Hospital, Seoul, Korea, Republic of; [6]Unknown, Seoul, Korea, Republic of; [7]Severance Hospital, Seoul, Korea, Republic of; [8]Unknown; [9]Yonsei University College of Medicine, Seoul, Korea, Republic of

**BACKGROUND** Randomized trials comparing intravascular ultrasound (IVUS)-guided vs. angiography-guided new-generation drug-eluting stent (DES) implantation were scarce. We evaluated the clinical usefulness of IVUS-guided new-generation DES implantation using meta-analysis with individual patient-level data from randomized trials.

**METHODS** Randomized trials comparing IVUS-guided vs. angiography-guided new-generation DES implantation were searched through MEDLINE, EMBASE and Cochrane databases. A total of 2,345 patients treated with new-geneation DES for complex coronary lesions from 3 randomized trials were identified and individual patient-level data was obtained. The primary end point was major adverse cardiovascular events (MACE), a composite of cardiac death, myocardial infarction, stent thrombosis or target-lesion revascularization. Secondary end point was the hard end point defined as a composite of cardiac death, myocardial infarction or stent thrombosis as well as individual components of the primary end point. All analyses were conducted by intention-to-treat.

**RESULTS** At 1 year, the primary end point of MACE occurred in 4.5% of the patients receiving IVUS-guided DES implantation and in 7.4% of those receiving angiography-guided DES implantation (HR=0.54, 95% confidence interval [CI]=0.36-0.81, p=0.002). Favorable clinical outcomes for IVUS-guided group were observed for myocardial infarction (0% vs. 0.4%, HR=0.09, 95% CI=0.00-0.80, p=0.026) and target-lesion revascularization (5.0% vs. 6.8%, HR=0.61, 95% CI=0.40-0.93, p=0.021).

**CONCLUSION** Compared to the angiography-guidance, IVUS-guided new-generation DES implantation was associated with favorable clinical outcomes which was driven by reduction of myocardial infarction and target-lesion revascularization.

**CATEGORIES IMAGING:** Intravascular

## TCT-565

### Fate of irregular protrusion after second-generation drug-eluting stent implantation: Serial optical coherence tomography study

Shinjo Sonoda,[1] Yoshinori Sanuki,[2] Yoshitaka Muraoka,[3] Hironori Takami,[4] Akiyoshi Shimizu,[4] Megumi Kitagawa,[4] Yuki Tsuda,[4] Masaru Araki,[4] Yutaka Otsuji[4]
[1]University of Occupational & Environmental Health, Kitakyushu, Japan; [2]university of occupational and environmental health, Japan, Kitakyusyu, Japan; [3]University of Occupational and Environmental, Kitakyusyu, Japan; [4]University of occupational and environmental health

**BACKGROUND** Previous optical coherence tomography (OCT) study reported that irregular protrusion (IP), defined as protrusion of material with an irregular surface into lumen between stent struts, and small minimal stent area (MSA) at post drug-eluting stent (DES) implantation were independent predictors of 1-year clinical outcome including target lesion revascularization (TLR). However the influence of IP on in-stent healing response after second-generation DES implantation is unknown. The aim of this study was to assess the relationship between IP at post percutaneous coronary intervention (PCI) and in-stent healing response at 8-month follow-up using OCT.

**METHODS** We evaluated a total of 81 patients (acute coronary syndrome: N=5, stable angina pectoris: N=76) who performed second-generation DES implantation and 8-month follow-up examination using OCT. They were divided by the existence of IP at post PCI into 2 groups (IP-group: N=37, non-IP group: N=53). At post PCI, presence of thrombus, MSA, % stent expansion, stent symmetry, stent edge dissection, and incomplete stent apposition were analyzed. At 8-month follow-up, existence of uncovered strut, micro-vessel, thrombus, and peri-stent ulcer like appearance (PSUA) were analyzed. Neointimal morphology (homogeneous, heterogeneous, and layered) and late lumen loss were also analyzed.

**RESULTS** There were no significant differences in patient characteristics between groups. During follow-up, there were 6 TLRs (6.7%) but no stent thrombosis. At post-PCI, thrombus was more frequent in IP group than in non-IP group (46% vs 25%, p<0.05), but otherwise there were no significant differences between groups. At 8-month follow-up, lipid rich plaque, micro-vessel, PSUA were more frequent in IP group than in non-IP group (22% vs 2%, 38% vs 9%, and 11% vs 0%, respectively, P<0.01). Heterogeneous neointima was more frequent in IP group than in non-IP group (27% vs 8%, p<0.05). Late lumen loss was larger in IP group than in non-IP group (IP-group: 1.58±1.71 mm vs non-IP group: 0.96±0.66 mm, P<0.05). On multivariate analysis, IP was an independent predictor of lipid rich plaque, micro-vessel, and heterogeneous neointima at 8-month follow-up (OR 13.6, 95%CI 2.1-270; OR 5.8, 95%CI 1.8-21.3; OR 4.6, 95%CI 1.3-19.1, respectively, P<0.05). MSA was one of the independent predictor of TLR.

**CONCLUSION** The finding of IP at post PCI associated with neoatherosclerosis formation and large late lumen loss at 8-month follow-up after second-generation DES implantation, which may predict subsequent late stent failure.

**CATEGORIES IMAGING:** Intravascular

## TCT-566

### Association Between Lesion Remodeling and Plaque Morphology Assessed By Intravascular Ultrasound and Optical Coherence Tomography

Mitsuaki Matsumura,[1] Gary Mintz,[1] WENBIN ZHANG,[1] Yang Cao,[1] Cheolmin Lee,[2] Tsunekazu Kakuta,[3] Akiko Maehara[1]
[1]Cardiovascular Research Foundation, New York, New York, United States; [2]Cardiovascular Research Foundation, New York, United States; [3]Tsuchiura General Kyodo Hospital, Tsuchiura, Japa

**BACKGROUND** We evaluated the association between intravascular ultrasound (IVUS)-defined remodeling and optical coherence tomography (OCT)-defined plaque morphology.

**METHODS** Overall, 277 pts with acute coronary syndromes (ACS) and 421 pts with stable angina underwent IVUS and OCT pre-PCI. IVUS remodeling index (RI) was calculated as the vessel area at the minimum lumen area (MLA) site divided by the average of the proximal and distal reference vessel areas. Indices of lipids, macrophages, and calcium were defined as mean angle × length and compared between lesions with RI ≥1 (positive) vs RI <1 (negative).

**RESULTS** Compared to pts with negative remodeling, pts with positive remodeling had more frequent ACS presentation (52.6% vs 29.6%, p<0.0001) and less statin use pre-admission (40.7% vs 50.1%, p=0.01) although pt age (median 66 vs 67 yrs, p=0.17) and diabetes prevalence (31.7% vs 34.7%, p=0.4) were similar. Compared to lesions with negative remodeling, lesions with positive remodeling had a greater IVUS plaque burden (87.1% [83.7-89.8] vs 82.7% [77.3-87.2], p<0.0001) although MLA (1.8 [1.6-2.4] mm2 vs 1.9 [1.6-2.5] mm2, p=1.0) and lesion length were similar (25.0 [19.1-32.0] mm vs 25.0 [18.6-33.0] mm, p=0.4). There were more vulnerable OCT morphologies in lesions with positive remodeling including thinner fibrous cap and more macrophages, lipids, plaque ruptures, thin-cap fibroatheroma, thrombus, and calcified nodules (Table). In the multivariable logistic regression model and among the OCT morphological findings, larger lipid index (per 100, OR 1.02 [1.00-1.04], p=0.02) and thinner fibrous cap (per 10 μm, OR 0.97 [0.94-1.00], p=0.07) were independently associated with positive remodeling.

| OCT Morphology | RI < 1.0 (n=392) | RI ≥ 1.0 (n=306) | p value |
|---|---|---|---|
| Fibrous cap thickness, μm | 100 (70-140) | 80 (60-120) | <0.0001 |
| Macrophage index | 324 (135-564) | 394 (228-650) | <0.0001 |
| Lipid index | 1142 (565-1976) | 1642 (1022-2387) | <0.0001 |
| Calcium index | 164 (0, 548) | 225 (0, 695) | 0.35 |
| Thin-cap fibroatheroma | 25.0% | 40.0% | <0.0001 |
| Plaque rupture | 21.9% | 38.2% | <0.0001 |
| Thrombus | 27.6% | 44.8% | <0.0001 |
| Calcified nodule | 3.8% | 40.0% | <0.0001 |
| Cholesterol crystal | 25.5% | 1.0% | <0.0001 |

**CONCLUSION** Lesions with IVUS-defined positive remodeling had more high-risk OCT-detected morphologies, particularly a thinner fibrous cap and more lipidic plaque.

**CATEGORIES IMAGING:** Intravascular