Ratio of Maximum Coronary Flow Reserve in Response to Adenosine Compared to Baseline Coronary Flow Reserve		
Ratio of Maximum Coronary Blood Flow in Response to Acetylcholine Compared to Baseline Coronary Blood Flow	Abnormal Ratio (≤2.5)	Normal Ratio (>2.5)
Abnormal Ratio (≤1.5)	Coronary flow reserve: 2.3 (2.1-2.4)	Coronary flow reserve: 3.0 (2.8-3.5)
	Coronary blood flow: 0.9 (0.6-1.2)	Coronary blood flow: 1.0 (0.7-0.8)
	n=268	n=478
Normal Ratio (>1.5)	Coronary flow reserve: 2.2 (2.0-2.4)	Coronary flow reserve: 3.2 (2.9-3.7)
	Coronary blood flow: 2.0 (1.7-2.1)	Coronary blood flow: 2.2 (1.8-2.8)
	n=173	n=520

TCT-315

Invasively Derived Coronary Flow Capacity: Prognostic Implications of a Cross-modality Physiological Concept

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Background: Either coronary flow reserve (CFR) or fractional flow reserve (FFR) can suffice for diagnosis of significant coronary stenoses, but they can over- or underestimate severity in many cases. An alternative approach is the coronary flow capacity (CFC) concept, originally derived from PET-imaging, which integrates CFR and hyperemic flow (hAPV) to depict the ischemic burden of the myocardium. We studied the prognostic implications of addition of hAPV to CFR within the CFC concept derived from invasive measurements.
Methods: Coronary pressure and flow velocity were measured in 154 patients in whom revascularization was deferred in the pre-FAME era. The additive value of hAPV to CFR was tested with the net reclassification index (NRI), integral discrimination improvement (IDI) and relative IDI. After stratification in normal, mildly reduced, moderately reduced, and severely reduced CFC, using literature-derived CFR cut-offs and the corresponding hAPV percentiles, event rates up to 10-years follow-up were estimated with the Kaplan Meier method, and a Cox proportional hazards model was used to test the association of CFC with MACE, adjusting for confounding variables (p< 0.1).
Results: Median follow-up was 11.9 years (10.0 – 13.4 years). CFR was significantly associated with MACE (p< 0.001). The addition of hAPV to CFR yielded an NRI of 0.49 (Standard error (SE) 0.17, p=0.003), IDI of 0.024 (SE 0.012, p=0.04), and rIDI of 43.3%. In contrast, addition of FFR to CFR did not improve discrimination. KM-estimates of MACE across the CFC categories showed a significant linear trend at all time-points (P< 0.001), with MACE increasing with increasing impairment of CFC. After adjusting for confounding variables, CFC was strongly associated with long-term MACE: compared with normal CFC, a mildly and moderately reduced CFC were associated with a 1.9-fold (95% CI: 1.0 – 3.4, p=0.040), and a 2.8-fold (95% CI: 1.2 – 6.2, p=0.013) increase in MACE, respectively.
Conclusions: The addition of hAPV to CFR in the CFC concept improves its discriminative value for MACE. CFC may provide a disruptive physiological concept, applicable to all diagnostic modalities that measure flow.

TCT-316

Impact of Coronary Artery Size on Physiologic Microcirculatory Indices: A Volumetric Intravascular Ultrasound Study with Coronary Flow Assessment

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Background: Microvascular dysfunction has been associated with increased mortality. However, little is known whether physiologic microciculatory indices can fundamentally be affected by coronary dimensions.
Methods: Volumetric IVUS (50 mm length) and physiologic assessment (Fractional Flow Reserve [FFR], Coronary Flow Reserve [CFR], and Index of Microcirculatory Resistance [IMR]) in the LAD artery were performed in 122 patients with non-obstructed epicardial arteries. Coronary flow was assessed with a thermo-dilution method by obtaining mean transit time (Tmn: an inverse correlate to absolute flow) at rest and hyperemia. IMR was measured as distal coronary pressure x hyperemic Tmn.

Results: No patient had significant stenosis in LAD (FFR: 0.87±0.04, %plaque volume: 26.1±9.0%). Resting Tmn positively correlated with vessel and lumen volumes (p< 0.01, p=0.04), whereas hyperemic Tmn showed no correlation with the artery size. As a result, IMR was unrelated to any IVUS indices, while CFR positively correlated with the artery size (p< 0.001 for both vessel and lumen). With microvascular dysfunction defined as IMR ≥25, ROC analysis determined CFR=3.75 as the best cutoff. Discordance of reduced CFR with normal IMR was seen in patients with smaller artery size, leading to shorter resting Tmn, despite the equivalent % plaque volume and hyperemic Tmn (Figure).

Concordant (Normal) vs. Discordant (Reduced) CFR in Patients with Normal IMR
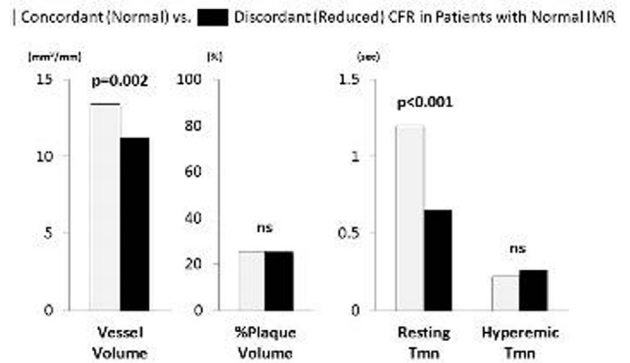
Conclusions: Small coronary size may increase resting coronary flow, reducing CFR even in the absence of epicardial stenosis and microvascular dysfunction. Potential impact of artery size should be noted in interpretation of physiologic indices using resting flow status.

TCT-317

Systematic detection of coronary vasospasm by methylergonovine-based provocative test in 2,397 patients

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Background: In the absence of clear-cut indications for provocative test (PT), coronary artery spasm (CAS) may be underdiagnosed whereas the widespread use of early coronary angiography has found that acute ischemic syndromes are not always related to atherosclerotis. The objective of the present study was to evaluate the incidence of CAS in a population of patients with chest pain who underwent methylergonovine-based PT.
Methods: The present study is a retrospective analysis from an University tertiary care hospital where a policy of systematic detection of CAS by PT is applied in patients with chest pain at rest and without significant coronary stenosis. PT complications include death, MI, stroke, delayed or resistant CAS, ventricular fibrillation, and acute atrio ventricular block.
Results: During a 10-year period (2002-2012), a total of 18,454 angiographies were performed. CAS was documented in 256 (10.7%) of the 2,397 patients with normal or near normal coronary arteries and chest pain who underwent PT. Compared to the overall population, CAS patients were more often female (44.7% vs. 29.6%; p< 0.0001), younger (55 [47.5-64] years vs. 61 [52-70] years; p=0.0001), and smokers (63.7% vs. 42.3%; p< 0.0001). Initial presentation was more frequently acute coronary syndrome (36.7% vs. 29.1%) or non-specific chest pain (46% vs. 21.9%). The rate of complications after PT was 0.9% (n=23). Complications included delayed or persistant CAS (0.3%), VF/asystoly/AVB (0.3%), transient ischemic attack (0.2%), and non Q wave MI (0.04%). Urgent coronary stenting was required to restore arterial patency in three patients with persistant CAS.
Conclusions: This retrospective study of 10 years of experience suggests that CAS is present in 10.7% of patients with myocardial ischemia symptoms at rest and without significant coronary stenosis. Methylergonovine based PT appear to be extremly safe when performed in selected patients with normal or near normal coronary arteries. These findings could justify performing PT more systematically in this setting to avoid the potentially severe outcomes of undiagnosed CAS.

TCT-318

Trans-lesional FFRCT gradient correlates with measured FFR gradient in vessels with serial coronary stenosis: role in stenting strategy

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Background: Fractional flow reserve derived from coronary CT (FFRct) has high diagnostic accuracy compared to FFRcath, and modulation of the FFRct with "virtual