The role of 2D and 3D fusion imaging in the reconstruction of complex aortic pathologies

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Disclosure

Speaker name:

.........Dr. Giovanni F. Torsello..................................................

I have the following potential conflicts of interest to report:

☐ Consulting

☐ Employment in industry

☐ Stockholder of a healthcare company

☒ Owner of a healthcare company: Vascupedia

☐ Other(s)

☐ I do not have any potential conflict of interest
Why use fusion imaging?
Radiation-induced DNA damage

Operators performing Complex EVAR suffer increased DNA damage in circulating WBC

El-Sayed T et al.
Radiation Induced DNA Damage in Operators Performing Endovascular Aortic Repair.
Circulation 2017
Complex EVAR
How is fusion imaging employed?
Preparation
Measurement / Obtaining Raw Data

- Durchschnittsdurchmesser 55.8 mm
- Minimaldurchmesser: 48.4 mm
- Maximaldurchmesser 62.3 mm

- Durchschnittsdurchmesser 62.2 mm
- Minimaldurchmesser: 57.2 mm
- Maximaldurchmesser 66.7 mm

- Durchschnittsdurchmesser 59.5 mm
- Minimaldurchmesser: 53.9 mm
- Maximaldurchmesser 65.9 mm
  Fläche: 2778 mm²

- Durchschnittsdurchmesser 60.3 mm
- Minimaldurchmesser: 57.0 mm
- Maximaldurchmesser 62.7 mm
Imaging Modalities
Step 1: Automatic Segmentation

- Lumen Outline
- Centerline
- Vessel Take-off
- Orthogonal Ring
Step 2: Patient preparation
Step 3: Automatic Registration
Step 4: Working Projection
Step 5: Deployment
Step 6: Vessel catherization
Postoperative CTA
Does this really make a difference?
Fusion Imaging reduces radiation exposure

- 5/7 publications report radiation dose reduction $^2,^4-^6$
- True for both 2D3D $^5$ and 3D3D $^4$
- In 2/7, the fluoro time was reduced $^4,^5$

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<th>Nr.</th>
<th>First Author</th>
<th>Year</th>
<th>Fusion vs. Standard guidance</th>
<th>Method</th>
<th>Radiation dose</th>
<th>Fluoro time</th>
<th>2D3D / 3D3D</th>
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<td>3D3D</td>
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What’s the difference between 2D and 3D Fusion?
2D3D Fusion workflow

1. Pt is brought to Hybrid OR and positioned

2. ± 10 mGy Skindose

- Similar workflow, no additional time, very little extra radiation
- Fusion „on the fly“
Altered workflow, necessitating additional time, radiation and contrast (OR personnel?)

Patient is positioned after obtaining the 3D dataset (arms)
Conclusions

Fusion imaging reduces radiation exposure

With progressing technology, we will be able to create vascular models without altering workflow or wasting time
Thank you!

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Universitätsmedizin Berlin

St. Franziskus Hospital
Münster
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