Vessel Calcification: Any Consensus on Reporting Standards?

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Disclosures

- Consultant / Speaker / Proctor / Advisory Board
  - Abbott
  - Bayer
  - Bard
  - Boston Scientific
  - Cook
  - Cordis
  - Ev 3-Covidien
  - Medtronic
  - Spectranetics
  - TriReme Medical
  - Volcano
  - W.L. Gore & Associates
Vascular Calcification

“ossification of the arteries”

- Diabetes mellitus
- Chronic kidney disease
- Aging

↑ Ca+++ and Phosphate

Induction of osteogenesis

Inhibition of mineralization

Migration and differentiation of macrophages and SMC into osteoclast-like cells

Mineral deposit in the intimal or media layer of the vessels

KJ Rocha-Singh – Cath Cardiovasc Interv 2014
A Sage – Nat Rev Cardiol 2010
How to evaluate … ?
How to evaluate … ?

USCD – CT Angiography – DSA – Xray – IVUS
How to evaluate … ?

Intimal vs. Medial calcifications
How to evaluate … ?

Circumferential and longitudinal distribution
Semiautomated Quantification of the Mass and Distribution of Vascular Calcification with Multidetector CT: Method and Evaluation

Institutional review board approval was obtained for this HIPAA-compliant study. Informed consent was obtained for prospective evaluation in 21 asymptomatic volunteers (10 women, 11 men; mean age, 60 years) but waived for retrospective (10 patients with and five patients without disease) evaluation. Prospective validation was in...
The COMPLIANCE 360° Trial: A Randomized, Prospective, Multicenter, Pilot Study Comparing Acute and Long-Term Results of Orbital Atherectomy to Balloon Angioplasty for Calcified Femoropopliteal Disease

Raymond Dattilo, MD1*; Stevan I. Himmelstein, MD2; Robert F. Cuff, MD, RVT3


Peripheral Arterial Calcification: Prevalence, Mechanism, Detection, and Clinical Implications

Krishna J. Rocha-Singh,1* MD, FACC, FAHA, Thomas Zeller,2 MD, and Michael R. Jaff,3 DO, FACC, FAHA

Catheterization and Cardiovascular Interventions 83:E212–E220 (2014)

Calcium Burden Assessment and Impact on Drug-Eluting Balloons in Peripheral Arterial Disease

F. Fanelli · A. Cannavale · M. Gazzetti · P. Lucatelli · A. Wilder · C. Cirelli · A. d’Adamo · F. M. Salvatori

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Raymond Dattilo, MD¹; Stevan I. Himmelstein, MD²; Robert F. Cuff, MD, RVT³


<table>
<thead>
<tr>
<th>Angiographic Calcium Score</th>
<th>1 (2.6%)</th>
<th>0 (0.0%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (none): no calcium on 2 orthogonal views</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>1 (mild): calcium deposits &lt;180° (on 1 side of vessel) in circumference and &lt;50% of total lesion length</td>
<td>6 (15.8%)</td>
<td>8 (29.6%)</td>
</tr>
<tr>
<td>2 (moderate): calcium deposits ≤180° in circumference and ≥50% of total lesion length</td>
<td>11 (29.0%)</td>
<td>7 (26.0%)</td>
</tr>
<tr>
<td>3 (moderate severe): calcium deposits ≥180° in circumference (on both sides of vessel) and &lt;50% of total lesion length</td>
<td>9 (23.3%)</td>
<td>6 (22.2%)</td>
</tr>
<tr>
<td>4 (severe): calcium deposits ≥180° in circumference and ≥50% of total lesion length</td>
<td>11 (29.0%)</td>
<td>6 (22.2%)</td>
</tr>
<tr>
<td>Mean score</td>
<td>2.61</td>
<td>2.37</td>
</tr>
</tbody>
</table>
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Peripheral Arterial Calcification Scoring Systems (PACSS)
**Peripheral Arterial Calcification: Prevalence, Mechanism, Detection, and Clinical Implications**

Krishna J. Rocha-Singh,¹ MD, FACC, FAHA, Thomas Zeller,² MD, and Michael R. Jaff,³ DO, FACC, FAHA

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**Peripheral Arterial Calcification Scoring Systems (PACSS)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No visible calcium at the target lesion site</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Unilateral calcification &lt; 5 cm; a) intimal calcification; b) medical calcification; c) mixed type</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Unilateral calcification ≥ 5 cm; a) intimal calcification; b) medical calcification; c) mixed type</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bilateral calcification &lt; 5 cm; a) intimal calcification; b) medical calcification; c) mixed type</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bilateral calcification ≥ 5 cm; a) intimal calcification; b) medical calcification; c) mixed type</td>
<td></td>
</tr>
</tbody>
</table>

Intimal and medial vessel wall calcification assessed by high intensity floroscopy and DSA in AP projection
Calcium Burden Assessment and Impact on Drug-Eluting Balloons in Peripheral Arterial Disease

F. Fanelli · A. Cannavale · M. Gazzetti · P. Lucatelli · A. Wlderk · C. Cirelli · A. d’Adamo · F. M. Salvatori

60 pts with PAD

- USCD, CTA, DSA, IVUS

- CT Angiography
- CT Angiography: CIRCUMFERENTIAL Distribution

Grade 1

Grade 2

Grade 2

Grade 4
Calcium Evaluation

- DSA: LONGITUDINAL Extension

Group A: < 3 cm
Group B: > 3 cm
## Calcium Evaluation

<table>
<thead>
<tr>
<th>GROUP</th>
<th>DIAMETER</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 a</td>
<td>0 – 90°</td>
<td>&lt; 3 cm</td>
</tr>
<tr>
<td>1 b</td>
<td></td>
<td>&gt; 3 cm</td>
</tr>
<tr>
<td>2 a</td>
<td>90 – 180°</td>
<td>&lt; 3 cm</td>
</tr>
<tr>
<td>2 b</td>
<td></td>
<td>&gt; 3 cm</td>
</tr>
<tr>
<td>3 a</td>
<td>180 – 270°</td>
<td>&lt; 3 cm</td>
</tr>
<tr>
<td>3 b</td>
<td></td>
<td>&gt; 3 cm</td>
</tr>
<tr>
<td>4 a</td>
<td>270 – 360°</td>
<td>&lt; 3 cm</td>
</tr>
<tr>
<td>4 b</td>
<td></td>
<td>&gt; 3 cm</td>
</tr>
</tbody>
</table>
Conclusions

- Calcium plays an important role in the results of all endovascular techniques
- Compared with the coronaries a non-invasive standard, method does not exist
- Few studies have proposed a method of classification
- However a consensus do not exist yet
- Further studies are necessary to validate one of the proposed methods of classification or to introduce a new one
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