Unusual Coronary Pathology: Spasm, Spontaneous Dissection, and Others

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TCT-429
Synergistic Effects of Hemoglobin, Platelet and C-Reactive Protein in the Development of Coronary Spasm
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Background: Although modest anemia protects against cerebral spasm, it is unclear whether the same is true for coronary spasm. Although women have higher platelet counts than men with coronary artery disease (CAD), this gender disparity has not been evaluated in coronary spasm. We sought to determine the roles that hemoglobin, platelet, and high-sensitivity C-reactive protein (hsCRP) play in patients with coronary spasm.

Methods: Patients (337 women and 532 men) undergoing diagnostic coronary angiography with proven coronary spasm but without obstructive CAD were evaluated at high-sensitivity C-reactive protein (hsCRP) tertiles of 1.21, 2.15, and 5.93 (p = 0.009). Among women with high hemoglobin levels, the odds ratios [OR] from the lowest to the highest tertiles of hsCRP were 1.21, 2.15, and 5.93 (p = 0.004). In women with low hemoglobin levels, an elevated risk was found from the middle to the highest tertiles of hsCRP (OR, 0.59 to 3.85) (p = 0.004). The highest likelihood of developing coronary spasm was found among women with the highest hsCRP tertile and low platelet counts (OR = 8.77) and among men with the highest hsCRP tertile and high platelet counts (OR = 4.58).

Results: There are interactive effects among hemoglobin, platelet, and hsCRP in women with this disease, but not in men. While hemoglobin is a modifier in the development of coronary spasm in women, platelet count is an independent risk factor for men.

Conclusions: There are positive interactions among hemoglobin, platelet, and hsCRP in women with the highest hsCRP tertile and low platelet counts (OR = 8.77) and among men with the highest hsCRP tertile and high platelet counts (OR = 4.58). There are interactive effects among hemoglobin, platelet, and hsCRP in women with this disease, but not in men. While hemoglobin is a modifier in the development of coronary spasm in women, platelet count is an independent risk factor for men.

TCT-430
Myocardial Bridging Increases Diffuse and Focal Chronic Stent Recoil Following Drug-Eluting Stent Implantation
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Background: The influence of myocardial bridge (MB) on the mechanical and biological response post stenting has not been evaluated among different stent materials. We hypothesized that a MB potentially impacts chronic stent recoil patterns among the stainless steel (SS)-based and cobalt-chromium (CoCr)-based drug-eluting stents (DES).

Methods: A total of 300 DES (143 SS: 157 CoCr) in LAD were analyzed. Volumetric IVUS was performed at baseline and 8-month follow-up (FU) regardless of symptoms. Volume index (VI) was defined as volume divided by stent length. Diffuse chronic stent recoil was defined as >10% decrease in stent volume index (SVI) during FU. Focal chronic stent recoil was defined as >20% stent area decrease in 3 consecutive 1-mm segments.

Results: MB was found within or ≤5-mm adjacent to the stent in 81 lesions (MB-stent). Compared with the non-MB-stent, the incidence of chronic stent recoil was higher in the MB-stent (Diffuse: 9.9 vs. 1.4%, p < 0.001; Focal: 7.4 vs. 2.7%, p = 0.067). The maximum SVI decrease along the stented segment was also greater in the MB-stent (Figure). The 2 stent materials, however, showed similar incidences and degrees of chronic recoil within the MB and non-MB-stent groups. The materials also had no effect on the minimum lumen area and neointimal encroachment at FU when stratified by MB.

Conclusions: MB was associated with a higher incidence and degree of chronic stent recoil. Even in the presence of MB, however, similar lumen patency could be achieved with SS- vs. CoCr-based DES.

TCT-431
High Prevalence of a Coronary Spasm to Ergonovine Testing in Patients With Stable Angina Pectoris and Unobstructed Coronary Arteries
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Background: In Japan, approximately 40% of patients of angina pectoris have been postulated to be vasospastic angina. Despite a typical clinical presentation with exercise-related anginal symptoms (chest pain or dyspnea) with or without occasional attacks of resting chest pain suggestive of coronary artery disease, nearly half of the patients are given a diagnosis of noncardiac chest pain, and some are considered to have microvascular angina because of normal or “near” normal coronary arteriograms. Many of these patients however, we speculate that abnormal coronary vasomotion might also represent a plausible explanation for the symptoms of the patient. The aimed of this study was to determine the prevalence of epicardial coronary spasm in Japanese patients with anginal symptoms despite angiographically normal coronary arteriograms, and to evaluate the risk of that.

Methods: This was a retrospective study in consecutive patient (51% men, mean age 66±12) with angina-like chest pain and unobstructed coronary arteries. Patients with normal coronary arteries or only minimal irregularities (<20%narrowings) on baseline diagnostic angiography underwent standardized intracoronary Ergonovine (ERG) provocation for the assessment of coronary vasomotor function. We defined epicardial coronary artery spasm as diameter reduction of <75% as compared with that after administration of ISDN.

Results: 778 patients underwent intracoronary Ergonovine (ERG) testing, 321 patients (41%) with epicardial spasm (<75% diameter reduction with reproduction of the symptoms or EKG change). Hyperuricemia (46.2% vs 37.6%, p = 0.018) and Smoking (43.8% vs 38.6%, p = 0.016) was strong risk factor for the spasm.
Conclusions: The ERG test triggered epicardial coronary spasm in more than 40% of Japanese patients who underwent diagnostic angiography for assessment of stable angina and unobstructed coronary arteries. Our results suggest that abnormal coronary vasoconstriction plays pathogenic role in this setting and that the ERG test might be useful to identify patients with cardiac symptoms, despite normal coronaries.

TCT-432
Angiographic Characteristics according to Acetylcholine Dose Responsible for Significant Coronary Artery Spasm

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Background: We assume that patients (pt) showing positive acetylcholine (Ach) provocation test to lower Ach dose may more vulnerable to CAS. We investigated whether there are differences in angiographic characteristics according to Ach dose causing significant CAS during intracoronary Ach provocation test.

Methods: A total 1730 consecutive pts underwent Ach provocation test by incremental doses of 20, 50, 100 were enrolled. Significant CAS was defined as focal or diffuse severe transient luminal narrowing (>70%) with/without chest pain or ST-T change on ECG. Angiographic characteristics were compared between the Low dose group (20 & 50 ug, n=716) and High dose group (100 ug, n=1014) among pts with positive Ach provocation test.

Results: Baseline clinical characteristics were similar between the two groups except the Low dose group had more elderly (>50 years), diabetes mellitus and previous myocardial infarction (MI). During the Ach provocation test, the incidence of anterio-ventricular (AV) block, severe CAS (>70% stenosis by QCA), multi-vessel spasm and diffuse spasm were more frequent in low dose group (Table).

Conclusions: In our study, we found that pts showing significant CAS to lower Ach dose showed more chance to have severe, diffuse and multivessel spasm during the test. Special care with intensive medical therapy should be considered who showed significant Ach response to lower Ach dose as compared with those responded to higher Ach dose.

TCT-433
Impact of Beta-Blocker on Angiographic and Clinical Parameters during Intracoronary Acetylcholine Provocation Test

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Background: Beta blockers (BB) are widely used to control hypertension. It is well known that BB may lead to significant vasospasm. However, the impact of chronic administration of BB on clinical and angiographic characteristics during acetylcholine (Ach) provocation test is not clarified yet.

Methods: A total 3034 consecutive patients (pts) underwent coronary angiography with Ach provocation test from January 2004 to August 2010 were enrolled for this study. Ach was injected in incremental doses of 20, 50, 100μg into the left coronary artery. Significant coronary artery spasm (CAS) was defined as focal or diffuse severe transient luminal narrowing (>70%) with/without chest pain or ST-T change on ECG. A total 1394 pts (45.9%) showed positive provocation tests. Among the (+) Ach provocation test pts, we compared the clinical and angiographic characteristics of patients with beta-blocker to those without beta-blocker in pts with myocardial infarction.

Results: The baseline clinical and procedural characteristics were well balanced between the two groups. There was no difference in the incidence of myocardial bridges, chest pain, ischemic ECG changes and atroventricular (AV) block on ECG, incidence of baseline spasm, severe vasospasm, multi-vessel involvements during the Ach provocation test were similar in both groups.

Conclusions: The use of beta blocker in pts with vasospastic angina was not associated with worse clinical and angiographic parameters during the Ach provocation test. BB may be safely used in pts with vasospastic angina.

TCT-434
Implantation of Sirolimus-Eluting Stent in Patients with Vasospastic Angina Deteriorates Late Catch-Up Phenomenon

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Background: The recent study has shown that an implantation of sirolimus-eluting stent (SES) is associated with late restenosis, i.e., late catch-up phenomenon. We investigated long-term angiographic outcome in patients with vasospastic angina (VSA) treated with the SES.

Methods: Subjects were patients who had undergone an ergonovine-provocation test for chest pain, and were subsequently treated with an SES or bare-metal stent (BMS) because of a progression of coronary artery stenosis. Patients were divided into four groups: SES with vasospasm (SES-V, n=26), SES without vasospasm (SES-NV, n=53), BMS with vasospasm (BMS-V, n=28); and BMS without vasospasm (BMS-NV, n=46). Coronary angiography was performed at 8 months (read-term follow-up) and 20 months (long-term follow-up) after the implantation of the stent.

Results: As shown in the figure, the SES implantation was associated with a reduction of minimum lumen diameter (MLD) at the long-term follow-up, indicating late catch-up phenomenon. This phenomenon was more obvious in patients with VSA than in those without (p<0.05). Both BMS groups showed a reduction in MLD at the mid-term follow-up compared with immediately after the intervention. This reduction had regressed at the long-term follow-up, and that was unrelated to VSA. The rate of stent edge restenosis compared with stent body restenosis in the SES-V group (87.3%) was higher than that in the SES-NV group (25.0%, p<0.05), suggesting the association of vasospasm with stent restenosis.

Conclusions: The SES implantation may be associated with high rate of late restenosis in patients with vasospastic angina.

TCT-435
Spontaneous Coronary Dissection: 10 Years Follow Up in Our Cath Lab

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Background: Spontaneous coronary artery dissection (SCAD) is a rare cause of ischemic disease. It occurs frequently in young population with predilection for women. Real incidence is probably underestimated.

Methods: We analyzed angiographic aspects and risk factors of consecutive Pts underwent coronary angiography and discharged by our Division with diagnosis of SCAD from January 1999 to June 2008.

Results: We observed an angiographic aspect of SCAD in 33/10073 Pts (0.33%); 21 women and 12 men. Mean age 50.8±14.0. Four patterns were recognized: 1) a true dissection with 100% stenosis; 2) the most common; 3) the dissection with 70-99% stenosis; 4) a type of dissection with Lt Collateralization. We observed an increase of the SCAD type 2 in women (6%) compared with 0% in men (p<0.05). The SEM was performed at 8 months (mid-term follow-up) and 20 months (long-term follow-up) after the implantation of the stent.

Conclusions: The SES implantation may be associated with high rate of late restenosis in patients with vasospastic angina.