TYPES OF CLOSURE
– WHAT STYLE, WHAT SUTURE?

Residents’ Retreat 2012
Cailan MacPherson
INCISIONAL HERNIA

- 9-20% of all midline incisions
- Pain, quality of life, life-threatening complications
  - Incarcerations 6-15%
  - Strangulation 2% ¹
  - 5 year reoperation 11% ²,³
  - 10 year reoperation 32% ²,³
  - 5 year hernia revision rates after:
    - First operation → 23.8%
    - Second operation → 35.3%
    - Third operation → 38.7%
May 2010

Attempted to improve upon the 5 SR’s previously published*

Primary objective \(\rightarrow\) lowest incidence of incisional hernia in adults undergoing elective, primary laparotomy via MLI
  - Eligibility: RCT’s, follow-up 12 months

Secondary outcomes \(\rightarrow\) dehiscence, suture sinus, wound infection, wound pain
STATISTICAL ANALYSIS

- Primary meta-analysis: elective primary lap via MLI
  - Extended to emergency and secondary laparotomy

- Subgroup analyses
  - Primary vs. secondary laparotomies
  - Elective vs. emergency
  - Continuous vs. interrupted
  - Rapidly vs. slowly vs. nonabsorbable suture material

- Bonferroni-Holm correction employed
PRIOR META-ANALYSES

- Weiland 1998: mixed incisions, randomized + nonrandomized
  - Continuous vs. interrupted → ND
  - Nonabsorbable preferred over absorbable
- Hodgson 2000: mixed incisions
  - Lower hernia rate with nonabsorbable
- Rucinski 2001: midline incisions
  - Lower hernia rate with nonabsorbable vs. absorbable
  - Effect vanished with comparing absorbable, monofilament to nonabsorbable
- Van’t Riet 2002: midline incisions, compared suture technique (C vs. I) and materials in combination
  - Higher hernia rates with continuous rapidly absorbable C/T continuous with slow or non-absorbable
- Gupta 2008: Continuous vs. interrupted, mixed population
  - Continuous vs. interrupted → ND
DIENER ET AL → RESULTS

- 14 datasets, 7711 patients, 6752 midline incisions
- Midline / Elective / Primary Lap
  - 3 studies – no difference between continuous slow vs. interrupted rapid
- Midline / Elective / Primary / Secondary **
  - Continuous < interrupted (OR 0.59 [0.43-0.82] p=0.001)
  - Absorbable < nonabsorbable (OR 0.41 [0.19-0.88] p=0.02)
  - Slow absorb < rapid absorb (OR 0.65 [0.47-0.90] p=0.009)
- Midline / Elective & Emerg / Primary / Secondary
  - No difference between interrupted/continuous or absorb/nonabsorb or slow/rapid
Continuous < interrupted (OR 0.59 [0.43-0.82] p=0.001)
Absorbable < nonabsorbable (OR 0.41 [0.19-0.88] p=0.02)
### 5.1 Elective procedures

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Slowly-absorbable</th>
<th>Rapidly-absorbable</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>Trimbos 1992</td>
<td>5</td>
<td>168</td>
<td>7</td>
</tr>
<tr>
<td>Bresler 1995</td>
<td>15</td>
<td>141</td>
<td>7</td>
</tr>
<tr>
<td>Colombo 1997</td>
<td>27</td>
<td>308</td>
<td>41</td>
</tr>
<tr>
<td>Hsiao 2000</td>
<td>0</td>
<td>71</td>
<td>4</td>
</tr>
<tr>
<td>Seiler 2009</td>
<td>37</td>
<td>354</td>
<td>28</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>84</td>
<td>1042</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 84

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 1.73$, df = 4 ($P = 0.79$); $I^2 = 0$

Test for overall effect: $Z = 2.62$ ($P = 0.009$)

### 5.2 Elective and emergency procedures

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Slowly-absorbable</th>
<th>Rapidly-absorbable</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>Wissing 1987</td>
<td>37</td>
<td>281</td>
<td>108</td>
</tr>
<tr>
<td>Sahlin 1993</td>
<td>20</td>
<td>148</td>
<td>11</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>57</td>
<td>429</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 57

Heterogeneity: $\tau^2 = 0.55$; $\chi^2 = 6.51$, df = 1 ($P = 0.01$); $I^2 = 85$

Test for overall effect: $Z = 0.17$ ($P = 0.86$)

**Slow absorb < rapid absorb (OR 0.65 [0.47-0.90] p=0.009)**
Lower hernia rate for continuous (vs. interrupted) technique, and slowly absorbing (vs. rapidly absorbing) material

Seen for primary and secondary MLI in elective population

Unable to prescribe treatment recommendation for emergency setting

Called for an RCT in emergency setting

Recommended against nonabsorbable (higher risk for incisional hernias and suture sinus in elective setting)
Lower hernia rate for continuous (vs. interrupted) technique, and slowly absorbing (vs. rapidly absorbing) material

Seen for primary and secondary MLI in elective population

Unable to prescribe treatment recommendation for emergency setting

Called for an RCT in emergency setting

Recommended against nonabsorbable (higher risk for incisional hernias and suture sinus in elective setting)
DIENER ET AL → CONCLUSIONS

- Lower hernia rate for continuous (vs. interrupted) technique, and slowly absorbing (vs. rapidly absorbing) material
- Seen for primary and secondary MLI in elective population
- Unable to prescribe treatment recommendation for emergency setting
- Called for an RCT in emergency setting
- Recommended against nonabsorbable (higher risk for incisional hernias and suture sinus in elective setting)