Do we need an Angio-CT suite to optimize embolization procedures?

Michael Moche, Jochen Fuchs
Dep. of Interventional Radiology, 310Klinik Nuremberg
Disclosure

Speaker name: Michael Moche

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s), Test-Site of Siemens Healthineers

- I do not have any potential conflict of interest
Do we need CT like images at all?

In 42 of the 52 lesions (81%), cone-beam CT provided additional useful information for therapeutic decision making or TACE compared with DSA.

J Vasc Interv Radiol. 2007
Usefulness of cone-beam volume CT with flat panel detectors in conjunction with catheter angiography for transcatheter arterial embolization. Kakeda et al.

AJR Am J Roentgenol. 2009
Impact of a unified CT angiography system on outcome of patients with hepatocellular carcinoma. Toyoda et al.

n = 182
(p = 0.0093)
Do we need CT like images at all?

CB-CT can significantly increase detection of tumors and tumor feeding arteries during TACE and should be considered as an adjunct tool to DSA during TACE of HCC.

J Vasc Interv Radiol. 2017
The Role of Cone-Beam CT in Transcatheter Arterial Chemoembolization for Hepatocellular Carcinoma: A Systematic Review and Meta-analysis (18 studies).
Pung et al.
CT guided superselective application

1.5 ml CM
Endoleak type 2 – no transvascular access

CT-guided puncture and guidewire placement

Fluoroscopic embolization
Endoleak type 2 – no transvascular access

CT-guided puncture and guidewire placement

Fluoroscopic embolization

Transfer of the patient
## CB-CT versus cCT

<table>
<thead>
<tr>
<th></th>
<th>CB-CT</th>
<th>cCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast resolution</td>
<td>5-10 HE</td>
<td>1 HE</td>
</tr>
<tr>
<td>Speed incl. prep</td>
<td>90 sec</td>
<td>20 sec</td>
</tr>
<tr>
<td>Breath hold</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Dose</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>FoV</td>
<td>~30cm</td>
<td>~50cm</td>
</tr>
</tbody>
</table>
CB-CT versus cCT

Coverage and Artifacts

Am J Roentgenol. 2008
Visualization of hypervascular liver lesions During TACE: comparison of angiographic C-arm CT and MDCT. Meyer et al.

- Liver not be visualized completely in 2/3 of the pat.
- Significant more Artifacts

<table>
<thead>
<tr>
<th>Segments</th>
<th>MDCT</th>
<th>C-Arm CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of resected liver segments</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Segments incompletely covered by imaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In both phases</td>
<td>0</td>
<td>8 (7)</td>
</tr>
<tr>
<td>In one phase</td>
<td>6 (5)</td>
<td>8 (7)</td>
</tr>
<tr>
<td>Segments completely covered by imaging in both phases</td>
<td>111 (95)</td>
<td>101 (86)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification of Artifacts&lt;sup&gt;a&lt;/sup&gt;</th>
<th>MDCT</th>
<th>C-Arm CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>None (A1)</td>
<td>115 (98)</td>
<td>68 (58)</td>
</tr>
<tr>
<td>Minor (A2)</td>
<td>2 (2)</td>
<td>21 (18)</td>
</tr>
<tr>
<td>Moderate (A3)</td>
<td>0</td>
<td>28 (24)</td>
</tr>
<tr>
<td>Major, not diagnostic (A4)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<sup>a</sup> p = 0.042

<sup>b</sup> p = 0.017
Answers to take home

- It's all about targeting - the future of embolization therapy
- cCT superior to CB-CT (IQ, FOV, speed, reduction of CM)
- cCT gold standard for percutaneous needle guidance
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