TCT-691

Contributions of Mechanical Factors and Biologic Response to Sirolimus-Eluting Stent Thrombosis: Final IVUS Results From the RESTART Registry

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Background: Stent thrombosis (ST) is a multifactorial phenomenon that has not been systematically characterized due to its low incidence. To overcome this limitation, a nationwide multicenter registry of definite ST after sirolimus-eluting stent implantation has been conducted in Japan, representing the largest database that comprises 611 ST patients from 543 centers analyzed using a centralized data center and independent core imaging laboratories.

Methods: In this registry, 124 ST patients (66 early ST; 27 late ST; 31 very late ST) who underwent IVUS at baseline and/or event were collected from 105 centers. To evaluate time-dependent differences in morphologic and morphometric characteristics, the IVUS findings were compared among early, late, and very late ST, as well as matched control patients in real-world clinical practice.

Results: In comparison with control groups, early and late ST patients were associated with stent underexpansion more frequently than very late ST patients (figure). In contrast, very late ST patients showed a significant increase in vessel area (28.9% increase from baseline to event), whereas early and late ST patients had no significant vessel area change beyond the stent (p<0.0001). The control patients also showed no significant vessel area increase at matched time points. At the time of ST, there was a significant difference in maximum vessel area among the groups (figure), while no difference was observed at baseline. In serial comparison of very late ST patients, greater expansive vessel remodeling occurred on the less diseased vessel wall at baseline (p=0.001).

Conclusion: Direct comparisons of a large number of ST patients confirmed significant time-dependent differences in IVUS characteristics, suggesting diverse contributions of mechanical vs biologic factors to the pathophysiology of this phenomenon.

TCT-692

Physiologic Lesion Assessment (Abstract nos 697 - 710)

TCT-693

Percent stenosis is a weak predictor of Fractional Flow Reserve: Insights from a French multicenter Registry (R3F)

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Background: It has previously been shown that fractional flow reserve (FFR) is inversely related to the degree of coronary stenosis. There is however no report of the value of the degree of coronary stenosis as a predictor of FFR with respect to other lesions and patient’s characteristics.

Methods: The R3F registry investigated the use of FFR in 20 French centers from October 2008 to June 2010. During this period, FFR was measured in 1266 lesions in 945 consecutive patients. Complete baseline clinical and angiographic characteristics were recorded for each patient.

Results: 75% of patients were males with a mean age of 65±10 years, 37% were diabetics and 19% had a recent ACS. Patients had non significant (<50% stenosis) angiographic coronary artery disease (14%), significant (<50%) angiographic 1- vessel (37%), 2- vessel (30%) or 3- vessel disease (19%). 63% of the lesions were located in the LAD, 15% in the LCx and 22% in the RCA. 66% were A/B1 and 34% B2/C in ACC/AHA classification. The mean reference diameter was 2.85±0.59mm, the mean lesion length was 12.6±7.8, the mean % stenosis was 52±13 and the mean FFR was 0.82±0.09. Univariate and multivariate analyses of the predictors of FFR were performed. The results of the multivariate analysis are presented below.

Predictors of FFR: A multivariate model

<table>
<thead>
<tr>
<th>T</th>
<th>β</th>
<th>95% CI</th>
<th>β</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not FFR</td>
<td>-0.49</td>
<td>-0.52</td>
<td>-0.38</td>
<td>0.0001</td>
</tr>
<tr>
<td>Lesion length</td>
<td>-0.39</td>
<td>-0.41</td>
<td>-0.31</td>
<td>0.0001</td>
</tr>
<tr>
<td>ACC/AHA</td>
<td>0.1</td>
<td>0.09</td>
<td>0.13</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Other variables in the model: Center, gender, diabetes, previous MACE, symptoms, stability, non-invasive testing, procedure, lesion reference diameter, MLD.

Conclusion: In patients with intermediate coronary lesions, the degree of stenosis is only a weak predictor of FFR. Other lesions characteristics including vessel location, lesion length and lesion complexity are much stronger predictors of FFR. These results are important to understand the mechanisms linking lesion characteristics to myocardial ischemia.

TCT-696

Optimal Cut-off Value of Coronary Flow Velocity to Predict Functional Recovery in TIMI-3 Reperfused Acute Myocardial Infarction

Hiroshi Hikita, Akira Sato, Shunsuke Kuroda, Naokiko Kawaguchi, Yuki Oosaki, Emiko Nakashima, Taiki Akiyama, Tomoyo Sugiyama, Tetsuo Kamishii, Shigeki Kimura, Atsushi Takahashi, Mitsuki Isobe, Cardiovascular Division, Kanto Medical Center, Tokyo, Japan

Background: The purpose of this study is to evaluate predictive value of coronary flow velocity (CFV) measured with TIMI frame-count and quantitative coronary angiogram (QCA) for functional recovery in patients with TIMI-3 reperfused acute myocardial infarction (AMI).

Methods: In 115 AMI patients with TIMI-3 reperfusion after coronary stent admission (age 65±12 years, mean±SD, men/women 90/25), TIBMPIPP SPECT using QGS program was performed to measure perfusion-metabolism mismatch score, an indicator of viable myocardium, from each total defect score of TIBMPIPP using 17-segment model and a semiquantitative visual score (0: normal, to 4: no uptake), and late ventricular ejection fraction (LVEF) within 2 weeks and 6 months after AMI. CFV over the target vessel was measured by using TIMI frame-count method and QCA: vessel length/frame-count (angiogram:15 frames/sec).

Results: Receiver-operating characteristics analysis indicated the best cut-off values of CFV and mismatch score within 2 weeks to predict 10% increase of LVEF from 2 weeks to 6 months after AMI (mean LVEF, 52% (2 weeks), 58% (6 months)) were 148 mm/sec with a sensitivity of 76% and specificity of 60% and 10 with a sensitivity of 55% and specificity of 72% respectively. Multivariate analysis showed CFV ≥148 was a significant independent predictor for 10% increase of LVEF (p=0.005).

Conclusion: CFV ≥148 mm/sec measured with TIMI frame-count and QCA is a useful predictor of functional recovery in TIMI-3 reperfused AMI

TCT-694

Can Potentially Significant Competitive Flow Be Identified at the Time of CABG?

T. Bruce Ferguson, Cheng Chen

Background: Despite many studies attributing bypass graft outcomes to competitive flow (CF), simultaneous visualization of flow down the competing conduits has never been imaged. The percent stenosis in the grafted vessel is the default CF definition. Visualization, with documentation of physiology, is necessary to identify PS CF at CABG.

Methods: The SPY Angiography fluorescence imaging system was modified for PS CF. Visualization, with documentation of physiology, is necessary to identify PS CF at CABG.

Results: We determined that PS CF was visually identified by native coronary flow

TCT-695

Recovery in TIMI-3 Reperfused Acute Myocardial Infarction

Hiroshi Hikita, Akira Sato, Shunsuke Kuroda, Naokiko Kawaguchi, Yuki Oosaki, Emiko Nakashima, Taiki Akiyama, Tomoyo Sugiyama, Tetsuo Kamishii, Shigeki Kimura, Atsushi Takahashi, Mitsuki Isobe, Cardiovascular Division, Kanto Medical Center, Tokyo, Japan

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Results: Receiver-operating characteristics analysis indicated the best cut-off values of CFV and mismatch score within 2 weeks to predict 10% increase of LVEF from 2 weeks to 6 months after AMI (mean LVEF, 52% (2 weeks), 58% (6 months)) were 148 mm/sec with a sensitivity of 76% and specificity of 60% and 10 with a sensitivity of 55% and specificity of 72% respectively. Multivariate analysis showed CFV ≥148 was a significant independent predictor for 10% increase of LVEF (p=0.005).

Conclusion: CFV ≥148 mm/sec measured with TIMI frame-count and QCA is a useful predictor of functional recovery in TIMI-3 reperfused AMI

TCT-699

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T. Bruce Ferguson, Cheng Chen

Background: Despite many studies attributing bypass graft outcomes to competitive flow (CF), simultaneous visualization of flow down the competing conduits has never been imaged. The percent stenosis in the grafted vessel is the default CF definition. This imaging liability and imprecise definition limit the understanding of potentially significant CF (PS CF). Visualization, with documentation of physiology, is necessary to identify PS CF at CABG.

Methods: The SPY Angiography fluorescence imaging system was modified for PS CF imaging and analysis. SPY images are 34-second video loops, which capture the arterial, microvascular and venous phases of cardiac blood flow and perfusion. A protocol was devised to compare post-grafting (baseline + graft flow, perfusion) with pre-grafting (baseline flow, perfusion) in 100 sec. OPCAB or on-pump, low-flow ejecting heart are ideal physiologic opportunities to assess grafts for PS CF.

Results: We determined that PS CF was visually identified by native coronary flow