Chronic Postoperative Inguinodynia: A pain in the *%^&%

Erik Ballert, MD
Assistant Professor of Surgery
University of Kentucky
Objectives

- Review inguinal anatomy and its relationship to postoperative pain
- Establish causes and discuss evaluation of inguinodynia
- Discuss treatment options for chronic postoperative pain after inguinal hernia repair
Scope of Problem

- Approximately 600,000 inguinal hernia repairs in US per year
- Roughly 10% patients have chronic pain after inguinal hernia repair
- That’s 60,000 patients/yr with chronic pain after herniorrhaphy!
Chronic Postoperative Pain

- Pain in surgical region lasting >3m
- Mild – Occasional pain/discomfort not limiting activity
- Moderate – Pain which limits some activities
- Severe – Incapacitating pain or pain that limits activities of daily living
Chronic Inguinodynia

- **Nociceptive Pain** – from tissue damage
  - Somatic
    - Osteitis Pubis
    - Adductor tenoperiostitis
  - Visceral
    - Pain with urination
    - Pain with ejaculation

- **Neuropathic**
  - Ilioinguinal, Iliohypogastric, Genital and Femoral Branches of Genitofemoral, Lateral Femoral Cutaneous

- **Meshoma/mesh related**

Adapted from Schwartz's Principles of Surgery - 8th Ed. (2005)
Nerves in the Inguinal Region

- Ilioinguinal – T12,L1 nerve roots
- Iliohypogastric – T12,L1 nerve roots
- Genital branch of the genitofemoral – L1,L2 nerve roots
- Femoral branch of the genitofemoral – L1,L2 nerve roots
- Lateral femoral cutaneous – L2,L3 nerve roots
Neuropathic pain

- Pain
  - Tearing
  - Throbbing
  - Stabbing
  - Shooting
  - Dull
  - Pulling
  - Tugging
- Parasthesia

Incidence of Chronic Pain

- Meta-analysis of prospective studies with minimum 3m followup period and 80% patient followup (29 studies, 8350 patients)

- Incidence of chronic pain – 11%
  - 76% mild
  - 17% moderate
  - 1% moderate/severe
  - 8% severe

- Chronic pain tended to be less with longer follow-up (OR .996, p=.085)

Incidence of Chronic Pain

- Less chronic pain with primary hernia (OR 0.76, p=.005)
- More pain with lower mean age (OR 1.53, p<.001)
- More pain when adjuvant/exclusive local anesthetic was used (OR 1.32, p=.039)
- No difference in nerve preservation vs. division
- Chronic pain less with endoscopic repair

Commonly Injured Nerves

- **Open**
  - Ilioinguinal
    - > Iliohypogastric > Genital branch of genitofemoral

- **Laparoscopic**
  - Lateral femoral cutaneous
    - > Genital branch of genitofemoral
Evaluation

- **History**
  - Including type of repair and if mesh employed
  - Symptoms – neuropathic vs somatic
  - Workers comp
  - Chronic back pain

- **Physical exam**
  - Recurrence?
  - Reproducibility – Tinel’s sign
  - Loss of touch sensation

- **Imaging**
  - Ultrasound – best for occult recurrence?
  - CT – evaluate for meshoma or recurrence
  - MRI – May evaluate cause but expensive and interobserver variability high
  - Herniography – not routinely done in US (not evaluated for recurrence)
Management

- Immediate re-exploration
- Time
- Anti-inflammatories
- Gabapentin/TCA
- Local injection
- Operate – after failed medical management for neuropathic pain in carefully selected patients
<table>
<thead>
<tr>
<th>Author</th>
<th>Approach</th>
<th># Pts</th>
<th>Success</th>
</tr>
</thead>
</table>
| Amid PK           | Triple neurectomy                                                         | 225   | 80% complete elimination of pain  
15% transient insignificant pain with no functional impairment |
| Keller et al      | Combined Lap/open approach with nerve division, mesh removal, and opposite approach repair with mesh | 21    | 20/21 significant improvement or resolution of symptoms                                                                            |
| Veuilleumier et al| Mesh removal and II and IH neurectomy                                     | 43    | 95% success rate                                                                                                                    |
| Madura et al      | Neurectomy and removal of mesh (27% had mesh)                             | 100   | 72% total relief  
10% marked decrease in symptoms                                                                                                    |
| Ducic et al       | Resection of neuromas, usually multiple found                             | 19    | 84% significant pain relief with stable results over minimum 1 yr f/u                                                               |
Prevention?

- Prophylactic neurectomy
- Routine identification of nerves
- Avoiding hernia sac ligation
- Type of repair
  - Laparoscopic
  - Lightweight mesh
  - Non-fixation of mesh
# Prophylactic Neurectomy

- **Retrospective chart review of 90 pts**

<table>
<thead>
<tr>
<th></th>
<th>Nerve excision</th>
<th>Nerve Preservation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>3/66 (5%)</td>
<td>5/24 (21%)</td>
<td>0.016</td>
</tr>
<tr>
<td>6 months</td>
<td>2/65 (3%)</td>
<td>6/23 (26%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1 year</td>
<td>2/61 (3%)</td>
<td>5/20 (25%)</td>
<td>0.003</td>
</tr>
<tr>
<td>3 years</td>
<td>2/35 (6%)</td>
<td>1/12 (8%)</td>
<td>0.748</td>
</tr>
</tbody>
</table>

Dittrick GW et al Am J Surg 2004
Incidence of Postoperative Parasthesia

<table>
<thead>
<tr>
<th></th>
<th>Nerve Excision</th>
<th>Nerve Preservation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>13/66 (20%)</td>
<td>1/24 (4%)</td>
<td>0.072</td>
</tr>
<tr>
<td>6 months</td>
<td>12/65 (18%)</td>
<td>1/23 (4%)</td>
<td>0.101</td>
</tr>
<tr>
<td>1 year</td>
<td>8/61 (13%)</td>
<td>1/20 (5%)</td>
<td>0.316</td>
</tr>
<tr>
<td>3 years</td>
<td>4/35 (11%)</td>
<td>1/12 (8%)</td>
<td>0.764</td>
</tr>
</tbody>
</table>

Dittrick GW et al Am J Surg 2004
Prophylactic Neurectomy

- Double-blind RCT
- 100 pts followed up for 1yr
- Mean pain severity score significantly less at POD1 and 1 month in nerve excision group
- At 6m and one year both groups very low pain
- Chronic inguinodynia in 13 patients
  - Nerve preservation 10 (21%)
  - Nerve excision 3 (6%)
  - p=.033
- No cases of hypoesthesia in either group at one year

Prophylactic Neurectomy

- 813 patients randomized to Ilioinguinal nerve division vs. preservation
- No difference in pain at 1m, 6m, or 1yr
- No significant difference in numbness
- Higher loss of touch sensation in nerve division group
- Higher loss of pain sensation at 1m and 6m but not at 1yr in nerve division

# Management of Nerve at Operation

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>No. of Repairs</th>
<th>Moderate to Severe Pain (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>All nerves identified</td>
<td>380</td>
<td>1.3</td>
<td>0.02</td>
</tr>
<tr>
<td>All preserved</td>
<td>310</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>All divided</td>
<td>10</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>1 or 2 nerves divided or injured</td>
<td>60</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>1 or 2 nerves not identified</td>
<td>404</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>1 nerve not identified</td>
<td>260</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>2 nerves not identified</td>
<td>144</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>No nerves identified</td>
<td>189</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>

*Percentage of moderate to severe pain at the 6-month follow-up.

*Statistical difference between the 3 main groups: hernioplasty with all 3 nerves identified (n = 380), 1 or 2 nerves not identified (n = 404), and no nerves identified (n = 189).

## TABLE 4. Moderate to Severe Pain at 6 Months According to Intraoperative and Technical Factors in 973 Hernioplasties

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Repairs (n)</th>
<th>Moderate to Severe Pain at 6 Months</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical procedure</td>
<td>Lichtenstein</td>
<td>733</td>
<td>16</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Trabucco</td>
<td>240</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Anesthesia</td>
<td>Local</td>
<td>535</td>
<td>11</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>General</td>
<td>211*</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spinal or epidural</td>
<td>227</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Type of hernia</td>
<td>Direct</td>
<td>321</td>
<td>4</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>Indirect</td>
<td>653</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pantaloon</td>
<td>32</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sliding</td>
<td>16</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Congenital</td>
<td>28</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Type of repair</td>
<td>Monolateral</td>
<td>797</td>
<td>16</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Bilateral</td>
<td>176</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Surgeon experience</td>
<td>Senior surgeon</td>
<td>856</td>
<td>17</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Resident</td>
<td>117</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

*Including bilateral herna repairs.
Management of Hernia Sac

- Double blind RCT of 477 pts
- High-ligation of hernia sac vs invagination
- Significantly less patients with pain at POD1, 7, and 30 when sac not ligated
- Intensity of pain significantly less at all time points when sac ligation omitted
- No recurrences

Delikoukos et al. Hernia 2007
**TEP without Fixation**

- A randomized prospective single blind study - Koch et al. JSLS 2006
  - shorter hospital stay (8 vs 16 hrs)
  - less likely to be admitted (10% vs. 50%)
  - less urinary retention
  - less narcotic usage

- Prospective multicenter double blinded randomized trial – Taylor et al. Surg Endo 2008
  - 500 hernia repairs in 360 pts
  - Evaluated for new pain at a mean of 8m after operation
  - New pain in 38% vs 23%, p = .0003
  - Felt once/week in 22% vs 15%, p = .049
  - Felt several times/week in 16% vs 8%, p = .009
  - Moderate or severe pain in 2% vs 0%, p = .06
  - Positive correlation between number of tacks and incidence of pain found
  - Bilateral hernias – non fixation side more comfortable
  - One recurrence (in fixation group)
Summary

- Chronic postoperative pain occurs in approximately 11% with 1/3rd severe enough to interfere with activity.
- More common than recurrence – should be discussed in informed consent.
- In carefully selected patients – neurectomy and mesh excision can provide relief in 80-95%.
- Prevention is paramount – identification of nerves and careful technique.
  - Ilioinguinal division versus preservation probably less important.
- Laparoscopic good choice for bilateral, recurrent, and younger patients.
- Can avoid tacks in smaller hernia defects in TEP repairs.
Take-Home Points

- Choose the right operation in the right patient initially
- Identify the nerves – select for division vs. preservation - AVOID ENTRAPMENT or INJURY
- Don’t re-operate without thorough workup and initial medical management