Geometrical remodeling of the aortic arch after hybrid treatment

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AIM

To measure the morphological remodeling of the thoracic aorta and aortic arch after hybrid treatment, which could be potentially related to clinical complications.

MATERIALS AND METHODS

Study design. Pre-operative and the 1-month post-operative CT scans are analyzed in order to reconstruct and compare the 3D shape of both the aortic lumen and endograft.

RESULTS

1 month FU results are reported.

### Clinical parameters

<table>
<thead>
<tr>
<th>TOTAL (n=22)</th>
<th>ZONE 0 (n=10)</th>
<th>ZONES 1-2 (n=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical success</td>
<td>100 %</td>
<td>100 %</td>
</tr>
<tr>
<td>Mortality</td>
<td>4.55 %</td>
<td>4.55 %</td>
</tr>
<tr>
<td>Reintervention rate</td>
<td>9.10 %</td>
<td>4.55 %</td>
</tr>
<tr>
<td>RTAD Endoleaks</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Changes between pre-op and 1 month FU centerline values are reported.

- **L: CENTERLINE LENGTH**
  - TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
  - +5.34 mm (P<0.05)
  - +9.00 mm (P<0.05)
  - +2.46 mm (P>0.05)

- **D<sub>AR-LSA</sub>: DISTANCE AORTIC-ROOT – LEFT SUBCLAVIAN ARTERY**
  - TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
  - +2.91 mm (P=0.01)
  - +3.50 mm (P>0.05)
  - +1.78 mm (P>0.05)

- **CVD: CENTERLINE VASCULAR DISTANCE**
  - TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
  - +1.12 mm (P>0.05)
  - +0.73 mm (P>0.05)
  - +1.40 mm (P>0.05)

### Point-wise curvature of the centerline: inverse of the radius of the circle which approximates the centerline in a given point.

- Type IA endoleak
- Greater risk of proximal neck degeneration

### Mean curvature: point-wise curvature values are averaged to compute mean curvature of the three aortic segments.

#### AA: ASCENDING AORTA

| TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>+ 7 % (P&lt;0.01)</td>
<td>+ 14 % (P&lt;0.01)</td>
<td>+ 1.5 % (P&gt;0.05)</td>
</tr>
</tbody>
</table>

#### SR: STENTED REGION

| TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>-3.3 % (P=0.005)</td>
<td>-3 % (P=0.05)</td>
<td>-3.5 % (P=0.05)</td>
</tr>
</tbody>
</table>

#### DA: DESCENDING AORTA

| TOTAL (n=22) | ZONE 0 (n=10) | ZONES 1-2 (n=12)
<table>
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<tbody>
<tr>
<td>+ 7 % (P&gt;0.05)</td>
<td>+ 15 % (P&gt;0.05)</td>
<td>+ 0.5 % (P&gt;0.05)</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- Hybrid arch repair is associated with a significant elongation of the vessel and a significant increase of curvature on the ascending aorta and on endograft proximal and distal landing zones.
- No evidence of a relationship of such remodeling with the type of endograft and type of pathology was observed.
- Curvature changes correlate with complications occurred at short or mid-term follow-up.

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