Best Practice Management of Incisional Hernia

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Disclosure:

None for this presentation.
Definitions:

**Incisional hernia** is any gap in the abdominal wall with or without a bulge in the area of a postoperative scar that can be seen or palpated on clinical exam or imaging.

A gentleman is someone who owns land. -Tarp

Is timing important?
What separates incisional hernia from dehiscence?
Risk ??%
Incidence 3-60%

50% are detected within one year of initial operation.

2% risk per year after.


348,000 repairs annually in US
154,000 inpatient ($15,900)
194,000 outpatient ($3,800)
$3.2 billion in annual cost

Prevention

- Continuous Closure with Running Suture
- Monofilament slowly absorbable suture (PDS) #1 or 2
- Suture: Wound Length ≤ 4:1


The only way not to spill water is not to carry water. - Tarp
Stitch Length

- **1 cm from edge 1 cm apart**
- Shorter may be better
  - 5 mm bites 5 mm apart
  - 730 patient RCT
    - Incisional hernia 6% vs 18%
    - SSI 5% vs 10%


<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Long (n = 381)</th>
<th>Short (n = 356)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (95% CI), y</td>
<td>64 (63-66)</td>
<td>65 (64-67)</td>
<td>.30a</td>
</tr>
<tr>
<td>Female, No. (%)</td>
<td>153 (40.2)</td>
<td>155 (43.5)</td>
<td>.37b</td>
</tr>
<tr>
<td>BMI, mean (95% CI)</td>
<td>26 (25-27)</td>
<td>29 (11.0)</td>
<td>.94a</td>
</tr>
<tr>
<td>Diabetes mellitus, No. (%)</td>
<td>33 (8.7)</td>
<td>19 (10.0)</td>
<td>.36b</td>
</tr>
<tr>
<td>Patient Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wound Dehiscence, No. (%)</td>
<td>1/381</td>
<td>0/356</td>
<td>.99</td>
</tr>
<tr>
<td>SSI, No. (%)</td>
<td>35/343 (10.2)</td>
<td>17/325 (5.2)</td>
<td>.02</td>
</tr>
<tr>
<td>Incisional Hernia, No. (%)</td>
<td>49/272 (18)</td>
<td>14/250 (5.6)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Liars figure and figures lie. -Tarp

Prediction:

• SSI double the risk
• Increased intrabdominal pressure post op
  • Ileus, urinary retention, coughing, vomiting, mechanical vent >48hrs
• BMI
• Wound Epithelialization > 16 days

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>p Value*</th>
<th>Total patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hernia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body mass index, kg/m²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 19</td>
<td>42</td>
<td>93.3</td>
<td>3</td>
<td>6.7</td>
<td></td>
<td>45</td>
<td>7.5</td>
</tr>
<tr>
<td>19–25</td>
<td>253</td>
<td>90.0</td>
<td>28</td>
<td>10.0</td>
<td></td>
<td>281</td>
<td>46.6</td>
</tr>
<tr>
<td>&gt; 25</td>
<td>227</td>
<td>81.9</td>
<td>50</td>
<td>18.1</td>
<td></td>
<td>277</td>
<td>45.9</td>
</tr>
<tr>
<td>Transverse diameter, cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>46 ± 8</td>
<td>49 ± 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative uremia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>407</td>
<td>88.5</td>
<td>53</td>
<td>11.5</td>
<td></td>
<td>460</td>
<td>76.3</td>
</tr>
<tr>
<td>Yes</td>
<td>115</td>
<td>80.4</td>
<td>28</td>
<td>19.6</td>
<td></td>
<td>143</td>
<td>26.7</td>
</tr>
<tr>
<td>Mean fascial incision length, cm</td>
<td>19 ± 5</td>
<td>22 ± 5</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean length of fascial suture, cm</td>
<td>108 ± 58</td>
<td>88 ± 28</td>
<td></td>
<td></td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ratio: fascial suture length to sagittal</td>
<td>58 ± 15</td>
<td>64 ± 15</td>
<td></td>
<td></td>
<td>0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>abdominal diameter, %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ratio: fascial suture length to fascial</td>
<td>5.6 ± 2.6</td>
<td>4.1 ± 0.7</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>incision length, cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reoperation during hospitalization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>518</td>
<td>87.5</td>
<td>74</td>
<td>12.5</td>
<td></td>
<td>592</td>
<td>98.2</td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>36.4</td>
<td>7</td>
<td>63.6</td>
<td></td>
<td>11</td>
<td>1.8</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>408</td>
<td>92.5</td>
<td>33</td>
<td>7.5</td>
<td></td>
<td>441</td>
<td>73.1</td>
</tr>
<tr>
<td>Superficial surgical site</td>
<td>94</td>
<td>78.3</td>
<td>26</td>
<td>21.7</td>
<td></td>
<td>120</td>
<td>19.9</td>
</tr>
<tr>
<td>Deep surgical site</td>
<td>19</td>
<td>50.0</td>
<td>19</td>
<td>50.0</td>
<td></td>
<td>38</td>
<td>6.3</td>
</tr>
<tr>
<td>Deep space or organ</td>
<td>1</td>
<td>25.0</td>
<td>3</td>
<td>75.0</td>
<td></td>
<td>4</td>
<td>0.7</td>
</tr>
<tr>
<td>Mean postoperative nausea score</td>
<td>4 ± 5</td>
<td>6 ± 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean postoperative emesis score</td>
<td>2 ± 3</td>
<td>4 ± 4</td>
<td></td>
<td></td>
<td>0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean postoperative cough score</td>
<td>6 ± 6</td>
<td>9 ± 7</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean postoperative pain score</td>
<td>21 ± 5</td>
<td>23 ± 5</td>
<td></td>
<td></td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean duration postoperative analgesic, d</td>
<td>6 ± 2</td>
<td>7 ± 3</td>
<td></td>
<td></td>
<td>0.001</td>
<td></td>
<td></td>
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<tr>
<td>Mean duration postoperative antibiotic, d</td>
<td>8 ± 4</td>
<td>10 ± 7</td>
<td></td>
<td></td>
<td>0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean time to suture removal or complete</td>
<td>15 ± 5</td>
<td>24 ± 17</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>epithelialization, d (median = 14)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
When do we fix it?

- Most frequent indication is symptomatic hernia (20 – 50%)
  - Most common symptom is pain
- 6 - 15% for strangulation or obstruction


“A commonsense approach is advocated. If the patient can safely have general anesthesia and the chance of successful repair is reasonable, then surgery is indicated. If the patient presents a high anesthetic risk or surgical repair will be technically difficult, then the size of the fascial defect relative to the hernia, the symptom complex, the patient’s age, and the patient’s preferences must be carefully considered. In such cases, conservative management may be more appropriate. This decision making process is patient specific and therefore we recommend that all patients are referred for a specialist opinion.”

-David Sanders and Andrew Kingsnorth
“You need to fit your suit to the cloth.”
-Tarp
How do we maximize our chances for a successful repair?

‣ Study it like a racing card.
‣ Get in the habit of having good habits.
‣ The pleural of anecdote isn’t data.

-Tarp
Use mesh in anything > 3 cm.

But what if I cause an enterotomy?

Mesh in an infected field

Living under Damocles’ sword.
-Tarp
Biologic Mesh
SAGES represents a worldwide community of surgeons that can bring minimal access surgery, endoscopy and emerging techniques to patients in every country. We represent over 6,000 surgeons and allied health professionals.

http://www.sageswiki.org/
Biologic Mesh Summary

- Use in hernia repair in the non contaminated setting not justified due to increased cost without benefit.
- Ideal use as reinforcement of repair
  - Don’t bridge the gap with biologic mesh
- Only level one study comparing mesh to tissue repair (PEH) showed no difference in recurrence at 5y.

Sageswiki


More on Biologics:

Laparoscopic vs Open Repair

Figure 3. Forest plot of comparison: Laparoscopic versus open repair (overall analysis), outcome: Hernia recurrence.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Laparoscopic Events</th>
<th>Total</th>
<th>Conventional Events</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>M-H, Random, 95% CI</td>
<td>M-H, Random, 95% CI</td>
</tr>
<tr>
<td>Asencio 2009</td>
<td>4</td>
<td>41</td>
<td>3</td>
<td>38</td>
<td>21.9%</td>
<td>1.24 [0.30, 5.17]</td>
<td></td>
</tr>
<tr>
<td>Barbaros 2006</td>
<td>0</td>
<td>23</td>
<td>1</td>
<td>23</td>
<td>4.5%</td>
<td>0.33 [0.01, 7.78]</td>
<td></td>
</tr>
<tr>
<td>Carbajo 1999</td>
<td>0</td>
<td>30</td>
<td>2</td>
<td>30</td>
<td>5.0%</td>
<td>0.20 [0.01, 4.00]</td>
<td></td>
</tr>
<tr>
<td>Itani 2010</td>
<td>9</td>
<td>73</td>
<td>6</td>
<td>73</td>
<td>46.5%</td>
<td>1.50 [0.56, 4.00]</td>
<td></td>
</tr>
<tr>
<td>Misra 2006</td>
<td>2</td>
<td>32</td>
<td>1</td>
<td>30</td>
<td>8.1%</td>
<td>1.88 [0.18, 19.63]</td>
<td></td>
</tr>
<tr>
<td>Moreno-Egea 2002</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>11</td>
<td>Not estimable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navarra 2007</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>12</td>
<td>Not estimable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olmi 2007</td>
<td>2</td>
<td>85</td>
<td>1</td>
<td>85</td>
<td>7.9%</td>
<td>2.00 [0.18, 21.64]</td>
<td></td>
</tr>
<tr>
<td>Pring 2008</td>
<td>1</td>
<td>30</td>
<td>1</td>
<td>24</td>
<td>6.1%</td>
<td>0.80 [0.05, 12.14]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>337</strong></td>
<td><strong>326</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>18</strong></td>
<td><strong>15</strong></td>
<td><strong>1.22 [0.62, 2.38]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events 18 15
Heterogeneity: Tau² = 0.00; Chi² = 2.64, df = 6 (P = 0.85); I² = 0%
Test for overall effect: Z = 0.58 (P = 0.56)

Laparoscopic vs Open Repair

Laparoscopic vs Open Repair

- No clearly defined difference in long term outcomes.
- Lower risk of wound infection
- Increased enterotomies
- Less pain and hospital stay

Where do I put the mesh?

Onlay

Inlay

Sublay

Oy Vey

<table>
<thead>
<tr>
<th>Technique</th>
<th>Recurrence</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlay</td>
<td>44%</td>
<td>Adhesions Erosions Not recommended</td>
</tr>
<tr>
<td>Onlay</td>
<td>5.5-14.8%</td>
<td>Have to close abdominal wall</td>
</tr>
<tr>
<td>Sublay</td>
<td>1-23%</td>
<td>European Hernia Society Standard</td>
</tr>
<tr>
<td>Rives Stoppa</td>
<td>1-8%</td>
<td>difficult</td>
</tr>
</tbody>
</table>


Summary

- Hernias are common, morbid, and costly.
- Best chance of success is mesh repair in an uncontaminated field.
  - Laparoscopic vs Open still debated
  - Sublay vs Onlay
  - Rives Stoppa = one shot

What can’t be cured must be endured.

“Swamp/Alligator argument” – Tarp

When you are up to your ass in alligators, it’s hard to remember you came to drain the swamp.
American Hernia Society Quality Collaborative (AHSQC).
Discussion

CLUELESSNESS

There are no stupid questions,
but there are a lot of inquisitive idiots.


27. Weyhe D, Belyaev O, Müller C, Meurer K. Improving outcomes in hernia repair by the use of light meshes—a comparison of different implant constructions based on a critical appraisal of the literature. World Journal of... 2007;


38. Bencini L, Sanchez LJ, Boffi B, Farsi M, Scatizzi M. Incisional hernia repair. Surgical ... 2003:


