Endograft Infections: Are Secondary Interventions the Source?

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November 17, 2018
Veith Symposium

Case #1

- 63 year old male
  - COPD, HTN, obesity, CAD
  - November 2008 52mm AAA
  - EVAR Gore Excluder
- Follow-up (2008-2013)
  - CTA sac regression 47mm
  - No endoleak
- June 2017
  - Duplex and CTA
  - Type 2 endoleak, sac enlargement 53mm

Case #1

- Aug 2017
  - Type Ib endoleak right CIA
  - Gore Excluder cuff 24x3.3
- Sept 2017
  - CTA sac 56mm, no endoleak
- March 2018
  - Duplex sac 68mm, type 2 endoleak
- Aug 2018
  - Coiled type II endoleak, 2 plugs placed in left IIA, left iliac limb extension

Case #1

- Aug 2018
  - Called PCP- 3 weeks post
  - Weakness and fatigue
- Sept 2018
  - Left gluteal and inguinal pain
  - Chills, weak and fatigue
- Oct 2018
  - Same symptoms, WBC 12.2
  - CTA: air in sac, 10cm left psoas fluid collection
  - Neg blood cultures

Case #1

- Oct 2018- 2 stage procedure
  - Extra-anatomic bypass
  - EVAR explant
  - Sac filled with purulent slimes
- Gram stain
  - Gram positive rods
- Culture
  - Heavy Cutibacterium Acnes

Disclosures:

- None
EVAR is the preferred treatment of AAA repair. Indications for use have expanded with progressive improvements:

- active fixation, imaging, delivery systems, physician experience
- Mid-term reports still show a significant need for secondary interventions

- 12-30% endoleaks
- 1% device migration
- 0.9% aortic rupture

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EVAR Reinterventions

- Giles et al. - Medicare beneficiaries
  - effect of re-interventions and readmissions after EVAR vs. open AAA repair
- Survival was negatively affected by readmits and re-interventions in both groups
  - even though most secondary endovascular interventions were minor in nature

EVAR Infection

- Infrequent, 0.2-1.0%
- Isolated case reports evolved into multiinstitutional cohorts
- EVAR infections
  - 1/3 present aortoenteric fistulas
- Bacteremia or direct seeding
  - non-vascular procedures
  - 14-38% catheter based secondary interventions

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Treatment and outcomes of aortic endograft infection

- 180 EVAR infections, multicenter
- mean, 22 months post implant
- >14% secondary endo procedures
- 35% 30-day mortality

Preliminary Results from a National Registry of infection in Abdominal Aortic Endovascular Repair (Registry of Infection in EVAR - RE- EVAR)

- 26 cases (’04-’12)
- Mean diagnosis time 20.5 months (range 1-72 months)
- Source:
  - 23% AEF
  - 34.6% secondary endo procedures
  - 30% urgent index procedure
  - 19.2% polymicrobial infections
  - 38.4% 30-day mortality

180 EVAR infections, multicenter
mean, 22 months post implant
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11 French institutions ’98-’15
33 infected EVAR patients (n=6,057)
Median time infection 414 days (range 6 days- 9 years)
Source:
- 30% (10) secondary interventions
- 12% (4) groin infections
- 18% (6) bacteremia
- 55% Gram positive cocci
38% 30-day mortality
UPMC EVAR Explant Experience

<table>
<thead>
<tr>
<th>Event</th>
<th>Primary</th>
<th>Secondary</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>9/13</td>
<td>4/17</td>
<td>13/69</td>
</tr>
<tr>
<td>LOS, median/IQR</td>
<td>12 [8-17]</td>
<td>22 [10-30]</td>
<td>7.9 [6-12]</td>
</tr>
<tr>
<td>Any complication</td>
<td>69.2%</td>
<td>41.2%</td>
<td>46.9%</td>
</tr>
<tr>
<td>MI</td>
<td>15.4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Resp failure</td>
<td>15.4%</td>
<td>11.8%</td>
<td>11.1%</td>
</tr>
<tr>
<td>AKI</td>
<td>38.5%</td>
<td>17.6%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Wound infection</td>
<td>7.7%</td>
<td>0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Return to OR</td>
<td>7.7%</td>
<td>17.6%</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

- 69% (9) secondary interventions
- 46% 1 year mortality

Sources of Infection/Risk Factors

- Perioperative contamination
  - Break in sterile technique
  - Radiology suite
  - Emergent cases
- Wound complications
- Infection, hematomas
- Hematogenous or lymphatic spread
- Secondary endo interventions
- UTI, catheter sepsis, dental, GI
- Mechanical graft erosion
- Impaired host defenses

Secondary Interventions: Association, Causation or Correlation?

- Association: something linked together
- Causation: an action of occurrence that can cause another event (cause and effect)
- Correlation: A statistical measure that describes the size and direction of a relationship between 2 or more variables

Conclusion

- Aortic endograft infections are rare, however the incidence is rising
- Secondary interventions following EVAR procedures appear to be a risk factor for aortic graft infection
- Endograft infections are associated with a high morbidity and mortality
- Utmost importance to maintain sterile technique and administer prophylactic antibiotics for all secondary endovascular catheter based procedures following EVAR