9-1-2022

TCT-121 Extraplaque Versus Intraplaque Tracking in Chronic Total Occlusion Percutaneous Coronary Intervention

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CTO STUDIES III

Abstract nos: 119-124

TCT-119

Procedural and Clinical Outcomes of IS-CTO and De Novo CTO PCIs

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BACKGROUND CTO percutaneous coronary interventions (PCI) remain the most technically challenging procedure. Occlusions in a previously stented segment with an incidence from 5% to 10% among all CTO represent a special category. Several studies have reported that the presence of IS-CTO was an independent predictor of repeat revascularization and adverse cardiovascular events despite the high PCI procedural success. The aim of present study was to examine the procedural and clinical outcomes of PCI in patient with IS-CTO compared with de novo CTO group.

METHODS We analyzed data from single-center prospective registry dedicated to CTO PCI. Basically, follow-up clinical outcomes were obtained by medical records or telephone interviews. Categorical variables are presented as a percentage of the total number of patients, quantitative variables as mean and standard deviation.

RESULTS A total of 1,118 CTO PCI procedures were performed (109 in-stent CTO and 1,009 de novo CTO). Procedural success was achieved in 87.2% of patients in the IS-CTO group and in 77.2% in the de novo CTO group ($P = 0.01$). There was no difference in the final technical success rate despite the increase of the CTO complexity scores. This association remained significant after multivariate logistic regression analysis (OR 3.52, 95% CI 1.57-9.44, $P = 0.005$).The overall in-hospital MACE rate was 2.3% without significant difference between groups. In patients with the de novo CTO perforation rate was statistically higher (5.5% vs 0.9%, $P = 0.03$), however incidence of pericardiocentesis was comparable in both groups (1.8% vs 1.2%, $P = 0.07$). During a median follow-up of 1.9 years 148 MACCE occurred in the de novo-CTO group and 19 in IS-CTO group (14.7% vs 17.4%, $P = 0.47$). All-cause death, non-fatal MI, stroke and unplanned revascularization did not differ between groups.

CONCLUSION Recanalization of in-stent CTO is associated with a higher procedural success probability and lower incidence of complications, such as coronary arteries perforation compared with the de novo CTO, regardless the angiographic characteristics of the occlusion complexity.

CATEGORIES CORONARY: Complex and Higher Risk Procedures for Indicated Patients (CHIP)

TCT-120

Impact of Complete Revascularization in Chronic Total Occlusion Patients With Multivessel Disease on Long-Term Clinical Outcomes

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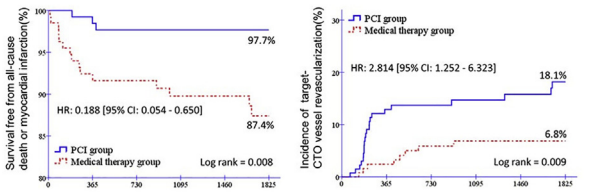
BACKGROUND This study compares the long-term clinical outcomes between two different treatment strategies: percutaneous coronary intervention (PCI) vs medical therapy (MT) for chronic total occlusion (CTO) in multivessel disease (MVD) patients.

METHODS The study data obtained from the CTO registry of Korea University Guro Hospital (KUGH), Seoul, South Korea. This trial is a single-center, prospective, all-comer registry designed to reflect "real world" practice since 2004. the study population has been divided into two groups: the CTO-PCI group having 233 patients and the CTO-MT group having 230 patients. A propensity score matching (PSM) analysis had performed to adjust for confounding factors.

RESULTS Following PSM, the two groups comprised the matched individuals from 336 pairs (total n = 272 patients). The baseline clinical and angiographic characteristics were well-balanced between the two groups. Up to a 5-year clinical follow-up by Kaplan-Meier survival analysis, the primary end point, as defined as the composite of all-cause death or myocardial infarction (MI), occurred more in the CTO-MT group (32.6%) than in the PCI group (2.3%), as did all-cause death (2.3% vs 8.4%, $P = 0.042$) and MI (4.3% vs 0.0%, $P = 0.023$). Target vessel revascularization (TVR) at CTO lesions still occurred more in the CTO-PCI group than in the CTO-MT group (38.3% vs 6.8%, $P = 0.009$).

Figure 2. Kaplan–Meier Survival Curves in Matched Population



Kaplan-Meier estimates for (left) all-cause death and/or myocardial infarction and (right) target lesion revascularization for CTO vessel in the two groups and propensity-matched population. CTO; chronic total occlusion, PCI; percutaneous coronary intervention.

CONCLUSION PCI is shown as a reasonable treatment option compared to MT for CTO lesions in MVD patients; TVR risk is still higher, although.

CATEGORIES IMAGING AND PHYSIOLOGY: Angiography and QCA

TCT-121

Extraplaque Versus Intraplaque Tracking in Chronic Total Occlusion Percutaneous Coronary Intervention

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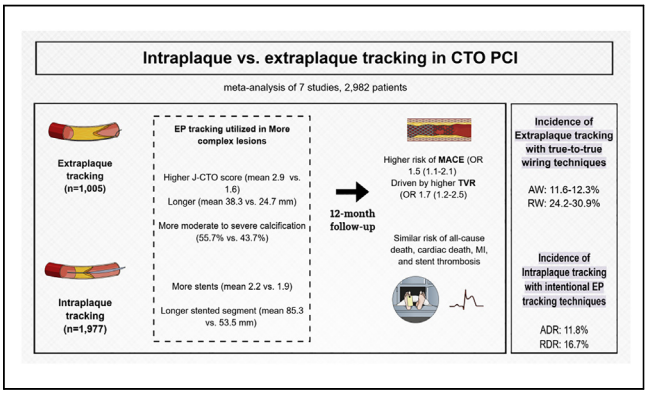
BACKGROUND The impact of modern extraplaque (EP) tracking techniques on long-term outcomes remains controversial.

METHODS We performed a systematic review and meta-analysis of studies that compared EP vs intraplaque (IP) tracking in CTO PCI. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated using the Der-Simonian and Laird random-effects method.

RESULTS Our meta-analysis included seven observational studies with 2,982 patients. Patients who underwent EP tracking had significantly more complex CTOs with higher J-CTO scores (2.9 ± 1.2 vs 1.6 ± 1.1, $P < 0.001$), longer lesion length, more severe calcification, and significantly longer stented segments. During a median follow-up of 12 months (range 9-12 months), EP tracking was associated with a higher risk of major adverse cardiovascular events (MACE) (OR 1.50, 95% CI 1.10-2.06, $P = 0.01$) and target vessel revascularization (TVR) (OR 1.69, 95% CI 1.15-2.48, $P = 0.01$) compared with IP tracking. There was no difference in the incidence of all-cause death (OR 1.37, 95% CI 0.67-2.78, $P = 0.39$), myocardial infarction (MI) (OR 1.48, 95% CI 0.82-2.69, $P = 0.20$), or stent thrombosis (OR 2.09, 95% CI 0.69-6.33, $P = 0.19$) between EP and IP tracking.



CONCLUSION Compared with IP tracking, EP tracking was utilized in more complex and longer CTOs, required more stents, and was associated with a higher risk of MACE at 12 months, driven by a higher risk of TVR, but without an increased risk of death or MI.

CATEGORIES CORONARY: Complex and Higher Risk Procedures for Indicated Patients (CHIP)

TCT-122

Revascularization Versus Optimal Medical Therapy on Left Ventricular Ischemia Reduction: Exploring the Associations Between Ischemia, Functional Outcome, and Collaterals in the Treatment of Chronic Total Occlusion Patients: Rationale and Design of the REVISE-CTO Trial

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BACKGROUND The appropriateness of percutaneous coronary intervention (PCI) of chronic total occlusions (CTO) remains controversial. Randomized clinical trials comparing CTO PCI to optimal medical therapy (OMT) demonstrated that CTO PCI improves symptoms, but no effect on hard end points such as mortality or left ventricular function was found. Observational studies suggested that a substantial ischemic burden is required prior to PCI to improve outcomes afterwards. However, whether PCI of a CTO in patients with a predefined clinically relevant ischemic burden is superior to OMT alone in the reduction of ischemia and improvement of clinical outcomes is yet unknown.

METHODS The REVISE-CTO study is a multicenter randomized controlled trial that aims to enroll 82 CTO patients with 1) >12.5% ischemia on exercise myocardial perfusion scintigraphy (MPS) and 2) <50% transmural extent of infarction on cardiac magnetic resonance imaging (CMR). Patients will be randomized 1:1 to CTO PCI and OMT or OMT alone. After 6 months, follow-up MPS, CMR and standardized questionnaires for symptoms will be performed. The primary end point is the change in ischemic burden at 6-month follow-up compared to baseline, as measured with exercise MPS. Secondary end points include angina and dyspnea complaints, quality of life, global and regional left ventricular function, infarct size and survival. With a 2-sided alpha of 0.05 there is 80% power to detect a difference of 4% ischemia reduction in favor of PCI. We accounted for a loss to follow-up of 10%.

RESULTS The study is currently enrolling in 4 dedicated CTO PCI centers in the Netherlands. To date, a total of 30 patients have been randomized.

CONCLUSION In the multicenter randomized REVISE-CTO trial, CTO patients with substantial ischemia and absence of transmural infarction are randomized to CTO PCI and OMT or OMT alone to determine which treatment strategy leads to better ischemia reduction and better clinical outcomes. The results of this randomized study will contribute to the understanding of the ischemic effects after CTO PCI and the correlation between ischemia and clinical outcomes.

CATEGORIES CORONARY: Complex and Higher Risk Procedures for Indicated Patients (CHIP)

TCT-123

Predictors of Success in Primary Retrograde Strategy in Chronic Total Occlusion Percutaneous Coronary Intervention: Insights From the PROGRESS-CTO Registry

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BACKGROUND An upfront (primary) retrograde strategy is often used in chronic total occlusion (CTO) percutaneous coronary intervention (PCI).

METHODS We examined the clinical, angiographic characteristics, and procedural outcomes of CTO PCIs that were approached with a primary retrograde strategy in the Prospective Global Registry for the Study of CTO Intervention (PROGRESS-CTO; NCT02061436). Interventional collaterals were defined as collaterals that appeared suitable for retrograde CTO PCI.

RESULTS Of 10,286 CTO PCIs, a primary retrograde strategy was used in 1,329 (13%) with an initial technical success of 66% and a final success of 83% with subsequent strategies. Successful vs unsuccessful primary retrograde cases had similar baseline characteristics with high prior coronary artery bypass graft surgery (52% vs 53%, $P = 0.682$), respectively. The PROGRESS-CTO score (1.3 ± 0.9 vs 1.6 ± 0.9, $P < 0.001$), air kerma radiation (3.9 ± 2.8 vs 3.4 ± 2.6 Gray, $P = 0.013$), and contrast (294 ± 148 mL vs 248 ± 128 mL, $P < 0.001$) were higher in the unsuccessful group, whereas the presence of interventional collaterals (95% vs 72%, $P < 0.001$) and Werner collateral connection grade 2 (43% vs 31%, $P < 0.001$) were higher in the successful group. On multivariable logistic regression analysis, the only variable associated with a successful primary retrograde strategy was the presence of interventional collaterals: odds ratio 6.52, 95% confidence interval 3.5-12.1, $P < 0.001$ (**Figure**).

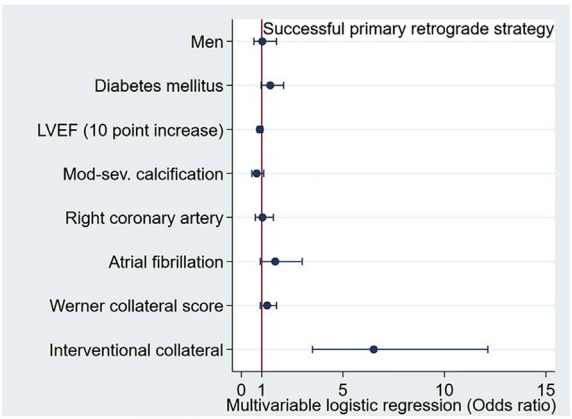

Figure 1: Multiple logistic regression analysis to predict variables associated with a successful primary retrograde strategy.