Hybrid Approach to Aortic Arch Disease

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Disclosures

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Complex Arch Disease Requires a Tailored Approach
Hybrid Arch Options Classification by MCS and Timing

Type I
Beating Heart
On or Off Pump

Type II
Cardiac Arrest Only

Type III
Circulatory Arrest
(incl FrozenET and EEC)

Single stage = a, Dual stage = b
Concomitant Cardiovascular Disease is Common Approach Should be Tailored

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>Coronaries</td>
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<tr>
<td>Valve</td>
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<tr>
<td>Ascending</td>
<td>-</td>
<td>+/-</td>
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<tr>
<td>Proximal Arch</td>
<td>-</td>
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Advantage of Staging

- Limits the insult to the patient
- Adjuncts protect the spinal cord
- Single biggest predictor SCI is length of aorta treated
81y/o acute hoarseness, CP

- Inferior wall ischemia
- Cath $\rightarrow$ 70% PLCx and Ig PV of Rt
- CT $\rightarrow$ Large arch aneurysm, Leak
- s/p PPM
- Jehovah’s Witness

- Hybrid Arch Type 1
  - Beating heart
CABG and Debranching
Proximal Graft First
Branch Anastomoses
Antegrade Delivery
Antegrade Device Delivery
Completion CT
Hybrid Arch
Debranching Issues

- Side biting clamps on diseased ascending aorta
  - Emboli, Retrograde dissection
- Ascending aortic diameter - large
- Partial/full sternotomy
- Reliance on extra-anatomic bypass patency
- Landing zone may be unreliable
  - Relatively short
  - 270 degrees curve of arch
  - ? Ascending prosthetic graft
## Results of Hybrid Arch Repairs

**Stentgraft in Zone 0 or 1**

<table>
<thead>
<tr>
<th>Study</th>
<th>Mortality</th>
<th>Stroke</th>
<th>SCI</th>
<th>IaEL</th>
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<td>Schumacher,06</td>
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<td>4%</td>
<td>0%</td>
<td>12%</td>
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**TOTAL**

- 15/144 (10%)
- 5/144 (3.5%)
- 1/144 (0.7%)
- 15 (10%)

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Up to 11% retrograde dissection


Hybrid 3a – Frozen Elephant Trunk single stage

Direct deployment under DHCA

Suture fixation

Case 2 – Acute Dissx with Ischemia

- 67y/o Male presents with abdominal pain, bloody diarrhea
- Acute Type A Dissection
- Turned down for surgery – tx’d
- To Hybrid OR as emergency
Simplified Extended Repair for Debakey Type 1 Dissection

Rt Axillary, cooling, wire into Ao
Rt ax, circ arrest, SA-FET
Post CT
Both Acute and Chronic Indications
86y/o asc an, chronic dissx
Completion CT
Proximal / Retrograde Dissection
Hybrid 3a - Reverse FET

- Estimated 1-3% incidence – especially in type B dissection, CTD
History

- 56 year old man
- Back pain and malperfusion
- PMH- HTN, DM, PAD, CKD, COPD
- PSH
  - TEVAR ‘10
  - TEVAR extension with left subclavian transposition ‘11
58y/o s/p type A dissection repair, severe AI, Max aorta 7cm, Root 5cm

- Redo
- Root replacement
- Arch +
- Extensive coverage required
- Chronic dissection and distal seal issue
First stage ET, Distal Fenestration
EEC 10 wks later
CT at 1 year
Q7. Acute aortic dissection should be treated with a hybrid arch Procedure:

a. Never
b. 100% of the time
c. in selected patients approximately 30% of the time
d. in select patients approximately 60% of the time