TAAA Open Repair: Updated Multimodal Approach

Roberto Chiesa
Vascular Surgery, Università Vita-Salute Scientific Institute San Raffaele – Milan, Italy
Conflict of interest

- Co/PI for several thoracic and abdominal aortic stent graft trials (Cook, Inc, Cordis® Corporation, Bolton Medical)
- Lecturer at symposia hosted by Cook, Inc., Bolton, W.L. Gore and Associates, and Medtronic, Inc.
- Educational grants from Cook, Inc.
Contemporary adjuncts

In TAAA open surgery:

• Preoperative
• Intraoperative
• Postoperative
Preoperative adjuncts
Preoperative adjuncts

Imaging – CT scan

• Spinal cord perfusion
Preoperative adjuncts

Imaging – CT scan

- Surgical approach
Preoperative adjuncts

Imaging – CT scan

- Cardiac perfusion
Intraoperative adjuncts
TAAA Open Surgery

Complex multisystemic management
Intraoperative adjuncts
A - Intraoperative Cardiac Management

- Dedicated anesthesiologist
- TEE continuous monitoring
B – Fluid Exchange

- Modulation of fluid exchange and body temperature (Level 1)
  - Pressure infusion system
  - Fluid warmer
C – Intraoperative Blood Salvage

Cell saver:
- Recover the blood loss
- Re-infuse it into the patient
- Rapid Infusion system

Pieri M, Chiesa R et al, EJVS 2017
Proximal cannulation

- Left pulmonary vein cannulation
D – LHBP

Distal cannulation

• Left common femoral artery over-the-wire cannulation (14-16 Fr) or aorta
D – LHBP

• The perfusionist modulates LHBP in continuous agreement with the anesthesiologist
E – Body temperature management

- Circulating water mattress & heat exchanger
- Mild hypothermia
F – MEP & SSEP

• Continuous intraoperative neuromonitoring to assess SC integrity

• Active maneuvers in response to change in the signal
G – CSFD with Liquoguard

- Liquoguard drains and simultaneously measure CSF pressure
- Fully automatic, Volume-controlled or Pressure-controlled CSF drainage
## Renal perfusion with Custodiol

**Curitiba Trial**

- **Prospective double-blind trial 2015 – 2017 in San Raffaele Hospital**

<table>
<thead>
<tr>
<th></th>
<th>Total (n = 84)</th>
<th>Ringer group (n = 42)</th>
<th>Custodiol group (n = 42)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Kidney Injury*</td>
<td>64 (76.2%)</td>
<td>38 (90.5%)</td>
<td>26 (61.9%)</td>
<td>0.002</td>
</tr>
</tbody>
</table>
Proximal aortic clamping

- Between LCCA and LSA
Visceral & Renal a. reimplantation

Carrel patch

Multibranched graft
Visceral & Renal a. reimplantation

- Gore Hybrid
- Faster & easier visceral and renal sutureless anastomosis
Intraoperative Lab adjuncts

Viscoelastic test (ROTEM®)

- Guide use of FFP and PLTs
- ↓ unnecessary transfusions
- ↓ bleeding/coagulopathy
Postoperative adjuncts
Respiratory function support

- Prophylactic NIV
- ↓ Postoperative mortality

Cabrini, Chiesa R et al. Curr Opin Anaesthesiol. 2015
Psychological support

- Daily talks
- Pharmacological support
Results
San Raffaele Experience
1993-2017

949 cases: routinely use of adjuncts in the last 511 TAAAs

<table>
<thead>
<tr>
<th>Extent</th>
<th>n</th>
<th>Paraplegia / Paraparesis</th>
<th>Renal Failure</th>
<th>30-day mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>103</td>
<td>8 (7.7%)</td>
<td>2 (1.9%)</td>
<td>10 (9.7%)</td>
</tr>
<tr>
<td>Type II</td>
<td>148</td>
<td>17 (11.5%)</td>
<td>11 (7.4%)</td>
<td>16 (10.8%)</td>
</tr>
<tr>
<td>Type III</td>
<td>136</td>
<td>9 (6.6%)</td>
<td>7 (5.1%)</td>
<td>13 (9.5%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>124</td>
<td>2 (1.6%)</td>
<td>5 (4.0%)</td>
<td>3 (2.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>511</td>
<td>36 (7.0%)</td>
<td>25 (4.9%)</td>
<td>42 (8.2%)</td>
</tr>
</tbody>
</table>
San Raffaele Experience

Overall survival (on 338 pts with available FU)

<table>
<thead>
<tr>
<th>Overall survival</th>
<th>Estimate Survival*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>87%</td>
</tr>
<tr>
<td>2 years</td>
<td>84%</td>
</tr>
<tr>
<td>3 years</td>
<td>75%</td>
</tr>
<tr>
<td>5 years</td>
<td>64%</td>
</tr>
</tbody>
</table>

*Kaplan-Meier analysis
Conclusions

• Contemporary TAAA repair yields good-to-excellent outcomes in experienced centers

• Long term survival very good

• Results are durable

• Maintain open surgery skills
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