The Role of Cardio-Ankle Vascular Index (CAVI) as an Indicator of the Severity of Coronary Artery Disease - Virtual Histology Intravascular Ultrasound Analysis
Jee Eun Kwon, Sang-Wook Kim, Wang-Soo Lee, Joon Ha Hwang, Sharath Kumar, Eun Young Kim, Kuang Ji Lee, Cho Jeong Kim, Dai Yun Cho, Tae Ho Kim

Background: Cardio-Ankle Vascular Index (CAVI) was developed as a parameter of atherosclerosis that does not depend on the blood pressure than pulse wave velocity (PWV). We assessed the predictive value of CAVI as an indicator of coronary artery disease and whether it reflects the severity of CAD.

Method: We assessed CAVI in 474 patients before undergoing coronary angiography. 207 patients had normal coronary angiogram, and 267 patients were confirmed to have coronary artery disease. IVUS analysis of the culprit lesion was done. VH-IVUS-defined thin-capped fibroatheroma (VH-TCFA) had necrotic core (NC) > 10% of plaque area, plaque burden >40%, and NC in contact with the lumen for >3 image slices.

Results: CAVI was higher in patients with coronary artery disease than normal patients (8.96 ± 1.54 vs 8.03 ± 1.39, p = 0.03). Among patient with coronary artery disease, patients with multi-vascular disease showed higher value of CAVI (8.76 ± 1.53 vs 8.23 ± 1.26, p < 0.001). IVUS analysis of the culprit lesion was amenable in 102 pts who were divided into 2 groups: CAVI < 9.52pts and CAVI ≥ 9.50pts. While minimal lumen area, plaque burden and remodeling index were similar, lesion length were longer in CAVI ≥ 9 group. CAVI showed correlation with lesion length (r = 0.615, p = 0.001), whereas not with minimal lumen area (r = −0.048, p = 0.672). Among 4 components (fibrotic, fibrofatty, necrotic, calcium), lesion maximal calcium (%) was higher in CAVI ≥ 9 group and also showed correlation with CAVI (r = 0.521, p < 0.001). The frequency of VH-TCFA phenotype was similar between the two groups (19/52 (36.5%) vs 17/50(34%), p = 0.263).

Conclusions: High CAVI value might suggest more severe (longer lesion length) and greater coronary artery disease complexity (more calcified plaque coronary lesion).

Table. Predictors of Recurrent Chest Pain based on 3-year Clinical Outcomes.

<table>
<thead>
<tr>
<th>Variable</th>
<th>CAVI &lt; 9 (n=52)</th>
<th>CAVI ≥ 9 (n=50)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesion length (mm)</td>
<td>15.94±5.86</td>
<td>20.68±5.76</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Distal reference lumen area (mm²)</td>
<td>6.71±3.28</td>
<td>7.03±2.52</td>
<td>0.619</td>
</tr>
<tr>
<td>MLA lumen area (mm²)</td>
<td>2.66±1.15</td>
<td>2.59±0.84</td>
<td>0.941</td>
</tr>
<tr>
<td>MLA plaque burden (%)</td>
<td>78.37±8.58</td>
<td>78.78±7.60</td>
<td>0.823</td>
</tr>
<tr>
<td>Remodeling index (MLA site)</td>
<td>0.84±0.18</td>
<td>0.78±0.16</td>
<td>0.117</td>
</tr>
<tr>
<td>Necrotic core (%) (max. NC site)</td>
<td>33.87±4.91</td>
<td>32.83±9.09</td>
<td>0.614</td>
</tr>
<tr>
<td>Dense calcium (%) (max. NC site)</td>
<td>9.12±8.02</td>
<td>9.82±7.18</td>
<td>0.582</td>
</tr>
<tr>
<td>Lesion Max. dense calcium (%)</td>
<td>11.48±10.43</td>
<td>18.71±10.59</td>
<td>0.003</td>
</tr>
</tbody>
</table>

* CAD indicates coronary artery disease, CAS, coronary artery spasm, FCL, Fixed atherosclerotic-coronary lesion.

CRT-154

Percutaneous Treatment of Refractory Heart Failure Secondary to Old Myocardial Infarction by Anteropapical Splinting Stent in the Left Anterior Descending Coronary
Hugo Gutiérrez Leonard, Luis Enrique Berumen Dominguez, Josue Luis Ojeda Delgado, Rodolfo Barrios Nanni, Miguel Ramirez Aldaraca

Hospital Militar, Mexico, Mexico

Background: Determine the therapeutic effect of splinting with stenting the LAD. Improve the NYHA functional class. Improve the ejection fraction.

Methods: A total of 48 patients between 62 and 74 years old, 31 men and 17 women, from October 2009 through February 2013. We established a randomized study, 2 groups each one with 24 patients. All patients suffered refractory heart failure with left fraction ejection less than 30% in class III and IV (NYHA classification). Transhoracic echocardiogram was performed at admission, 6 and 12 months, nuclear imagine was done the day after improving their medical conditions, all studies shows no viability in this territory and coronary angiography was done the next day. All patients suffered from LAD disease only, and the vessel was patent in every one. We deliver bare metal stents from distal to proximal, the stents used are from 2.5mm to 3.5mm in diameter and 28 to 36mm long. We performed coronary angiography and ventriculography by femoral access then in the most severe lesions we made angioplasty before delivering the stents as we mentioned. All stents were spliced together with 5 mm each from distal to proximal just to the main lesion. All patients are reassessed clinically each month and an echocardiography study was performed at 6 and 12 months.

Results: The functional class improves in all the patients from the experimental group (24 patients), 21 patients pass to II functional class and only 3 patients stayed in III
functional class, actually 2 patients died, the first one died at the next 8 months and the second one at the 18 months. From the control group 6 patients died in the first year, in the next six months 3 more patients died and all 6 patients stayed in III and the rest in IV functional class. The left fraction ejection improve in a average 5%, but in all the patients the therapeutic medication were reduced. From the control group we found that 80% of the patients were hospitalized around 3 or 4 times per year and in the experimental group only 10%.

**Conclusion:** This technique is effective for treat patients with refractory heart failure, besides being easy to apply, during the procedure there were no deaths, and functional class improved significantly for patients in a period of 6 months until these period. The containment of the discinetique zone with a mechanical barrier effect, promoted the consequent increase in the contractility of the rest of the walls. This clinical trial is innovative for the treatment of refractory heart failure using a percutaneous technique.

**Multi-Center Prospective Study to Evaluate Outcomes of Moderate to Severely Calcified Coronary Lesions (MACE): Study Design and Acute Outcomes**

**Samin Sharma**  
Mount Sinai Medical Center, NY, NY

**Background:** Recently presented retrospective analysis comparing none, moderate, and severely calcified coronary lesions showed that percutaneous coronary intervention (PCI) patients that have moderate/severely calcified coronary lesions have poorer outcomes than patients with none/mild calcified coronary lesions.

**Methods:** MACE study conducted by Cardiovascular Systems Inc. (CSI) is the first study that will prospectively monitor PCI outcomes in patients with varied degrees of calcification in coronary lesions. This study will enroll up to 500 subjects in up to 50 U.S. study sites. The objectives of the MACE study are to: 1) assess current standard of care treatment outcomes in none/mild (n=300), moderate (n=200), and severe (n=200) calcified coronary lesions. 2) Obtain financial data and procedure data to support reimbursement initiatives and health care economics analysis. Subjects scheduled for endovascular treatment involving stent deployment in de novo coronary lesions are qualified to be included in the study. Endovascular treatment is defined as treatment with commercially available devices that may include but is not limited to balloon, cutting balloon, Rotablator, etc. followed by the stent placement. The subjects will not be included in the study if 1) diagnosed with chronic renal failure unless under hemodialysis or has a serum creatinine level >2.5 mg/dl; 2) have evidence of current LVEF <25%; 3) have history of major cardiac intervention within 30 days, not including a PCI procedure for a staging purpose; 4) have uncontrolled insulin dependent diabetes.

**Results:** The primary endpoint is to assess the current standard of care treatment when used to facilitate stent deployment in de novo, coronary lesions. This will be measured by a composite of major adverse cardiac events (MACE) at 30 days and 1-year post procedure. MACE is composed of cardiac death; myocardial infarction (MI) — defined as a CK-MB level > 3 times the upper limit of lab normal (ULN) value with or without new pathologic Q wave; and target vessel revascularization (TVR) — defined as revascularization at the target vessel (inclusive of the target lesion) after the completion of the index procedure. Secondary endpoints include procedural success and health economics.

**Conclusion:** An interim analysis of acute outcomes will be presented on up to 50 subjects that have completed the discharge visit.