAID: Ibuprofen (400 mg x 4) (max: 3-5 days)
  3. Dexamethasone (single dose 16 mg)
  4. Gabapentin (single dose: 600-900 mg)
• Local anaesthetics (infiltration/bloks/EPI)
• Morphine as escape
• Organizational approach & implementation
• Guidelines, cross-sectional collaboration