Persistent post surgical pain

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Declaration

- Within the last five years I have accepted hospitality from the pharmaceutical industry, received honoraria from Mundipharma NZ and attended meetings sponsored by Eisai Europe Ltd.
Persistent post surgical pain

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Definition - CPSP

- Pain developed after a surgical procedure;
- Pain is of at least two months duration;
- Other causes have been excluded (for example continuing malignancy or chronic infection); and
- The possibility of continuing pain from a pre-existing problem must be explored and exclusion attempted.
### Incidence

#### Incidence of chronic pain after surgery

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>Incidence of Chronic Pain (%)</th>
<th>Estimated Incidence of Chronic Severe Pain (&gt;5 out of 10) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amputation</td>
<td>30–85</td>
<td>5–10</td>
</tr>
<tr>
<td>Thoracotomy</td>
<td>5–65</td>
<td>10</td>
</tr>
<tr>
<td>Mastectomy</td>
<td>11–57</td>
<td>5–10</td>
</tr>
<tr>
<td>Inguinal hernia</td>
<td>5–63</td>
<td>2–4</td>
</tr>
<tr>
<td>Coronary bypass</td>
<td>30–50</td>
<td>5–10</td>
</tr>
<tr>
<td>Cesarian section</td>
<td>6–55</td>
<td>4</td>
</tr>
<tr>
<td>Cholecystectomy</td>
<td>3–50</td>
<td>Not estimated</td>
</tr>
<tr>
<td>Vasectomy</td>
<td>0–37</td>
<td>Not estimated</td>
</tr>
<tr>
<td>Dental surgery</td>
<td>5–13</td>
<td>Not estimated</td>
</tr>
</tbody>
</table>

#### Table 1: Incidence of persistent postoperative pain after a variety of surgical procedures from studies of reasonably good design

<table>
<thead>
<tr>
<th>Surgery</th>
<th>Incidence (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inguinal hernia</td>
<td>12</td>
<td>Aasvang and colleagues(^8)</td>
</tr>
<tr>
<td>CABG</td>
<td>44</td>
<td>Bar-El and colleagues(^35)</td>
</tr>
<tr>
<td>Thoracotomy</td>
<td>52</td>
<td>Pluijms and colleagues(^27)</td>
</tr>
<tr>
<td>Femoral popliteal bypass</td>
<td>23</td>
<td>Greiner and colleagues(^36)</td>
</tr>
<tr>
<td>Pelvic trauma</td>
<td>48</td>
<td>Meyhoff and colleagues(^37)</td>
</tr>
<tr>
<td>Hip arthroplasty</td>
<td>28</td>
<td>Nikolajsen and colleagues(^38)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>18</td>
<td>Bruce and colleagues(^39)</td>
</tr>
<tr>
<td>Amputation</td>
<td>27–30</td>
<td>Hanley and colleagues(^6)</td>
</tr>
<tr>
<td>Mastectomy</td>
<td>48</td>
<td>Poleshuck and colleagues(^22)</td>
</tr>
</tbody>
</table>

- Direct Burden
- Indirect burden
- Indirect costs
- Direct costs

Pain
Disability
Lost productivity
Individual/society
What causes pain after surgery?

• Cut nerves & tissues
• Induced injury response
• Altered peripheral & central nervous system pain processing


Predictors

Who gets CPSP?
## Predictors

### Table 1.3  Risk factors for chronic postsurgical pain

| Preoperative factors | Pain, moderate to severe, lasting more than 1 month  
|                     | Repeat surgery  
|                     | Psychologic vulnerability (eg catastrophising)  
|                     | Preoperative anxiety  
|                     | Female gender  
|                     | Younger age (adults)  
|                     | Workers’ compensation  
|                     | Genetic predisposition  
|                     | Inefficient diffuse noxious inhibitory control (DNIC)  
| Intraoperative factors | Surgical approach with risk of nerve damage  
| Postoperative factors | Pain (acute, moderate to severe)  
|                      | Radiation therapy to area  
|                      | Neurotoxic chemotherapy  
|                      | Depression  
|                      | Psychological vulnerability  
|                      | Neuroticism  
|                      | Anxiety |
Preoperative risk factors

- Preoperative pain
- Genetic susceptibility
- Psychosocial factors

Psychological Factors

- Depression, ‘psychological vulnerability’ (definition varies between studies), and stress were predictors.

- Preoperative pain related to impairment of activities predicted
  Preoperative anxiety and depression per se were not independent predictors (n=464)

- Pre-operative pain expectations, pain catastrophizing and surgical fear were predictors (n=648)

- Pre-surgical pain severity and pain catastrophizing were predictors

- Low pre-operative optimism and low perceived control over pain at 1 week after surgery predicted higher pain intensity at 4 months.
  No emotional variables were independently predictive of CPSP.
**Testing with experimental pain**  
DNIC or CPM

**Reported heat pain intensity** was shown to have a positive correlation with postoperative pain.


**Low CPM efficiency** was predictive of chronic post surgical pain


Kalkman pain prediction

- Sex: female, 1 point; male, 0 point
- Age: younger than 30 years, 2 points; 31 to 65 years, 1 point; older than 65 years, 0 point
- Pain before surgery at the site: none, 0 point; moderate, 2 points; severe, 3 points
- Regular use of opioids, 1 point
- Regular use of anxiolytic antidepressants, 1 point (otherwise 0)
- Open surgery, 1 point (otherwise 0)
- Type of surgery: thoracic, 3 points; abdominal, 2 points; orthopedic, 1 point; other, 0 point
- Long-lasting procedures (>120 minutes), 1 point (otherwise 0)
- Obesity (BMI > 30), 1 point (otherwise 0)
- High level of anxiety at the preoperative visit, 1 point (otherwise 0)

The risk-intense postoperative pain is important when the score is 4 out of 15.

Intraoperative Factors

• Surgical
  – “Invasiveness”
  – Nerve injury
  – Long duration of surgery
  – Redo interventions
  – Surgery in a previously injured area
  – Damaging surgical techniques such as crushing / retraction

Postoperative Factors

- Post op Pain severity and duration
- Radiation therapy to area
- Neurotoxic chemotherapy
- Psychological factors – as pre-op
- Genetics

Schug SA, Pogatzki-Zahn EM. IASP Pain Clinical Update Vol. XIX, Issue 1 January 2011
"I'll have an ounce of prevention."
Psychology interventions

• Explanation of pain and pain relief improved post op pain scores in children

• Self hypnosis improved pain scores in children

• Instruction in coping skills led to less postoperative anxiety and pain for adolescents ages 13 and younger

• psychologist-directed pain coping skills training intervention improved pain scores at 2 months.
Surgical Interventions

- Techniques preserving nerves or materials inducing reduced inflammatory reaction decreased CPSP

- Chronic groin pain was significantly more common after open repair than after laparoscopic repair (38.3 versus 22.5 per cent; P < 0.01, n= 454).
Acute Pain Management

- Good postoperative analgesia in THR or TKR decreased moderate and severe ambulatory pain at all follow ups to 6 months (15% versus 4%, n=249)

- 41% of patients experience moderate to severe pain after surgery (n=20,000)

- 31% of patients had severe or extreme pain and another 47% had moderate pain after surgery (n=250)

- 26.9% report severe pain during movement in first 24hrs (n=1900)
Surgery specific guidelines

- Prospect

- U.S. Veteran’s Health Administration & University of Iowa
  - http://www.healthquality.va.gov/
Breast Surgery

- Paravertebral Block improved at 1yr
- Venlafaxine decreased movement pain 6/12
- Gabapentin decreased burning pain at 3/12
- Gabapentin, EMLA and ropivacaine decreased pain at 3 months


Thoracotomy

- **Perioperative Ketamine did not reduce pain at 4 months (n=86)**

- **No change with epidurals (6 study Meta analysis, n=458)**

- **No reliable benefit of any analgesic intervention**
Lower limb amputation

- Prevention techniques were not convincing. 11 studies. One showed benefit but small numbers.
  

- Good pain control before amputation may minimize the risk of persistent pain after amputation. (n=65)
  
Joint replacement

- 15% severe pain post TKR, 6% severe pain post THR at 3 yrs

- Ketamine had no significant effect on CPSP following total knee replacement

- Pregabalin reduced neuropathic pain at 3 and 6 months (0% vs 8.7% and 5.2%)
Future Developments

• Predictive scoring systems
• Bedside testing
• Genetic testing
• New Drugs
• Targeted therapies
Conclusions

- Persistent postoperative pain is affecting thousands of patients in NZ and worldwide.

- Significant cost and burden

- Should be considered preoperatively

- Evidence for interventions is not consistent yet

- Minimally invasive surgery and good post op pain relief are best bet.
The aim of the wise is not to secure pleasure, but to avoid pain.

Aristotle

384-322 BC