Near infrared spectroscopic assessment of lipid core plaque changes after coronary artery stenting

Diaa Abdel Hakim1, Akiko Maehara2, Gary S Mintz1, Subhash Banerjee1, Abdul-Rahman Abdul-Karim1, Tadayuki Yukishiki2, Stephen T Sum1, Sean P Madden1, Gregg W Stone2, James E Mullen3, Emmanouil S Brilakis1

1Columbia University Medical Center and Cardiovascular Research Foundation, New York, NY; 2Yale North Texas Healthcare System and University of Texas Southwestern Medical Center at Dallas, Dallas, TX; 3Infraveds Inc, Infraveds Inc, MA

Background: Intravascular near-infrared spectroscopy (NIRS) has been validated for assessment of confluent lipid core plaque (LCP) while virtual histology intravascular ultrasound (VH-IVUS) classifies plaque as necrotic core (NC), fibrofatty, fibrotic, or dense calcium.

Methods: We performed both NIRS and VH-IVUS pre- and post-intervention in a cohort of 30 pts to evaluate LCP changes after coronary artery stenting. Based on the NIRS block chromogram (a metric of the probability of any LCP in a 2mm-long NIRS segmentogram), we excluded 5 lesions without any LCP (no yellow block, the highest probability of LCP). We divided the other 25 pts into 2 groups: A – lesions with a ≥2 block reduction in the number of yellow or tan blocks (2 highest probabilities of LCP, n=17) in the post-stent block chemogram and B – lesions with little or no change post-stenting (n=8) VH-IVUS assessment of the worst 10mm-long lummen-compromised segment included quantitative measures of the 4 plaque components and the presence of a VH thin cap or thick-cap fibroatheroma(TCFNA or ThCFA)

Results: 51% of pts presented with acute coronary syndrome. The average stent size (2.9±0.3mm) and total stent length (22.3±6.8mm) were comparable between the 2 groups. Pre-intervention lipid core burden index (LCBI) was similar in both groups, but was significantly reduced post-stenting in Group A. Pre-intervention VH-IVUS showed that Group A had a smaller minimum lumen area (MLA) with a greater plaque burden at the MLA site, and a trend longer toward VH-TFCF, but shorter ThCFA (Table).

Conclusion: more than half (56.6%) of lesions have a decrease in LCP (NIRS) after coronary stent implantation. These lesions, in contrast to the rest of the population, had a lower plaque area at MLA site. This finding was also shown by a significant decrease in LCBI and MLA values post-intervention.

TCT-667

Acute effects of nicardipine and esmolol on the cardiac cycle, hemodynamic and endothelial shear stress in patients with unstable angina pectoris and moderate coronary stenosis: results from single center, randomized study

Shao-Liang Chen, Zuo-Ying Hu, Jun-Jie Zhang, Fei Ye
Nanjing First Hospital, Nanjing Medical University, Nanjing, China

Background: Nicardipine and esmolol exhibit cardioprotection via different mechanisms. However, their acute effects on hemodynamic and ESS are still unknown.

Methods: 116 patients with unstable angina and moderate coronary stenosis were randomly divided into 2 groups (n=58) and esmolol (n=57) groups. Both drugs were injected as a bolus followed by continuous infusion to achieve the steady states defined simultaneously calculated at baseline and steady states.

Results: Both drugs significantly reduced blood pressure and rate-pressure load. Nicardipine was associated with negative remodeling of the distal segment. Esmolol increased minimal luminal diameter (p=0.040), prolonged SFT (0.3±0.03 vs. 0.4±0.03 s; p<0.001), reduced DCP (p<0.001) and increased blood velocity (33.6±5.7 cm/s vs. 43.6±1.25 cm/s; p<0.001) at SFT stages, with increased blood velocity (p<0.001) at SFT stages, with increased blood velocity (p<0.001). Both drugs increased downstream ESS. Esmolol significantly reversed abnormally increased ESS (p<0.001) and increased upstream ESS compared with nicotine (p<0.001).

Conclusion: Beyond a similar reduction of AP, patients with UA and MCS could benefit more from the reduction of heart rate induced by esmolol, rather than nicardipine (ChiCTR-TRC-10000964).

TCT-668

New Insights Into The Coronary Artery Bifurcation: Hypothesis Generating Concepts Utilising 3-Dimensional Optical Frequency Domain Imaging

Vasim Farooq, Patrick W Serruya, Jung Ho Heo, Bill D Gogas, Takayuki Okamura, Yoshihito Onuma, Josep Gomez-Lara, Salvatore Brugalla, Maria Radu, Roberto Diletti, Hector M Garcia-Garcia, Robert Jan van Geuns

Background: Coronary artery bifurcations are a common challenging lesion subset approximating to 10-20% of all PCI. Provisional T-stenting (Prov-T) is generally recommended as the first line management of most lesions. Carina shift is the predominant mechanism of side-branch (SideB) pinching during Prov-T & has been indirectly inferred from benchwork & 2D intravascular imaging modalities.

Methods: Offline 3D reconstructions of coronary bifurcations & the effects of Prov-T from patients in the FIM trial of the high-frequency (160 fr/s) Terumo OFDI system were undertaken. 3D QCA were performed to assess the bifurcation angulation.

Results: Through a series of 3D reconstructions several novel hypothesis-generating concepts are presented. The principles of “perpendicular” & “parallel” bifurcations & the clinical implications for SideB closure are demonstrated. It is postulated that the appearances of the carina secondary to the angle of divergence between the main-branch (MainB) & SideB origins dictates how the SideB will react to the effects of MainB stenting. A more perpendicular take-off of the SideB from the MainB may not be affected by carina shift, whereas a shallower angle of divergence between MainB & SideB origins may potentially expose the SideB to risk of closure. The principle of re-crossing of the coronary wire (after MainB stenting) into the SideB through the most distal cell of the MainB stent covering the SideB opening, & implications of resultant malapposed struts with metallic extension of the carina if not undertaken are demonstrated.

TCT-669

Long-Term Follow-Up of a Large Cohort of Patients with Intermediate Lesions Assessed with IVUS

Jose M De la Torre Hernandez, Tamara Garcia Camarero, Gonzalo Martin Gorria, Blanca Arnaez, Piedad Lerena, Dae-Hyun Lee, Fermin Sainz Laso, Javier Zueco Hemodynamic, Hospital U. Marques de Valdecilla, Santander, Spain

Background: The assessment of intermediate lesions can be done with IVUS. However the indication of recanalization based on this strategy and the safety of this approach has been evaluated in small studies without really long-term follow up. We have analyzed the clinical outcome of all consecutive pts with intermediate lesions (40-60% stenosis) who underwent IVUS examination in a 4 years period (2004-2007) in our institution. The criteria for recanalization was a minimum lumen area < 4mm² in vessels >3 mm and < 3.5 mm² in vessels 2.5-3 mm.

Results: A total of 340 pts were included (408 lesions studied). After IVUS examination 225 (55%) lesions were left untreated in 185 pts. In this group at 3 years follow up there were 7 deaths (3 cardiac and not lesion related) and 3 infarctions not related with the target lesion. Regarding recanalizations, at 3 years 8 lesions (3.5%) initially evaluated with IVUS in 8 pts (4.3%) required treatment due to progression. In the first year of follow up the incidence of recanalization over target-lesions was 1%. In this follow up 5 pts (2.7%) underwent recanalization of new lesions and 11 pts (6%) over restenotic lesions.

Conclusion: The assessment of intermediate lesions with IVUS indicates recanalization in almost half of lesions. At 3 years follow up the deferred group shows a very low rate of lesion-related events, only recanalization of a 3.5% of lesions.