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)?

Sayan Sen[1], Kaleab Asrress[2], Ricardo Petraco[1], Sukhjinder Nijjer[1], Christopher Broyd[3], Nicolas Foin[4], Rodney Foale[5], Iqbal Malik[6], Ghada Mikhail[7], Amarjit Sethi[5], Masood Khan[5], Muhammed Khawaja[8], Alun Hughes[1], Darrel Francis[1], Christopher Baker[5], Jamil Mayet[1], Carlo Di Mario[1], Javier Escaned[9], Simon Redwood[10], Justin Davies[1]

[1]Imperial College London, London, United Kingdom, [2]King's College London, LONDON, United Kingdom, [3]Imperial College, London, London, [4]International Centre for Circulatory Health, Imperial College London, London, United Kingdom, [5]Imperial College Healthcare NHS Trust, London, United Kingdom, [6]Imperial College NHS Trust, London, London, [7]Imperial College Healthcare Trust, London, United Kingdom, [8]King's College London, London, United Kingdom, [9]Cardiovascular Institute, Hospital Clinico San Carlos, Madrid, Spain, [10]King's College London/ St Thomas' Hospital, London, United Kingdom

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 categorisation. 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 an adenosine-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

Brian Ko[1], James Cameron[1], Michael Leung[1], Sujith Seneviratne[1], Paul Antonis[1], Yuvi Malaiapan[1], Ian Meredith[1]

[1]Monash HEART, Monash Cardiovascular Research Centre, Monash University, Melbourne, Australia

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 angiographic-findings alone, 48/144 vessels and 27/48 patients were referred for revascularisation. After FFR assessment, management was altered in 16 (11%) vessels, and 11 (23%) patients. Time taken, contrast volume, radiation dose and cost for IA and FFR components were 23mins and 30mins, 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 angiographic-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.

Imaging

Hall D

Tuesday, October 23, 2012, 8:00 AM–10:00 AM

Abstract nos: 241-313

POSTERS

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

Christopher Schlett[1], Pál Maurovich-Horvat[1], Fabian Bamberg[2], William Warger[1], Masataka Nakano[3], Atsushi Tanaka[1], Marc Vorpahl[4], Harald Seifarth[1], Maros Ferencik[1], Renu Virmani[3], Guillermo Tearney[1], Udo Hoffmann[1]

[1]Massachusetts General Hospital/Harvard Medical School, Boston, MA, [2]Hospital Grosshadern/University of Munich, Munich, Germany, [3]CVPath Inc, Gaithersburg, MD, [4]Helius Clinic Wuppertal/University Witten/Herdecke, Wuppertal, Germany

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 human donor hearts, 9 coronary arteries were imaged by CTA, OCT, and histology whereon coronary lesions as well presence of lipid-core plaque (LCP; fibro-atheroma with core diameter >200μm, core circumference >60°, and cap thickness <450μm) were defined. Each cross-section of a lesion was evaluated for NRS in CTA and lipid-rich plaque in OCT.
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 vs 73%, p=0.01) 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-sequential 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

Takashi Akasaka[1], Junya S hite[2], Mitsuyasu Terashima[3], Shiro Uemura[4], Bo Yu[5], Nobuaki Suzuki[6], Takashi Kubo[1], Shaosong Zhang[7]

[1]Wakayama Medical University, Wakayama, Japan, [2]Kobe University, Kobe, Japan, [3]Toyohashi Heart Center, Toyohashi, Japan, [4]Nara Medical University, Nara, Japan, [5]Harbin Medical University, Harbin, China, [6]Teikyo University, Tokyo, Japan, [7]LightLab Imaging/St. Jude Medical, MA

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) in FD-OCT, IVUS and quantitative CAG (QCA) in addition to qualitative morphological assessment.
Results: Compared with QCA, MLD was significantly greater in OCT and IVUS (1.85 +/− 0.77 vs 1.94 +/− 0.70 vs 2.10 +/− 0.59 mm, p<0.001, respectively), and it was significantly greater in IVUS compared with OCT (p<0.001), although there were significant correlations one another (IVUS vs OCT, QCA vs OCT and QCA vs IVUS; R2=0.92, 0.83 and 0.82, p<0.001 respectively). MLA was also significantly greater in IVUS compared with OCT (3.70 +/− 2.04 vs 3.36 +/− 2.28 mm^2, p<0.001), although a significant correlation was observed between them (y=0.85x+0.83, p<0.001). Furthermore, OCT was superior to IVUS in inter-observer variability in MLA (y=1.01x-0.01,