Methods: From 105 patients (male gender 79%, age 61.6±11.0 years), the angiographic grade and direction of collateral flow in 121 totally occluded vessels was compared to the transluminal attenuation gradient of vessel distal to total occlusion (TAGdistal) derived from 64-detector row CCTA. TAG is defined as the linear gradient of luminal attenuation along coronary artery, and was validated against angiographic stenosis and flow velocity in our previous study.

Results: TAGdistal increased consistently and significantly with the degree of collateral flow, from -4.43±4.02 HU/mm for Rentrop score 0 to 0.82±1.08 HU/mm for Rentrop score 3 (p<0.0001). TAGdistal was also significantly higher in retrograde flow compared to antegrade collateral flow (-2.44±3.04 HU/mm vs. -1.35±3.25 HU/mm, p=0.0001). The angio-CTA and developed collateral vessel that have Rentrop score 2 or 3, which was found in 42.1% (51/121), could be predicted by the TAGdistal cutoff value of > -1.28 HU/mm with area under receiver operating characteristic curve of 0.689, and with a sensitivity and specificity, positive and negative predictive value of 86.3%, 47.1%, and 54.3%, 82.5%, respectively.

Conclusions: As far as we know, this is the first study showing that CT can evaluate coronary collateral flow. Using TAG method, CCTA appears to be able to measure quantitatively the degree and direction of coronary collateral circulation, and predict angiographically well developed collateral vessels. These abilities of CCTA may be useful for evaluation of patients with complex coronary artery disease.

TCT-74
Impact of Pre-Procedural Coronary CT Angiography on the Procedural Success of Percutaneous Coronary Intervention for Chronic Total Occlusion: A Multicenter Study of e-CTO Investigators
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Background: Coronary CT angiography (CCTA) has been used to predict procedural success of percutaneous coronary intervention (PCI) for chronic total occlusion. However, the role of CCTA on the procedural outcome has not been reported in a large-scale study. We investigated the impact of pre-procedural CCTA on the procedural success of CTO PCI on a patient-basis.

Methods: We retrospectively compared 2,840 patients without pre-procedural CCTA (non CTO group) and 658 patients with CCTA (CTO group) from e-CTO, a Korean multicenter registry comprising 26 centers. Results were further confirmed in propensity-matched subgroup (N=1,316).

Results: CTO groups were younger (62.1±10.6 vs. 63.1±11.2), more were females (21.9% vs. 17.8%), and more stents were used in the OCT group (52.4% vs. 36.7%, p<0.05), and more risk factors. These differences were eliminated after matching of 21 variables. The adjusted CTO PCI success rate was lower in CCTA group compared to non CTO group (83.4% vs. 75.2%), and it was consistent in subgroup analyses by lesion location (LAD, 78.4% vs. 85.7%; LCx, 72.5% vs. 84.3%; RCA, 73.3% vs. 80.4%, p=0.05). The use of preoperative CCTA was related to 0.61-fold decrease of odds for procedural success (95% confidence interval (CI)=0.49-0.74, p<0.001) in unadjusted model. This result was confirmed in covariate-adjusted model (OR=0.57, 95% CI=0.45 – 0.71) and in propensity-score matched model (OR=0.61, 95% CI=0.47 – 0.80, p<0.001).

Conclusions: Pre-procedural CCTA did not show beneficial impact on the procedural success of CTO PCI in our multicenter registry. Careful selection or sophisticated CCTA analytic methods would be required to demonstrate the clinical role of pre-procedural CCTA before CTO PCI.

TCT-75
Lumen Enlargement of the Coronary Segments Located Distal to Chronic Total Occlusions Successfully Treated with Drug-Eluting Stents at Follow-up
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Background: Chronic total occlusions (CTO) are the final stage of coronary atherosclerosis. Coronary arteries with CTO have shown large plaque burden and negative remodeling of the occluded region and the segments located distal to the occlusion. Lumen enlargement of the coronary segments located distal to successfully re-occluded CTO remain unknown at follow-up.

Methods: Ninety-one CTO successfully treated with drug-eluting stents in 86 patients underwent quantitative angiography at baseline and 12-18 months follow-up. Thirty-one lesions were investigated with IVUS. All analyses were performed by 3 independent operators. Angiographic changes of were assessed with quantitative coronary angiography as differences in minimal, mean and maximal lumen diameter (MinLD, MeanLD and MaxLD, respectively). Vessel remodeling was assessed with IVUS as changes in lumen, plaque and vessel volume.

Results: At follow-up, MinLD increased 23.9% (from 0.88±0.32 to 1.09±0.35 mm; p<0.01), MeanLD 16.4% (from 1.39±0.44 to 1.85±0.45 mm; p<0.01) and MaxLD 11.7% (from 2.39±0.67 to 2.67±0.70 mm; p<0.01). Lumen enlargement was greater in non-restenotic lesions, small lumen area at baseline and low LDL-cholesterol levels during the study period. By IVUS, lumen increased 26.9% (from 108.1±89.2 to 137.5±115.3 mm²; p<0.0001). The vessel increased 12.1% (from 207.1±170.2 to 232.2±196.0 mm³; p<0.01) and plaque tended to decrease (-3.9%, from 98.9±88.7 to 94.2±89.3 mm³; p=0.07). Small lumen at baseline was related to greater lumen enlargement.

Conclusions: Distal segments to re-canализed CTO show a notable lumen and vessel enlargement with a trend towards of mild plaque regression. Low LDL-cholesterol levels during the study increases lumen enlargement. Angiographic lesions distal to CTO may change and stent implantation must be discouraged.

TCT-76
Predictive Value of the J-CTO Score in Percutaneous Coronary Interventions for Chronic Total Occlusions
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Background: Introduction The J-CTO score has been shown to predict successful guidewire crossing within 30 minutes in percutaneous coronary intervention (PCI) or percutaneous coronary intervention in chronic total occlusion (PCI-CTO) at 12 months. In percutaneous coronary intervention in chronic total occlusion (PCI-CTO) we assessed the hypothesis that the J-CTO score is a useful risk score for the prediction of procedural failure of PCI for CTO in a different cohort of patients.

Methods: Methods The study included all consecutive patients undergoing PCI for CTO at 3 tertiary PCI centres between January 2004 and December 2011. The J-CTO score assigns 1 point to each of the following: calcification, bending, blunt stump, occlusion length ≥ 20 mm, and previously failed lesion and classifying lesions failures (score of 0 to 3). We assessed the J-CTO score and PCI failure at 12 months. Success of CTO PCI was defined as the absence of restenosis at follow-up.

Results: Results A total of 1261 patients, median age 63 yrs-old (25th-75th percentile, 55-72), undergoing PCI for 1418 CTO were included. PCI failure occurred in 410 (28.9%) lesions. Failure rate significantly increased with increasing J-CTO score (13.6%, 24.7%, 37.0%, 44.8%, in the groups with J-CTO score of 0, 1, 2, ≥3, respectively, p=0.001). At multivariable mixed effect logistic regression J-CTO score was a significant predictor of failure (odds ratio 1.68, 95% confidence interval (CI) 1.43-1.97, p=0.001, for each unit increase in J-CTO score). PSHF was 0.34 and 0.33 in a model containing J-CTO score only, or containing J-CTO score and PCI site. The J-CTO score was significantly higher than the J-CTO score in the clinical, procedural variables and vessel site (0.77, 95% CI 0.75-0.80, vs. 0.71, 95% CI 0.69-0.74, p<0.001).

Conclusions: The J-CTO score is an independent predictor of failure of PCI for CTO and has a good predictive accuracy as stand-

TCT-77
Initial and Mid-Term Angiographic Outcomes of Septal Channel Perforation Related to Retrograde Recanalization for Chronic Total Occlusions
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Background: Septal channel perforation occurs rarely in retrograde recanalization via septal channel for chronic total occlusion (CTO) lesions. There has been little data on mid-term angiographic outcomes of septal channel perforation.

Methods: Mid-term outcomes of patients with septal channel perforation were included. Angiographic changes at follow-up were analyzed by Digital subtraction angiography. Changes in lumen, plaque and vessel volume were assessed. Changes in vessel area and changes in vessel area/axial length ratio were analyzed.

Results: Between October 2005 and December 2011, we performed the retrograde approach in 465 patients with 484 CTO lesions. Of these, the septal channel was used in 26% (267/484). In-hospital outcomes were no major adverse cardiac events and 1 cardiac tamponade. The incidence of septal channel perforation was 15.4% (41/267). In septal channel perforation cases, we used the coil (n=5), fat tissue (n=2), balloon dilatation (n=3), and protamine (n=15). Of
41 lesions, 22 lesions were followed without treatment. Angiographic characteristics of septal channel perforation were Ellis class I (n=14), class II (n=2), and class IIICS (n=6). Septal channel perforation occurred in guidewire (n=13), balloon dilatation (n=8), and microcather (n=1). The angiographic follow up rate was 81.8% (class I: n=11, class II: n=2, and class IIICS: n=5). Persistent septal channel perforation disappeared at follow up angiography in all lesions.

Conclusions: Persistent septal channel perforation into the ventricle and coronary sinus or of non-spreading myocardial blush may have a good outcome.

TCT-78
Long-Term (4-Year) Clinical Outcomes of Total Occlusions and Completeness of Revascularisation in the Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery Trial

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Background: The impact of successful chronic total occlusion (TO) recanalisation and completeness of revascularisation after PCI on long-term survival remains unsettled.

Methods: Within the All-Comers SYNTAX Trial (n=2636), the PCI and CABG arms were stratified by the presence of TOs and complete (CR) vs. incomplete (ICR) revascularisation. Clinical outcomes (Kaplan-Meier) were analysed with log-rank and Cox regression analyses.

Results: In the randomised population, recanalisation/bypass rates of 49.4% (PCI) vs. 68.1% (CABG) were reported. In the All-Comers population, 840 patients (PCI: 26.3%, CABG: 36.4%, p<0.001) with 1007 TOs were identified. The presence of TOs was significantly associated with less CR by PCI (CR: TO 34.3%, PCI: 26.3%, CABG: 36.4%, p<0.046), an effect that was more pronounced in

Conclusions: Within the PCI and CABG arms of the All-Comers SYNTAX Trial – and specifically in patients with TOs – whatever the acceptable threshold of revascularisation is appropriate for an individual patient, the identification of ICR (compared to CR) using the SYNTAX Trial definition identifies patients who have an adverse longer-term prognosis.