KEYS TO SUCCESS WITH EMBOLIC TREATMENT OF COMPLEX RECALCITRANT TYPE 2 ENDOLEAKS AFTER EVAR

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WHAT INFLUENCE DO TYPE 2 LEAKS HAVE?

- 28% incidence > 1 mo post EVAR with CTA, duplex f/u > 6 mo
- 34% incidence of spontaneous resolution mean f/u 36 mo
- 29% of type 2 leaks required secondary intervention for sac growth > 5 mm or for large AAA / large leak / fixation loss

- All IMA source leaks abolished with embolotherapy
- 36% incidence of small persistent leak after lumbar embolotherapy
- 5 – 10% failure rate embolotherapy & continued expansion required open sac exploration and branch ligations

DISCLOSURES

Physician Training Instructor for Cook Medical / Aortic, WL Gore / Aortic; Medtronic / Aortic

EVOLUTION OF EMBOLOTHERAPY TECHNIQUES FOR COMPLEX TYPE II LEAKS

First
• Transfemoral coil embol of IMA and/or iliolumbar feeder vessels via staged/simultaneous approach
  (before 2002)
• Translumbar aortic sac puncture under fluoro guidance, P monitor
  Coil emb of major IMA / lumbar feeders
  n-BCA glue injection of sac leak & small lumbar feeders
  (2002 to 2005)
• Translumbar aortic sac puncture or translumbar SMA-IMA or iliolumbar sac access under fluoro guidance, P monitor
  No initial coil emb of large feeders
  Onyx glue controlled injection into sac leak & feeders
  (2006 to 2009)

Next
• Surveillance imaging
  – mostly serial aortic duplex and intermittent noncontrast CT for fixation / device stability

Evolution of Embolotherapy Techniques for Complex Type II Leaks: Current Approach

- Surveillance imaging  →  mostly serial aortic duplex and intermittent noncontrast CT for fixation / device stability
- Indications for secondary intervention for persistent type 2 endoleaks
  • AAA diameter growth > 5 mm beyond 6 mo post EVAR
  • Large type 2 leak in AAA > 6 cm size
  • Loss of proximal / distal device fixation associated with altered AAA morphology, limb movement with large type 2 leak
- 3-phase CTA for leak location and feeding branch contributions
- Diagnostic 5-point arteriogram
  • eliminate type I & III leak source with pararenal and B limb injections
  • selected SMA (for IMA) and B hypogastric (for iliolumbar) injections

Current Approach

• Surveillance imaging
  – mostly serial aortic duplex and intermittent noncontrast CT for fixation / device stability

If unsuccessful transarterial access
  →  Translumbar sac puncture

EVOLUTION OF EMBOLOTHERAPY TECHNIQUES FOR COMPLEX TYPE II LEAKS: CURRENT APPROACH

Transarterial / femoral approach
  →  IMA involved? SMA access
  lumbar only? Large iliolumbar access
  under iliac endograft limb to sac nidus
  →  Translumbar sac puncture

<table>
<thead>
<tr>
<th>Table 1. Transarterial Courses Utilized to Access Endoleak Channel</th>
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<tbody>
<tr>
<td>Procedure</td>
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<tr>
<td>Transarterial</td>
</tr>
<tr>
<td>SMA-involved IMA</td>
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<tr>
<td>Under iliac endograft limb</td>
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<tr>
<td>External iliac inflow sheath</td>
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</table>
Transfemoral access to SMA and selective middle / left colic to IMA microcath → Injection shows sac nidus and lumbar L3 outflow → EVOH (Onyx) extrusion into lumbar, sac and IMA origin

Complex type II leak with IMA and multiple lumbar feeders - translumbar sac puncture and embolotherapy

IMA & lumbar contributions

Coil embo of IMA, lumbar and sac with emergence distal lumbar

Additional coil & glue embo

2009 data, n = 33 type 2 embolizations
Mean f/u = 28 mo (3 – 86 mo post intervention)
Treated type 2 group average 8 mm growth after mean 22 mo post EVAR before intervention
Arrested growth and AAA behavior similar to untreated type 2 patients

Recent data, n=53 type 2 embolizations but early follow-up only (mean 4 mo)
34 % some residual type 2 endoleak detectable
More complete embolization leads to early AAA growth stabilisation

Table 1. Follow-Up Imaging Data for All Type II Endoleaks

<table>
<thead>
<tr>
<th>Change in Aneurysm Size</th>
<th>n</th>
<th>% Residual Endoleak Rate</th>
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<tbody>
<tr>
<td>Decrease by &gt; 1cm²</td>
<td>24</td>
<td>45.3%</td>
</tr>
<tr>
<td>Stabilized (&lt; 1cm² change)</td>
<td>15</td>
<td>35.3%</td>
</tr>
<tr>
<td>Increase by &gt; 1cm²</td>
<td>14</td>
<td>33.7%</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>100%</td>
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<tr>
<td>*n = 42</td>
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| AAA diameter changes relative to type II leak management: mean 28 months post treatment, comparative groups mean 33 months post EVAR

- Expansion
- No change
- Regression

TREATED TYPE 2 LEAK
UNTREATED TYPE 2
NO LEAK

<10% 42% 23% 54% 70%
P = 0.06

CONCLUSIONS

- Type 2 leaks are common and most persist
- Up to 30% cases type 2 leak associated with sac expansion and require embolotherapy
- Presence of type 2 leaks associated with late fixation loss
- Transarterial approach successful in most cases / less need for translumbar puncture
- Evolved use of EVOH / Onyx to fill sac nidus & extrusion into branch origins
- > 90 % mid/late term success