How to Treat Infected Suprarenal Aortic Grafts or Endografts by Graft Excision With Restoration of Distal and Critical Branch (Visceral and Renal) Flows:
Not Simple but Doable

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Disclosure
I have no relevant financial relationships to disclose

Treatment of Infected Aortic Grafts

Evolution from axillofemoral to in situ prothetic reconstruction for the treatment of aortic graft infections at a single center

Significant improvement in primary patency and limb salvage with similar procedure related mortality and reinfection rate

In situ rifampin-soaked grafts with amental coverage and antibiotic suppression are durable with low reinfection rates. Graft. native aortic erosion or R

- Operative mortality 2% in nonruptured aneurysms
- Excellent graft patency and limb salvage
- Avoid in patients with excessive perigraft purulence

Our Approach to Graft Infection

- Rapidly assess comorbid conditions
- Drain abscesses prior to operation
- Remove the infected graft or aneurysm and debride periaortic tissues
- Sew to healthy aorta
- Reconstruct with an in-situ graft
- Cover the graft with omentum
- Administer organism-specific IV and then long-term oral antibiotics

Conduit Options

- Rifampin-soaked graft
  - Easily available
  - Effective for low-grade infections / AEF
- Cryopreserved allograft
  - Preferred if extensive purulence or virulent organisms
  - Graft of choice for infected EVAR

Treatment of Infected Endografts

Treatment strategies and outcomes in patients with infected aortic endografts

- Early mortality 4%
- Endograft explantation and in-situ reconstruction is safe.
- Low risk of long-term graft related complications and reinfection.
Para and Suprarenal Aortic Graft Infection

- Preservation of renal / visceral blood flow
- Significant physiological stress
- Presence of large abscess around graft creates further challenge to in-situ repair
- Traditional extra-anatomic reconstruction not feasible
- Choice / availability of conduit
- Creative positioning and tunneling of grafts necessary

Background & Lessons Learned

- These problems are rare but problematic to treat
- We still favor in-situ reconstruction for most patients, but peri-aortic inflammation / abscess may dictate the need for remote reconstruction
- Location, presentation and causative agent matter
- Each patient is different, so surgeons have to be creative
- Important to have a team of anesthesiologists and critical care specialists

Para and Suprarenal Aortic Graft Infection - Treatment Strategy

- Single stage procedure
- Sequential visceral and aorto-iliac reconstruction
- Have several plans for reconstruction, including a remote path for the graft
  - CTA underestimates the amount of periaortic inflammation
  - Perform separate bypasses of the renal or visceral arteries to reduce physiologic stress
- Know exposures of the thoracoabdominal, supraceliac and pararenal aorta
- Choose the correct incision

Treatment of Infected Aortic Grafts

In-situ replacement

- Rifamipin Soaked Dacron
- Cryopreserved arterial conduit

Case Example

- 73 yr old man with infected infrarenal aortic graft + suprarenal mycotic aneurysm
- Osteomyelitis with L2 - L5 destruction
- s/p lumbar decompression
- s/p MI
- Large paraspinal abscess - percutaneous drain
- PCR diagnosed Q Fever
Intra-abdominal Extra-anatomic Aortic Reconstruction

Temporary Axfem Supraceliac aorta-CA,SMA & RRA bypass

Intra-abdominal Extra-anatomic Aortic Reconstruction

Supraceliac aortoiliac bypass with Rifampin soaked dacron

Intra-abdominal Extra-anatomic Aortic Replacement

Extensive abscess and vertebral debridement, left nephrectomy

Intra-abdominal Extra-anatomic Aortic Replacement

Extensive abscess and vertebral debridement, left nephrectomy

Case Example

64 yr old man with infected endograft, AEF and L4 vertebral body erosion

Aortic pseudoaneurysm with air along entire endograft

Intra-abdominal Extra-anatomic Aortic Replacement

• Supraceliac aorto-iliac bypass with cryopreserved allograft
• SMA bypass
• Reimplantation left renal artery
• Ilio-right renal bypass
• Buttress of aortic stump with fascia lata
• Omental wrap

Postop CTA
Intra-abdominal Extra-anatomic Aortic Reconstruction

Hepatorenal and aortorenal bypass with GSV
Supraceliac aorta to B/L EIA bypass with Rifampin soaked dacron

Preoperative Postoperative

Customized Reconstructions

Recurrent aortic graft infection
Antegrade debranching from thoracic aorta
Aortoiliac replacement with dacron

Visceral patch infection
Thoraco-iliac + retrograde visceral dacron grafts
Omental wrap

Customized Reconstructions

Mayo Experience

N = 16 pts
(135 aortic and graft infections)

N=14
N=2

Mean age 64 years
(range 38-82)

• Osteomyelitis – 4 pts
• Q Fever – 2 pts

Operative Details

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
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</thead>
<tbody>
<tr>
<td>Operative approach</td>
<td></td>
</tr>
<tr>
<td>Trans-abdominal</td>
<td>9 (56)</td>
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<tr>
<td>Thoraco-abdominal</td>
<td>7 (44)</td>
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<tr>
<td>In-situ</td>
<td>11 (69)</td>
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<tr>
<td>Extra-anatomical</td>
<td>5 (31)</td>
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<tr>
<td>Conduit</td>
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<tr>
<td>Cryopreserved artery</td>
<td>6 (37)</td>
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<tr>
<td>Rifampin soaked polyester</td>
<td>10 (63)</td>
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<td>Omentoplasty</td>
<td>12 (75)</td>
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Operative Details

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
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<tbody>
<tr>
<td>Renal /Visceral reconstruction</td>
<td>Total 34</td>
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<tr>
<td>Renal bypass only</td>
<td>8 pts (50)</td>
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<td>Renal, SMA + CA bypass</td>
<td>3 pts (50)</td>
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<tr>
<td>Conduit</td>
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<tr>
<td>Rifampin soaked polyester</td>
<td>23 (67)</td>
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<tr>
<td>Cryopreserved artery</td>
<td>11 (33)</td>
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<td>Saphenous vein</td>
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<td>Splenic artery</td>
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### Results

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<thead>
<tr>
<th>Variable</th>
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<tr>
<td>30 day mortality</td>
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<td>In-hospital mortality (2 at SNF)</td>
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<td>18</td>
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<tr>
<td>MSOF</td>
<td>3</td>
<td>18</td>
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<tr>
<td>Myocardial infarction</td>
<td>1</td>
<td>6</td>
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<tr>
<td>Renal failure (dialysis)</td>
<td>2</td>
<td>12</td>
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<tr>
<td>Respiratory failure (tracheostomy)</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Ischemic colitis</td>
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<tr>
<td>Limb ischemia</td>
<td></td>
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<tr>
<td>Hospital stay (Median days)</td>
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### Summary

- Though challenging single stage infected aortic graft excision with visceral and aortic reconstruction can be safely performed
- Sequential reconstruction decreases the physiological stress
- New aortic, renal and visceral grafts can be successfully routed and compartmentalized away from areas of major sepsis
- Early mortality and morbidity are significant but complete graft excision results in low risk of reinfection in survivors

**Median Clinical FU – 6 years**
**Median Imaging FU – 4.5 years**
**No graft thrombosis, re-infection or aneurysmal degeneration**