Advances in Inguinal Hernia Repair

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UCSF Postgraduate Course in General Surgery
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Inguinal Hernia in 2012

- When to operate? Watchful waiting versus repair
- Laparoscopic or Open?
- Which open technique is best?
  - Lichtenstein repair
  - Plug and patch repair
  - Prolene Hernia System
- How do I minimize chronic pain?

When to operate

Randomized 720 men with minimally-symptomatic inguinal hernia to elective Lichtenstein repair vs. watchful waiting

Men followed mean of 3.2 years

Outcome measures: pain, functional status, crossover between arms, strangulation
When to operate

**Watchful Waiting vs Repair of Inguinal Hernia in Minimally Symptomatic Men**
A Randomized Clinical Trial

**Figure 2. Pain Interfering with Activities: Group Differences at 2 Years**

<table>
<thead>
<tr>
<th>Pain Interfering with Activities</th>
<th>Group</th>
<th>Risk Difference</th>
<th>95% CI</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection to Trial</td>
<td>WW</td>
<td>-17 (-37, 9)</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Repair</td>
<td>WW</td>
<td>-9 (-29, 11)</td>
<td>0.44</td>
<td></td>
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<tr>
<td>Watchful Waiting</td>
<td>WW</td>
<td>-2 (-9, 5)</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>All-collected</td>
<td>WW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>WW</td>
<td>42 (3, 81)</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Watchful Waiting</td>
<td>WW</td>
<td>7 (0, 15)</td>
<td>0.04</td>
<td></td>
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</tbody>
</table>

Reference group for infection to trial is hernias free repair (n=39); reference group for all-collected is patients randomized to and received hernia repair (n=71).

When to operate

**Long-term follow-up of patients with a painless inguinal hernia from a randomized clinical trial**

L. Chung*, J. Norris* and P. J. O'Dwyer*

*British Journal of Surgery 2011; 98: 596–599

**Fig. 1. Study profile**

- Crossover rate to surgery
  - 160 pts randomized to WW vs surgery
  - At 6 and 12 mos, WW had: more pain less QOL

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Risk of strangulation was 1.8 of 1000 patient-years
When to operate

**SUMMARY**

The risk of strangulation is low (~1 in 500 patients per year)

The risk of becoming symptomatic is high

Pain scores are same or lower in patients who have elective surgery compared to don't.

This has implications when we start to talk about chronic pain (stay tuned later in the talk)

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**Laparoscopic or Open?**

Open Mesh versus Laparoscopic Mesh Repair of Inguinal Hernia

Leigh Neumayer, M.D., Anita Goldberg-Harber, M.S., Olga Jonasson, M.D., Robert Fitzgibbons, Jr., M.D., Dorothy Durand, Ph.D., James Gibbs, Ph.D., Dennis Reda, Ph.D., and William Henderson, Ph.D., for the Veterans Affairs Cooperative Studies Program 436 Investigators*

Randomized 2,164 patients with inguinal hernia to open Lichtenstein vs. laparoscopic (mostly TEP) repairs.

Primary outcome = recurrence at 2 years

Secondary outcomes = complications, death, pain

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**PAIN**

<table>
<thead>
<tr>
<th>Open Repair Better</th>
<th>Laparoscopic Repair Better</th>
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<tbody>
<tr>
<td>Average pain at rest Day of surgery</td>
<td>2 wk</td>
</tr>
<tr>
<td>Pain during normal activities Day of surgery</td>
<td>2 wk</td>
</tr>
<tr>
<td>Pain during work or exercise Day of surgery</td>
<td>2 wk</td>
</tr>
<tr>
<td>Perception of worst pain Day of surgery</td>
<td>2 wk</td>
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<table>
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<th>Differences in Score (mm)</th>
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<tr>
<td>-24</td>
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</table>

Twice as many recurrences at 2 years with laparoscopic
10x as many life-threatening complications
Laparoscopic or Open?

Laparoscopic techniques versus open techniques for inguinal hernia repair (Review)

McCormack K, Scott N, Go PM, Ross SJ, Grant A. Collaboration the EU Hernia Trialists

Meta-analysis of over 6,000 patients enrolled in randomized trials up to 2003

Results:

OR time: 15 minutes longer for laparoscopy
Hematoma, seroma, infection: no difference
Visceral injury: 8/2315 laparoscopic, 1/2599 open
LOS: no difference

Laparoscopic or Open?

Laparoscopic techniques versus open techniques for inguinal hernia repair (Review)

McCormack K, Scott N, Go PM, Ross SJ, Grant A. Collaboration the EU Hernia Trialists

Persistent pain OR 0.54 p=0.001 in favor of laparoscopy
Persistent numbness OR 0.38 p=0.01 in favor of laparoscopy
RECURRANCE: OR 0.81 p=0.16
NO DIFFERERENCE!!

Laparoscopic or Open?

Low Recurrence Rate After Laparoscopic (TEP) and Open (Lichtenstein) Inguinal Hernia Repair

A Randomized, Multicenter Trial With 5-Year Follow-Up

Arne S. Ekholm, MD, * Agnete K. Montgomery, MD, PhD, ‡ Jørn C. Ramussen, MD, PhD, ‡ Rune P. Sandhøj, MD, PhD, ‡ Løf A. Berghvist, MD, PhD, ‡ and Claus R. Roedberg, MD, PhD

Randomized 1512 patients to TEP vs. Lichtenstein with 5 year FU

1/3 of TEP recurrences were from 1 surgeon
After exclusion, TEP recurrence was 2.4% (vs 1.2% open)

Laparoscopic or Open?

Laparoscopic (TEP) Versus Lichtenstein Inguinal Hernia Repair: A Comparison of Quality-of-Life Outcomes

Edith Myers - Katherine M. Broome - Rona O. Kassouf - Michael Barkey

<table>
<thead>
<tr>
<th></th>
<th>TEP (n = 90)</th>
<th>Lichtenstein (n = 90)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (range) (years)</td>
<td>54 (42-71)</td>
<td>56 (43-75)</td>
<td>ns</td>
</tr>
<tr>
<td>Gender (number)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>86</td>
<td>86</td>
<td>ns</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Recurrence rate (number %)</td>
<td>3 (3%)</td>
<td>2 (2%)</td>
<td>ns</td>
</tr>
<tr>
<td>Dysentery (number %)</td>
<td>9 (10%)</td>
<td>27 (30%)</td>
<td>0.03*</td>
</tr>
<tr>
<td>Chronic pain (number %)</td>
<td>3 (3%)</td>
<td>9 (10%)</td>
<td>0.06</td>
</tr>
<tr>
<td>Conversion rate (number %)</td>
<td>2 (2%)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Technical failure rate (number %)</td>
<td>1 (1.1%)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Wound infection (number %)</td>
<td>0 (0%)</td>
<td>2 (2%)</td>
<td>0.41</td>
</tr>
<tr>
<td>Hematoma/seroma (number %)</td>
<td>6 (7%)</td>
<td>2 (2%)</td>
<td>0.33</td>
</tr>
</tbody>
</table>

FIGURE 2. Cumulative recurrence rate for the TEP and Lichtenstein repair, respectively.
Laparoscopic or Open?

Summary

In centers of excellence, laparoscopic inguinal hernia repairs have about the same recurrence risk as open repairs. In the real-world, there may be twice as many recurrences with laparoscopy. But the absolute magnitude of the recurrence risk is small for both techniques. There is less early pain and faster recovery with laparoscopy. It is debatable whether there is any long-term difference in pain.

What is the best mesh technique for open inguinal hernia repair?
Recurrence

My choice: Lichtenstein

Why?
1. Teach residents
2. No posterior mesh

Makes redos easier!

What can I do to reduce the risk of pain after open inguinal hernia repair?

POSSIBLE STRATEGIES

Strategy 1: identify all 3 nerves
Strategy 2: divide ilioinguinal nerve routinely
Strategy 3: use lightweight mesh
Strategy 4: use self adhesive mesh (minimal sutures)
Strategy 5: use local nerve block

Influence of Preservation Versus Division of Iliohypogastric, Iliohypogastric, and Genital Nerves During Open Mesh Herniorrhaphy
Prospective Multicentric Study of Chronic Pain

Sergio Alfieri, MD; Fabio Bonucci, MD; Andrea Di Giorgio, MD; Uberto FrancoGallo, MD; Maria Francesca Sartorelli, MD; Mario Sartorelli, MD; Paolo Sartorelli, MD; Michael Calvin, MD; Amedeo Ciampi, MD; Giovanni Battista Ruggiero, MD; and the Chronic Pain Trial Group

TABLE 6. Multivariate Analysis* Risk of Complaining of Pain at 6 Months According to Nerve Treatment

<table>
<thead>
<tr>
<th>No. of nerves not identified</th>
<th>RR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.2</td>
<td>0.2–26.4</td>
<td>0.539</td>
</tr>
<tr>
<td>2</td>
<td>12.4</td>
<td>1.3–115.3</td>
<td>0.027</td>
</tr>
<tr>
<td>3</td>
<td>19.2</td>
<td>2.2–157.7</td>
<td>0.006</td>
</tr>
</tbody>
</table>
Divide ilioinguinal nerve routinely?

Dittrick 2004 Am J Surg

| Retrospective review of 90 patients, of whom 66 had routine nerve excision |

Malekour 2008 Am J Surg

| Blinded randomized controlled trial |

| 121 patients: 61 nerve excised, 60 nerve preserved |

Outcome = pain in first year (VAS) | nerve excision nerve preservation p-value |

Pain POD1 | 2.2 ± 0.8 | 2.8 ± 0.7 | <0.001 |

Pain POD30 | 0.7 ± 0.7 | 1.5 ± 0.7 | <0.001 |

chronic pain | 6% | 21% | 0.033 |

Mui 2006

Use lightweight mesh?

Three-year results of a randomized clinical trial of lightweight vs. standard polypropylene mesh in Lichtenstein repair of primary inguinal hernia

Use lightweight mesh?

| Self-adhesive mesh? |

| n=30 | n=30 |

| Self-adhesive group | Lichtenstein group |

| Mean VAS at 2nd year ± SD | 1.71 ± 2.05 | 1.70 ± 1.01 | 0.090 (NS) |

| No. of patients with moderate or severe chronic pain (%) | 12 (25%) | 7 (26%) | 0.294 (NS) |

| No. of patients with tolerable pain (%) | 3 (12.5%) | 4 (16.7%) | 0.627 (NS) |

| No. of recurrences (%) | 1 (4.1%) | 1 (3.7%) | 0.888 (NS) |
What can I do to reduce the risk of pain after open inguinal hernia repair?

Strategy 1: Identify all 3 nerves (recommended)
Strategy 2: Divide ilioinguinal nerve routinely (controversial)
Strategy 3: Use lightweight mesh (recommended)
Strategy 4: Use self adhesive mesh (controversial)
Strategy 5: Use local nerve block (recommended)