Transition from Acute to Chronic Pain after Surgery

Pr Patricia Lavand’homme
Anesthesiology Dpt & Acute Pain Service
Brussels, Belgium
• No conflict of interest to declare
Some disclosures…

• Pain is multi-faceted ➔ highly complex

Persistent postsurgical pain: risk factors and prevention
Henrik Kehlet, Troels S Jensen, Clifford J Woolf
Lancet 2006

• Lecture will focus on clinical aspects, ongoing improvements and future challenges
Cut and thrust: antecedent surgery and trauma among patients attending a chronic pain clinic

Iain Kinloch Crombie\textsuperscript{a,*}, Huw Talfryn Oakley Davies\textsuperscript{b}, William A. Macrae\textsuperscript{c}

- Surgery contributed to pain in 22.5% of patients

- Longterm pain after surgery is a cause of disability (\downarrow quality of life, \uparrow healthcare use)

- \textit{Patients who attribute their pain to a specific cause} report higher levels of emotional distress and pain intensity
A classification of chronic pain for ICD-11

Diseases or clinical conditions associated with chronic pain
R. D. Treede (DE) and W. Rief (DE)
assisted by A. Barke (DE)

Primary Pain
J. Vlaeyen (BE)
M. Nicholas (AU)

Post-surgical and Posttraumatic Pain
S. Schug (AU)
P. Lavand’homme (BE)

Cancer Pain
M.I. Bennett (UK)
S. Kaasa (NO)

Neuropathic Pain
J. Scholz (US)
N.B. Finnerup (DK)

Headache
S. Evers (DE)
S.-J. Wang (TW)

Orofacial Pain
P. Svensson (DK)
R. Benoliel (US)

Musculoskeletal Pain
S. Perrot (FR)
M. Cohen (AU)

General Advice
M.B. First (US), ICD
E. Kosek (SE), IASP Terminology group

Primary Care Applicability
B. Smith (UK)

Pain 2015
Actual picture of CPSP

- CPSP may occur after ANY surgical procedure but some procedures carry higher risk than other ones

- **Rough estimation of CPSP incidence**
  - 1 patient out of 10 (10%) will develop longlasting pain after surgery
  - 1 patient out of 100 (1%) will develop severe CPSP with negative impact on **QoL and rehabilitation/recovery** (Breivik & Stubhaug, *Pain 2008*)
• CPSP at 6 months $\Rightarrow$ 56% pain free at 12 months
• 3% with no pain at 6 months $\Rightarrow$ CPSP at 12 months
• Signs of neuropathic pain in 35 to 57% of CPSP patients ($\downarrow$ QoL, $\uparrow$ pain severity)
Chronic postsurgical pain in children: prevalence and risk factors. A prospective observational study

H. Batoz¹, F. Semjen¹, M. Bordes-Demolis¹, A. Bénard² and K. Nouette-Gaulain¹,³

- Little is known about the epidemiology of chronic postsurgical pain (CPSP) in children.
- The authors performed a prospective study of the prevalence and risk factors for CPSP in children.
- The prevalence of CPSP was found to be 10.9%.
- Risk factors for CPSP were pain before surgery and severe acute postoperative pain.

CPSP = 10.9% with a Neuropathic component = 64.3%
Defining persistent post-surgical pain: is an update required?

M. U. Werner* and U. E. Kongsgaard2

Br J Anaesthesia 2014

• The pain developed after a surgical procedure or increased in intensity after the surgical procedure.
• Duration at least 2 months ⇒ at least 3 – 6 months with a significant negative effect on QoL.
• Pain is a continuation of acute postoperative pain or develops after an asymptomatic period.
• Pain is localized in the surgical field or in referred area.
• Exclusion of other possible causes for the pain (infection, cancer recurrence...).
Why me?

Pain results from pain amplification and psychological distress.
Genetic and Clinical Factors Associated with Chronic Postsurgical Pain after Hernia Repair, Hysterectomy, and Thoracotomy

A Two-year Multicenter Cohort Study - GENDOLCAT study

What This Article Tells Us That Is New

- Persistent postoperative pain was diagnosed in 18% of a population-based sample of 2,929 patients who had hernia repairs, hysterectomies, or thoracotomies.
- The association of persistent pain with 90 genetic markers showed no evidence for genetic predisposition in a subset of 1,000 patients.
- Six clinical factors predicted 73% of the persistent pain that developed.

Anesthesiology 2015
From acute to chronic pain after surgery

**PRE operative**
- Pre-op pain in the part of the body operated on
- Pre-op pain elsewhere
- One or more co-morbid stress symptoms e.g. sleep disturbance, depression...
- Capacity overload in the past 6 months

*(Althaus et al, Eur J Pain 2012)*

**Perioperative / ACUTE Postoperative**
- Severity of acute Postoperative pain
- Time spent in severe pain

*(Althaus et al, Eur J Pain 2012)*
*(Fletcher et al, Eur J Anaesth 2015)*

**SUBACUTE Postoperative**

???
Acute Postoperative Pain

- « Recall pain » in retrospective studies

- **Clinical reality:**
  - *Not all the patients with severe acute pain will develop CPSP* \(<\) *« optimal control » of acute pain does not prevent CPSP*

- Acute pain **intensity**?
  - Duration: **pain resolution** (pain trajectories)?
  - **Type** of acute postoperative pain?
• Percentage of **time spent in severe pain**
• A 10% increase in time spent in severe pain at **day 1** was associated with a 30% increase of CPSP incidence at 12 months
Improving Individual Measurement of Postoperative Pain: The Pain Trajectory

C. Richard Chapman, Gary W. Donaldson, Jennifer J. Davis, and David H. Bradshaw

Figure 1. Mean POP trajectory for the entire sample (N = 502). Symbols are mean NRS values ± 99% confidence interval for each. Line indicating the mean POP trajectory is a linear regression fitted to the points.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Sample Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole sample</td>
<td>502</td>
<td>100%</td>
</tr>
<tr>
<td>Negative slope</td>
<td>314</td>
<td>63%</td>
</tr>
<tr>
<td>Flat slope</td>
<td>127</td>
<td>25%</td>
</tr>
<tr>
<td>Positive slope</td>
<td>61</td>
<td>12%</td>
</tr>
</tbody>
</table>
Characteristics and prediction of early pain after laparoscopic cholecystectomy

Thue Bisgaard*, Birthe Klarskov, Jacob Rosenberg, Henrik Kehlet

Pain 2001
Incidence: 14% persistent pain at 3-6 months; 9% unexplained CPSP at 12 months

**Predictive factors for CPSP after laparoscopic cholecystectomy:**
- Cumulated visceral pain scores during the first week
- Number of preoperative biliary pain attacks

(Pain 2014)
Pain Trajectories Identify Patients at Risk of Persistent Pain After Knee Arthroplasty

An Observational Study

Figure 2.
Mobilization Pain score (NRS 0 - 10)

No PPSP
PPSP
NeuP PPSP

CPSP at 3 months: 58% with 10.7% NeuP

(Lavand’homme et al, Clin Orthop Relat Res 2013)
Neuropathic pain and the APS

- 3% diagnosed by APS
  ➔ 78% ongoing pain at 6 months/ 56% ongoing pain at 1 year
  (Hayes et al, Acute Pain 2002)

- 24% patients with 1-4 positive signs in DN4 questionnaire within 72h after surgery
  (Taverner & Prince, Br J Nurs 2014)

Martinez, Pain 2012
• **NeuP component** (DN4 applied in 593 patients) in 5.6% (95%CI 3.6-8.3) patients at day 0 and 12.9% (95%CI 9.7-16.7) at day 2

• DN4 positive post-surgery is a significant risk factor for CPSP NeuP (OR 4.22)
Trajectories of NeuP

- **Free interval for some patients**
  - 8% NeuP component (positive S-LANSS) within 48h ➔ 22% NeuP component at 3M after thoracotomy (Searle et al, 2009)

- DN4 questionnaire value increases with time: predictive value at 1M >>48h (RR 5.5 vs 2.8) (Martinez et al, Pain 2012)
• **Preoperative pain control**
  - Preoperative analgesic use but NO pain: 8% CPSP
  - Preoperative analgesic use and unrelieved preoperative pain: 32% CPSP

(Hoofwijk et al, Clin J Pain 2015)
Opioid intake and TJA

Opioids sensitize CNS (OIH)
- Difficult postoperative pain management
- Poor postsurgical outcome
Changes in patient-reported outcome measures (PROMs)
Topical review

Pain modulation profile and pain therapy: Between pro- and antinociception

David Yarnitsky a,b,*, Michal Granot c, Yelena Granovsky a,b

Fig. 2. Proposed patterns of change in pain modulation profile in various conditions.
Commentary

One man’s risk factor is another man’s outcome: Difference in risk factor profiles for chronic postsurgical pain maintenance vs transition

• Preoperative Pain

• Acute Postoperative Pain (<10 Days? < 6 Weeks?)

• Sub-acute Postoperative Pain (? < 3 Months)

• CPSP (> 3 Months)

→ Chronic Pain in general population
Subacute pain (at 2 weeks and later)
- Intensity
- Unpleasantness

Increases the risk of CPSP development and persistence

(Pain 2015; Pagé et al, J Pain Res 2013)
Parental risk factors for the development of pediatric acute and chronic postsurgical pain: a longitudinal study

- **Postoperative catastrophizing of the parents** (related to parent’s personal experience of pain)
  - delays child’s recovery
  - major risk of CPSP development in children
  - with time, the influence of the parents increases

- No impact of child’s catastrophization, no impact of child’s preoperative pain on recovery

Perioperative medicine

De Kock M. Anesthesiology 2009

Expanding our Horizons

Transition of Acute Postoperative Pain to Persistent Pain and Establishment of Chronic Postsurgical Pain Services

Katz et al, J Pain Research 2013

The Toronto General Hospital Transitional Pain Service: development and implementation of a multidisciplinary program to prevent chronic postsurgical pain
Summary

- We have a good picture of the actual prevalence / incidence of CPSP
- Not much changes since the first reports (2000)

BUT

- Ongoing improvements
  - Better definition of CPSP
  - New populations of patients being screened or to be (e.g. pediatric and outpatients)
  - Inclusion of CPSP in ICD-11
  - IASP year 2017: Pain after Surgery
From acute to chronic pain after surgery

Future challenges:
Optimalization of predictive tools
Pain after surgery is a dynamic process
Development of PERIOPERATIVE MEDICINE