**TCT-281**

The Association Between Cholesterol Crystal And Features Of Plaque Vulnerability On Optical Coherence Tomography

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**Background:** Cholesterol crystals are often seen abundantly within atheromatous plaques and at sites of plaque disruption. Recent studies have demonstrated that crystallization of cholesterol promotes volume expansion potentially, triggering plaque rupture. However, the relationship between cholesterol crystals and other features of plaque vulnerability has not been characterized. As optical coherence tomography (OCT) enables the visualization of cholesterol crystals in vivo, we investigated the impact of cholesterol crystals on plaque vulnerability by using OCT.

**Methods:** 102 patients with angiographic or clinical coronary artery disease underwent OCT imaging of non-culprit lipid plaque. Cholesterol crystals were identified as a thin, linear region with high signal intensity and backscattering. Patients with (n=44) and without (n=58) cholesterol crystals were compared with regard to clinical characteristics and OCT-derived features of plaque vulnerability.

**Results:** 43% of study population demonstrated cholesterol crystals in non-culprit atherosclerotic plaque. Patients with cholesterol crystals were more likely to have a history of myocardial infarction (41% vs. 22%, p=0.04) and demonstrated higher leucocyte counts (9362/ul vs. 7911/ul, p=0.03). These patients more frequently received ACE-I (46% vs. 38%, p=0.009) and were less likely to be treated with a statin (52% vs. 32%, p=0.04). OCT demonstrated that patients with cholesterol crystals had a thinner fibrous cap thickness and were more likely to contain plaque microchannels and lipid pools (Table).

**Conclusions:** The presence of cholesterol crystals is associated with features of plaque vulnerability on OCT. These patients require more intensive risk factor modification for the prevention of future ischemic events.

**Table.**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cholesterol crystal (+) (n=44)</th>
<th>Cholesterol crystal (-) (n=58)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction</td>
<td>41%</td>
<td>22%</td>
<td>0.04</td>
</tr>
<tr>
<td>Statin</td>
<td>38%</td>
<td>64%</td>
<td>0.01</td>
</tr>
<tr>
<td>Leukocyte /ul</td>
<td>52%</td>
<td>32%</td>
<td>0.04</td>
</tr>
<tr>
<td>FCT</td>
<td>98.6 ± 62.0 um</td>
<td>71.9 ± 25.8 um</td>
<td>0.03</td>
</tr>
<tr>
<td>Microchannel</td>
<td>39%</td>
<td>73%</td>
<td>0.001</td>
</tr>
<tr>
<td>Lipid-rich plaque (quadrant ≥ 2)</td>
<td>52%</td>
<td>86%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TCFA</td>
<td>41%</td>
<td>58%</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**TCT-282**

The REMEDEE OCT study: A prospective randomized study of the early vascular healing of a novel Dual Therapy Stent in comparison with an everolimus eluting stent

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**Background:** The Combo Dual Therapy Stent is a new technology unique in its combined mechanism of action. The REMEDEE OCT study is a prospective, randomised, parallel, open-label, single-centre trial comparing the early vascular healing of the Combo Dual Therapy Stent (OrbusNeich Medical, Ft. Lauderdale, USA) versus an everolimus eluting stent (EES) in patients with acute coronary syndrome (ACS). OCT was performed at baseline and 6 months after stent deployment. OCT was performed at baseline and 6 months after stent deployment.

**Methods:** In-stent % volume obstruction was increased in EES as compared to SES (median (interquartile range): 2.8 mm³ (0.0 to 12.6) vs. 0.0 mm³ (0.0 to 1.1), p<0.001). IH volume obstruction compared to SES was increased in EES as compared to SES stent without involvement of vascular remodelling sites in Europe.

**Results:** Treatment of the Combo Dual Therapy Stent versus EES (64% vs. 38%, p=0.009) showed moderate, statistically significant correlation between coronary and carotid artery atherosclerotic plaque components in coronary and carotid artery atherosclerotic lesions.

**Conclusions:** The Combo Dual Therapy Stent is a new technology unique in its combined mechanism of action. The REMEDEE OCT study is a prospective, randomised, parallel, open-label, single-centre trial comparing the early vascular healing of the Combo Dual Therapy Stent (OrbusNeich Medical, Ft. Lauderdale, USA) versus an everolimus eluting stent (EES) in patients with acute coronary syndrome (ACS). OCT was performed at baseline and 6 months after stent deployment. OCT was performed at baseline and 6 months after stent deployment.

TCT-283

Intimal Hyperplasia and Vascular Remodeling after Everolimus-eluting and Sirolimus-eluting Stent Implantation in Diabetic Patients. The Randomized Diabetes and Drug-Eluting Stent (DiabeDES) IV Intravascular Ultrasound Trial

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**Background:** Patients with diabetes mellitus have increased risk of in-stent restenosis after drug-eluting stent implantation due to their high intimal hyperplasia. The mechanism of this study (sub-study of the SORT OUT IV trial), was to use volumetric intravascular ultrasound (IVUS) to evaluate the effects of the everolimus-eluting XienceTM (EES) and the sirolimus-eluting CypherTM (SES) on intima hyperplasia in diabetic patients. The primary correlation endpoint was the OCT analysis of circulating EPCs. The primary endpoint of the study was to determine correlation between intravascular ultrasound virtual histology (IVUS-VH) defined atherosclerotic plaque components in coronary and carotid artery atherosclerotic lesions.

**Methods:** In the DiabeDES IV IVUS trial, serial IVUS 10-month follow-up data were available in 88 patients, including 48 EES and 40 SES treated patients. IVUS of the stented segment and 5-mm long segments immediately proximal and distal to the stent was performed after the procedure and at follow-up. IVUS endpoints included IH volume and in-stent percent volume obstruction.

**Results:** Baseline clinical characteristics and lesion parameters were similar in the two groups. As compared to the SES group, IH volume was increased in the EES group (median [interquartile range]: 2.8 mm³ (0.0 to 12.6) vs. 0.0 mm³ (0.0 to 1.1), p<0.001). In-stent % volume obstruction was increased in EES as compared to SES (median [interquartile range]: 1.6% (0.0 to 8.2) vs. 0.0% (0.0 to 1.0), p<0.001). Peri-stent external elastic membrane (EEM) volume (post procedure vs. follow-up EES [300 mm³ (219-491) vs. 307 mm³ (223-482); p=ns] and SES [316 mm³ (235-399) vs. 323 mm³ (246-404); p=ns]) and peri-stent plaque volume (EES: 163 mm³ [103-273]; p=ns]) and SES [186 mm³ (139-248) vs. 175 mm³ (153-243); p=ns]) were unchanged in both groups. In the distal reference and proximal reference, there were no significant changes in reference-segment EEM, plaque or lumen volume in either of the two stent groups.

**Conclusions:** In diabetic patients, EES stent implantation was associated with increased IH volume obstruction compared to SES stent without involvement of vascular remodeling.

TCT-284

Significant Correlation Between Coronary And Carotid Atherosclerotic Plaque Components By Intravascular Ultrasound Virtual Histology In Patients With Generalized Atherosclerosis

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**Background:** Also there are differences in the carotid and coronary vascularization, both vascular distributions are believed to share common pathways in disease progression. However, there is little known about atherothrombotic plaque composition and morphological differences between carotid and coronary artery disease. The aim of the study was to determine correlation between intravascular ultrasound virtual histology (IVUS-VH) defined atherosclerotic plaque components in coronary and carotid artery atherosclerotic lesions.

**Methods:** In a single-centre prospective study 100 consecutive patients (60 men and 40 women) with mean age 69.6±8.4 years were enrolled. All patients were scheduled for carotid and/or coronary artery stenting and underwent IVUS-VH examination of coronary and carotid plaque before intervention. Statistical comparison between coronary and carotid artery plaque composition according to IVUS-VH was done with Pearson correlation.

**Results:** High percentage of necrotic core was found both in coronary (22.5±5.7% and coronary (19.8±9.35) artery plaques, r=0.459, p<0.001. Percentage of dense calcium (13.58±8.15 vs. 7.67±5.64, r=0.557, p<0.001), fibrolipids (12.54±9.08 vs. 19.55±9.06, r=0.379, p<0.001) and fibrotic tissue (51.72±10.33 vs. 53.42±7.95, r=0.422, p<0.001) showed moderate, statistically significant correlation between coronary and carotid arteries, respectively (Figure 1).