Abstract: 3039
Vulnerability of carotid atherosclerosis: relationship with plaque location, plaque eccentricity and vessel remodeling patterns. Insight from the the MAGNETIC observational study

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Carotid atherosclerosis is a cause of brain ischemic events. Cardiovascular magnetic resonance (CMR) can assess plaque vulnerability. We investigated atherosclerosis vulnerability in relation to plaque location, eccentricity and vessel remodeling. Methods-Baseline CMR evaluations of the MAGNETIC observational study, were analyzed. We quantitated with MRI-Plaque View™, vessel lumen/wall and vulnerable plaque components of a 32-mm segment of common carotid artery (12 mm), bulb (8 mm) and internal carotid artery (12 mm). Lipid-rich necrotic core [LRNC], fibrous cap [CAP] and intraplaque hemorrhage [IPH] were expressed as percent of wall area. Results-A data-set of 8080 sections of adequate quality in 260 patients (198 male [76%], median age 71 years [65–76]), were analyzed. Patients were on therapy with antiplatelet, ACE-inhibitors/ARB and statins (196–229 out of 260 [75–88%]). We found significant differences in plaque composition according to longitudinal and circumferential location, eccentricity and vessel remodeling (table). At multivariate regression analysis, including classical RF and atherosclerotic burden, we found an independent association of: LRNC and IPH with longitudinal location, eccentricity and positive remodeling, and of CAP with eccentricity (p<0.001 for all).

Conclusions: Carotid atherosclerotic plaque vulnerability seems to be independently associated with longitudinal location, plaque eccentricity and vessel positive remodeling.

<table>
<thead>
<tr>
<th>Lipid-rich necrotic core</th>
<th>Fibrous cap</th>
<th>Intraplaque hemorrhage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longitudinal distribution</strong></td>
<td><strong>Common carotid artery</strong></td>
<td><strong>Carotid bulb</strong></td>
</tr>
<tr>
<td>4% [1–10] p&lt;0.001</td>
<td>6% [4–11] p&lt;0.001</td>
<td>0% [0–3] p&lt;0.001</td>
</tr>
<tr>
<td><strong>Circumferential location</strong></td>
<td><strong>Antero-medial</strong></td>
<td><strong>Antero-lateral</strong></td>
</tr>
<tr>
<td>4% [0–11] p&lt;0.001</td>
<td>7% [4–12] p&lt;0.07</td>
<td>0% [0–2] p&lt;0.001</td>
</tr>
<tr>
<td><strong>Plaque eccentricity</strong></td>
<td><strong>Concentric</strong></td>
<td><strong>Eccentric</strong></td>
</tr>
</tbody>
</table>

Plaque eccentricity was defined as eccentricity index (EI = [maximum wall thickness − minimum wall thickness]/maximum wall thickness) in the highest quartile. Positive remodeling was defined as remodeling index (= [vessel cross-sectional area − reference area]/cross-sectional area) in the highest quartile.
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