Conclusions: In this study, pts who had relatively low cumulative incidence of ST (2.4%), given that around 95% of patients were ST-free up to 12 yrs, significant predictors of overall ST were recent MI, multiple stent implantation, SVG and stent under-expansion; as for definite ST only, predictors were recent MI, multiple stent implantation and SVG; considering early ST occurring up to 30 days, predictors were diabetes and recent MI.

Coronary Lesions - In-stent Restenosis

Washington Convention Center, Lower Level, Hall A
Saturday, September 13, 2014, 5:00 PM–7:00 PM

Abstract nos: 648-663

TCT-648
The Optimal Strategy for Restenosis With Stent Fracture After Drug-Eluting Stent Implantation: Plain Old Balloon Angioplasty vs. Paclitaxel-Coated Balloon vs. Drug-Eluting Stent

Suguru Otsuru1, Kazushige Kadota1, Shunsuke Kubo1, Yusuke Hyodo1, Daiji Hasegawa1, Seiji Habara1, Takeki Tada1, Hiroyuki Tanaka1, Yauushi Fukui1, Tatsuyoshi Goto1, Kazuki Mitsudo1
1Kurashiki Central Hospital, Kurashiki, Japan

Background: Stent fracture is related to restenosis after drug-eluting stent (DES) implantation. As percutaneous coronary intervention (PCI) cases for complex lesions increased, those for stent fracture-related restenosis also increased. However, the optimal PCI strategy for such restenosis remains unclear. We compared the results of PCI with plain old balloon angioplasty (POBA), paclitaxel-coated balloon (PCB), and DES (sirolimus-eluting stent, paclitaxel-eluting stent, everolimus-eluting stent, and biolimus-eluting stent) for restenosis with stent fracture after DES implantation.

Methods: From November 2002 to December 2012, 9357 patients with 15894 lesions underwent DES implantation successfully. Of these, 12918 lesions were angiographically followed up after 6 to 8 months (midterm FU) and 9989 were followed up at 12 months after midterm FU. Stent fracture occurred in 576 (4.5%) of the 12918 lesions and restenosis with stent fracture occurred in 206 lesions. Restenosis with stent fracture was defined as a restenosis lesion within 5 mm from a stent fracture site. Of the 206 lesions, target lesion revascularization by PCI with POBA, PCB, or DES was performed on 124 lesions.

Results: Data are shown in the figure. At 2-year FU, the cumulative incidence of restenosis was significantly lower after retreatment with DES than that with POBA and PCB. In addition, late catch-up phenomenon was found after retreatment with PCB.

Predictors of Overall ST

<table>
<thead>
<tr>
<th>Predictor</th>
<th>HR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent MI up to 72 hours</td>
<td>2.66 (1.52-4.66)</td>
<td>0.001</td>
</tr>
<tr>
<td>Recent MI &gt;72 hours</td>
<td>1.89 (1.08-3.29)</td>
<td>0.03</td>
</tr>
<tr>
<td>Multiple DES implanted</td>
<td>1.89 (1.28-2.80)</td>
<td>0.002</td>
</tr>
<tr>
<td>SVG</td>
<td>2.21 (1.29-3.78)</td>
<td>0.004</td>
</tr>
<tr>
<td>Residual stenosis (QCA analysis)</td>
<td>1.03 (1.00-1.05)</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Conclusions: Retreatment with DES could be an acceptable treatment for restenosis with stent fracture after DES implantation.

TCT-649
Outcomes After Repeat Intervention With Everolimus-eluting Stent For Sirolimus-eluting Stent Restenosis Lesion With Stent Fracture

Yasunari Sakamoto1, Toshiya Muramatsu1, Reiko Tsukahara1, Yoshiaki Ito1, Hiroshi Ishimori1, Keisuke Hiran1, Masatsugu Nakano1, Masahiro Yamawaki1, Motohara Araki1
1Saiseikai Yokohama City Eastern Hospital, Yokohama, Japan

Background: Presence of stent fracture (SF) after sirolimus-eluting stent (SES) implantation has reported to be associated with an increased risk of adverse events and those are previously reported. But little is known about the outcomes after re-intervention for SES restenosis lesion with SF. After index procedure were analyzed. SF was defined as complete or partial separation of the stent as assessed by plain fluoroscopy. During the target lesion revascularization procedure, 14 lesions implanted everolimus-eluting stent (EES group), 20 lesions implanted sirolimus- and paclitaxel-eluting stent, stainless steel stent with durable polymer (SS group). And also 15 lesions were dilated with balloon angioplasty alone (POBA group). We compared the outcomes of 3 groups retrospectively.

Results: Baseline characteristics were similar. One-year cumulative incidence of restenosis after repeat intervention those calculated by Kaplan-Meier methods were EES group 22%, SS group 66% and POBA group 76%, respectively. EES group significantly reduced the cumulative incidence of restenosis after repeat intervention (versus SS group; p=0.0471 and POBA group; p=0.0085).

Conclusions: For reduction in incidence of re-restenosis for the SES restenosis lesion with SF during 1-year after repeat intervention, cobalt chromium EES implantations were superior to stainless steel stent with durable polymer or balloon angioplasty alone.

TCT-650
Incidence and Clinical Impact of Stent Fracture after the PROMUS Element Platinum Chromium Everolimus Eluting Stent Implantation

Shoichi Kuramitsu1, Takashi Hiramasa1, Soichiro Enomoto2, Takenori Domei1, Shinichi Shirai2, Kenji Ando1
1Kokura Memorial Hospital, Kitakyushu, Japan, 2Tori Hospital, Tenri, Japan

Background: Stent fracture (SF) is unresolved, clinically relevant issue, even in the newer-generation drug-eluting stent era. The PROMUS Element Platinum chromium everolimus-eluting stent (PcCr-EES; Boston Scientific, Natick, Massachusetts) is designed to provide the improved fracture resistance, whereas the incidence and clinical impact of SF after PcCr-EES implantation remains unclear. The aim of this study was to assess the incidence and clinical impact of SF after PcCr-EES implantation.

Methods: Between March 2012 and June 2013, a total of 676 patients with 839 lesions undergoing PcCr-EES implantation and follow-up angiography within 9 months after index procedure were analyzed. SF was defined as complete or partial separation of the stent, as assessed by plain fluoroscopy, intravascular ultrasound, or optical coherence tomography during the follow-up. We assessed the rate of SF and the cumulative incidence of clinically-driven target lesion revascularization and definite stent thrombosis within 9 months.

Results: SF was observed in 12 of 839 lesions (1.4%) and 12 of 676 patients (1.7%). Cumulative incidence of clinically-driven target lesion revascularization within 9 months was numerically higher in the SF group than that in the non-SF group (25.0% versus 2.4%). Cumulative incidence of definite early and late stent thrombosis within 9-month was similar between the SF and non-SF groups (0.0% versus 0.2%).

Conclusions: SF after PcCr-EES occurs in 1.4% of lesions and appears to be associated with clinically-driven target lesion revascularization.

TCT-651
The Relevance to Clinical Outcomes of Stent Fracture after Second Generation DES deployment

Takahiro Tokuda1, Tsuyoshi Muramatsu2, Reiko Tsukahara1, Yoshiaki Ito1, Hiroshi Ishimori1, Keisuke Hiran1, Motohara Araki1, Norihito Kobayashi1, Hideyuki Takimura1, Yasunari Sakamoto1, Shunsuke Mori1, Masakazu Tsutsumi1, Hiroshi Takafuji1
1Saiseikai Yokohama City Eastern Hospital, Yokohama, Japan, 2Saiseikai Yokohama City Eastern Hospital, Yokohama-city, Kanagawa, Japan

Background: Stent fracture is related to restenosis with stent fracture after DES implantation.

Methods: Between April 2007 to August 2011, total 2059 lesions implanted SES during PCI at our hospital. Total 228 lesions, 11.1% had restenosis (defined as %diameter stenosis >50%) in follow-up angiogram until March 2013. Subjects of the study were 49 lesions 42 patients those implanted SES for denovo coronary artery stenosis and in-stent restenosis with SF was documented in follow-up angiogram. SF was defined as complete or partial separation of the stent as assessed by plain fluoroscopy. During the target lesion revascularization procedure, 14 lesions implanted everolimus-eluting stent (EES group), 20 lesions implanted sirolimus- and paclitaxel-eluting stent, stainless steel stent with durable polymer (SS group). And also 15 lesions were dilated with balloon angioplasty alone (POBA group). We compared the outcomes of 3 groups retrospectively.

Results: Baseline characteristics were similar. One-year cumulative incidence of restenosis after repeat intervention those calculated by Kaplan-Meier methods were EES group 22%, SS group 66% and POBA group 76%, respectively. EES group significantly reduced the cumulative incidence of restenosis after repeat intervention (versus SS group; p=0.0471 and POBA group; p=0.0085).

Conclusions: For reduction in incidence of re-restenosis for the SES restenosis lesion with SF during 1-year after repeat intervention, cobalt chromium EES implantations were superior to stainless steel stent with durable polymer or balloon angioplasty alone.
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 clinical follow up period was 788±15 days. There were no significant differences in patient background and lesion characteristics except HD. (SF group: 30.4% versus non-SF group: 4.2%; 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 1823 lesions (1.4%). The rate of TLR and stent thrombosis were significantly higher in the SF group than in the non-SF group (33.3% versus 5.4%; p<0.001 and 3% versus 0.1%; p=0.02). 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 Incident and Predictors of Late Catch-up Phenomenon After Drug-eluting Stent Implantation

Masanobu Ohya1, Kazuhide Kadota2, Seiji Habara1, Takeshi Tada1, Hiroshi Tanaka1, Yuzuki Fuku1, Tsuyoshi Goto1, Kazuaki Mitsudo1
1Kurashiki Central Hospital, Okayama, Japan

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%, p=0.06) but significantly lower in SES than in SES (4.4% vs. 7%, p=0.004). The predictors of late catch-up phenomenon (<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 involvement, 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

Masanori Tanikawa1, Stephan Windecker1, Serge Zaugg2, Sandro Baumgartner1, Thomas Zanchi1, Peter Jani1, Bernhard Meier1, Lorenz Raber2
1Bern University Hospital, Bern, Switzerland
2University of Bern, Bern, Switzerland

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 10mm. The minimal lumen diameter (MLD) was serially assessed within matched 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 QCA. 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 (4%) (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.