Conclusions: iFR and FFR had equivalent agreement with HSR classification of coronary stenoses severity across the entire spectrum of stenosis severities. This suggests iFR may be suitable as a vasodilator-free alternative to FFR.

TCT-239
Does Adenosine Administration Improve Diagnostic Classification Of The Instantaneous Wave-Free Ratio (iFR)?
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Background: The instantaneous wave-free ratio (iFR) is a vasodilator-free pressure-only measure of coronary stenosis severity comparable to fractional flow reserve (FFR) in diagnostic categorization. The administration of adenosine during measurement of iFR may lead to lower values. However, it has not been demonstrated if this would result in an improvement in diagnostic classification. In this study we compare resting iFR and iFR with adenosine (iFRa) to FFR and hyperaemic stenosis resistance (HSR) to determine if adenosine administration improves the diagnostic classification of iFR.

Methods: In 51 vessels intra-coronary pressure and flow velocity was measured distal to the stenosis at rest and during adenosine mediated hyperaemia. iFR, iFRa, FFR and HSR were calculated using fully-automated algorithms.

Results: Mean iFR and FFR were both significantly higher than mean iFRa (0.84±0.2 iFR vs 0.79±0.2 FFR vs 0.69±0.2 iFRa, p<0.001 for both). Despite being numerical different, both iFR and iFRa had equivalent agreement with FFR (ROC AUC 95% iFR vs 100% iFRa, p=0.15) and with HSR (ROC AUC 0.93 iFR vs 0.94 iFRa, p=0.66). Conclusions: iFR and iFRa had equivalent agreement with HSR and FFR treatment classification of coronary stenoses. Although administration of adenosine results in lower values of iFR, it does not lead to an improvement in treatment classification. This suggests that providing the wave-free period can be isolated reliably, iFR can be used as a vasodilator-free pressure-only alternative to FFR.

TCT-240
Benefits and costs of routine fractional flow reserve assessment in all major epicardial vessels during elective invasive angiography
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Background: Fractional flow reserve (FFR) is commonly reserved to assess the functional significance of coronary lesions with intermediate stenoses. We sought to determine the benefits and costs of routine FFR assessment in all major epicardial vessels during elective invasive coronary angiography (IA).

Methods: 144 vessels in 48 patients with stable chest pain were assessed by IA immediately followed by FFR in all major epicardial vessels. FFR was assumed to be 0.5 in vessels with >90% stenosis and 0.95 in smooth arteries. Interventionists recorded the management strategy on per vessel and patient basis (revascularisation or medical therapy) before and after knowledge of FFR results. Time taken, contrast volume and radiation dose were documented for both components of IA and FFR.

Results: 93 vessels were successfully interrogated with FFR with no adverse effects (mean 1.9 vessels per-patient). In the remaining 51 vessels, 26 had >90% stenoses and 25 were angiographically smooth. FFR was ≤0.8 in 51/144 (35.4%) vessels. Based on angioanographic findings alone, 48/144 vessels and 27/48 patients were referred for revascularisation. After FFR assessment, management was altered in 16 (11%) vessels, and 85mls and 50mls, 9.2mSv and 10.0mSv and $300 and $1060 AUD respectively.

Conclusions: Routine FFR performance in all major epicardial coronary arteries during elective invasive angiography altered the initial angioanographic-guided management in 23% of patients and 11% of vessels. Routine FFR assessment is safe and associated with increased procedural time, contrast volume, radiation dose and financial cost.

TCT-241
Value of Optical Coherence Tomography beyond the Napkin-Ring Sign in CT Angiography for Detecting Coronary Lipid-Core Plaques as Determined by Histology: A Multimodality Imaging Study in Human Donor Hearts
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Background: In CT angiography (CTA), the napkin-ring sign (NRS) is a specific marker for coronary high-risk plaque, which may warn further evaluation by invasive imaging like Optical Coherence Tomography (OCT). We thought to determine the visualization of CTA-NRS lesions by OCT and its value above CTA with histology as the gold-standard.

Methods: Of 120 human donor hearts, 9 coronary arteries were imaged by CTA. OCT and histology were used as positivity criteria, while sensitivity remained unchanged at 77%.

Results: In total, 292 cross-sections were assessed in CTA, OCT and histology and grouped into 45 lesions of them 13 (29%) contained LCP. LCP lesions had higher plaque burden (82±73%, p=0.001) and were longer (8 vs 5mm, p=0.02) compared to non-LCP lesions in histology. NRS in CTA had 46% sensitivity and 97% specificity to detect LCP lesions. Containing ≥1 cross-sections lipid-rich plaque in OCT led to moderate specificity (66%) for LCP, but increased to 94% (p=0.004) if ≥2 cross-sections lipid-rich plaque in OCT were used as the positivity criteria, while sensitivity remained unchanged at 77%. OCT was independent and incremental to CTA while area under the ROC curve for LCP detection increased from 0.715 for CTA only to 0.898 for using both, CTA and OCT (p=0.01). Those findings remained after adjustment for confounders. Based on CTA, 7 NRS lesions were identified, of those 5 were also positive in OCT (71% agreement), all 5 lesions contained LCP in histology. Of lesions with disagreement, OCT was false negative in one case (significant calcification associated with the necrotic core) and true negative in the other.

Conclusions: OCT had incremental value above CTA for detecting LCP lesions as determined by histology. However, a high sub-segmental agreement was achieved between NRS lesions in CTA and lipid-rich lesions in OCT. Therefore NRS in CTA may serve as a target for invasive imaging like OCT. Larger sample-size is needed for generalization of these results.

TCT-242
Accuracy of Optical Coherence Tomography Measurement Compared to Intravascular Ultrasound: OPUS-CLASS Study
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Background: Although frequency domain OCT (FD-OCT) has been introduced recently in clinical practice, efficacy and feasibility of it has not been described yet in vivo in human. Thus, the aim of this study was to compare the reliability and feasibility of FD-OCT to intravascular ultrasound (IVUS) in coronary lesion assessment.

Methods: FD-OCT and IVUS were performed prospectively in 5 centers in 100 patients with coronary artery disease (CAD) at the time of coronary angiography (CAG) (20 cases) before and after stenting (60 cases) and at stent follow-up (20 cases). Quantitative analyses were performed in minimum lumen diameter and area (MLD and MLA, respectively) and it was also significantly greater in IVUS compared with OCT (3.70±1.64 vs 2.04±3.36, 5.28±2.28 mm2, p=0.001), although a significant correlation was observed between them (r=0.88±0.33, p<0.001).

Conclusions: OCT was superior to IVUS in inter-observer variability in MLD (p=1.01x1.001).
Comparison of Neointimal Coverage of Everolimus-Eluting Stents and Sirolimus-Eluting Stents: Optical Coherence Tomography Subanalysis from the RESET Trial

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Background: Confirming complete neointimal coverage after implantation of a drug-eluting stent is clinically important because incomplete stent coverage is responsible for late thrombosis and sudden cardiac death. Optical coherence tomography (OCT) is emerging as a promising endovascular imaging tool for the evaluation of neointimal recurrence after drug-eluting stent implantation. This study used OCT to compare neointimal recurrence between Everolimus-Eluting stents (EESs) and Sirolimus-eluting stents (SESs).

Methods: RESET trial was a prospective dual-arm randomized trial of EESs and SESs in 3197 patients with coronary artery disease. From the RESET trial, 90 patients (EES = 54, SES = 55) with 1-year follow-up OCT were investigated. Image analysis was performed at 1-mm intervals.

Results: OCT identified 9591 struts in EESs and 9425 struts in SESs. The frequency of stent struts with neointimal coverage was significantly higher in EESs compared with SESs (89% vs. 83%, p < 0.001). The frequency of malapposed stent struts was significantly lower in EESs compared with SESs (0.01% vs. 1%, p < 0.001). Averaged neointimal thickness (128 +/- 53 μm vs. 124 +/- 73 μm, p = 0.751) and neointimal volume (25.71 +/- 14.11 mm3 vs. 23.90 +/- 17.56 mm3, p = 0.555) was similar in EESs and SESs. Thrombus was observed in 2% of EESs and 11% of SESs (p = 0.113).

Conclusions: In this OCT subanalysis from RESET trial, neointimal coverage was incomplete in both EESs and SESs at 1-year after stent implantation. Uncovered struts and malapposed struts were less observed in EESs compared with SESs.

Impact of Intensive Statin Therapy on Plaque Characteristics as Assessed by Serial Optical Coherence Tomography

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Background: Recent clinical trials have demonstrated that intensive lipid-lowering therapy by statins could prevent recurrent cardiac events after acute coronary syndrome (ACS). Optical coherence tomography (OCT) is capable of estimating fibrous cap thickness (FCT) of coronary atherosclerotic plaques, which might be associated with plaque instability. This study was a prospective, randomized, open-label, multi-center study to compare the effect of intensive vs. moderate statin therapy on OCT by using OCT.

Methods: A total of 56 ACS patients with dyslipidemia [low-density lipoprotein cholesterol (LDL-C) levels >100 mg/dL] were enrolled in this study. After percutaneous coronary intervention (PCI), the patients were randomly assigned to two groups: intensive statin therapy (atorvastatin 20 mg/dl, n = 27) or moderate statin therapy (atorvastatin 5 mg/day, n = 25). OCT was performed to measure FCT in non-culprit intermediate lesions at baseline and at 12-month follow-up.

Results: Serum LDL cholesterol levels were significantly decreased in patients with intensive statin therapy (132.7 +/- 28.2 to 70.5 +/- 13.4 mg/dL, -45.4 +/- 13.0%) compared with moderate statin therapy (129.3 +/- 31.3 to 84.9 +/- 23.8 mg/dL, -33.2 +/- 18.3%, p = 0.02). FCT was significantly increased in patients with intensive statin therapy (119.4 +/- 46.9 to 193.0 +/- 76.0 μm, 66.2 +/- 40.9%) compared with moderate statin therapy (118.0 +/- 44.3 to 142.2 +/- 69.2 μm, 19.8 +/- 32.9%) (p < 0.001). The change of FCT had a significant negative correlation with the changes in LDL-C (r = -0.75, p = 0.02) and LDL-C (r = -0.32, p = 0.02), while there was no correlation between the changes of FCT and HDL-C (r = 0.06, p = 0.68). Furthermore, the change in FCT showed a negative correlation with the changes in hs-CRP (r = -0.30, p = 0.03) and MPO-9 (r = -0.57, p < 0.001).

Conclusions: This OCT study suggests that the intensive lipid-lowering therapy with 20 mg/dl of atorvastatin might be more helpful to stabilize coronary atheros.