

IMAGING

IVUS

CRT-300.01

Predictors of Dimension of Non-diseased Left Main Coronary Arteries Assessed by Intravascular Ultrasound



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BACKGROUND Estimation of the length, diameter and percent diameter stenosis of left main coronary artery lesions (LMCA) remains challenging. Limited data is available on the exact diameters and length of non-diseased left main coronary arteries. Our aim was to provide insights in the dimensions of left main coronary arteries and to find a possible correlation with gender and patient habitus.

METHODS This study was performed in a consecutive cohort of patients that underwent Intravascular Ultrasound (IVUS) guided PCI of the left coronary system between January 2010 to December 2016. Out of a total of 1197 pullbacks, 254 pullbacks were available from patients who did not undergo left main treatment and of whom complete footage of the LMCA was available. All pullbacks were motorized with a pullback speed of 0,5 mm/sec.

RESULTS Mean age was 63±11 years, and 78% of the patients were male. Average weight was 83.8±15.9 kg while average length of the patients included was 175.0±9.2 cm; BMI was 27.3±4.5. Mean LMCA length as measured with IVUS was 7.37±4.2mm, and mean lumen area was 15.63±4.76 mm² corresponding to a mean lumen diameter of 4.41±0.67mm. An IVUS derived mean lumen diameter of >4 mm was present in 71.7%, >4.5 mm in 43% and >5mm in 19% of patients. Weight of the patient was the sole significant predictor for length of the left main ($\beta=0.14$, CI(0.017:0.085), $p=0.003$). Significant predictors of the mean lumen area are length of the left main artery and height of the patient. IVUS derived mean lumen areas were larger among men compared to women, although excluded in a multivariate regression (16.15±4.8, 14.11±4.01 $p=0.004$ univariate analysis) and they were negatively correlated with the length of the left main ($\beta=-0.25$, CI(-0.41:-0.14), $p<0.001$) and positively with the height of the patient ($\beta=0.20$, CI(0.04:0.17), $p=0.002$).

CONCLUSION Mean lumen area of non-diseased left main coronary arteries significantly correlates to the height of the patient and negatively correlates to the length of the left main. IVUS derived mean luminal diameter is 4 mm or greater in the majority of patients.

CRT-300.02

Longitudinal Distribution of Lipid-rich Plaque Components in Culprit Lesions: A Near-infrared Spectroscopy Study



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BACKGROUND The near-infrared spectroscopy (NIRS) catheter system identifies lipid core-containing coronary plaques (LCP) of interest in the coronary arteries. We sought to evaluate axial distance in location between the maximum LCP site and the site that had the most luminal-narrowing as assessed by NIRS system.

METHODS We performed NIRS imaging in 72 native coronary lesions in 63 patients: 14 acute coronary syndrome (ACS) and 58 non-ACS culprit lesions. Intravascular ultrasound (IVUS) derived lesion was defined as the site of minimal lumen area (MLA) within the culprit segment. Otherwise, an NIRS-derived lesion was defined as the site of maximum LCP site (the center of 4mm maximum lipid core burden index $L_{max}LCBI4mm$) within the culprit segment. The distance between the IVUS-derived lesion and the NIRS-derived lesion was evaluated for each culprit segment.

RESULTS Overall, the mean distance between the MLA site and the maximum LCP site was 2.3 ± 4.4 mm. Of the total of 72 lesions, 48 were in the left anterior descending (LAD), 11 were in the left circumflex (LCx) and 13 were in the right coronary artery (RCA). There was no significant difference in axial measurement data in the IVUS- and NIRS-derived lesion when comparing LAD to non-LAD (LCx and RCA). Furthermore, $_{max}LCBI4mm$ was also similar among the lesion location (479.1 ± 218.5 vs. 436.7 ± 239.9 , $p = 0.46$). Interestingly, the maximum LCP site was located more proximally to the MLA site and more widely distributed in the LAD lesion than that in the non-LAD lesion ($3.01 \pm 4.93mm$ vs. $0.82 \pm 2.61mm$, $p = 0.02$).

CONCLUSIONS NIRS may be helpful to identify vulnerable regions more precisely as well as assess strategies for their modification.

CRT-300.03

Explanation of Post Procedural Fractional Flow Reserve Below 0.85: A Comprehensive Ultrasound Analysis of the FFR SEARCH Registry



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BACKGROUND Fractional Flow Reserve (FFR) after Percutaneous Coronary Intervention (PCI) is a predictor of adverse cardiovascular events during follow-up. However, the rationale for low post procedural FFR values remains often elusive based on angiographic findings alone.

METHODS FFR search is a prospective registry in which post procedural FFR were assessed in 1000 consecutive all-comer patients after successful PCI. FFR measurements were performed with a novel over-the-wire monorail microcatheter inserted over the previously used coronary guidewire distally of the most distal stent edge. FFR measurements were performed in resting conditions and under maximum hyperemia with intravenous adenosine. In patients with a post-procedural FFR ≤ 0.85 intravascular high definition ultrasound analysis were performed at a pullback speed of 2.5 mm/sec at 60 MHz to identify potential reasons for a low post-procedural FFR in 100 consecutive cases. Images were analyzed every 0.5 mm.

RESULTS 22% of the patients in FFR SEARCH had at least one lesion with an FFR value ≤ 0.85 post procedural. IVUS analyses were performed in 100 vessels from 95 patients with a post-procedural FFR ≤ 0.85 . Mean post-procedural Pd/Pa was 0.91 ± 0.04 while under maximum hyperemia the mean FFR was 0.79 ± 0.05 . On IVUS, mean lumen area was $6.18 \pm 1.55mm^2$ with a minimal lumen area of $2.53 \pm 1.04 mm^2$. Minimum stent area was $4.27 \pm 1.65 mm^2$. Significant focal lesions proximal to the stented segment were present in 29% of the vessels analysed while focal distal lesions were apparent in 30% of the patients. Stent underexpansion was present in 68% of patients according to the MUSIC criteria while malposition was present in 22% of the cases. In 54/100 patients clear focal signs of luminal narrowing were found.

CONCLUSIONS In patients with a post-procedural FFR ≤ 0.85 IVUS revealed focal signs of luminal narrowing in the majority of the cases. While additional treatment will optimize the longer term results of these patients remains to be determined.

OCT

CRT-300.04

Quantitative Assessment of the Reproducibility of Bright Spots Detection in Infarct-Related Artery of Patients with ST-Segment Elevation Myocardial Infarction by Optical Coherence Tomography



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BACKGROUND Bright spots in optical coherence tomography (OCT) images were correlated with a variety of plaque components, including macrophages, and thought to be linked to the degree of