

9th CHALLENGES in CARDIOLOGY

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Determinants and prognostic value of periprocedural myocardial injury after successful percutaneous chronic total occlusion intervention

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Introduction: Periprocedural myocardial injury (PMI) has been generally associated with worse prognosis regardless of the different definitions used. Limited studies have addressed the risk factors of PMI in patients undergoing chronic total occlusion (CTO) percutaneous coronary intervention (PCI) and its prognostic relevance.

Purpose: This study sought to evaluate the determinants and prognostic implications of PMI in successful CTO-PCI.

Methods: We retrospectively examined 125 consecutive CTO patients who underwent PCI attempt between December 2013 and December 2017 in our centre. Angiographic success was achieved in 115 patients (92.0%) and measurement of troponin I (Tn-I) values was obtained 12-24 hours after stent implantation. PMI was defined, according to the 3rd Universal Definition of Myocardial Infarction (MI), as an asymptomatic elevation of Tn-I > 5 times the 99th percentile upper reference limit. Baseline demographic, clinical, angiographic and procedural characteristics were compared between groups. Multivariate analysis was performed to determine the independent risk factors of PMI as well as the correlates of PMI and major adverse cardiovascular events (MACE) at 1-year follow-up, defined as a composite of cardiovascular death, non-fatal MI and target lesion revascularization.



Results: Overall, mean age was 67 ± 17 years, 25 (21.7%) patients were female, and 26 (22.6%) CTO were diagnosed following an acute coronary event. Retrograde technique (RT) was used in only 7.0% ($n=8$) of the procedures. PMI occurred in 41 patients (35.7%) and was more frequent among patients with lower glomerular filtration rate and more severe CTO calcification; in longer procedures; in cases of RT use, greater total stent length or complicated with vessel dissection or mural hematoma. PMI patients also showed higher rates of 1-year MACE (Figure 1A). Multivessel disease (MVD) (odds ratio [OR]: 5.1; 95% confidence interval [CI]: 1.0-25.2; $p=0.046$) and procedural complications (OR: 21.7; 95%CI: 1.9-247.3; $p=0.013$) were identified as independent predictors of PMI. However, PMI failed to predict 1-year MACE. Procedural complications were associated with worse outcome while significant collateralization (Rentrop 3) showed a protective role (Figure 1B).

Conclusion: In this cohort, asymptomatic PMI following successful CTO-PCI was predicted by the presence of angiographic multivessel disease and iatrogenic vessel dissection or mural hematoma. These patients had worse ischemic outcomes but PMI was not independently associated with 1-year MACE. More research is needed to better evaluate the clinical implications of CTO-PCI related PMI.

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Figure 1A. Differences between groups – variables of interest (univariate analysis)

	Non PMI patients (64.3%; n=74)	PMI patients (35.7%; n=41)	p-value
Glomerular filtration rate (ml/min/1.73m2)*	88.5±29.9	71.6±25.0	0.003
Troponin I levels (nanogram/millilitre)	0.07±0.04	1.84±4.80	0.002
Procedure duration (minutes)	59.6±29.6	77.3±39.9	0.008
Fluoroscopy duration (minutes)	29.0±18.1	40.0±24.6	0.007
Retrograde technique	2.7% (2/74)	14.6% (6/41)	0.024
Multivessel disease (≥2 vessels)	68.9% (51/74)	82.9% (34/41)	0.123
Calcification (J-CTO score)	20.8% (11/53)	45.8% (11/24)	0.031
Total stent length (millimetres)	39.9±20.5	49.8±22.5	0.019
Procedural Complications	2.7% (2/74)	29.3% (12/41)	0.001
-Coronary perforation	1.4% (1/74)	7.3% (3/41)	0.129
-Coronary dissection / mural hematoma	1.4% (1/74)	24.4% (10/41)	0.001
1-year Major Cardiovascular events	4.1% (3/74)	19.5% (8/41)	0.016
-Cardiovascular death	2.7% (2/74)	0.0% (0/41)	0.537
-Non-fatal myocardial infarction	0.0% (0/74)	7.3% (3/41)	0.043
-Target lesion revascularization	1.4% (1/74)	14.6% (6/41)	0.008

PMI – Periprocedural myocardial lesion; *Cockcroft-Gault equation

Figure 1B. Proanostic predictors and discriminative power of the risk model

