De novo Peri-Aortic Inflammatory Response (DPAIR) after EVAR: What is its significance

A. Stella

FINANCIAL DISCLOSURE
Nothing to declare

Recognized EVAR complications
- Endoleaks
- Limb kinking/thrombosis
- Stent-graft fracture/tearing
- Infection
- Inflammation

Imaging After EVAR

CT

PET-CT

18 FDG uptake of the anterior aortic wall

Aortic wall enhancement

CEUS
DPAI / Incidence

2005 – 2013
- 713 elective EVAR for infra-renal AAA
- DPAI 3 (0.4%)
  2 medical treatment
  1 conversion to OR (sac enlargement)

# 1
- 54 yrs-old M
- BMI 35
- Infra-renal AAA Ø 58mm
- ASA III
- Vascutek-Anaconda

# 1  F. up 1-month
- Back pain
- Fatigue
- Malaise

Symptoms

# 1  F. up 3-month
- No infection
- No renal problem
- No anemia

Laboratory

# 1  F. up 3-month
- Peri-aortic inflammation
- Oral steroid therapy

# 1  F. up 12-month
- Persistent Inflammation, but
  Symptoms disappeared
# 1  F. up 24-month

**Inflammation reduction**

# 1  After 60 months

**Inflammation disappeared**

AAA-shrinkage

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# 2

- 76 yrs-old M
- Infra-renal AAA
  - Ø 54mm
- ASA III
- Gore Excluder C3

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# 2  F. up 3-month

**Symptoms**
- Back pain
- Fatigue
- Malaise
- Fever

**Laboratory**
- No infection
- No renal problem
- No anemia
  - ↑ ERS

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# 2  F. up 3-month

**Peri-aortic inflammation**

**Oral steroid therapy**

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# 2  F. up 6-month

**Inflammation and AAA volume reduction**
Inflammation disappeared
AAA-shrinkage

80 yrs-old F
Infra-renal AAA
Ø 60mm
ASA IV
AUI Medtronic-Talent

# 3 F. up 1-month
EL type II

Symptoms
- Acute back pain
- Fatigue

Laboratory
- Hb 8.8 mg/dl
- ↑ ERS

# 3 F. up 37-month
Open Repair for acute back pain
Peri-aortic inflammation

Endoleak Type II

1 Discussion (DPAIR)

Clinical onset
- Abdominal pain
- Fatigue/malaise
- Fever

Radiological pattern

After 3 months
There are several analogies with iAAA

iAAA

DPAIR

2 Discussion (DPAIR)

- Pubmed 2000 – 2015
- English languages
- Key-words
  - peri-aortic inflammation
  - peri-aortic fibrosis
  - aortitis
- AFTER endovascular aneurysm repair EVAR

DPAIR Literature review

<table>
<thead>
<tr>
<th>Author</th>
<th>Journal</th>
<th>Year</th>
<th>Cases</th>
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<tr>
<td>Simons</td>
<td>AJR</td>
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<td>Jetty</td>
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<td>Brouw</td>
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<td>Vijaynagar</td>
<td>AVS</td>
<td>2011</td>
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<td>Alomran</td>
<td>AVS</td>
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DPAIR / Timing

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<th>Time (month)</th>
<th>Clinical onset</th>
<th>Laboratory</th>
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<tbody>
<tr>
<td>1</td>
<td>17</td>
<td>abdominal pain, ureteric obstruction</td>
<td>1 ESR</td>
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<td>5</td>
<td>anuria, acute renal failure</td>
<td>1 ESR, 1 creatinine</td>
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<td>3</td>
<td>36</td>
<td>abdominal pain, malaise, fever</td>
<td>1 ESR, 1 RCP</td>
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<tr>
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<td>3</td>
<td>back pain, fatigue</td>
<td>1 ESR, 1 RCP</td>
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<td>5</td>
<td>9</td>
<td>left loin pain, ureteric obstruction</td>
<td>1 ESR, 1 RCP, 1 creatinine</td>
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<tr>
<td>6</td>
<td>8</td>
<td>acute renal failure</td>
<td>1 RCP, 1 creatinine</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>back pain, fatigue</td>
<td>1 ESR</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>Malaise, fever, fatigue</td>
<td>1 ESR</td>
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<tr>
<td>9</td>
<td>37</td>
<td>abdominal pain, malaise</td>
<td>anemia, 1 ESR</td>
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</table>

DPAIR / Clinical onset

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DPAIR / Etiology - Pathogenesis 1

**Immune modulate reaction**

- **EVAR is trigger** for an inflammatory reaction...
- Releasing of atheromatous material into deeper layers
- Local inflammatory reaction to antigens leads to chronic aortitis
Microscopic Appearances
- intima
- media
- adventitia

- thrombus, atheromatous infiltrations, disruption IEL
- loss of smooth muscle, fragmentation of elastic fibres, inflammatory infiltration, collagenization
- markedly thickened, densely infiltrated with lymphocytes, plasma cells, histiocytes

Walker, Br J Surg 1972

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Inflammatory Aneurysm (IAAA)

Insidious extension of the post-implantation syndrome after EVAR

Alomran, Ann Vasc Surg, 2014

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Material and Farmacological

Immune modulate reaction
- Polyester endograft material
- Nickel in the metal endograft meshwork
- Reaction to drugs
  - B-adrenergic blockers, methyldopa, amphetamines, cocaine

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Results of the endovascular abdominal aortic aneurysm repair using the Anaconda aortic endograft

How to treat it?
**DPAI / Treatment**

<table>
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<tr>
<th>N</th>
<th>Treatment</th>
<th>Result</th>
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<tr>
<td>1</td>
<td>Nephrectomy + Tamoxifen (10mg x 2/die)</td>
<td>solved</td>
</tr>
<tr>
<td>2</td>
<td>Dialysis + Ureteric stents + Prednisone (60mg/die for 1 year)</td>
<td>solved</td>
</tr>
<tr>
<td>3</td>
<td>Prednisone (dose not reported)</td>
<td>solved</td>
</tr>
<tr>
<td>4</td>
<td>Prednisone (dose not reported)</td>
<td>solved</td>
</tr>
<tr>
<td>5</td>
<td>Ureteric stent + Tamoxifen (10mg twice daily) + Prednisone (60mg/die for 3 months)</td>
<td>solved</td>
</tr>
<tr>
<td>6</td>
<td>Prednisone (20 mg/die for 3 months)</td>
<td>solved</td>
</tr>
<tr>
<td>7</td>
<td>Prednisone (20 mg/die for 6 months)</td>
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<tr>
<td>8</td>
<td>Conversion to OR</td>
<td>solved</td>
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</table>

**Conclusion**

**De novo peri-aortic inflammation after EVAR**

- Very rare and idiopathic EVAR complication
- Early detection allows a conservative treatment
- High dose of steroid and/or tamoxifen stops the inflammation and prevent urologic complications
- Ureteral stenting to treat urinary obstruction