thin-cap fibroatheroma (TCFA) neointima and calcified neointima were detected in 22 (43.1%), 19 (37.3%), and 5 (9.8%) patients. Neoatherosclerosis was more frequently observed in BMS (12/16, 75.0%) compared with DES (11/33, 33.3%) (p = 0.013). The percentage of frames with neoatherosclerosis in the stent segment was higher in BMS (60.56% [38.36, 77.86] vs. 18.18% [12.50, 39.13], respectively, p = 0.022). Maximum consecutive lipid neointima length was longer in BMS than in DES (5.5mm [3.0, 10.1] and 2.5mm [1.2, 4.5], p = 0.022). There was no significant difference in the minimum fibrous cap thickness (53.3μm [33.3, 60.0] and 50.0μm [45.5, 53.3], respectively, p = 0.12).

CONCLUSIONS Neoatherosclerosis was the common mechanism of VLST in both type of stents, however it was more prevalent and diffuse in BMS. DES had a wide variety mechanisms such as uncovered strut, malapposed strut and neoatherosclerosis. The indication of intravascular imaging is necessary for the case with VLST because the heterogeneity of underlying mechanism is present.

### Table 1: The case with neoatherosclerosis

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Stable 1</th>
<th>Stable 2</th>
<th>Stable 3</th>
<th>Stable 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>20/240(4.19)</td>
<td>27.4 (15.6, 36.1)</td>
<td>56.1 (70.0, 81.8)</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Stem area, mm²</td>
<td>8.3 (3.0, 10.5)</td>
<td>4.8 (1.8, 9.1)</td>
<td>7.0 (7.0, 10.6)</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td>Frame percentage w/ Neoatherosclerosis (%)</td>
<td>50.0 (50.0, 90.0)</td>
<td>30.0 (20.0, 40.0)</td>
<td>50.0 (40.0, 60.0)</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Frame percentage w/ TCA neointima (%)</td>
<td>50.0 (50.0, 90.0)</td>
<td>30.0 (20.0, 40.0)</td>
<td>50.0 (40.0, 60.0)</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Total lipid neointima, %</td>
<td>3.4 (1.0, 5.9)</td>
<td>1.2 (1.4, 3.9)</td>
<td>5.1 (1.0, 15.0)</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Maximum lipid neointima length, mm</td>
<td>2.0 (0.0, 6.0)</td>
<td>2.1 (0.0, 6.0)</td>
<td>5.1 (0.0, 15.0)</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Maximum TCFA neointima length, mm</td>
<td>5.1 (1.0, 5.6)</td>
<td>5.3 (1.0, 6.0)</td>
<td>5.0 (0.0, 6.0)</td>
<td>0.002</td>
<td></td>
</tr>
</tbody>
</table>

### RESULTS

Pd/Pa ratio was significantly higher in TMs than in SCMs (0.904 vs. 0.842, p < 0.0001). Agreement between TM and SCM in identifying patients with a Pd/Pa ratio ≤ 0.80 under basal flow conditions was only k = 0.47 (p = 0.049). Average SS was 4.64 Pascal lower in TMs than in SCMs (p < 0.0001), with marked differences in the point-per-point comparison, ranging from -60.71 to 7.47 Pascal.

CONCLUSIONS True anatomical TMs that take into account the flow through side branches are feasible for accurate hemodynamic and biomechanical calculations. Traditional SCMs underestimate Pd/Pa and are inaccurate for regional SS estimation. Implementation of TMs might improve the accuracy of SS and virtual fractional flow reserve calculations, thus improving the consistency of biomechanical studies.

### CATEGORIES IMAGING: Intravascular

### KEYWORDS

Neatherosclerosis, Optical coherence tomography, ST-Stent Thrombosis

### TCT-340

Impact of Side Branches Modeling on Computation of Endothelial Shear Stress in Coronary Artery Disease: a Novel Method for Patient-Specific Coronary Tree Reconstruction by Fusion of X-ray Angiography and Optical Coherence Tomography

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### BACKGROUND

Computational fluid dynamics allow virtual evaluation of coronary physiology and shear stress (SS). Most studies hitherto assumed the vessel as a single conduit without accounting for the flow through side branches. Our aim was to develop a new approach to reconstruct coronary geometry that also computes outgoing flow through side branches in hemodynamic and biomechanical calculations, using fusion of optical coherence tomography (OCT) and 3-dimensional (3D) angiography.

### METHODS

Twenty-one patients enrolled in the DOCTOR Fusion study underwent OCT and 3D-angiography of the target vessel (9 LAD, 2 LCX, 10 RCA). Coronary 3D reconstruction was performed by fusion of OCT and angiography, creating a true anatomical tree model (TM) including the side branches, and a traditional single-conduit model (SCM) disregarding the side branches. Figure legend: (A) Angiography of a RCA, with an OCT pullback starting at *; (B) Fusion of 3D angiography and OCT luminogram, using side branches to correct for longitudinal and rotational mismatch. (C) Coronary tree model resulting from merging the OCT of the RCA with the 3D-angiography of the side branches. (D) Simulated flow velocity. (E) Regional map of computed endothelial SS.

### RESULTS

Pd/Pa ratio was significantly higher in TMs than in SCMs (0.904 vs. 0.842, p < 0.0001). Agreement between TM and SCM in identifying patients with a Pd/Pa ratio ≤ 0.80 under basal flow conditions was only k = 0.47 (p = 0.049). Average SS was 4.64 Pascal lower in TMs than in SCMs (p < 0.0001), with marked differences in the point-per-point comparison, ranging from -60.71 to 7.47 Pascal.

CONCLUSIONS True anatomical TMs that take into account the flow through side branches are feasible for accurate hemodynamic and biomechanical calculations. Traditional SCMs underestimate Pd/Pa and are inaccurate for regional SS estimation. Implementation of TMs might improve the accuracy of SS and virtual fractional flow reserve calculations, thus improving the consistency of biomechanical studies.

### CATEGORIES IMAGING: Intravascular

### KEYWORDS

Endothelial shear stress, Fractional flow reserve, Optical coherence tomography

### TCT-341

Thrombus And Plaque Erosion In Patients With Vasaospastic Angina Using Optical Coherence Tomography

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### BACKGROUND

In patients with vasaospastic angina (VSA), transient local hemodynamic changes due to vasoconstriction can result in endothelial damage and thrombus formation. However, its incidence has not been well-defined yet. The aim of this study was to evaluate the incidence of thrombus and plaque characteristics at coronary spasm segments compared to non-spasm segments in patients with suspicious VSA using optical coherence tomography (OCT).

### METHODS

One hundred and thirty three patients with suspected VSA were included in this study. The ergonovine provocation test was performed in all patients for the diagnosis of VSA except patients with spontaneous spasm. All target lesions were analyzed by OCT.

### RESULTS

77 spasm segments in 66 VSA patients were compared with 46 non-spasm segments in 30 non-VSA patients. Thrombus was seen more frequently at spasm segments compared to non-spasm segments.
(27.3% vs. 8.7%, p = 0.019) and the size of thrombus was larger at non-spasm segments compared to non-spasm segments (0.31 ± 0.28 mm² vs. 0.04 ± 0.01 mm², p = 0.046). In spasm segments, thrombus was most frequently located at spasm sites (81%) followed by upstream of the spasm segments (19%). Thin cap fibroatheroma was mainly seen in non-spasm segments compared to spasm segments (21.6% vs. 4.7% vs. p = 0.038). Plaque erosion however, was more prevalent at spasm segments compared to non-spasm segments (26.0% vs. 6.5%, p = 0.008).

**CONCLUSIONS** Compared to non-spasm segments, thrombus and plaque erosion were more common at spasm segments. These findings suggest the potential benefit and treatment role of antiplaque therapy in VSA.

**CATEGORIES IMAGING:** Intravascular

**KEYWORDS** OCT, Thrombus, Vasospastic angina

**TCT-342**

**Impact of Daily Glucose Fluctuation on Vessel Healing after 2nd Generation Drug-eluting Stent Implantation Assessed by Continuous Glucose Monitoring and Optical Coherence Tomography**

Masaru Kuroda,1 Toshiro Shinke,1 Hiromasa Otake,1 Tomofumi Takaya,1 Masaru Kuroda,1 Toshiro Shinke,1 Hiromasa Otake,1 Tomofumi Takaya,1 Ken-ichi Hirata1

**BACKGROUND** Several investigations revealed that daily glucose fluctuation has adverse effects on endothelial cells. Moreover, we reported that it may have an independent contributing factor on coronary plaque vulnerability. Little is known, however, about its impact on neointimal growth after stenting in coronary artery disease (CAD) patients. We aimed to investigate the impact of glucose fluctuation on neointimal growth following everolimus-eluting stent (EES) implantation.

**METHODS** This prospective study enrolled 70 consecutive CAD patients pretreated with adequate lipid-lowering therapy. 46 patients of them underwent 8-month follow-up optical coherence tomography (OCT) analysis 8 spaced radial sectors for every 1-mm cross-section by OCT analysis 8

**RESULTS** Post-procedural geometrical parameters and their impact on adverse cardiovascular events: insights from the ABSORB II trial

Pannipa Suwannasom,1 Felippe N. Albuquerque,2 Yuki Ishibashi,3 Yohiel Sotomi,2 Carlos M. Campos,3 Yoon-Kyung Cho,4 Dariusz Dudek,5 Angel Cequier,6 Didier Carrié,7 Andres Iñiguez Romo,8 Marcello Dominici,9 Rene J. van der Schaaf,10 Michael Haude,11 Bernard Chevalier,12 Hector Manuel Garcia Garcia,13 Robbert J. de Winter,14 Joanna J. Wykryzkowska,15 Yoshinobu Onuma,16 Patrick W. Serruyse17

**BACKGROUND** Mechanical properties of a fully bioresorbable poly-lactide scaffold are inherently different from a permanent metallic stent. A previous retrospective intravascular ultrasound (IVUS) study suggested that immediately after the procedure the Absorb scaffold was more eccentric and asymmetric when compared to a Xience stent. However, the relationship between the IVUS parameters and clinical events has not been investigated in the context of a randomized trial.

**RESULTS** The overall results are presented in the Figure. Post-procedural EI was smaller in the Absorb arm than in the Xience arm (0.74±0.07 vs. 0.81±0.05, p<0.001). At 1-year, the MAC rates were 8.2%, 6.0% and 2.3% in “eccentric/asymmetric” group, the “concentric/asymmetric” group and the “concentric/symmetric” group, respectively (p=0.04).