What’s New in Source Control?

John C. Marshall MD FRCSC
Critical Care Canada Forum
November 8, 2018
All physical measures undertaken to eradicate a focus of invasive infection, and to correct the anatomic derangement(s) responsible for ongoing microbial contamination.
Some infections cannot be cured without source control.
Others are not generally amenable to source control.
Still others are on some occasions ...
When is source control indicated?

- When there is a focal infectious process
- When the infection arises from a breach of a hollow organ
- When there is tissue necrosis
- When the infection arises in relation to a foreign body
Principles of Source Control

- Drainage
- Debridement
- Device removal
- Definitive repair
Drainage:

Liquid component of a localized infection
Drainage:

Creates a controlled *sinus* (a communication between a closed space and the exterior) or *fistula* (a communication between two epithelially-lined surfaces)
Percutaneous drainage of a diverticular abscess
Surgery is needed if a controlled sinus or fistula cannot be accomplished by percutaneous drainage.
Open abdomen approaches: Damage control
Debridement

The physical removal of necrotic or infected solid tissue:

- Surgical
- Dressing changes
- Debriding agents
Pancreatic abscesses are the exception to the general rule that necrotic tissue should be debrided as rapidly as possible.
A Step-up Approach or Open Necrosectomy for Necrotizing Pancreatitis

Hjalmar C. van Santvoort, M.D., Marc G. Besselink, M.D., Ph.D., Olaf J. Bakker, M.D., H. Sijbrand Hofker, M.D., Marja A. Boermeester, M.D., Ph.D., Cornelis H. Dejong, M.D., Ph.D., Harry van Goor, M.D., Ph.D., Alexander F. Schaap, M.D., Ph.D., Casper H. van Eijck, M.D., Ph.D.

- N Engl J Med 362:149
2010
Device Removal

- Foley catheter
- Central line
- Prosthetic joint
- Heart valve
Principles of Source Control

- Drainage
- Debridement
- Device removal
- Definitive repair
Timing

- As rapidly as feasible
- Particularly if necrosis present
- Limited data available
Impact of Source Control in Patients With Severe Sepsis and Septic Shock*

María Luisa Martínez, MD¹; Ricard Ferrer, MD, PhD²; Eva Torrents, MD¹; Raquel Guillamat-Prats, PhD³; Gemma Gomà, RN¹; David Suárez, MSc, PhD⁴; Luis Álvarez-Rocha, MD⁵; Juan Carlos Pozo Laderas, MD, PhD⁶; Ignacio Martín-Loeches, MD, PhD⁷; Mitchell M. Levy, MD, FCCP, FCCM⁸; Antonio Artigas, MD, PhD¹³; for the Edusepsis Study Group

TABLE 5. Outcome Measurements in the Source Control Group

<table>
<thead>
<tr>
<th>Outcome Measurements</th>
<th>All Patients Receiving Source Control, n = 1,090</th>
<th>Patients Receiving Source Control &lt; 12 hr, n = 825</th>
<th>Patients Receiving Source Control ≥ 12 hr, n = 265</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of mechanical ventilation, d, mean (sd)</td>
<td>7.1 (13.1)</td>
<td>7.1 (12.9)</td>
<td>7.1 (13.9)</td>
<td>0.995</td>
</tr>
<tr>
<td>Duration of vasopressors, d, mean (sd)</td>
<td>4.8 (8.1)</td>
<td>4.6 (7.5)</td>
<td>5.4 (9.7)</td>
<td>0.168</td>
</tr>
<tr>
<td>ICU stay, d, mean (SD)</td>
<td>12.2 (15.3)</td>
<td>12.1 (15.2)</td>
<td>12.6 (15.4)</td>
<td>0.518</td>
</tr>
<tr>
<td>Hospital stay, days mean (SD)</td>
<td>32.3 (31.3)</td>
<td>31.9 (29.7)</td>
<td>31.6 (28.5)</td>
<td>0.884</td>
</tr>
<tr>
<td>Mortality, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>226 (20.7)</td>
<td>172 (20.8)</td>
<td>54 (20.4)</td>
<td>0.869</td>
</tr>
<tr>
<td>Hospital</td>
<td>299 (27.4)</td>
<td>228 (27.6)</td>
<td>71 (26.8)</td>
<td>0.789</td>
</tr>
</tbody>
</table>
Trial of Short-Course Antimicrobial Therapy for Intraabdominal Infection


<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group (N = 260)</th>
<th>Experimental Group (N = 257)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary outcome: surgical-site infection, recurrent intraabdominal infection, or death — no. (%)</td>
<td>58 (22.3)</td>
<td>56 (21.8)</td>
<td>0.92</td>
</tr>
<tr>
<td>Surgical-site infection</td>
<td>23 (8.8)</td>
<td>17 (6.6)</td>
<td>0.43</td>
</tr>
<tr>
<td>Recurrent intraabdominal infection</td>
<td>36 (13.8)</td>
<td>40 (15.6)</td>
<td>0.67</td>
</tr>
<tr>
<td>Death</td>
<td>2 (0.8)</td>
<td>3 (1.2)</td>
<td>0.99</td>
</tr>
<tr>
<td>Time to event — no. of days after index source-control procedure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis of surgical-site infection</td>
<td>15.1±0.6</td>
<td>8.8±0.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diagnosis of recurrent intraabdominal infection</td>
<td>15.1±0.5</td>
<td>10.8±0.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Death</td>
<td>19.0±1.0</td>
<td>18.5±0.5</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Key Messages

• Consider opportunities for source control in all patients with sepsis

• Undertake as rapidly as feasible

• Re-evaluate adequacy of source control when sepsis fails to resolve

• Engage surgical expertise in decision-making process
Thank you!

marshallj@smh.ca