Background: Stent fracture (SF) after DES implantation has recently become an important concern because of its potential association with in-stent restenosis and stent thrombosis. However, the incidence and clinical relevance to SF after second generation DES (zotarolimus-eluting stent: ZES, everolimus-eluting stent: EES, and biolimus-eluting stent: BES) remain unclear, so the aim of study is to reveal clinical impact of SF after second generation DES deployment.

Methods: A total of 1734 patients with 2185 lesions undergoing second generation DES implantation and follow-up angiography within 12 months were performed from April 2009 to September 2012 in a single center. We divided into SF group and non-SF group and assessed the rates of SF and major adverse cardiac events (MACE), defined as death, myocardial infarction, stent thrombosis, and target lesion revascularization (TLR), retrospectively.

Results: We had obtained 1826 lesions follow-up angiography. (83.6%) The mean follow-up period was 788±157 days. The rate of TLR was significantly higher in the SF group than in the non-SF group (4.3% versus 0.2%; p<0.001) However, there was no significant difference in the calcification lesion between the two group (N.S.). SF was observed in 26 of 2182 lesions (1.2%). The rate of TLR and late stent thrombosis were significantly higher in the SF group than in the non-SF group (33.3% versus 5.4%; p=0.001 and 0.3% versus 0.1%; p=0.002). MACE was significantly higher in the SF group than in the non-SF group (44.4% versus 10.9%; p<0.001).

Conclusions: SF after second generation DES implantation occurs in 1.4% of lesions and is associated with higher rate of TLR, MACE, and late stent thrombosis.

TCT-652
Incidence and Predictors of Late Catch-up Phenomenon After Drug-eluting Stent Implantation
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Background: We aimed to evaluate the incidence and predictors of late catch-up phenomenon after first and second generation drug-eluting stent (DES) implantations.

Methods: From 2002 to 2012, 10996 lesions received DES implantation: first generation, 6242 sirolimus-eluting stents (SES); second generation, 3391 everolimus-eluting stents (EES) and 1363 biolimus-eluting stents (BES). Mid-term angiographic follow-up was scheduled at 8 months and late-term at 20 months. We analyzed 6849 lesions (SES, 3871; EES, 2153; and BES, 825) after late-term follow-up, which were free from in-stent restenosis (ISR) and target lesion revascularization at mid-term follow-up. ISR was defined as restenosis >50% and late catch-up phenomenon as the first ISR over one year after DES implantation. The follow-up duration was two years.

Results: The late catch-up phenomenon rate was not significantly different between EES and SES (5.8% vs. 7.1%, p=0.06) but significantly lower in SES than in SES (4.4% vs. 7.1%, p=0.004). The predictors of late catch-up phenomenon (p<0.10, univariate analysis) were hypertension, diabetes, hemodialysis, ostial lesion in the right coronary artery or in the left circumflex artery, ISR lesion, reference diameter <2.5 mm, percent diameter stenosis before (>75%) or after (>25%) DES implantation, angulated lesion, lesion length >30 mm, chronic total occlusion lesion, left main or main-stenting, and DES types, from which 10 variables in the final multivariable regression model obtained by the forward stepwise method are shown in the table.

Conclusions: BES implantation is a negative predictor of late catch-up phenomenon.

TCT-653
Association Between Native Coronary Artery Disease Progression And Instant Neoatherosclerosis: A Long-term Angiographic And Optical Coherence Tomography Cohort Study
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Background: The association between native coronary artery disease progression in non-target lesion (TL) segments and the process of in-stent neoatherosclerosis (NA) five years after DES implantation is unknown.

Methods: The SIRTAX-LATE OCT population was analyzed for evidence of in-stent NA as assessed by OCT five years after DES (sirolimus-eluting stent (SES) and paclitaxel-eluting stent (PES)) implantation. NA was defined as the presence of fibrocalcific plaques or fibroatheromas within the neointima of previously implanted DES with longitudinal extension of >1.5mm. Native coronary artery disease progression in non-TL segments was evaluated by serial quantitative coronary angiography (QCA) in all arterial segments with diameter of at least 1.5mm and length of at least 4mm. The minimal lumen diameter (MLD) of each QCA was measured at matched endovascular segments at baseline and five year angiographic follow-up, or prior to any non-TL revascularization. The change in MLD between baseline and follow-up was calculated as endpoint related to angiographic disease progression. The clinical endpoint was any non-TL revascularization assessed throughout 5 years by an independent clinical event committee.

Results: A total of 88 patients with 88 lesions were available for OCT analysis 5 years after DES implantation. In-stent neoatherosclerosis was observed in 14% of all stented segments with the majority of patients having fibroatheromas (12.5%) followed by fibrocalcific plaques (5.6%). A total of 716 untreated native coronary artery segments (8.1:1.7 segments/patient) were serially evaluated by OCTA. The change in MLD between baseline and five year angiographic follow-up was significantly higher in patients with OCT evidence of NA (0.25mm, 95%CI 0.15-0.35) as compared with patients without evidence of NA (0.13mm, 95%CI 0.09-0.17, p=0.002). Consistent with the angiographic findings, any revascularization in non-TL segments occurred more frequently in patients with evidence of NA (79%) as compared with patients without evidence of NA (45%) (p<0.001).

Conclusions: Patients with angiographic and clinical evidence of native coronary artery disease progression in non-TL segments are more likely to develop in-stent neoatherosclerosis.

TCT-654
Effects of Bioabsorbable Versus Durable Polymer Drug-eluting Stent on Neoatherosclerosis: Optical Coherence Tomography Analysis
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Background: Neoatherosclerosis after drug eluting stent (DES) implantation is known to be related with increased risk of late restenosis and stent thrombosis. Studies have suggested that inflammation by polymer may be one of several mechanisms, but there have been a few data about bioabsorbable polymer DES (BP-DES) versus durable polymer DES (DP-DES) and its effect on neoatherosclerosis.

Methods: We enrolled 292 patients undergoing OCT analysis after DES implantation were divided into 2 groups according to stent type (BP-DES (n=107) and DP-DES (n=185)). OCT analysis was performed within 2 years after stent implantation. Neoatherosclerosis was defined as presence of more or 1 of as followings: plaque rupture, thrombus, neovascularization, plaque erosion, microvessel, macrophage and thin of thick fibrous cap atheroma. The primary end point was the incidence of neoatherosclerosis, and the secondary end point was the occurrence of MACE (major cardiac events; death, myocardial infarction, target lesion revascularization, or stent thrombosis).

Results: A total of 292 patients undergoing OCT analysis after DES implantation were divided into 2 groups according to stent type (BP-DES (n=107) and DP-DES (n=185)). OCT analysis was performed within 2 years after stent implantation. Neoatherosclerosis was defined as presence of more or 1 of as followings: plaque rupture, thrombus, neovascularization, plaque erosion, microvessel, macrophage and thin of thick fibrous cap atheroma. The primary end point was the incidence of neoatherosclerosis, and the secondary end point was the occurrence of MACE (major advanced cardiac events; death, myocardial infarction, target lesion revascularization, or stent thrombosis).

Conclusions: In this follow-up year study, patients undergoing BP-DES implantation had lower rates of neoatherosclerosis than patient with DP-DES, but it did not translate into better clinical outcomes.

TCT-655
Contribution of In-stent Neoatherosclerosis to Late Stent Failure Following Bare Metal and 1st- and 2nd-Generation Drug-eluting Stent Placement: An Autopsy Study
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Background: In-stent neoatherosclerosis has emerged as an important contributing factor for late stent failure including very late stent thrombosis (VLST) and restenosis. Clinical imaging modalities, however, have limited capability of evaluating the presence and characteristics of neoatherosclerosis. The aim of the current pathologic study was to investigate the prevalence of neoatherosclerosis in lesions with late stent failure.