The Image-Fusion using 2D-3D registration in TEVAR procedures

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Disclosure

I do not have any potential conflict of interest.
The principle of image fusion (IF) is to produce a roadmap-overlay based on the preoperative CTA or MR and merge this overlay with the intraoperative fluoroscopic imaging.

This could be done in 2 ways; either as 2D-3D or as a 3D-3D registration.
Aim of Study

• Accuracy and effect of applying IF technology using the 2D-3D (based on 2 fluoro images) in patients undergoing TEVAR on the patient’s:

• *radiation exposure (dose and time),*
• *amount of injected contrast medium needed*
• *as well as procedural time.*
Methods-Patients

• Between 2008-2016, 314 (146 included) patients underwent TEVAR.

• IF began March 2013.

Comparison:

• IF vs.
• No-IF
## Results

<table>
<thead>
<tr>
<th></th>
<th>IF</th>
<th>Controls</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/ Female</td>
<td>54/44</td>
<td>31/17</td>
<td>0.290*</td>
</tr>
<tr>
<td>Age (years)</td>
<td>72, IQR: 62-77</td>
<td>76.5, IQR: 61.5-83</td>
<td>0.036‡</td>
</tr>
<tr>
<td>BMI</td>
<td>25.2, IQR: 19.9-28.7</td>
<td>26.6, IQR: 23.8-31.3</td>
<td>0.263‡</td>
</tr>
<tr>
<td>Diameter of Aneurysm (mm)</td>
<td>62.5, IQR: 53.5-68.8</td>
<td>61.5, IQR: 55-70</td>
<td>0.952‡</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>11(11%)</td>
<td>7(14.6%)</td>
<td>0.402*</td>
</tr>
<tr>
<td>PAD</td>
<td>29(29.6%)</td>
<td>12(25%)</td>
<td>0.806*</td>
</tr>
<tr>
<td>CAD</td>
<td>40(42.9%)</td>
<td>20(41.7%)</td>
<td>0.912*</td>
</tr>
<tr>
<td>ATH</td>
<td>47(48%)</td>
<td>23(47.9%)</td>
<td>0.320*</td>
</tr>
</tbody>
</table>
Results

For the whole cohort (n= 146), there was a significant lower iodinated contrast medium use in the IF group in comparison to in controls. (P<.001)
I- TEVAR with a carotid-subclavian artery bypass:

(26 Patients Vs. 11 Patients)
TEVAR with Carotid-Subclavian Bypass

P = .015

Procedure Time (min)

No use of IF

Use of IF
TEVAR with Carotid-Subclavian Bypass

P = .058
Use of IF

TEVAR with Carotid-Subclavian Bypass

P < .005
TEVAR with Carotid-Subclavian Bypass

P = .370
II- TEVAR without a carotid-subclavian artery bypass:

(44 Patients Vs. 30 Patients)
TEVAR without Carotid-Subclavian Bypass

P = .545
Use of carotid-subclavian bypass: No subclavian bypass

P = .848
Use of carotid-subclavian bypass: No subclavian bypass

P = .281
Conclusion

• IF could reduce the amount of iodinated contrast medium.

• With carotid-subclavian bypass even with a significant reduction of fluoroscopic and procedural time.

• More experience and confidence with IF is needed.

• Larger and even more conform cohorts are needed.
Thank You for Your Attention
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