Conclusions: We found significant correlations of IVUS-VH determined atherosclerotic plaque components between coronary and carotid arteries in patients with atherosclerosis involving both arterial beds.

TCT-285
Frequency and Type of Neoatherosclerosis Five Years After Drug-Eluting Stent Implantation: An Optical Coherence Tomography Study
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Background: The frequency, type and extent of neoatherosclerosis within drug-eluting stents (DES) has not been described during very long-term follow-up. Moreover, it is unknown whether DES eluting sirolimus differ from those eluting paclitaxel in the propensity for neoatherosclerosis during long-term follow-up.

Methods: The SIRTAX LATE OCT population was analyzed for evidence of neoatherosclerosis within stented segments five years after DES implantation. Using OCT definitions according to the Consensus Statement of the International Working Group of OCT, we assessed the presence of fibrocalcific plaques, fibroatheromas, macrophage accumulations, microvessels, as well as surface erosions and ruptures in each single frame. Plaques were considered to be present in case of a longitudinal extension of at least 1mm, and all other findings had to be visualized in at least three consecutive frames.

Results: All segments were independently assessed by two experienced observers. A total of 89 event-free patients with 41 lesions treated with SES (41 patients) and 48 lesions treated with PES (48 patients) were analyzed at five years of follow-up. Neoatherosclerotic plaques were observed in 15% of lesions, and fibroatheromas (12.4%) were more common than fibrocalcific plaques (5.6%). While macrophage accumulations were frequently present (32.6%), microvessels (2.2%) and surface erosions (2.2%) were rare, and no plaque rupture was observed. Neoatherosclerotic plaques were more common among lesions treated with PES (25%) than SES (5%; P < 0.01), and differences between stent types applied to both the frequency of fibrocalcific plaques (SES 0%, PES 10.5%; P = 0.046) as well as fibroatheromas (SES 4.9% vs. PES 18.8%; p=0.046). Similarly, macrophage accumulations were more frequent among lesions treated with PES (47.9%) than SES (14.6%); p < 0.001.

Conclusions: Among event-free patients, neoatherosclerotic plaques were observed in 15% of lesions five years after DES implantation. The frequency, type and extent of neoatherosclerotic changes were importantly influenced by the implanted DES type.

TCT-286
Characteristics of OCT findings for lesions avoiding onset of AMI
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Background: Cavity aperture resulting from plaque rupture is often located in the proximal forami for STEMI patients and distal for NSTEMI patients. To investigate the characteristics of lesions avoiding onset of AMI through observing lesion cavities in angiography patients.

Methods: Target population consisted of 232 patients (250 lesions) with ischemic heart disease (excluding AMI patients) undergoing OCT prior to therapeutic treatment that presented to our facility from May, 2009 to December, 2011. Of these, OCT findings determined a cavity at stenosed location in 22 patients. A comparative investigation was performed on cavity aperture location: proximal side (Group P: 12 lesions) or others (group D: 8 lesions).

Results: OCT findings Distal lumen area (group P: 5.97±1.88, group D: 8.68±2.51, p = 0.045), minimal lumen area (1.95±1.21, 2.68±1.31, p = 1.97±1.28, 3.09±1.02, p = 0.05), proximal lumen area (6.76±2.24, 10.72±3.74, p=0.05) Location of plaque rupture site was: proximal (group P: 66%, group D: 38%); middle (25%, 12%); distal (9%, 30%, p = 0.05). There was no difference determined between groups for location of MLA or residual low intensity area. Furthermore, there was a higher tendency for group D to have spotty calcification at lesion location compared to Group P (50%, 88%, respectively).

Conclusions: In comparison to those patients with proximal cavity aperture, distal cavity aperture patients had larger vessel diameter, larger plaque volume and plaque disruption distal to lesion location.

TCT-287
Abstract Withdrawn

TCT-288
Impact of the Prevalence of Diabetes Mellitus on Coronary Plaque Vulnerability Assessed by Integrated Backscatter Intravascular Ultrasound
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Background: Diabetes mellitus (DM) is a well-established risk factor for coronary artery disease (CAD). However, little is known about relationship the prevalence of DM and coronary plaque vulnerability assessed by integrated backscatter intravascular ultrasound (IB-IVUS).

Methods: One hundred sixteen consecutive patients with stable CAD who underwent percutaneous coronary intervention were enrolled. Nonculprit coronary lesions with mild to moderate stenosis were measured by IB-IVUS. A total of 20 IB-IVUS images were recorded at an interval of 0.5 mm for 10 mm length in each plaque. Patients were divided into two groups: the DM group and the non-DM group. We assessed the relations among DM and coronary plaque instability using IB-IVUS.

Results: Plaque volume (PV) and percentage of PV (%PV/Vessel) in the DM group were significantly higher than those in the non-DM group (66.0±22.7 mm3 vs. 56.8±21.2 mm3, p=0.0278 and 42.5±9.7% vs. 39.0±8.8%, p=0.0453, respectively). Lipid volume (LV) and percentage of LV (%LV, 100%LV/100%PV) in the DM group were significantly higher than those in the non-DM group (28.9±15.5 mm3 vs. 22.2±13.0 mm3, p = 0.0130 and 42.1±12.4% vs. 37.3±12.2%, p = 0.0400, respectively). Furthermore, multiple regression analysis revealed that the prevalence of DM was independently associated with PV (p = 0.035), LV (p = 0.0164) and %LV (p = 0.0304) among IVUS parameters in addition to other metabolic factors.

Conclusions: Nonculprit coronary lesions in patients with DM are associated with more lipid-rich plaque content and a greater PV, suggesting that DM patients increased plaque vulnerability.
Conclusions: In this first-in-human feasibility study, the theoretical concerns of higher-frequency IVUS were not documented in clinical settings, demonstrating a comparable ability of 60MHz imaging in measurements of diseased coronary arteries as compared with conventional 40MHz imaging.

CORRESPONDING IVUS IMAGES OBTAINED AT 40MHZ (LEFT) AND 60MHZ (RIGHT). A DISSECTION STARTING AT 5 O’CLOCK AND EXTENDING COUNTERCLOCKWISE CAN BE EASILY DETECTED IN THE 60MHZ IVUS IMAGE BUT CANNOT BE WELL APPRECIATED IN THE 40MHZ IVUS IMAGE.

TCT-290
Vascular tissue reaction to acute malapposition in human coronary arteries: sequential assessment with optical coherence tomography
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Background: The vascular tissue reaction to acute incomplete stent apposition (ISA) is scarcely known. The aim of this study is characterizing the vascular response to acute ISA in vivo and looking for predictors of incomplete healing.
Methods: Optical coherence tomography studies from 3 randomized trials including different types of stents were sequentially analysed after implantation and at 6 to 13 months. Segments with acute ISA were matched with the follow-up study using fiduciary landmarks. The pattern of healing was categorized according to morphologic criteria. Volumetric and per strut analysis (aposition and coverage) were performed. Predictors for ISA correction and for completeness of coverage were sought.
Results: 66 stents (43 patients) were sequentially analyzed. 78 ISA segments were identified. ISA volume decreased and 71.5% of the ISA segments were spontaneously corrected at follow-up. Coverage of acute ISA segments is delayed with respect to well-apposed segments (RR 2.37, 95% CI 2.01 – 2.78). ISA coverage depended on the type of stent, but acute ISA volume was the only independent predictor for persistent ISA (OR 3.19, 95% CI 1.43 – 7.12) and for massively delayed coverage (OR 1.37, 95% CI 0.69 – 2.72). Very good reproducibility for separate catheter acquisitions was demonstrated: correlation coefficients of 0.96 for thin regions and 0.92 for thick regions.
Conclusions: Thin regions were present in 709/901 (7.8%) sections and thick regions were present in 120/901 (13.3%) sections. The algorithm classified thin and thick fibrous cap regions with an AUC of 0.78 (95% CI 0.72-0.85). Very good reproducibility for separate catheter acquisitions was demonstrated: correlation coefficients of 0.96 for thin regions and 0.92 for thick regions. A retrospective analysis of fibrous cap thickness conducted in clinical NIRS scans containing LCPs, shows applicability of the technique to in vivo images.

TCT-292
Evaluation of Neointimal Healing and Late luminal Loss of Endothelial Progenitor Cell Capturing Sirolimus-Eluting (COMBO) Stent by Optical Coherence Tomography: the EGO-COMBO Study
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Background: After the first-in-man REMEDEE Study report, the dual therapy COMBO Stent (OrbusNeich Medical, FL, USA) was further evaluated for its in-vivo pro-healing benefit and neointimal suppression as a DES in this Study.
Methods: In this prospective, single center study, 61 patients treated by COMBO Stent (9 months DAPT) were randomly assigned to 4 monthly groups (2nd to 5th month, 1:2:2:1 ratio). OCT was performed sequentially 3 times at baseline PCI, early follow-up in 4 monthly groups (for early stent coverage using 6 stringent Categories; every frame & strut analyzed), and then 9 months (for OCT neointima analysis; every 5 frames). Clinical event adjudication, core lab. QCA & OCT analyses were undertaken by Cardiovascular Research Foundation, NY.
Results: 61 patients (32% DM) received 88 COMBO stents. From 2nd to 5th monthly group, covered struts % increased significantly from 77.2%, 82.2%, 91.5% to 98.1% (100% coverage at 150 days; refer to Figure). At 9 months, mean OCT neointimal thickness was 0.135mm and area 1.259 mm², with a corresponding QCA late loss of 0.313mm. At 9-month FU, 1 patient had non-ischemic angiographic stenosis treated by simple ballooning; otherwise no other MACE (restenosis nor stent thrombosis) was recorded to date, totaling a MACE rate of only 1.64% (1/61) throughout a mean FU period of 508 days. Final core lab. results are pending.
Conclusions: This novel catheter-based NIRS system already in clinical use to identify LCPs in patients, accurately and reproducibly classified fibrous caps overlaying LCP through blood in coronary autopsy specimens. Assessment of fibrous cap thickness may be of value in management of patients with coronary artery disease and development of anti-athero drugs.

TCT-291
Detection of Thin and Thick Fibrous Caps Overlying Lipid Core Coronary Plaques with a Catheter-Based Near-Infrared Spectroscopy System
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Background: Intravascular NIRS is well-validated for coronary lipid core plaque (LCP) detection. Initial work has shown ability to differentiate LCP cap thickness by relative cholesterol/collagen contribution to overall signal. This study assessed NIRS vs histology LCP cap thickness in coronary autopsy specimens using improved multivariate methods, reproducibility, and clinical applicability.
Methods: NIRS was performed through blood in 212 coronary segments from 84 autopsy hearts. Histologic sections were analyzed every 2mm, and fibrous cap thickness was measured in each LCP section was measured. Accuracy of classifying fibrous caps as thin (<65μm), intermediate, or thick (>400μm) was tested for a combined-model approach using cross-validation.
Results: Thin regions were present in 709/901 (7.8%) sections and thick regions were present in 120/901 (13.3%) sections. The algorithm classified thin and thick fibrous cap regions with an AUC of 0.78 (95% CI 0.72-0.85). Very good reproducibility for separate catheter acquisitions was demonstrated: correlation coefficients of 0.96 for thin regions and 0.92 for thick regions.
Conclusions: Thin regions were present in 709/901 (7.8%) sections and thick regions were present in 120/901 (13.3%) sections. The algorithm classified thin and thick fibrous cap regions with an AUC of 0.78 (95% CI 0.72-0.85). Very good reproducibility for separate catheter acquisitions was demonstrated: correlation coefficients of 0.96 for thin regions and 0.92 for thick regions. The COMBO stent is the first DES with a healing profile established (rapid strut coverage). The promising outcomes after almost 18 months FU appeared to support LCPIs in patients, accurately and reproducibly classified fibrous caps overlaying LCP through blood in coronary autopsy specimens. Assessment of fibrous cap thickness may be of value in management of patients with coronary artery disease and development of anti-athero drugs.