

Table S1 Demographics and clinical characteristics according to target vessels

Risk factors	LAD (n=210)	LCX (n=80)	RCA (n=210)	P value
Age (years)	64 [55, 69]	60 [49, 67]	64 [55, 71]	0.044*
Male	178 (84.8)	72 (90.0)	177 (84.3)	0.441
Hypertension	132 (62.9)	52 (66.3)	145 (69.0)	0.407
Diabetes mellitus	66 (31.4)	34 (42.5)	70 (33.3)	0.198
Smoking history	100 (47.6)	43 (53.8)	115 (54.8)	0.313
OMI	58 (27.6)	20 (25.0)	58 (27.6)	0.890
Prior PCI	59 (28.1)	30 (37.5)	63 (30.0)	0.294
Prior CABG	3 (1.4)	3 (3.8)	13 (6.2)	0.039*
Prior failed attempt	40 (19.0)	8 (10.0)	67 (31.9)	<0.001*
Stroke	9 (4.3)	4 (5.0)	20 (9.5)	0.079
Presentation at the first admission				
Stable angina	168 (80.0)	63 (78.8)	161 (76.7)	0.706
Unstable angina	18 (8.6)	8 (10.0)	24 (11.4)	0.621
NSTEMI	20 (9.5)	7 (8.8)	20 (9.5)	0.977
STEMI	4 (1.9)	2 (2.5)	5 (2.4)	0.928
Presentation at follow up				
Stable angina	201 (95.7)	77 (96.3)	204 (97.1)	0.732
Unstable angina	6 (2.9)	3 (3.8)	4 (1.9)	0.646
NSTEMI	3 (1.4)	0 (0.0)	2 (1.0)	0.548
STEMI	0 (0.0)	0 (0.0)	0 (0.0)	–
Laboratory and auxiliary examinations				
Creatinine (μmol/L)	82 [71, 92]	81 [74, 98]	80 [70, 91]	0.640
hs-CRP (mg/L)	1.50 [0.50, 4.45]	1.20 [0.60, 3.25]	1.55 [0.60, 3.90]	0.738
White blood cell count (×10 ⁹ /L)	6.17 [5.36, 7.27]	6.72 [5.36, 8.15]	6.56 [5.64, 7.69]	0.111
Platelet (×10 ⁹ /L)	203 [167, 236]	203 [167, 236]	202 [164, 235]	0.631
Hemoglobin (g/L)	142 [129, 147]	141 [132, 150]	139 [129, 148]	0.412
Total cholesterol (mmol/L)	3.61 [2.8, 4.44]	3.64 [2.92, 4.49]	3.64 [3.07, 4.45]	0.707
Low density lipoprotein (mmol/L)	1.88 [1.28, 2.62]	1.54 [1.26, 2.61]	1.82 [1.40, 2.49]	0.783
Triglyceride (mmol/L)	1.44 [1.06, 2.03]	2.04 [1.23, 2.89]	1.62 [1.13, 2.32]	0.016*
High density lipoprotein (mmol/L)	1.00 [0.83, 1.18]	0.85 [0.73, 1.05]	0.96 [0.81, 1.11]	0.008*
Lp (a) (mg/L)	154 [69, 331]	199 [82, 534]	178 [96, 450]	0.009*
HbA1c (%)	5.9 [5.5, 6.7]	6.1 [5.6, 6.9]	6.0 [5.6, 6.8]	0.407
Pre-PCI hs-cTnT (ng/mL)	0.012 [0.008, 0.025]	0.011 [0.008, 0.028]	0.011 [0.008, 0.025]	0.901
Post-PCI hs-cTnT (ng/mL)	0.068 [0.030, 0.189]	0.086 [0.041, 0.215]	0.075 [0.034, 0.178]	0.910

Data are shown as median [IQR 25, 75] or n (%). *, P<0.05. LAD, left anterior descending artery; LCX, left circumflex artery; RCA, right coronary artery; OMI, old myocardial infarction; PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting; NSTEMI, non-ST-segment elevation myocardial infarction; STEMI, ST-segment elevation myocardial infarction; hs-CRP, high-sensitivity C-reactive protein; Lp (a), lipoprotein (a); hs-cTnT, high-sensitivity cardiac troponin T; IQR, interquartile range.

Table S2 Lesion and procedural features according to target vessels

Risk factors	LAD (n=210)	LCX (n=80)	RCA (n=210)	P value
Syntax score	25.0 [20.5, 28.5]	21.0 [11.5, 26.0]	19.5 [11.0, 26.0]	<0.001*
J-CTO score	2 [1, 3]	2 [2, 3]	2 [2, 3]	0.792
Collateral circulation				
Ipsilateral	17 (8.1)	31 (38.8)	12 (5.7)	<0.001*
Contralateral	86 (41.0)	14 (17.5)	113 (53.8)	<0.001*
Bilateral	107 (51.0)	35 (43.8)	85 (40.5)	0.093
Rentrop classification				
1	24 (11.4)	18 (22.5)	15 (7.1)	<0.001*
2	160 (76.2)	56 (70.0)	162 (77.1)	0.434
3	26 (12.4)	6 (7.5)	33 (15.7)	0.167
Dual angiography	102 (48.6)	28 (35.0)	119 (56.7)	0.004*
Revascularization strategy				
Antegrade	167 (79.5)	70 (87.5)	160 (76.2)	0.104
Retrograde	5 (2.4)	0 (0.0)	5 (2.4)	0.378
Hybrid	38 (18.1)	10 (12.5)	45 (21.4)	0.211
Wire cross technique				
Wire escalation	174 (82.9)	73 (91.3)	161 (76.7)	0.014*
Parallel wiring	14 (6.7)	5 (6.3)	18 (8.6)	0.691
ADR	2 (1.0)	0 (0)	2 (1.0)	0.681
R-CART	12 (5.7)	1 (1.3)	19 (9.0)	0.046*
Kissing wire	8 (3.8)	1 (1.3)	9 (4.3)	0.453
Intra-stent occlusion	17 (8.1)	4 (5.0)	21 (10.0)	0.382
Stent length (mm)	61 [42, 71]	45 [33, 60]	84 [64, 108]	<0.001*
Average stent diameter (mm)	2.81 [2.68, 3.00]	2.50 [2.41, 2.63]	3.00 [2.80, 3.25]	<0.001*
Minimal stent diameter (mm)	2.50 [2.50, 2.75]	2.50 [2.25, 2.50]	2.62 [2.50, 3.00]	<0.001*
Side-branch loss	4 (1.9)	0 (0)	2 (1.0)	0.375
Dissection/hematoma	1 (0.5)	1 (1.3)	7 (3.3)	0.030*
Collateral perforation	1 (0.5)	0 (0.0)	7 (3.3)	0.082
calMR after CTO PCI	18.3 [14.1, 23.6]	20.7 [15.9, 25.7]	16.6 [12.8, 21.1]	<0.001*
CTFC after CTO PCI	9 [7, 13]	16 [12, 19]	16 [12, 20]	<0.001*
Target lesion restenosis at follow up	23 [11.0]	12 [15.0]	59 [28.1]	<0.001*
Diameter stenosis at follow-up** (%)	9.94±27.94	14.14±33.96	24.01±37.12	<0.001*

Data are shown as median [IQR 25, 75] or n (%) or mean ± SD. *, P<0.05; **, the most severe residual stenosis in the target vessel after PCI. LAD, left anterior descending artery; LCX, left circumflex artery; RCA, right coronary artery; ADR, antegrade dissection re-entry; R-CART, reverse controlled antegrade and retrograde subintimal tracking; calMR, coronary angiography derived-index of microcirculatory resistance; CTO, chronic total occlusion; PCI, percutaneous coronary intervention; CTFC, corrected thrombolysis in myocardial infarction frame count; IQR, interquartile range.

Table S3 Demographics and clinical characteristics

Risk factors	Slow to normal flow (n=17)	Consistent slow flow (n=12)	P value	Consistent normal flow (n=428)	Normal to slow flow (n=43)	P value
Age (years)	63 [50, 68]	56 [51, 64]	0.499	63 [55, 69]	62 [55, 66]	0.373
Male	16 (94.1)	12 (100.0)	1.000	366 (85.5)	33 (76.7)	0.128
Hypertension	13 (76.5)	8 (66.7)	0.873	281 (65.7)	28 (65.1)	0.944
Diabetes mellitus	6 (35.3)	2 (16.7)	0.494	150 (35.0)	12 (27.9)	0.347
Smoking history	9 (52.9)	7 (58.3)	0.774	222 (51.9)	20 (46.5)	0.503
OMI	8 (47.1)	5 (41.7)	0.774	116 (27.1)	7 (16.3)	0.123
Prior PCI	7 (41.2)	5 (41.7)	0.979	124 (29.0)	16 (37.2)	0.260
Prior CABG	1 (5.9)	1 (3.4)	>0.99	15 (3.5)	2 (4.7)	>0.99
Prior failed attempt	7 (41.2)	4 (33.3)	0.968	93 (21.7)	11 (25.6)	0.562
Stroke	2 (11.8)	0 (0.0)	0.498	26 (6.1)	5 (11.6)	0.162
Presentation at the first admission						
Stable angina	14 (82.4)	8 (66.6)	0.595	339 (79.2)	31 (72.1)	0.279
Unstable angina	0 (0.0)	2 (16.7)	0.163	41 (9.6)	7 (16.3)	0.166
NSTEMI	2 (11.8)	2 (16.7)	1.000	39 (9.1)	4 (9.3)	0.967
STEMI	1 (3.4)	0 (0.0)	>0.99	9 (2.1)	1 (2.3)	1.000
Presentation at follow-up						
Stable angina	17 (100.0)	12 (100.0)	–	414 (96.7)	39 (90.7)	0.121
Unstable angina	0 (0.0)	0 (0.0)	–	10 (2.3)	3 (7.0)	0.200
NSTEMI	0 (0.0)	0 (0.0)	–	4 (0.9)	1 (2.3)	0.946
Laboratory and auxiliary examinations						
Creatinine (µmol/L)	85 [76, 97]	80 [71, 87]	0.283	81 [71, 92]	79 [67, 92]	0.126
hs-CRP (mg/L)	1.60 [0.50, 6.80]	1.60 [0.65, 4.55]	0.611	1.50 [0.60, 3.60]	1.50 [0.60, 3.85]	0.716
White blood cell count (×10 ⁹ /L)	6.62 [5.25, 7.75]	6.89 [5.98, 8.38]	0.556	6.37 [5.40, 7.57]	6.45 [5.40, 8.07]	0.847
Platelet (×10 ⁹ /L)	190 [166, 213]	216 [189, 242]	0.107	201 [163, 238]	210 [169, 228]	0.845
Hemoglobin (g/L)	142 [138, 154]	150 [142, 153]	0.471	141 [130, 148]	138 [126, 146]	0.587
Total cholesterol (mmol/L)	3.47 [3.35, 3.83]	3.89 [3.38, 5.03]	0.195	3.66 [3.00, 4.44]	3.67 [3.30, 4.94]	0.429
Low density lipoprotein (mmol/L)	1.74 [1.53, 2.14]	2.10 [1.67, 3.33]	0.211	1.85 [1.33, 2.54]	1.94 [1.24, 2.94]	0.054
Triglyceride (mmol/L)	1.54 [1.18, 1.75]	1.74 [1.56, 2.39]	0.263	1.54 [1.10, 2.21]	1.97 [1.32, 2.76]	0.886
High density lipoprotein (mmol/L)	0.96 [0.84, 1.08]	0.94 [0.85, 1.05]	0.744	0.97 [0.81, 1.14]	1.03 [0.78, 1.14]	0.768
Lp (a) (mg/L)	179 [90, 384]	301 [123, 830]	0.370	168 [76, 411]	236 [103, 558]	0.159
HbA1c (%)	5.8 [5.5, 7.1]	5.9 [5.5, 6.2]	0.746	5.9 [5.6, 6.7]	6.0 [5.7, 6.7]	0.938
Pre-PCI hs-cTnT (ng/mL)	0.011 [0.009, 0.028]	0.013 [0.007, 0.032]	0.777	0.011 [0.008, 0.026]	0.010 [0.007, 0.017]	0.282
Post-PCI hs-cTnT (ng/mL)	0.146 [0.093, 0.217]	0.122 [0.031, 0.231]	0.419	0.068 [0.030, 0.184]	0.113 [0.046, 0.263]	0.072
Ejection fraction in the first hospitalization (%)	57.5±11.7	63.0±6.1	0.034*	60.0±9.3	59.8±8.3	0.513
Change in low density lipoprotein (mmol/L)**	−0.22±1.04	−0.49±0.62	0.444	−0.45±0.87	−0.58±1.08	0.750
Change in triglyceride (mmol/L)**	0.52±2.16	−0.47±0.80	0.018*	0.01±1.75	0.34±2.09	0.382
Change in high density lipoprotein (mmol/L)**	0.09±0.19	0.19±0.64	0.556	0.05±0.30	0.03±0.15	0.630
Change in Lp (a) (mmol/L)**	−15±176	−97±210	0.879	−43±187	−65±123	0.357
Change in ejection fraction (%)**	2.33±9.09	−1.25±6.81	0.200	0.23±6.32	0.03±6.09	0.950

Data are shown as median [IQR 25, 75], n (%) or mean ± standard deviation. *, P<0.05; **, the values recorded at follow up minus the values recorded during the first hospitalization. OMI, old myocardial infarction; PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting; NSTEMI, non-ST-segment elevation myocardial infarction; STEMI, ST-segment elevation myocardial infarction; hs-CRP, high-sensitivity C-reactive protein; Lp (a), lipoprotein (a); hs-cTnT, high-sensitivity cardiac troponin T; IQR, interquartile range.

Table S4 Lesion and procedural features

Risk factors	Slow to normal flow (n=17)	Consistent slow flow (n=12)	P value	Consistent normal flow (n=428)	Normal to slow flow (n=43)	P value
Syntax score	23.5 [19.5, 25.0]	13.5 [9.5, 21.5]	0.180	22.5 [17.5, 27.5]	21.0 [10.5, 28.0]	0.140
J-CTO score	2 [1, 2]	2 [1, 3]	0.826	2 [1, 3]	2 [1, 3]	0.746
Target vessel						
LAD	4 (23.5)	0 (0)	0.121	197 (46.0)	9 (20.9)	0.002*
LCX	4 (23.5)	0 (0)	0.121	68 (15.9)	8 (18.6)	0.644
RCA	9 (52.9)	12 (100)	0.009*	163 (38.1)	26 (60.5)	0.004*
Collateral circulation						
Ipsilateral	5 (29.4)	0 (0.0)	0.059	50 (11.7)	5 (11.6)	0.992
Contralateral	7 (41.2)	10 (83.3)	0.023*	178 (41.6)	18 (41.9)	0.973
Bilateral	5 (29.4)	2 (16.7)	0.727	200 (46.7)	20 (46.5)	0.978
Rentrop classification						
1	1 (5.9)	2 (16.7)	0.749	46 (10.7)	6 (14.0)	0.523
2	12 (70.6)	9 (75.0)	0.793	327 (76.4)	32 (74.4)	0.771
3	4 (23.5)	1 (8.3)	0.570	55 (12.9)	5 (11.6)	0.819
Revascularization strategy						
Antegrade	11 (64.7)	9 (75.0)	0.582	345 (80.6)	32 (74.4)	0.333
Retrograde	0 (0.0)	1 (8.3)	0.414	9 (2.1)	0 (0)	1.000
Hybrid	6 (35.3)	2 (16.7)	0.494	74 (17.3)	11 (25.6)	0.178
Wire cross technique						
Wire escalation	17 (100.0)	9 (75.0)	0.060	348 (81.3)	35 (81.4)	0.989
Parallel wiring	0 (0.0)	1 (8.3)	0.414	33 (7.7)	3 (7.0)	0.863
ADR	0 (0.0)	0 (0.0)	–	4 (0.9)	0 (0)	1.000
R-CART	0 (0.0)	1 (8.3)	0.414	28 (6.5)	3 (7.0)	0.913
Kissing wire	0 (0.0)	1 (8.3)	0.414	15 (3.5)	2 (4.7)	0.701
Intra-stent occlusion	1 (5.9)	3 (25.0)	0.356	33 (7.7)	5 (11.6)	0.369
Stent length (mm)	57 [38, 70]	40 [0, 86]	0.370	64 [48, 86]	71 [57, 98]	0.403
Average stent diameter (mm)	3.00 [2.67, 3.27]	2.73 [2.56, 3.27]	0.511	2.81 [2.64, 3.00]	3.01 [2.75, 3.50]	0.477
Minimal stent diameter (mm)	2.50 [2.50, 3.00]	2.50 [2.44, 2.94]	0.588	2.50 [2.50, 2.75]	2.75 [2.50, 3.25]	0.009*
Side-branch loss	0 (0.0)	1 (8.3)	0.414	3 (0.7)	2 (4.7)	0.016*
Dissection/hematoma	0 (0.0)	1 (8.3)	0.414	7 (1.6)	1 (2.3)	0.739
Collateral perforation	2 (11.8)	1 (8.3)	1.000	5 (1.2)	0 (0)	0.476
CTFC after CTO PCI	28 [28, 33]	38 [36, 45]	<0.001*	12 [9, 17]	16 [12, 21]	<0.001*
calMR after CTO PCI	35.4 [22.3, 41.0]	30.5 [23.0, 47.8]	0.972	17.4 [13.1, 22.5]	19.5 [15.2, 25.2]	0.048*
CTFC at follow up	20 [14, 24]	40 [33, 70]	<0.001*	15 [12, 20]	52 [30, 98]	<0.001*
Target lesion restenosis at follow up	2 (11.8)	8 (66.7)	0.008*	54 (12.6)	30 (69.8)	<0.001*
Diameter stenosis at follow-up** (%)	9.41±22.21	60.83±46.21	0.006*	10.78±27.31	76.91±36.21	<0.001*

Data are shown as median [IQR 25, 75] or n (%) or mean ± standard deviations. *, P<0.05; **, the most severe residual stenosis in the target vessel after CTO PCI. CTO, chronic total occlusion; LAD, left anterior descending artery; LCX, left circumflex artery; RCA, right coronary artery; ADR, antegrade dissection re-entry; R-CART, reverse controlled antegrade and retrograde subintimal tracking; CTFC, corrected thrombolysis in myocardial infarction frame count; PCI, percutaneous coronary intervention; calMR, coronary angiography derived-index of microcirculatory resistance; IQR, interquartile range.

Table S5 Independent risk factors of periprocedural myocardial injury* in logistic regression model

Risk factors	Adjusted odds ratio (95% CI)	P value
Slow flow after CTO PCI	4.12 (1.68–10.07)	0.002
Stent length	1.01 (1.01–1.01)	0.021
Syntax score	1.03 (1.01–1.05)	0.006

*, defined according to the fourth universal definition of myocardial infarction. CI, confidence interval; CTO, chronic total occlusion; PCI, percutaneous coronary intervention.