Abstract: P3411

Prevalence and risk factors of multifocal cardiovascular calcification in patients at high cardiovascular risk

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Topic(s):
Prevention – Cardiovascular Risk Assessment: Imaging

Citation:

Background
Cardiovascular calcification is associated with a higher risk for cardiovascular disease (CVD). The pathophysiology of calcium deposition is different for arteries and heart valves, and is not yet completely understood.

Purpose
The aim of the present study is to determine the prevalence of coronary artery calcification (CAC), thoracic aorta calcification (TAC) (including ascending aorta, aortic arch, and descending aorta), mitral annulus calcification (MAC), and aortic valve calcification (AVC), and to compare the associations with predetermined cardiovascular risk factors, in patients at high cardiovascular risk.

Methods
Computed tomography imaging was performed in 645 patients with stable CVD or marked risk factors, visualizing heart and thoracic aorta. Prevalence of site-specific and multifocal calcification was determined. To quantify the association of risk factors with cardiovascular calcification per location, ordinal regression analyses were performed. 99% confidence intervals were estimated to account for multiple testing.

Results
Prevalence of CAC, TAC, MAC, and AVC was 82%, 65%, 13%, and 48% respectively. Patients with MAC were most likely to have calcification in other locations simultaneously (Table 1). Age was associated with calcification in all locations (lowest OR 2.18; 99%CI 1.58-3.05 for ascending aorta calcification), and number of packyears with vascular calcification (lowest OR 1.26; 99%CI 1.03-1.54 for CAC). Diabetes mellitus and systolic blood pressure were associated with TAC, whereas waist circumference and male sex were determinants of CAC (Figure 1).

Conclusion
Arterial and heart valve calcifications are generally multifocal in a population at high vascular risk. Age was the only consistent risk factor. Differences in association with cardiovascular risk factors imply limited influence of atherosclerotic pathways in heart valve calcification compared to vascular calcification, and suggest more pronounced tunica media involvement in TAC than in CAC.

<table>
<thead>
<tr>
<th></th>
<th>Coronary artery calcification (CAC)</th>
<th>Mitral annulus calcification (MAC)</th>
<th>Aortic valve calcification (AVC)</th>
<th>Thoracic aorta calcification (TAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>524</td>
<td>83</td>
<td>306</td>
<td>415</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Location of calcification</th>
<th>Coronary artery calcification (CAC)</th>
<th>Mitral annulus calcification (MAC)</th>
<th>Aortic valve calcification (AVC)</th>
<th>Ascending aorta calcification (AAC)</th>
<th>Aortic arch calcification (AAC)</th>
<th>Descending aorta calcification (DAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients (%)</td>
<td>524 (82%)</td>
<td>83 (13%)</td>
<td>306 (48%)</td>
<td>190 (28%)</td>
<td>318 (49%)</td>
<td>289 (44%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Male</td>
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<td></td>
<td></td>
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<tr>
<td>Diabetes mellitus</td>
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<td></td>
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<tr>
<td>Packyears</td>
<td></td>
<td></td>
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<tr>
<td>Waist circumference (cm)</td>
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<tr>
<td>Systolic blood pressure (mmHg)</td>
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<tr>
<td>Pulse pressure (mmHg)</td>
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</tbody>
</table>

Prevalence of calcification is shown for patients with presence of CAC, MAC, AVC, or TAC. For example; 103 (20%) of the patients with CAC have no calcification in other studied locations, and 77 (15%) of the patients with CAC have MAC as well.

Odds ratios with 99% confidence intervals are shown per location, adjusted for age, sex, packyears of smoking, systolic blood pressure, LDL cholesterol, kidney function, and diabetes mellitus (if not determinant of interest).