TCT-223
Instantaneous Fractional Flow Reserve - Conceptual Implications For Myocardial Perfusion Imaging
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Background:Extent and severity of myocardial hyperperfusion correlates with patient outcome in CHD. The nuclear substudy of COURAGE indicates patients with ischaemia >30% total myocardial volume burden by myocardial perfusion imaging may have improved outcomes compared to medical therapy alone. As such, the concept of a 'bright spot' may have clinical relevance. The aim of the current study was to assess whether a contemporaneous imaging modality that is more physiologically relevant to CMR. Variation of tracer uptake during the cardiac cycle may aid the diastolic period.

Methods:Instantaneous pressure wire and coronary catheter pressure recordings were sampled in 22 patients. Instantaneous Fractional Flow Reserve (iFFR) and Rest Trans-Stenotic Pressure Ratios (iRTPR) were interrogated at 5 millisecond (ms) intervals. Analysis of these indices were performed representative of Single Photon Emission Computed Tomography (SPECT) and CMR myocardial perfusion sequences. Comparison with conventional FFR (cFFR) and conventional RTPR (cRTPR) were assessed.

Results:Maximum iFFR differed from minimum iFFR by 0.20 +/- 0.17 over 234 +/- 13 ms. Similarly maximum iRTPR differed from minimum by 0.16 +/- 0.13 over 247 +/- 156 ms. Difference between maximum and minimum iFFR and iRTPR correlated with cFFR(r=0.65) and cRTPR(r=0.97) respectively. For SPECT, the ratio of cFFR to cRTPR moderately correlated with cFFR(r=0.58). For CMR, hypothetical phase specific slice averaged iFFR differed from cFFR by 0.85 +/- 0.58 and iRTPR by 0.05 +/- 0.08 in the diastolic period. The largest difference between period averaged iFFR & iRTPR values was 0.88 +/- 0.10 and occurred at lower cFFR & cRTPR values during the diastolic period.

Conclusions:iFFR, iRTPR, and the difference and ratio between each varies during the cardiac cycle. This has considerable implication for quantification of physiologically significant total myocardial ischaemic burden by myocardial perfusion imaging, particularly pertinent to CMR. Variation of trace uptake during the cardiac cycle may aid diagnosis in the setting of balanced ischaemia when adopting SPECT.

TCT-224
Long-term Clinical Outcomes of Medical Therapy Versus Coronary Revascularisation in Patients with Intermediate Stenoses Guided by Pressure Wire
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Background:Clinical studies have demonstrated better outcomes in percutaneous coronary intervention (PCI) guided by coronary fractional flow reserve (FFR) when compared with angiography. We examined the long term clinical outcomes of medical treatment versus revascularisation in patients with intermediate stenoses guided by pressure wire.

Methods:All patients who underwent FFR measurement for intermediate coronary lesions (50% to 75% visually) in our center from June 2002 to December 2009 were analysed. Revascularisation treatment is performed in patients with FFR of <0.75, while the rest were treated with optimal medical therapy. All patients were prospectively followed up for major adverse cardiac events (MACE) of death, myocardial infarction and non-fatal revascularization (%).

Results:Of 24,389 patients, chronic stable angina was present in 29 patients and acute coronary syndrome was present in 27 patients. Twenty nine patients had a chronic total occlusion lesion (CTO) and 27 patients had an acute total occlusion (non-CTO). Collateral flow grade by Rentrop classification ≥2 was more higher in patients with CTO. Reference vessel diameter was significantly lower in patients with CTO, whereas number of stents was significantly higher in patients with CTO. Amount of contrast and fluoroscopy time was also significantly higher in patients with CTO. The mean pre-intervention FFR in CTO patient was 0.51 ± 0.11, whereas mean pre-intervention FFR in non-CTO patient was 0.62 ± 0.15. Baseline CFI (0.31 ± 0.11 versus 0.25 ± 0.11, p = 0.041) and recruitable CFI in patients with CTO (0.31 ± 0.08 versus 0.23 ± 0.11, p = 0.003) was significantly higher in CTO compared with non-CTO. There was no significant differences between baseline CFI and recruitable CFI in patients with CTO (0.31 ± 0.10 versus 0.31 ± 0.08, p = 0.090) and non-CTO (0.24 ± 0.10 versus 0.23 ± 0.11, p = 0.877).

Conclusions:Baseline CFI and recruitable CFI were significantly lower in patients with non-CTO compared with CTO patients. Collateral flow changes immediately after PCI was not observed both CTO and non-CTO patients.

TCT-225
The role of collateral pressure index assessing collateral function and coronary hemodynamics in patients with total or nearly total occluded coronary lesions
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Background: The aim of this study was to assess collateral function and coronary hemodynamics of the total or nearly totally occluded coronary lesions in acute and chronic coronary lesions by fractional flow reserve (FFR) using pressure wire.

Methods: Between March 2011 and March 2012, 56 patients (49 men; mean age = 58.0 ± 10.9 year-old) who underwent percutaneous coronary intervention (PCI) for total or nearly totally occluded coronary lesions were included in this study. The FFR at maximum hyperemia induced by intravenous adenosine was determined at pre- and post-intervention. The pressure-derived collateral pressure index (CFI) was determined as (Pw - Pcvp)/(Pa - Pcvp), where Pw represents coronary wedge pressure, Pcvp central venous pressure, and Pa mean aortic blood pressure. Both were measured during transient occlusion by a balloon inflation of 1 to 3 minutes.

Results: Of these patients, chronic stable angina was present in 29 patients and acute coronary syndrome was present in 27 patients. Twenty nine patients had a chronic total occlusion lesion (CTO) and 27 patients had an acute total occlusion (non-CTO). Collateral flow grade by Rentrop classification ≥2 was more higher in patients with CTO. Reference vessel diameter was significantly lower in patients with CTO, whereas number of stents was significantly higher in patients with CTO. Amount of contrast and fluoroscopy time was also significantly higher in patients with CTO. The mean pre-intervention FFR in CTO patient was 0.51 ± 0.11, whereas mean pre-intervention FFR in non-CTO patient was 0.62 ± 0.15. Baseline CFI (0.31 ± 0.11 versus 0.25 ± 0.11, p = 0.041) and recruitable CFI (0.31 ± 0.08 versus 0.23 ± 0.11, p = 0.003) was significantly higher in CTO compared with non-CTO. There was no significant differences between baseline CFI and recruitable CFI in patients with CTO (0.31 ± 0.10 versus 0.31 ± 0.08, p = 0.090) and non-CTO (0.24 ± 0.10 versus 0.23 ± 0.11, p = 0.877).

Conclusions: Baseline CFI and recruitable CFI were significantly lower in patients with non-CTO compared with CTO patients. Collateral flow changes immediately after PCI was not observed both CTO and non-CTO patients.

TCT-226
Comparison Of Endothelial Function In The Left Main Coronary Artery And Epicardial Arterial Segments
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Background: While intracoronary (IC) salbutamol provoked endothelium-dependent vasomotion of the epicardial and coronary microvasculature is well described, specific evaluation of the left main coronary artery (LMCA), in comparison to neighboring epicardial segments in humans in vivo, has yet to be reported.

Methods: Thirty patients referred for coronary angiography underwent IC salbutamol provocation during intravascular ultrasound (IVUS) imaging of the proximal-mid portion of a non-critically diseased, left-sided non-intervened conduit vessel. Macrovascular response (change in average lumen area (LA) at baseline and following 5-mins of 0.30 mg/min IC salbutamol), plaque burden and eccentricity indices (EI) were evaluated in the 30 LMCA and 255 consecutive 5-mm epicardial coronary segments.

Results: The LMCA harbored larger vessel, lumen and absolute plaque areas, with plaque present in a more concentric distribution (Table 1). Percent atheroma volume (PAV) did not differ across groups. While epicardial segments demonstrated significant endothelium-dependent vasodilatation from baseline, the LMCA did not. The most proximal corresponding epicardial segment demonstrated similar plaque burden, but smaller lumen and vessel areas than the LMCA. These most proximal epicardial segments demonstrated a similar lack of endothelium-dependent vasodilatation as seen within the LMCA.

Conclusions: FFR-guided medical treatment of intermediate lesions is safe and is associated with low incidence of TVR and MACE at long term follow-up. This has significant cost-saving impact in real world practice.
It is not well known whether endothelial dysfunction after drug-eluting stent (DES) implantation affects the prognosis. Purpose: We tried to find the predictors of cardiovascular events after successful DES implantation.

**Methods:** A consecutive 122 patients who underwent successful first generation DES (Cypher, Cordis Corp., Miami Lakes, Florida and Taxus, Boston Scientific, Natick, Massachusetts) implantation and had no residual stenosis at follow-up coronary angiography (CAG) were included. All patients also underwent acetylcholine provocation test (ACH) at follow-up CAG. Definition of positive ACh test (ACH+) was >90% stenosis with symptom and ischemic electrocardiographic change. Age, sex, coronary risk factors (smoking, hypertension, diabetes mellitus, dyslipidemia), medication (calcium channel blockers, angiotensin receptor blockers, angiotensin converting enzyme inhibitors, diuretics, β-blockers, statins), duration from stent implantation to follow-up CAG (15.5±14.5 months), old myocardial infarction, ACH+ were included as variables for multivariate analysis for cardiovascular events (angina pectoris without intervention, acute myocardial infarction, definite or probable stent thrombosis, cardiac death, and stroke).

**Results:** ACH provocation test was positive in 64.8%. The following events occurred during mean follow-up period of 26.9±9.5 months; angina pectoris without intervention in 12, very late stent thrombosis in 1, acute myocardial infarction in 1, sudden death in 1, and stroke in 4. Table shows the results of multinomial Cox and logistic regression models. Since data of ACH did not fit the conditions of a proportional Hazard model, it used multinomial logistic regression.

**Independent Predictors of Cardiovascular Events after first generation DES Implantation**

**Table 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>LMCA N=30</th>
<th>Proximal epicardial N=30</th>
<th>p-value*</th>
<th>Epicardial N=255</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average LA (mm²)</td>
<td>15.2±3.9</td>
<td>10.0±3.8</td>
<td>&lt;0.001</td>
<td>8.5±3.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Average plaque area (mm²)</td>
<td>7.4±2.8</td>
<td>6.3±3.0</td>
<td>0.085</td>
<td>5.3±2.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PAV</td>
<td>32.6±8.0</td>
<td>38.4±14.1</td>
<td>0.059</td>
<td>37.0±13.6</td>
<td>0.09</td>
</tr>
<tr>
<td>Average EEM area (mm²)</td>
<td>22.6±5.4</td>
<td>16.4±4.5</td>
<td>&lt;0.001</td>
<td>13.8±4.9</td>
<td>0.001</td>
</tr>
<tr>
<td>EI</td>
<td>3.2±(2.3,3.9)</td>
<td>6.7±(3.3,9.1)</td>
<td>0.001</td>
<td>5.2±(3.7,9.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% change in LA (mm²) Within segment p-value</td>
<td>0.10±1.8 (0.98)</td>
<td>4.20±2.1 (0.01)</td>
<td>0.59</td>
<td>3.3±0.07 (&lt;0.001)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

PAV = percent atheroma volume; EEM = external elastic membrane; EI = eccentricity index.

#Least squares means from a mixed model adjusting for baseline measurements.

Changes in LA are in response to IC saltubalamin administered via the guiding catheter.

**Conclusions:** Endothelium-dependent vasomotion is heterogeneous within the conduit system. Despite similar degrees of plaque burden, the LMCA and its most adjacent epicardial segment display greater degrees of vascular stiffness than the remainder of the more distal epicardial tree. These observations may provide mechanistic insights into the focal nature of coronary plaque progression and stability in vivo.

**TCT-227**

Outcomes of Deferred FFR-Negative Stenoses: Real World Experience in a Community-Based Cardiac Referral Center

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**Background:** Fractional flow reserve (FFR) guided percutaneous coronary intervention (PCI) has been validated in the FAME trial, which demonstrated a statistically significant reduction in the composite of death or myocardial infarction compared to PCI. Since 2005, the use of FFR-based percutaneous coronary intervention (PCI) has been validated in the FAME trial, which demonstrated a statistically significant reduction in the composite of death and myocardial infarction compared to PCI. FAME trial, which demonstrated a statistically significant reduction in the composite of death and myocardial infarction compared to PCI. FAME trial, which demonstrated a statistically significant reduction in the composite of death and myocardial infarction compared to PCI.

**Methods:** A consecutive 122 patients who underwent successful first generation DES implantation were included. We used multinomial logistic regression. Since data of ACh did not fit the conditions of a proportional Hazard model, it used multinomial logistic regression.

**Conclusions:** Coronary endothelial dysfunction evaluated by ACH provocation test at stable stage is the strongest predictor of further prognosis in patients with first generation DES.