**TCT-5**

**Drug-eluting Stents for the Treatment of Chronic Total Occlusion: A Comparison with Sirolimus, Paclitaxel, Zotarolimus (Endeavor Resolute), Biolimus A9, EPC Capture and Everolimus-Eluting Stent: Multicenter Registry in Asia**

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**Background:** The aim of this study is to compare the safety and efficacy of Sirolimus (SES), Paclitaxel (PES), Zotarolimus (ZES-R/Endeavor Resolute), Biolimus A9 (BES), EPC capture (ECS) and Everolimus-eluting stent (EES) on the outcome of patients with chronic total occlusion (CTO).

**Methods:** A prospective analysis of 1576 patients with 1738 CTOs (396 SES, 526 PES, 219 ZES-R, 209 BES, 148 ECS, 240 EES) in six high volume Asian centers after successful recanalization of CTO was performed. The study endpoints were 30 days and 12 months major adverse cardiac events (MACE), 12 months angiographic restenosis and target lesion revascularization (TLR).

**Results:** See table for clinical results.

<table>
<thead>
<tr>
<th>Number of patients/lesions</th>
<th>SES</th>
<th>PES</th>
<th>PES</th>
<th>SES</th>
<th>ECS</th>
<th>EES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAD/LCX/RCA (%)</td>
<td>54/23/23</td>
<td>52/24/24</td>
<td>50/18/32</td>
<td>46/21/33</td>
<td>52/16/30</td>
<td>53/21/26</td>
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<tr>
<td>Procedural success (%)</td>
<td>100/100/100</td>
<td>100/100/100</td>
<td>100/100/100</td>
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<tr>
<td>MACE at 30 days (%)</td>
<td>0.5/0.6/0.5</td>
<td>0/0/0</td>
<td>0/0/0</td>
<td>0/0/0</td>
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<tr>
<td>Procedural RD (mean mm)</td>
<td>2.86/2.80/2.85</td>
<td>2.84/2.92/2.87</td>
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<tr>
<td>MLD at baseline (mean mm)</td>
<td>2.05/2.54/2.60</td>
<td>2.78/2.62/2.67</td>
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<tr>
<td>12 months MLD (mean mm)</td>
<td>2.50/2.30/2.49</td>
<td>2.46/2.10/2.58</td>
<td></td>
<td></td>
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<tr>
<td>Restenosis rate (%)</td>
<td>7.1/8.2/7.6</td>
<td>8.7/3.9</td>
<td>7.9/21.2*</td>
<td>4.5</td>
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<tr>
<td>TLR (%)</td>
<td>5.5/6.3/7.0</td>
<td>5.9/17.9*</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MACE (%)</td>
<td>7.1/8.7/7.3</td>
<td>7.9/19.5*</td>
<td>4.5</td>
<td></td>
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</tbody>
</table>

**Conclusion:** The use of drug-eluting stents in patients with CTO was safe with low acute complication. Patients treated with 2nd generation DES such as ZES-R, BES and EES showed lesser rate of restenosis compared with 1st generation drug-eluting stents.
to determine whether the use of MSCT co-registration will result in improved procedural success rate.

TCT-8
Increased Radiation Exposure in Percutaneous Coronary Interventions for Chronic Total Occlusions
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Background: Radiation exposure of over 7 Gy at International Electric Commission reference point [Air Kerma (AKR)] increases the risk of radiation injury. Limited data exist on the predictors of high AKR in complex coronary chronic total occlusion (CTO) PCI.

Methods: We reviewed the AKR in 310 consecutive CTO recanalization attempts in 303 patients. Radiation exposure was measured during the procedure.

Results: Procedural success was 73.1%. Mean fluorescence time was 38.4±21.4min. Mean radiation was 5.6±3.6Gy and 328±16Gy/cm2. As compared to successful PCI, failed attempts were associated with longer fluorescence duration (44.6±22.4min vs 36.1±20.6min; p<0.001) and higher radiation (6.2±3.3Gy vs 5.4±3.0Gy; p<0.05). Patients with AKR above and below 7 Gy are compared in the Table. Multivariable analysis (2005 and 2010) 278 cases (29.4% planned retrograde PCI, male gender [OR: 2.8 (95% CI 1.0, 8.00; p=0.0495), calcification [OR: 2.49 (95% CI 1.31, 4.71; p=0.005)] and dual injection technique [OR: 2.43 (95% CI 1.32, 4.46; p=0.004)] as independent predictors of AKR >7Gy. There were no statistically significant differences in AKR according to CTO coronary artery or proximal vs. distal lesions.

Conclusion: Recanalization of complex CTO lesions is associated with high patient radiation exposure to radiation. Risk factors for increased radiation include large body surface area, male gender, calcification, and dual injection technique. When these factors are present, increased weighing is warranted to employ strategies that reduce radiation exposure.

TCT-9
Management of Procedural Complications Related To Percutaneous Coronary Intervention Of Chronic Total Occlusions Via The Retrograde Approach. A Toyohashi Experience
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Background: The recanalization of chronic total occlusions (CTOs) in native coronary arteries does not represent one of the technically challenging of interventional procedures. Despite recent high success rates owing to the development of new strategies such as the retrograde approach during percutaneous coronary intervention (PCI) of CTOs have not been fully evaluated.

Methods: The aim of this study was to investigate in-hospital outcomes, including complications, with the retrograde approach.

Results: Out of 943 cases involving 1,014 CTOs undergoing attempted recanalization between 2005 and 2010, 278 cases (29.4%) were attempted using the retrograde approach. The overall procedural success rate was 85% (862/1014). CTO lesions were most frequently located in the right coronary artery (n=166) followed by the left anterior descending artery (n=80), and the left circumflex artery (n=33). Septal, epicardial, and saphenous vein graft collaterals were used in 67.3%, 24.8%, and 7.9% of cases involving the retrograde approach, respectively. Specific complications with the retrograde approach were observed in 36 cases (14.7%) and were recovered in the cath-lab with the exception of 1 case as shown in the table.

Conclusion: Although the complication rate during the retrograde approach was around 15%, all cases were solved with optimal treatments. A safe procedure with careful wire manipulation and appropriate management should be required for the retrograde approach.

TCT-10
Development of a High-Volume, Multiple-Operator Program for Percutaneous Chronic Total Coronary Occlusion Revascularization: Procedural, Clinical and Cost-Utilization Outcomes
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Background: Development of a specialized chronic total coronary occlusion (CTO) revascularization program attentive to procedural guidelines, quality oversight and cost/resource utilization has not been described.

Methods: A single-center CTO interventional program was initiated requiring: didactic training, on-site protorship, determination of case appropriateness, adherence to procedural safety guidelines and a 2-operator/ case approach. Clinical and angiographic characteristics, procedural outcomes, in-hospital clinical events and cost/resource utilization were examined.

Results: Among 145 patients, 160 consecutive CTO revascularization procedures were attempted between October 2009 and December 2010. Procedural and technical characteristics included: bilateral femoral access, 90.0%; planned retrograde guidewire technique, 79.4%; bilateral collaterals, 54.4%; long lesions, 57.5%; trifurcation, 36.3%; and chronic obstructive pulmonary disease, 38.6%. Overall procedure and technical success rates were 95.0% and 92.0%, respectively. Procedural complications included: tamponade, 0.6%; major bleeding, 1.9%; and death, 0.0%. CTO revascularization was associated with a positive contribution margins ($5,173±8,958 non-CTO, P=0.58). Compared with patients undergoing non-CTO PCI, procedural and total hospital costs per patient were significantly higher among the CTO cohort despite overall similar contribution margins ($5,173±12,052 CTO vs $5,730±8,958 non-CTO, P=0.58).

Conclusion: Following initiation of a dedicated program with implementation of quality and performance guidelines, complex CTO revascularization may be safely performed with outcomes comparable to reports from established centers. Despite higher resource utilization, CTO revascularization is associated with a positive contribution margin similar to that of non-CTO procedures. Requirement of educational and performance standards, mentorship from experts, consensus review for appropriateness and provision of catheterization laboratory policies may represent a model for program development.

Drug-Eluting Balloons and In-Stent Restenosis
Room 130
Tuesday, November 8, 2011, 10:15 am - 12:25 pm
(Abstract nos 11 - 20)

TCT-11
In-Stent Restenosis Is Not a Benign Clinical Entity, Presenting As Acute Coronary Syndrome In 40 % Of Cases
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Background: In-stent restenosis (ISR) following stent implantation may occur in 10-20% of the cases according to patient and lesion complexity. We aimed to determine the different clinical presentations of ISR in a large cohort of consecutive, non-selected