Table 1: Differences related to QCA and OCT findings after 9-months implantation among BMS, E-ZES, EES and BES

<table>
<thead>
<tr>
<th></th>
<th>BMS</th>
<th>E-ZES</th>
<th>EES</th>
<th>BES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Restenosis rate (%)</strong></td>
<td>38.2</td>
<td>27.1</td>
<td>14.9(\pm)0.8</td>
<td>14.8(\pm)0.6</td>
</tr>
<tr>
<td><strong>Target lesion revascularization rate (%)</strong></td>
<td>13.6</td>
<td>4.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Covered strut rate (%)</strong></td>
<td>98.4</td>
<td>99.0</td>
<td>93.7(\pm)3.2</td>
<td>96.4</td>
</tr>
<tr>
<td><strong>Uncovered strut rate (%)</strong></td>
<td>0.17</td>
<td>0.18</td>
<td>3.58(\pm)0.8</td>
<td>0.99(\pm)0.6</td>
</tr>
<tr>
<td><strong>Malapposed covered rate (%)</strong></td>
<td>0.82</td>
<td>0</td>
<td>1.73(\pm)0.3</td>
<td>1.77(\pm)0.2</td>
</tr>
<tr>
<td><strong>Malapposed uncovered rate (%)</strong></td>
<td>0.46</td>
<td>0</td>
<td>1.1(\pm)0.2</td>
<td>1.73(\pm)0.2</td>
</tr>
<tr>
<td><strong>Malapposed uncovered rate (%)</strong></td>
<td>0.36</td>
<td>0</td>
<td>0.63(\pm)0.2</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Tissue coverage thickness (µm)</strong></td>
<td>346.8</td>
<td>267.0</td>
<td>93.4(\pm)19.6</td>
<td>73.4(\pm)19.6</td>
</tr>
<tr>
<td><strong>Neointimal coverage area (%)</strong></td>
<td>35.3</td>
<td>28.5</td>
<td>11.5(\pm)2.4</td>
<td>9.16(\pm)2.4</td>
</tr>
<tr>
<td><strong>Evaporation/strut (%)</strong></td>
<td>0.8</td>
<td>0.02</td>
<td>2.45(\pm)0.5</td>
<td>8.12(\pm)0.5</td>
</tr>
</tbody>
</table>

**TCT-557**

IVUS Echogenicity Analysis of the Paclitaxel-Eluting Absorbable Magnesium Scaffold (DREAMS)

Michael Haude, Nico Brunning, Raimund Erbel, Paul Erne, Stefan Verheyen, Paul Vermeersch, Hubertus Degen, Dirk Boese, Ron Waksman, Jacques Koolen

**Background:** The aim of this study is to explore the application of IVUS derived parameters to act as a surrogate monitoring the absorption and degradation process of a Paclitaxel-Eluting-Absorbable Magnesium Scaffold (DREAMS) implanted in human coronary arteries. The ultrasonic changes of this scaffold are assumed to have a strong relationship towards its degradation and biore sorption process.

**Methods:** Serial IVUS data of the BIOSOLVE-I study was analysed by applying differential echogenicity analyses, a method which previously showed that visual changes of the ultrasonic appearance of biodegradable scaffolds can be quantitatively identified.

**Results:** In post-implantation IVUS images, the struts of the magnesium scaffold appear as clearly visible and quantifiable hyperechogenic spots without, unlike calcified areas, causing any acoustic shadowing. Echogenicity analyses of pre- and post-implantation scaffolded segments showed a significant increase of %hyper-echogenicity caused by the scaffold from 9 to 22% (p<0.001), respectively (Figure 1). At 6 months the %hyper-echogenicity decreased significantly from 22 to 16% (p<0.001). At further time points the scaffolded segments showed still a continuous further decrease of %hyper-echogenicity, however, leveling off to a non-significant change between 12 and 18 months, 13 vs. 12% (p=0.5).

**Conclusions:** The magnesium scaffold shows a continuous decrease of its ultrasonic appearance over time and the quantitative differential echogenicity evaluation supports that the DREAMS absorption is likely to be completed at 6-months.

**TCT-558**

Adjunctive Rotational Atherectomy Before Drug-Eluting Stent Deployment is not an Essential Strategy for Severely Calcified Stenosis Identified by Pre-procedural Intravascular Ultrasound: Mid-term Angiographic and Clinical Outcomes

Satoshi Tahara1, Yasuie Fujino1, Hiroto Yabushita1, Kenkichi Takeg1, Michihiro Sato1, Satoru Mitomo1, Hirohiko Kawamoto1, Takahiro Matsutomo1, Takaaki Watanabe1, Hisashi Ishiguro1, Keiko Fukino1, Naoyuki Kariya1, Koji Higawa1, Shoutaro Nakamura1, Sanoo Nakamura1

**1**New Tokyo Hospital, Matuda, Japan

**Background:** Rotational atherectomy (RA) is an effective strategy for the modification of heavily calcified coronary lesions, particularly those which balloon catheters or imaging devices cannot cross. Identification of extended superficial calcium by intravascular ultrasound (IVUS) has led to selected vessel modification with RA to facilitate stent delivery and expansion. We assessed the necessity of lesion preparation with RA for heavily calcified stenoses identified by pre-procedural IVUS in drug-eluting stent (DES) era.

**Methods:** From January 2010 through October 2012, 143 de novo severely calcified stenoses (defined as calcium arc >270 degrees as identified by pre-procedural IVUS) in 143 patients were randomized to RA followed by DES or stenting without RA at the discretion of the operator. Angiographically documented calcified lesions that an IVUS catheter could not cross were excluded. IVUS morphometric analysis was performed. Cardiac death, myocardial infarction, stent thrombosis, target lesion revascularization (TLR) and target vessel revascularization (TVR) were assessed at mid-term.

**Results:** RA was performed in 51/143 lesions (35.7%). Complete procedural success was achieved in all cases. Second-generation DES was used in 121 cases (84.6%). Patient and lesion characteristics were similar in both populations. Minimal lumen area at post-procedure was larger in RA patients vs. non-RA patients (6.95±2.70mm² vs. 6.06±1.16mm², p=0.02). No cardiac death and stent thrombosis occurred in either population. There was no difference in myocardial infarction between RA patients and non-RA patients (7.8% vs. 2.2%, p=0.1). RA patients showed a trend of higher TLR and TVR vs. non-RA patients (TLR: 19.6% vs. 9.8%, p=0.097, TVR: 21.6% vs. 9.8%, p=0.052). Multivariable logistic regression analysis showed chronic kidney disease on hemodialysis to be the strongest independent predictor of TLR (OR, 5.86, 95% CI 1.93-17.80, p=0.002) and TVR (OR, 5.02, 95% CI 1.74-14.47, p<0.003).

**Conclusions:** In conclusion, DES implantation without RA could be a default strategy for severely calcified lesions, even those with ring calcification, when IVUS assessment is possible for pre-procedural.

**TCT-559**

Incidence, Predictors, and Three-Year Outcome of Tissue Prolapse After Stent Implantation in ST-Segment Elevation Myocardial Infarction Patients

Hyuck-Jun Yoon1, In-Cheol Kim2, Jeong-Eun Lee2, Yun-Kyeong Cho2, Hyong-Seob Park2, Hyungsong Kim2, Chung-Wook Nam3, Toon-Nyoon Kim4, Kwon-Bae Kim5

**1**Keimyung University Dongsan Medical Center, Daegu, Korea, Republic of.

**2**Keimyung University Dongsan Medical Center, Daejeon, Dongsan, Republic of.

**Background:** Several observational studies have shown that tissue prolapse (TP) lesions detected by intravascular ultrasound after stent implantation in coronary artery diseases are not fatal phenomena. However data are lacking about their characteristics and long term outcomes in patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PCI).

**Methods:** From August 1, 2008, to December 31, 2009, one hundred eight patients who underwent primary PCI with IVUS under diagnosis of STEMI were enrolled in this study. Fifty four patients (50.0%) showed TP in IVUS after stent implantation. Clinical characteristics, angiographic and IVUS data were statistically analyzed according to presence of TP (TP+ vs. TP-). One month, one year, two years, and three years follow-up was performed.

**Results:** In TP+ group, EF was lower (47.5±8.0% vs. 52.3±8.8%, p=0.004), peak creatine kinase-myocardial band (CK-MB) level was higher (230.8±219.5 mg/dl vs. 179.3±168.5 mg/dl, p=0.019) and TVR vs. non-TP patients (TLR: 23.6% vs. 9.8%, p=0.021). No cardiac death and stent thrombosis occurred in either population. There was no difference in myocardial infarction between TP+ patients and non-TP patients (7.8% vs. 2.2%, p=0.1). TP+ patients showed a trend of higher TLR and TVR vs. non-TP patients (TLR: 19.4% vs. 9.8%, p=0.097, TVR: 21.6% vs. 9.8%, p=0.052). Multivariable logistic regression analysis showed chronic kidney disease on hemodialysis to be the strongest independent predictor of TLR (OR, 5.86, 95% CI 1.93-17.80, p=0.002) and TVR (OR, 5.02, 95% CI 1.74-14.47, p<0.003).

**Conclusions:** In conclusion, DES implantation without RA could be a default strategy for severely calcified lesions, even those with ring calcification, when IVUS assessment is possible for pre-procedural.
TCT-560

Randomized Serial Optical Coherence Tomographic Evaluation of The Lesions Following Biolimus-A9-eluting versus Sirolimus-eluting stents: SEVEN OCT trial

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Background: No randomized studies have been conducted to investigate serial changes of optical coherence tomography (OCT) findings following biolimus-A9-eluting stents (BES) vs. sirolimus-eluting stents (SES) implantation.

Methods: A total of 60 patients fulfilling study criteria were randomly assigned into BES (n=30) and SES (n=30) implantation. Of these, serial OCT evaluation at post-PCI, 6, and 12 months was performed in 46 patients (BES (n=22) and SES (n=24)) and OCT findings were compared according to the types of stents and follow-up time intervals. The primary endpoint was the percentage of uncovered struts (ratio of uncovered struts to total struts in all cross-sections with 0.2-mm interval) at 3 and 12 months and the changes (Δ) of percentages between 3-12 months.

Results: Although the percentages of uncovered struts at 3 months were not significantly different between two stents, BES compared to SES showed a significantly higher percentage of uncovered struts on 12-month OCT without significant difference of neointimal thickness (See Figure A). A thorough serial OCT evaluation, both stents significantly increased strut coverage from 3 to 12 months. However, BES showed a greater Δ percentage of uncovered struts between 3-12 months than SES (See Figure B).

Conclusions: This randomized serial OCT study, both DESs still showed the incomplete strut coverage at 3 months but BES compared to SES showed a significantly lower prevalence of uncovered struts at 12 months by superior coverage from 3 to 12 months.

TCT-561

Comparison Of Stent Axial Integrity In First- Versus Second-Generation Drug-Eluting Stents: Insights From An Intravascular Ultrasound Analysis

Hironori Kitabata1, Joshua P. Loh1, Lakshmana Pendyala2, Salem Badr2, Aljazir Omar1, Israel Barbash3, Sa’ar Minhu1, Marco A. Magalhaes2, Hideaki On1, Fang Chen1, Rebecca Torgerson1, Lowell F. Satler4, William O. Suddath5, Kenneth Kent6, Augusto Pichard7, Ron Waksman1

1Medstar Washington Hospital Center. Washington, DC

Background: Longitudinal stent deformation (LSD) is a recently reported complication of coronary intervention. However, to date, the axial integrity of stents has not been systematically examined. This study aimed to assess the rate of LSD after implantation utilizing intravascular ultrasound (IVUS).

Methods: A total of 218 drug-eluting stents (DES) of 197 patients with coronary artery disease who underwent IVUS after implantation for de novo lesions were included: 32.1% sirolimus-eluting stents (SES); 15.6% paclitaxel-eluting stents (PES); 22.9% cobalt-chromium everolimus-eluting stents (CC-EES); and 29.4% platinum-chromium everolimus-eluting stents (PC-EES, Element platform). Stent length was determined using automatic pullback of an IVUS catheter. The absolute value of the difference in length [IVUS-measured stent length – labeled stent length] (mm), and the absolute value of the relative difference in length [IVUS-measured stent length – labeled stent length] divided by labeled length] (%) were analyzed.

Results: There was no significant difference with regards to the absolute and relative differences in stent length among groups. The absolute relative difference of Δ was the lowest in the SES group compared to the other groups. Significant (>15%) absolute value of the relative difference in stent length was low and similar among groups. (Table)

<table>
<thead>
<tr>
<th></th>
<th>Cypher (n=70)</th>
<th>TAXUS (n=34)</th>
<th>Xience/ Promus (n=50)</th>
<th>Promus Element (n=64)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ (mm)</td>
<td>1.0±0.7</td>
<td>1.0±0.7</td>
<td>1.0±0.7</td>
<td>0.9±0.6</td>
<td>0.965</td>
</tr>
<tr>
<td>Δ (%)</td>
<td>4.9±3.8</td>
<td>6.2±4.5</td>
<td>5.7±3.6</td>
<td>6.0±4.7</td>
<td>0.386</td>
</tr>
</tbody>
</table>

Conclusions: This IVUS analysis proved that there are no significant differences in axial stent integrity between first- and second-generation DES and among second-generation DES. The anecdotal reports of longitudinal deformation are unsubstantiated in contemporary clinical practice.

TCT-562

Impact of Target Lesion Coronary Calcification on Stent Expansion: An Optical Coherence Tomography Study

Ryotaro Yamada1, Hiroaki Okura1, Terayoshi Kume1, Yuhei Kobayashi1, Yukari Kobayashi1, Shintaro Nezuo2, Kenzo Fukahara1, Terumasa Koyama1, Akhiro Hayashida1, Yoshi Nishi1, Takahiro Kawamoto1, Yoshiyoshie1

1Kawasaki medical school, Kurashiki, Japan, 2Kawasaki hospital, Okayama, Japan

Background: Stent underexpansion is still a concern as a cause of drug-eluting stent (DES) failure. Although the amount of coronary calcification is considered as a contributing factor for stent under expansion, a previous intravascular ultrasound (IVUS) study failed to demonstrate relation between stent expansion and coronary calcification. Optical coherence tomography (OCT) offers better quantitative assessment of coronary calcium than IVUS and therefore may have potential to predict stent expansion. Thus, the purpose of this study was to investigate whether stent expansion could be predicted by coronary calcification assessed by OCT.

Methods: A total of 51 de novo native coronary artery lesions from 44 patients treated by single 2nd generation DES were enrolled. Prior to stent deployment, arc of calcium and area of calcium at the maximal calcification site within the target lesion were measured using OCT. After successful stent implantation, OCT imaging was repeated.