Optimize radiation and contrast dose by complex aortic procedures: the role of 2D/3D fusion imaging

G. Panuccio

Department of Vascular Surgery
St. Franziskus Hospital Münster
University Hospital Münster
Head: Univ.-Prof. Dr. G. Torsello
Disclosure

Speaker name:

............... G. Panuccio............................

I have the following potential conflicts of interest to report:

☐ Consulting

☐ Employment in industry

☐ Stockholder of a healthcare company

☐ Owner of a healthcare company

☒ Honoraria and Travel Cost: Siemens

☐ I do not have any potential conflict of interest
Radiation Exposure in complex endovascular procedure

„...effort must be made to decrease radiation dose...“

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FUSION
# Intraoperative C-arm cone-beam computed tomography in fenestrated/branched aortic endografting

Martijn L. Dijkstra, BA, Matthew J. Eagleton, MD, Roy K. Greenberg, MD, Tara Mastracci, MD, and Adrian Hernandez, MD, PhD, Cleveland, Ohio

<table>
<thead>
<tr>
<th></th>
<th>CBCT fusion</th>
<th>Historical control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoro time (minutes)</td>
<td>Median (IQR) 81 (54-118)</td>
<td>90 (46-128)</td>
<td>.932</td>
</tr>
<tr>
<td>Contrast dose (cc)</td>
<td>Median (IQR) 94 (72-131)</td>
<td>136 (96-199)</td>
<td>.001</td>
</tr>
<tr>
<td>Radiation dose (mGy)</td>
<td>Median (IQR) 7 (4-12)</td>
<td>7 (5-10)</td>
<td>.782</td>
</tr>
<tr>
<td>Operative time (minutes)</td>
<td>Median (IQR) 330 (273-522)</td>
<td>387 (290-477)</td>
<td>.651</td>
</tr>
<tr>
<td>Technical success</td>
<td>N (%) 28 (85)</td>
<td>44 (90)</td>
<td>.975</td>
</tr>
</tbody>
</table>
Extra Radiation Exposure needed
SkinDose 300 mGy

Extra Contrast agent needed
SkinDose ca 50ml
Münster Experience since November 2012

Fusion Prototype

2D/3D Registration MESH model

Extra Radiation Exposure needed

SkinDose increase ca10 mGy

No additional contrast agent
Set up in the hybrid room
Step 1: Automatic Segmentation

- Lumen Outline
- Centerline
- Orthogonal Ring
- Vessels Take-off
Step 2: Automatic Registration
Step 3: choose Working Projection
Step 4: Delivery and Alignment

Take off CT
Take off SMA
Take off Renal Arteries

CT bifurcation
Step 5: Deployment
Step 6: Vessel catheterization
Vessel catheterization
Arch
Semi Automatic Registration
Fusion assisted deployment
Iliac Vessel

Distortion Correction of MESH model

before

after
Conclusions

Fusion simplify this complex procedure
- Less angiography
- No pre catheterization of the target vessel

2D/3D Registration simplify the workflow
- No Rotational Scanning
- Just 10mGy radiation exposure

Overlapping MESH Model
- Reduce time to identify the targets
- Improve Image quality (noise reduction)
- More information for the operator
  - Projection, length assessment
  - Distortion Correction

Radiation Exposure
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