Should Type II Endoleaks Be Taken Seriously?

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What do patients want from an AAA repair?

• Low risk
• Quick return to normal activities
• Minimal follow up
• No re-interventions
• Knowledge that their AAA is fixed for good
Does EVAR fulfil patients’ wishes?

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- Quick return to normal activities
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Endoleaks are the Achilles heel of EVAR
Type II Endoleak Most Common

Type II endoleak is an enigmatic and unpredictable marker of worse outcome after endovascular aneurysm repair.

Almost 400 peer-reviewed papers published in last 5 years

Long-term outcomes of secondary procedures after endovascular aneurysm repair

CX35 experts sharply divided on type II endoleak challenge
Endoleak impact

• EUROSTAR EJVES 2004
  – 3995 patients
  – 55% rate of AAA growth or re-interventions with a type 2 leak
  – 15% if no type 2 leak
  – Significant association with late conversion

"more frequent surveillance visits for patients with type II endoleak"
Endoleak impact

- **OVER trial** VEITH 2014
  - 881 patients
  - After 6yrs 31% endoleak rate (76% type 2)
  - Reduced sac regression with endoleak

- **Stanford group** JVS 2014
  - After 48m EVARs with type 2 leak 1cm larger
  - 35% re-intervention rate v 0% if no leak

  "significantly associated with aneurysm sac growth"
Type II leaks predict sac expansion

“5-year post EVAR rate of AAA Sac Enlargement was 41%”
At least 1 in 8 Patients Treated w/ EVAR will undergo Secondary Intervention within 5 years$^{1-8}$

### Observational Studies
- **Conrad (2009), 832**: 13%
- **EVAR-1 (2010), 626**: 26%
- **Al-Jubouri (2013), 558**: 14%
- **Abbruzzese (2009), 565**: 20%
- **Dias (2009), 279**: 23%
- **Verzini (2014), 882**: 13%

### RCTs
- **DREAM (2010), 173**: 25%
- **EVAR-2 (2010), 197**: 25%
- **EVAR-1 (2010), 626**: 26%

13% - 26% Reinterventions reported across studies
2/3 of Secondary Interventions after EVAR are due to Endoleaks.
# All Endoleaks Matter

<table>
<thead>
<tr>
<th>Treatment indication</th>
<th>Patients, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type II endoleak + sac enlargement (1 rupture)</td>
<td>10 (56)</td>
</tr>
<tr>
<td>Type III endoleak</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Type Ia and II endoleak</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Type Ia and Ib endoleak</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Type Ia endoleak + rupture</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Stent graft thrombosis + type II endoleak</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Aortoenteric fistula</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Limbs’ thrombosis</td>
<td>1 (5.6)</td>
</tr>
<tr>
<td>Type Ib endoleak</td>
<td>1 (5.6)</td>
</tr>
</tbody>
</table>

Complications more prevalent in patients with type II endoleak

<table>
<thead>
<tr>
<th>Event</th>
<th>Type II EL</th>
<th>No Type II EL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aneurysm Sac Enlargement</td>
<td>40%</td>
<td>17%</td>
</tr>
<tr>
<td>Secondary Intervention</td>
<td>15%</td>
<td>7%</td>
</tr>
<tr>
<td>Rupture</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Conversion</td>
<td>6%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Type II Endoleak **DOUBLES** complications following EVAR

Newer generation endografts fail to reduce type II related reinterventions.

Tadros et al. (2014) % reinterventions (mean follow up 2.5 yrs)

Re-intervention outcomes for type II are suboptimal

“endovascular intervention for type II endoleak with aneurysm sac growth does not appear to alter the rate of aneurysm sac growth, and the majority of patients display persistent / recurrent endoleak.”

Secondary Reinterventions Increase Costs

<table>
<thead>
<tr>
<th>Event</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endoleak</td>
<td>$5,706</td>
<td>$26,739</td>
</tr>
<tr>
<td>Secondary Intervention</td>
<td>$3,668</td>
<td>$31,696</td>
</tr>
</tbody>
</table>

“Efforts aimed at minimizing cost should emphasize technical and device modifications aimed at reducing endoleaks and the need for secondary procedures.”

Re-intervention costs money

Cost (£)

14000
12000
10000
8000
6000
4000
2000
0

EVAR group
£ 13,258

Open repair group
£ 9,946

- Secondary interventions/scanning
- Other costs of primary admission
- Hospital stay and ITU/HDU usage
- Costs of primary procedure
Direct impact on patients

• DREAM trial
  – Quality of life better early on with EVAR
  – By 6 months open repair was superior
    » EJVES 27 February 2004: 121–127

• Radiation exposure

• Repeated contrast dosing
  – EVAR leads to a deterioration in renal function
    » J Endovasc Ther 2008, Boyle et al
“don’t worry that your aneurysm is getting bigger”
Overall Endoleak Rates at 6-12 Months

- EVAS Forward Global Registry: Mean follow-up 6 months
- 1-year results shown for Aorfix and Incraft (6 month data not reported)
Thank you for your attention
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