Intra procedural 3D imaging
during endovascular aortic procedures:
Technical solutions to reduce radiation and contrast

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Disclosure

- Research grant: Siemens Healthcare
- Speakers fee: Siemens Healthcare
3- D Imaging: EVAR workflow

- Preoperative: Sizing
- Procedure: Fluoroscopy & DSA, Completion DSA
- Postoperative: CTA
3-D Imaging: EVAR workflow

- **Preoperative**
  - Sizing

- **Procedure**
  - Guidance: Fluoroscopy & DSA
  - Evaluation: Completion DSA

- **Postoperative**
  - CTA

- **Preoperative**
  - Sizing / Segmentation

- **Procedure**
  - Guidance: Fusion Imaging
  - Evaluation: Cone Beam CT

- **Postoperative**
  - CEUS
3-D Imaging: EVAR workflow

Preoperative
- Sizing

Procedure
- Guidance: Fluoroscopy & DSA
- Evaluation: Completion DSA

Postoperative
- CTA

Preoperative
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Procedure
- Guidance: Fusion Imaging
- Evaluation: Cone Beam CT

Postoperative
- CEUS
3-D Guidance: Fusion Imaging
3-D Guidance: Fusion Imaging

Preoperative CTA + Fluoroscopy = Fusion Imaging

Registration
Fusion Imaging: 3D - 2D Registration

Preoperative CTA

Intraoperative Fluoro

3-D

Registration

2-D
Fusion Imaging: 3D – 2D Registration
Fusion Imaging: 3D – 3D Registration

pre-operative CTA

3-D

Registration

non-contrast Dyna CT

3-D
Fusion Imaging: 3D – 3D Registration
Case: Anastomotic Aneurysm
Centerline measurement tool
Software Solutions
to correct vessel deformation iliac arteries
3- D Guidance: Quality Assessment
Dyna CT Acquisition
5s Protocol; 90 LAO - 110 RAO
Dyna CT: Volume of Acquisition

Standard EVAR ✔
FEVAR ✔
Iliac Side branch ✔
Branched Endografts ?
Detection of complications
New workflow reduces reinterventions

Procedure:
- EVAR
  - Completion DSA
  - Postoperative CTA
    - Technical Success?
      - No: Reintervention
      - Yes: Standard Follow-up

Procedure:
- EVAR: Fusion Imaging
  - Intraoperative Dyna CT
    - Technical Success?
      - Yes: Immediate Revision
      - No: CEUS
        - Standard Follow-up
## Radiation and contrast reduction

<table>
<thead>
<tr>
<th></th>
<th>DynaCT replaces completion DSA runs</th>
<th>DynaCT replaces completion DSA runs + postoperative CTA</th>
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</thead>
<tbody>
<tr>
<td>Reduction of radiation dose (%)</td>
<td>-5% (±2%, p&lt;0.05)</td>
<td>Procedure: -5% Postop CTA: + 7 mSv</td>
</tr>
<tr>
<td>Reduction of contrast dose (%)</td>
<td>+3% (±1%, p=0.21)</td>
<td>-48% (±13%, p&lt;0.05)</td>
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Summary

Technical solutions for a 3-D Imaging workflow

Fusion imaging:
- Fast & Easy use
- Optimal Guidance for endovascular procedures
- Tool to further reduce radiation & contrast

Completion ceDynaCT:
- Reduces Reinterventions
- Reduces “in hospital” radiation & contrast exposure
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