CBCT – what is it and how can it improve endovascular treatment compared to DSA and pressure measurement?

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Disclosure

COOK Medical - Consulting, IP, Speaker, Investigator
Cordis – Investigator
Medtronic – Investigator, SAB
GORE - Investigator

EVAR

- DSA

AOID

- DSA
- Pressure Measurement

Completion Imaging

<table>
<thead>
<tr>
<th></th>
<th>Endoleaks</th>
<th>Limb issues</th>
<th>Branch/Fens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiography</td>
<td>++</td>
<td>+</td>
<td>+ (flow)</td>
</tr>
<tr>
<td>Pressure Measurement</td>
<td>-</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Discharge CT</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>

Cone Beam Computed Tomography

- “angioCT”
- With or without contrast
- Protocol
  - 9/5 sec acquisition, 30F/s (220 degrees)
  - Contrast 140mgI/ml
    - 8ml/sec (8sec)
    - Total 72/40ml
- Immediate reformatting in Workstation
Most complications are seen and treated within 30 days post EVAR


Subanalysis show that patients who undergo CBCT require less reinterventions

• Tripple fenestrated
• Preloaded system
• Crack and Pave

Results

<table>
<thead>
<tr>
<th></th>
<th>Final DSA</th>
<th>CBCT</th>
<th>1 mo CTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1 EL</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Type 2 EL</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Stentgraft compression</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Stentgraft kink</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Conclusion

- CBCT detected 80% of type 1 EL
- CBCT detects structural issues better than DSA

Problem

- Tortuous Vessels
- Multiple stents complicate visualization
- DSA often supplemented by Pressure measurements
- Post op re-interventions often needed to achieve results comparable to open surgery

Prospective AOID trial

- 53 patients
- DSA + Pressure measurement + CBCT
Control CBCT after additional stenting

Results

<table>
<thead>
<tr>
<th></th>
<th>DSA + PM</th>
<th>DynaCT</th>
<th>PM + DynaCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kissing stents</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Other (CIA)</td>
<td>4 (0)</td>
<td>7 (5)</td>
<td>0</td>
</tr>
</tbody>
</table>

38% of patients needed additional intraoperative adjunctive procedures

25% identified by CBCT only

1/3 needed additional intraoperative adjunctive procedures

2/3 identified by CBCT only

CAUTION
RADIOACTIVE
Results

<table>
<thead>
<tr>
<th>Patient</th>
<th>TG 200 Fantom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effective dose (mSv)</td>
</tr>
<tr>
<td>DynaCT 5s</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>DynaCT 8s</strong></td>
<td><strong>9.6</strong></td>
</tr>
<tr>
<td>Somatom 16</td>
<td>15.6</td>
</tr>
<tr>
<td>Flash</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Can DynaCT replace CTA or final angio?

- More sensitive for EL than DSA
- Better for structural problems
  - Kinks, compression
- Can be used w/o contrast for
  - Fenestrated/branch
- Adds Radiation To Procedure
  - Use judiciously!!