Carotid Plaque Volume measured by Tomographic 3D Ultrasound

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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)

☐ I do not have any potential conflict of interest
Asymptomatic carotid surgery trial (ACST)
N=3,120  follow-up 5 years

ipsilateral stroke

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>sem</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEA</td>
<td>2.7</td>
<td>0.5</td>
</tr>
<tr>
<td>medical</td>
<td>9.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Difference 6.8%
95% CI  4.8-8.8

p<0.0001
Carotid Plaque Remodels
Carotid Plaque Volume

\[ \text{CPV} = \frac{Wt}{D} \]
Carotid Plaque Volume

$N=339$

<table>
<thead>
<tr>
<th></th>
<th>Symptomatic</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n$</td>
<td>270</td>
<td>69</td>
</tr>
<tr>
<td>Mean cm$^3$</td>
<td>0.97</td>
<td>0.74</td>
</tr>
<tr>
<td>SD</td>
<td>0.43</td>
<td>0.41</td>
</tr>
</tbody>
</table>

$p<0.01$

Ball & Rogers et al, BJS (2018); 105:262-269.
Carotid Plaque Volume
N=339

P<0.001

Ball & Rogers et al, BJS (2018); 105:262-269.
Carotid Plaque Volume

N=270

Ball & Rogers et al, BJS (2018); 105:262-269.
Tomographic 3D ultrasound (tUS)

N=200

Volume of Lumen = 336.456 mm³
Volume of Wall = 795.34 mm³
Difference Wall - Lumen = 459.884 mm³
Tomographic 3D Ultrasound (tUS)

N=200
Image Fusion
CPV measured by tUS
N=56

7 asymptomatic
7 female

Median stenosis 60 – 69%

B-mode
CEUS
Fused
tUS Intra-observer (cm³)
N=56

$r=0.96$
$p<0.0001$

$\text{bias}=0.03 \text{ cm}^3$
$\text{sd}=-0.17 \text{ cm}^3$
tUS Inter-observer (cm³)
N=56

r=0.93
p<0.0001

bias=-0.07 cm³
sd=-0.19 cm³
CEA vs tUS CPV’s (cm³)
N=56

**B-mode**
- Bias = -0.18 ± 0.32 cm³
- r = 0.87
- P < 0.0001

**Fused**
- Bias = -0.07 ± 0.19 cm³
- r = 0.92
- P < 0.0001
Carotid Plaque Volume (CPV)

Relates to cerebral ischemia symptoms

Accurately measured in patients by tUS

Does CPV predict stroke?

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