

Conclusions: Transradial CTO PCI can be performed with similar success and complication rates with transfemoral CTO PCI, but is associated with longer procedural and fluoroscopic times.

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Meta-Analysis on the impact of percutaneous coronary intervention of Chronic Total Occlusions on Long-term Mortality

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Background: Patients with coronary artery disease with a chronic total occlusion (CTO) are associated with worse clinical outcome compared to patients without a CTO. Percutaneous coronary intervention (PCI) of CTOs may have a beneficial effect on survival. In literature mainly small, observational and predominantly single center studies exist about successful PCI and the impact on reducing long-term mortality for CTO.

Methods: This meta-analysis compared the long-term mortality of successful versus failed PCI for CTO. Relevant studies were examined and analyzed independently by two investigators. To prevent distortion of the results by the inclusion of (sub-)acute 100% occlusions, a subgroup analysis was performed on only those studies which included patients with a CTO of at least 3 months.

Results: We identified 27 studies eligible for inclusion in this meta-analysis, including 11,085 CTO patients with successful and 4,347 CTO patients with unsuccessful revascularization (mean follow-up duration 1 to 10 years). We did not find any randomized controlled trials between CTO PCI versus medical treatment only. Successful CTO PCI was associated with reduced mortality in comparison to failed CTO PCI (odds ratio (OR): 0.52, 95%CI: 0.43-0.62, p-value= 0.01). For the subgroup analyses the results remained qualitatively similar (OR: 0.47, 95%CI: 0.35-0.64, p-value < 0.01) (figure 1). **Conclusions:** This meta-analysis confirmed previous findings of a reduced mortality after successful versus failed CTO PCI. Randomized controlled trials are needed to confirm the value of PCI in patients with a CTO in reducing the mortality.

Methods: We screened 2,024 consecutive patients with at least one CTO detected on coronary angiogram. Of these, we analyzed data from 738 patients with Rentrop 3 grade collateral circulation who were treated with medical therapy alone (n=236), coronary artery bypass grafting (n=170) or percutaneous coronary intervention (PCI) (n=332; 80.1% successful). Patients who underwent revascularization and medical therapy (revascularization group, n =502) were compared to those who underwent medical therapy alone (medication group, n=236) in terms of cardiac death and major adverse cardiac events (MACE), defined as the composite of cardiac death, myocardial infarction, or repeat revascularization.

Results: During a median follow-up duration of 42 months, multivariate analysis revealed a significantly lower incidence of cardiac death (hazard ratio [HR] 0.29; 95% confidence interval [CI] 0.15 to 0.58; p< 0.01) and MACE (HR 0.32; 95% CI 0.21 to 0.49; p< 0.01) in the revascularization group compared to the medication group. After propensity score matching, the incidence of cardiac death (HR 0.27; 95% CI 0.09 to 0.80; p=0.02) and MACE (HR 0.44; 95% CI 0.23 to 0.82; p=0.01) were still significantly lower in the revascularization group than in the medication group.

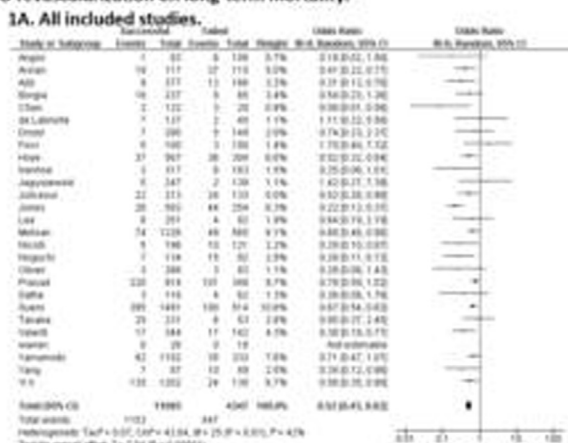
Table. Clinical outcomes in all study patients

	Medication	Revascularization	Unadjusted HR (95% CI)	p Value	² Adjusted HR(95% CI)	p Value
Total population (n=738)	n=236	n=502				
All-cause death	44 (18.6)	39 (7.8)	0.39 (0.26-0.61)	<.001	0.44 (0.27-0.71)	<.001
Cardiac death	23 (9.7)	17 (3.4)	0.33 (0.18-0.61)	<.001	0.29 (0.15-0.58)	<.001
MI	2 (0.8)	4 (0.8)	0.91 (0.17-4.98)	0.92	1.04 (0.16-6.80)	0.97
¹ Repeat revascularization	37 (15.7)	34 (6.8)	0.38 (0.24-0.61)	<.001	0.38 (0.23-0.63)	<.001
² MACE	59 (25.0)	51 (10.2)	0.36 (0.25-0.52)	<.001	0.32 (0.21-0.49)	<.001

Data are presented as n (%).

¹Repeat revascularization included target vessel revascularization-PCI, non-target vessel revascularization-PCI and coronary artery bypass grafting (CABG).
²Major adverse cardiac events (MACE) included cardiac death, MI, and repeat revascularization with PCI or CABG.
³Adjusted covariates include age, ACS, CTO of LAD, multiple CTOs, previous PCI and Proximal to mid CTO
 ACS = acute coronary syndrome; CI = confidence interval; CTO = coronary chronic total occlusion; HR = hazard ratio; LAD = left anterior descending artery; MI = myocardial infarction; PCI = percutaneous coronary intervention

Figure 1. Meta-analyses of studies evaluating successful versus failed CTO revascularization on long-term mortality.



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Long-term Survival Benefit of Revascularization compared with Medical Therapy in Patients with Coronary Chronic Total Occlusion and Well-developed Collateral Circulation

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Background: Little is known about the clinical outcomes and optimal treatment strategies of chronic total occlusion (CTO) with well-developed collateral circulation.

Conclusions: In patients with coronary CTO and well-developed collateral circulation, aggressive revascularization may reduce the risk of cardiac mortality and MACE. These findings need to be confirmed in randomized controlled trials.

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Retrograde Recanalization Of Chronic Total Occlusions In Europe: Procedural And In-Hospital Outcomes From The Multicenter ERCOT Registry

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Background: The aim of this study was to describe the five-year European experience of retrograde percutaneous coronary interventions (PCI) revascularization for complex chronic total occlusions (CTOs) of coronary arteries.

Methods: Demographic data, procedural outcomes and in-hospital clinical events were collected on 1582 consecutive lesions of 1395 patients enrolled between January 2008 and December 2012 having retrograde CTO PCI at 44 European medical centers by 45 experienced interventionalist operators. A retrograde J-CTO score was used to better describe success according to lesion difficulty. Data about clinical follow-up were collected.

Results: Patients mean age was 62.0 ± 10.4 years. During the procedure the retrograde approach was used as first line strategy in 76.2% of cases, while immediately after antegrade failed approach in 23.8% of cases. Procedural success was achieved in 75.3% of cases. A major complication occurred in 16 patients (1.0%). In multivariate analysis, age of the patient (per 10-year increase) (OR:1.19, 95%CI:1.03-1.34; p=0.02), lower operator volume (OR:3.00, 95%CI:2.41-4.21; p< 0.001) and increased retrograde J-CTO score (OR:0.42, 95%CI:0.24-0.74; p< 0.001) were recognized as independent predictors of procedural failure. The mean follow-up period was 24.7 ± 15.0 months. Major adverse cardiac and cerebral events (MACCE) occurred in 13.6% of cases (cardiac death 1.9%, myocardial infarction 3.2%, stroke 0.6% and target vessel revascularization 13%). By multivariate Cox regression, the independent predictors of MACCE were: male gender (HR:0.47, 95% CI:0.30-0.74; p=0.01); prior myocardial infarction (HR:1.45, 95%CI:1.01-2.09; p=0.04); number of previous attempts (HR:1.63, 95%CI:1.36-1.95; p< 0.001); CTO length (HR:1.01, 95%CI:1.00-1.02; p=0.004); and total stent length (HR:0.98, 95% CI:0.97-0.98;p< 0.001).

Conclusions: In Europe among selected centers dedicated to CTO revascularization, retrograde approach was performed over a 5-year period in 16.5% of these patients.