Highlights of Optimal Current Management of Type A Aortic Dissection

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Disclosure
Medtronic, Inc
PI Clinical Trials, Consultant

Edwards Lifesciences
PI Clinical Trials

Terumo Aortic
Royalties, Consultant, Educational Grant,
PI Clinical Trials

WL Gore & Associates
PI Clinical Trials, Consultant

1 st successful acute dissection repair

- 32 year old physician in excellent health
- Overwhelming pain
- Divergent pulse
- Aortic insufficiency
- False lumen obliterated with continuous suture
- Valve resuspended
- Complete recovery

Morris et al, JAMA 1963

Metabolic Demands of the Brain

- The brain’s metabolic rate at rest is 7 times more than the rest of the body
- Requires a constant source of glucose & oxygen which are delivered by blood: No reserves
  Aerobic glycolysis → ATP
  Anaerobic glycolysis → lactate
- Lactate increase & altered pH are fatal to neurons

The Brain Infrastructure:
- 15% total cardiac output
- 25% total body oxygen
- 25% total body glucose
- 2% total body weight
Acute Ascending Aortic Dissection

Gold standard approach
- Urgent open aortic repair
- Excise site of tear
- Graft replacement of ascending aorta
- Management of aortic valve/root as needed
- Limited repair of aortic arch

Crawford et al J Thorac Cardiovasc Surg 1992
Early Outcomes: Surgery for Acute Type A Dissection

<table>
<thead>
<tr>
<th>Registry/Database</th>
<th>Author, y</th>
<th>Years</th>
<th>n</th>
<th>Early death n (%)</th>
<th>Stroke n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS</td>
<td>Lee, 2018</td>
<td>2011-12</td>
<td>2982</td>
<td>519 (17%)</td>
<td>325 (11%)</td>
</tr>
<tr>
<td>GERAADA</td>
<td>Conzelmann, 2016</td>
<td>2006-10</td>
<td>2177</td>
<td>362 (17%)</td>
<td>320 (15%)</td>
</tr>
<tr>
<td>IRAD</td>
<td>Evangelista, 2018</td>
<td>1996-13</td>
<td>2539</td>
<td>502 (20%)</td>
<td>250 (10%)</td>
</tr>
</tbody>
</table>

IRAD: Trends

Evangelista 2018 Circulation
IRAD: Trends

Evangelista 2018 Circulation

Remodeling vs Reimplantaion

“Remodeling”
- Yacoub
- David-II
- David-III
- T. David-IV
- T. David-V

“Reimplantation”
- Scalloped graft
- Straight graft
- T. David-I
- T. David-III
- T. David-IV
- T. David-V

Valve-sparing David 1 procedure in acute aortic type A dissection: a 20-year experience with more than 100 patients

Erik Becevar, Andreia Matias, Jana Petis, Tim Kaith, Julia Vereenbeek, Jan-C S. Hentsch, Jan B. Schmitt, Tangerine Casper, Andries van Schouwen and Inheo L. G. T. van Eijk

Table 2: Postoperative Data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All [N=100]</th>
<th>VSSR [n=59]</th>
<th>ROOT [n=77]</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30d mortality n(%)</td>
<td>12 (8.8)</td>
<td>2 (3.4)</td>
<td>10 (13)</td>
<td>0.05</td>
</tr>
<tr>
<td>Stroke n(%)</td>
<td>3 (2.7)</td>
<td>1 (1.7)</td>
<td>4 (5.2)</td>
<td>0.29</td>
</tr>
<tr>
<td>Discharge to home n(%)</td>
<td>107 (84.3)</td>
<td>52 (89.8)</td>
<td>55 (73.6)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Accepted Manuscript

Durability and safety of David V valving-sparing root replacement in Acute Type A aortic dissection

James T. W. Becevar, MD, PhD, Andreia Matias, Jana Petis, Tim Kaith, Jula Vereenbeek, Jan-C S. Hentsch, Jan B. Schmitt, Tangerine Casper, Andries van Schouwen and Inheo L. G. T. van Eijk

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59 Hemiarch + TEVAR, acute aortic dissection
Jan 1997 - Sept 2018

<table>
<thead>
<tr>
<th>Outcome characteristics</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative (early) death</td>
<td>7 (12.3%)</td>
</tr>
<tr>
<td>30-day death</td>
<td>6 (11.9%)</td>
</tr>
<tr>
<td>Persistent stroke</td>
<td>4 (6.8%)</td>
</tr>
<tr>
<td>Persistent renal failure/dialysis</td>
<td>5 (8.5%)</td>
</tr>
<tr>
<td>Persistent paraplegia</td>
<td>1 (1.7%)</td>
</tr>
<tr>
<td>Adverse event*</td>
<td>11 (18.6%)</td>
</tr>
<tr>
<td>Postop ICU LOS (days), Median [IQR]</td>
<td>10 [4-18]</td>
</tr>
<tr>
<td>Postop LOS (days), Median [IQR]</td>
<td>16 [10-23]</td>
</tr>
</tbody>
</table>

*Early death; Persistent stroke; renal failure; paraplegia; or paraparesis

Open Elephant Trunk Repair

94 Patients
In-Hospital Mortality 12%
- Group 1: 21%
- Group 2: 9%

84 year old
- s/p AVR 1998
- s/p pectoralis flap for wound infection
- CAD, HTN, CHF, multiple DVT's, prior stroke
- Medtronic Talent 36x75
- Still endoleak

Gore TAG 37x10
No endoleak
The GORE® ASG was granted FDA approval in October 2017 and is the current study device for the ARISE EFS.

The device was designed with the challenges of the ascending aorta in mind and features a staged deployment with proximal angulation control to accommodate for the magnitude of curvature in the ascending aorta.

The GORE® ASG is initially deployed to 50% diameter, at which point blood is flowing through and around the device. Positioning adjustments can be made at this stage.

At intermediate diameter, the GORE® ASG has a feature allowing adjustment of the proximal end of the device to optimize orthogonality at the sinotubular junction and maximize proximal seal while preserving coronary artery perfusion and aortic valve function.

Once angulation and position have been optimally adjusted, the device is deployed to full diameter. At this stage angulation adjustments can be further refined as needed.
As I have mentioned in previous writings on aortic dissection, surgery for this aortic dissection is often done by general cardio surgeons who may not be familiar with such complex surgical procedures so aortic valve-sparing operations, and not doing the prosthetic of the aortic root with polyester or porcine aortic valve and biological tissue is probably the safest procedure, since the main goal of this surgery is to save the patient's life. Not only in the emergency situation but also in non-emergency situations, this is the best choice to prevent further damage to the aortic root.