Nellix-In-Nellix With Proximal Extension
For Failed EVAS: Technique And
Multicenter Results
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Endovascular Aneurysm Sealing
- Commercially introduced in 2013 to reduce the incidence of re-intervention and late complications
- Multiple manuscripts have been published on the short-term outcome
- Maturation in indications for treatment, instructions for use, procedural practice and the device itself
- Complications including migration, AAA growth and proximal endoleak have been recognized

Classification of Post-EVAS Endoleaks

Management of type Ia after EVAS
Emboliization with coils and glue/Onyx

Management of type Ia after EVAS
Proximal extension with secondary Nellix

Suitable only in patients with gutter endoleaks without migration

Suitable in patients with migration with or without an endoleak
Management of type Ia after EVAS
Proximal extension with secondary Nellix

- At least 2-3 cm protrusion; chimney’s often indicated
- Flaring of initial stent (12 mm)
- Stents as long as possible; increase rigidity
- Unfurling of endobags prior to stent deployment
- Nellix balloons deflated during fill
- Low volume
  - Steep volume-pressure curve
  - Contrast (contrast polymer ration <10%)


Management of type Ia after EVAS
Proximal extension with secondary Nellix

- Retrospective observational cohort study
- 12 international sites (>50 EVAS procedures)
  - Elective cases: N=32
  - Ruptures: N=9
  - Time from first procedure was 18.5 months (IQR 12.3-35.3)
- Indication for NINA in elective cases
  - Type Ia endoleak n=7
  - Migration without endoleak n=5
  - Migration with endoleak/growth n=16
  - Other n=4

Anatomical characteristics at time of first EVAS
Elective cases (n=32)

<table>
<thead>
<tr>
<th>Anatomical characteristic</th>
<th>Median (IQR)</th>
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<tbody>
<tr>
<td>Maximum AAA sac diameter (mm)</td>
<td>63 (58-65)</td>
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<tr>
<td>Maximum AAA lumen diameter (mm)</td>
<td>38 (30-43)</td>
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<tr>
<td>Maximum infrarenal neck diameter (mm)</td>
<td>25 (23-31)</td>
</tr>
<tr>
<td>Infrarenal neck length (mm)</td>
<td>17 (10-26)</td>
</tr>
<tr>
<td>Infrarenal neck angulation (degrees)</td>
<td>20 (10-46)</td>
</tr>
<tr>
<td>Maximum diameter left CIA (mm)</td>
<td>16 (13-20)</td>
</tr>
<tr>
<td>Maximum diameter right CIA (mm)</td>
<td>17 (13-20)</td>
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</tbody>
</table>

5/32 electively cases were primary treated with Chimney-EVAS

Management of type Ia after EVAS
Proximal extension with secondary Nellix

- Procedural time 208 min (IQR 164-256)
- Used Nellix stents 100 mm (100-120 mm)
- Chimney’s n=21 (65%)
- Polymer volume 15 mL (IQR 11-30 mL)
- Polymer pressure 200 mmHg (190-240 mmHg)
- Technical success* 93.8%
- Postprocedural endoleak n=2 (6.3%)
  - Type Ia n=1
  - Type II n=1

* = defined as successful introduction and deployment of the device without conversion, death, type I or II endoleak, or graft limb occlusion within 24 hours after the procedure.

Management of type Ia after EVAS
Proximal extension with secondary Nellix

- 30-day outcome in elective cases:
  - Mortality rate n=1 (3.1%)
  - Reintervention rate n=7 (22%)
    - Embolization type Ia endoleak n=1
    - Thrombus aspiration chimney n=1
    - Access related re-interventions n=2
    - Conversion for endobag rupture n=1
    - Compartment syndrome n=2

Management of type Ia after EVAS
Proximal extension with secondary Nellix

Latest FU in elective cases (median 3 months (IQR 1-11));
- Overall mortality n=6 (18%)
- AAA-related death n=1 (3.1%)
- Re-migration n=2 (6.2%)
- Reinterventions n=2 (6.3%)
  - PTA stenosis n=1
  - Embolisation type Ia endoleak n=1
Management of type 1a after EVAS

Conversion

- 42 conversions (4.2%) in 8 international high volume sites
  - 67% elective procedures
  - 33% acute procedures (rupture or impending rupture)
- Mean time to conversion 20 months
- Indications for conversion
  - Migration
  - Type Ia endoleak
  - Infection
- Overall mortality
  - Elective conversion 7% (2/28)
  - Emergency conversion 42% (6/14)

Summary

- Type 1a and migration are the most common late complications after EVAS
- The Nellix-in-Nellix technique differs significantly from primary EVAS
- Nellix-in-Nellix is feasible with a low 30-day mortality, but related to a significant early re-intervention rate
- Conversion to open repair remains to be preferred in the fit patients

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