Supplementary data

Supplementary Appendix 1. Eligibility criteria for the T-TIME clinical trial

Patients with a clinical diagnosis of acute ST-segment elevation myocardial infarction (STEMI) were eligible for randomisation according to the following eligibility criteria:

Inclusion

- Acute MI (symptom onset ≤6 hours) with persistent ST-segment elevation or recent left bundle branch block.
- Coronary artery occlusion (Thrombolysis In Myocardial Infarction [TIMI] coronary flow grade 0 or 1), or impaired coronary flow (TIMI coronary flow grade 2, slow but complete filling) in the presence of definite angiographic evidence of thrombus (TIMI grade 2 or more).
- Proximal-mid culprit lesion location in a major coronary artery (i.e., the right, left anterior descending, intermediate, or circumflex artery).
- Radial artery access.
- TIMI coronary flow grade ≥2 pre-stent achieved prior to randomisation.
- Informed consent, i.e., only patients who were sufficiently well to understand the information about the study, as described by the attending cardiologist, were eligible to participate.

Exclusion

- Normal flow in the culprit coronary artery at initial angiography (TIMI grade 3).
- Functional coronary collateral supply (Rentrop grade 2/3) to the culprit artery.
- Previous infarction in the culprit artery (known or suspected clinically, e.g., wall motion abnormality revealed by echocardiography).
- Cardiogenic shock (Killip Class IV).
- Multivessel percutaneous coronary intervention (PCI) intended before the day 2-7 cardiovascular magnetic resonance (CMR) scan.
- Estimated body weight <60 kg.
- Non-cardiac comorbidity with expected survival <1 year.
- Contraindication to contrast-enhanced CMR imaging.
- Pacemaker, or implantable defibrillator.
- Known impaired renal function (estimated glomerular filtration rate <30 ml/min).
- Significant bleeding disorder either at present or within the past six months.
- Known haemorrhagic diathesis.
- Patient with current concomitant oral anticoagulation therapy (international normalised ratio >1.3), including apixaban, dabigatran and rivaroxaban.
- Any history of central nervous system damage (i.e., neoplasm, aneurysm, intracranial or spinal surgery).

- Severe hypertension (blood pressure >180/110 mmHg) not controlled by medical therapy.
- Major surgery, biopsy of a parenchymal organ, or significant trauma within the past three months (this includes any trauma associated with the current acute MI).
- Recent trauma to the head (<2 months).
- Prolonged cardiopulmonary resuscitation (>2 minutes) within the past two weeks.
- Acute pericarditis and/or subacute bacterial endocarditis.
- Acute pancreatitis.
- Severe hepatic dysfunction, including hepatic failure, cirrhosis, portal hypertension (oesophageal varices) and active hepatitis.
- Active peptic ulceration.
- Arterial aneurysm and known arterial/venous malformation.
- Neoplasm with increased bleeding risk.
- Any known history of haemorrhagic stroke, or stroke of unknown origin.
- Known history of ischaemic stroke, or transient ischaemic attack in the preceding six months.
- Dementia.
- Hypersensitivity to gentamicin, or natural rubber.
- Incapacity, or inability to provide informed consent.
- Previous randomisation to this study, or participation in a study with an investigational drug, or medical device within 90 days prior to randomisation.
- Women of child-bearing potential (i.e., pre-menopausal), or breast feeding.
- Requirement for immunosuppressive therapy at any time during the preceding three months. This would include corticosteroids (but not inhaled or topical), drugs used following transplantation (e.g., tacrolimus, cyclosporine), anti-metabolite therapies (e.g., mycophenolic acid, azathioprine, leflunomide and immunomodulators including biologics (e.g., adalimumab, or etanercept) and disease-modifying anti-rheumatic drugs. This list is not exhaustive.
- Active or prophylactic treatment with oral, or parenteral antibiotic, antifungal, or antiviral therapy, to prevent or treat infection.
- Any anti-cancer treatment (excluding surgery as this is covered above) at any time during the preceding three months, including chemotherapy, radiotherapy, and treatment with biologics, such as vascular endothelial growth factor receptor (VEGFR) inhibitors (e.g., bevacizumab, pazopanib). This list is not exhaustive.
- Any significant concurrent, or recent condition(s) not listed above that in the opinion of the treating clinician would pose an additional risk to the patient.

Supplementary Appendix 2. Invasive coronary physiology acquisition and analysis methods

Intracoronary nitroglycerine (200 µg) was administered to the culprit artery. A calibrated wire was equalised to guide catheter pressure, then advanced to the distal third of the culprit artery. Using thermodilution, the mean transit time (Tmn) of a hand-injected 3 ml bolus of room temperature saline was measured in triplicate at rest and during steady-state maximal hyperaemia, induced by intravenous adenosine (140 µg/kg/min). Simultaneous measurements of Pa and Pd were made.

To mitigate potential bias through disclosure of IMR, CFR, or TRT results, the operators were blinded by obscuring the display of the RadiAnalyzer™ Xpress monitor (Abbott Vascular, Santa Clara, CA, USA). Experienced physiology technicians recorded the thermodilution data and quality assured the acquisition. Data were extracted from the RadiAnalyzer Xpress instrument and analysed offline (Coroventis Research AB, Uppsala, Sweden). At the end of primary PCI when IMR was measured after stenting, there was no residual epicardial stenosis, therefore IMR correction with wedge pressure or Yong's formula was not required.

A narrow unimodal waveform was defined as an acute temperature reduction (duration of <0.42 seconds from the beginning of the temperature reduction to nadir temperature) followed by rapid return to resting temperature. A wide unimodal waveform was defined as a temperature decrease to nadir >0.42 seconds, followed by a gradual return to baseline temperature. A bimodal waveform was defined as having two distinct nadirs, with a valley deeper than 20% of peak temperature drop.

The coronary physiology data were evaluated in the Glasgow Core Laboratory, according to a standard operating procedure, by an investigator blinded to the CMR data (A.M. Maznyczka) with the readings second read by an experienced investigator (C. Berry). The final coronary physiology data were established by consensus agreement.

Supplementary Appendix 3. Angiogram acquisition and analysis methods

Coronary angiograms were acquired during emergency care with cardiac catheter laboratory X-ray and information technology equipment. The angiograms were analysed using post-processing software (QAngio® XA; Medis, Leiden, the Netherlands) by experienced investigators who were blinded to treatment allocation. Catheter calibration was performed using the catheter calibration function on Medis QAngio. For each lesion, a view perpendicular to the long axis of the vessel was used in order to avoid foreshortening and overlap of branches. The single plane projection showing the best opacified and most severe lesion with minimal foreshortening and minimal branch overlap was selected. Feedback was provided to sites on the quality and completeness of the angiograms.

Non-culprit lesions ≥50% visual stenosis, in main vessels, were included in assessment for multivessel disease.

TIMI coronary flow grade

The TIMI coronary flow grade was assessed using the following definitions:

TIMI coronary flow grade	Definition
0	No flow
1	Minimal flow past obstruction
2	Slow (but complete) filling and slow clearance
3	Normal flow and clearance

TIMI myocardial perfusion grade

TIMI myocardial perfusion grade provides a score for ground-glass appearance ("blush") of the contrast entering the microvasculature and contrast washout. TIMI myocardial perfusion grade was assessed according to the following definitions:

TIMI myocardial perfusion grade	Definition
0	Minimal or no myocardial blush in the distribution of the culprit artery.
1	Myocardial blush is present in the distribution of the culprit artery, but there is incomplete clearance of dye between injections (with ~30 seconds between injections).
2	Myocardial blush is present in the distribution of the culprit artery, but there is slow contrast entry into the microvasculature and slow clearance of contrast. Specifically, blush is strongly persistent (i.e., either does not or only minimally diminishes in intensity) beyond three cardiac cycles after injection.
3	Myocardial blush is present in the distribution of the culprit artery, with normal entry and exit of dye (mild/moderate persistence of dye beyond three cardiac cycles, but notably reduced after three cardiac cycles). Blush that is only mild intensity throughout three cardiac cycles after injection (washout phase) but fades minimally is also classified as grade 3.

TIMI frame count

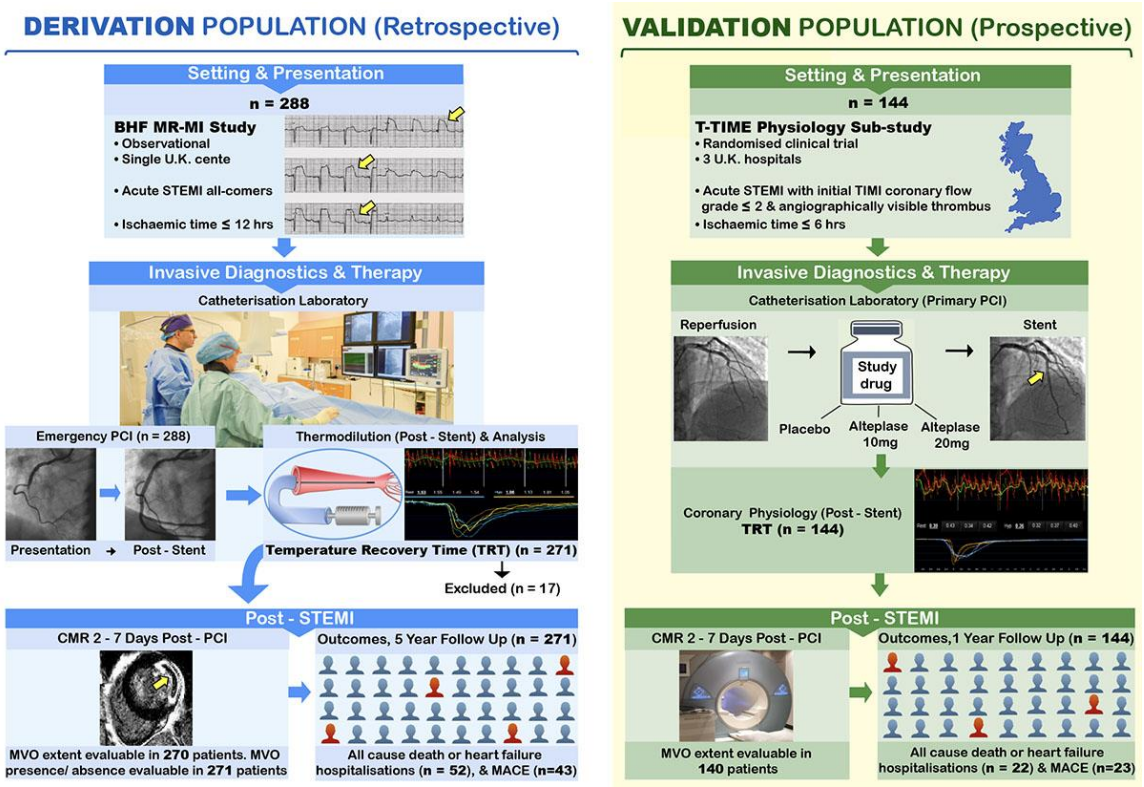
The TIMI frame count represents the amount of time (in frames) for contrast dye to reach a standardised distal landmark. If the culprit vessel was the left anterior descending artery the frame count was divided by 1.7 (correcting for longer vessel length).

Supplementary Appendix 4. Statistical methods

Between-group comparisons of continuous variables used the Student's t-test or Mann-Whitney test. Differences in proportions were assessed with a χ^2 test. Associations with MVO extent were assessed with linear regression, and the regression coefficients represented mean change in MVO extent for a 1-unit increase in TRT. Association with MVO presence or clinical outcomes was evaluated using odds ratios (ORs), from logistic regression. A preponderance of heart failure episodes occurred during the index hospitalisation, therefore the assumption for the Cox proportional hazards regression model for constant effects over time was not met. The associations with MVO were adjusted for the following covariates: age, ischaemic time, CFR ≤2, IMR >32, hyperaemic Tmn >median and thermodilution waveform (bimodal or wide unimodal vs narrow unimodal). There was a priori concern that these covariates were clinically relevant confounders. Non-dichotomised continuous TRT, IMR, CFR, or hyperaemic Tmn were not included together in multivariable models due to collinearity. Stepwise regression was performed, and the validity of regressions was verified by analysis of model residuals, testing for heteroscedasticity and multicollinearity.

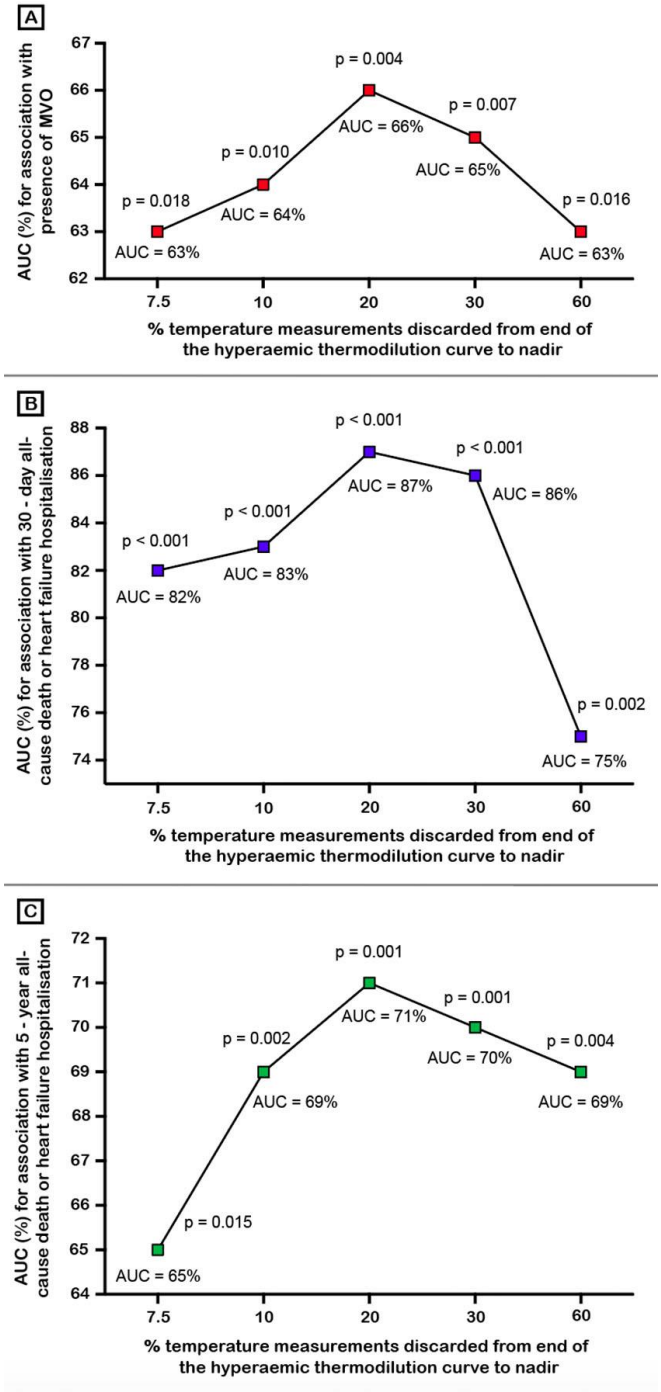
The predictive value of TRT was evaluated using the McNemar test. Receiver operating characteristic (ROC) curve analysis was performed to detect the optimal cut-off values for predicting MVO. In this, sensitivity and specificity were considered equally important, therefore the optimal cut-off was considered as the one giving the maximum Youden index. ROC comparisons were made using the DeLong method.

All tests were two-tailed and a p-value of <0.05 was considered statistically significant. There was no imputation for missing values. Statistical analyses were performed in SPSS, Version 25.0 (IBM Corp., Armonk, NY, USA), or MedCalc Statistical Software version 18 (MedCalc Software, Ostend, Belgium).



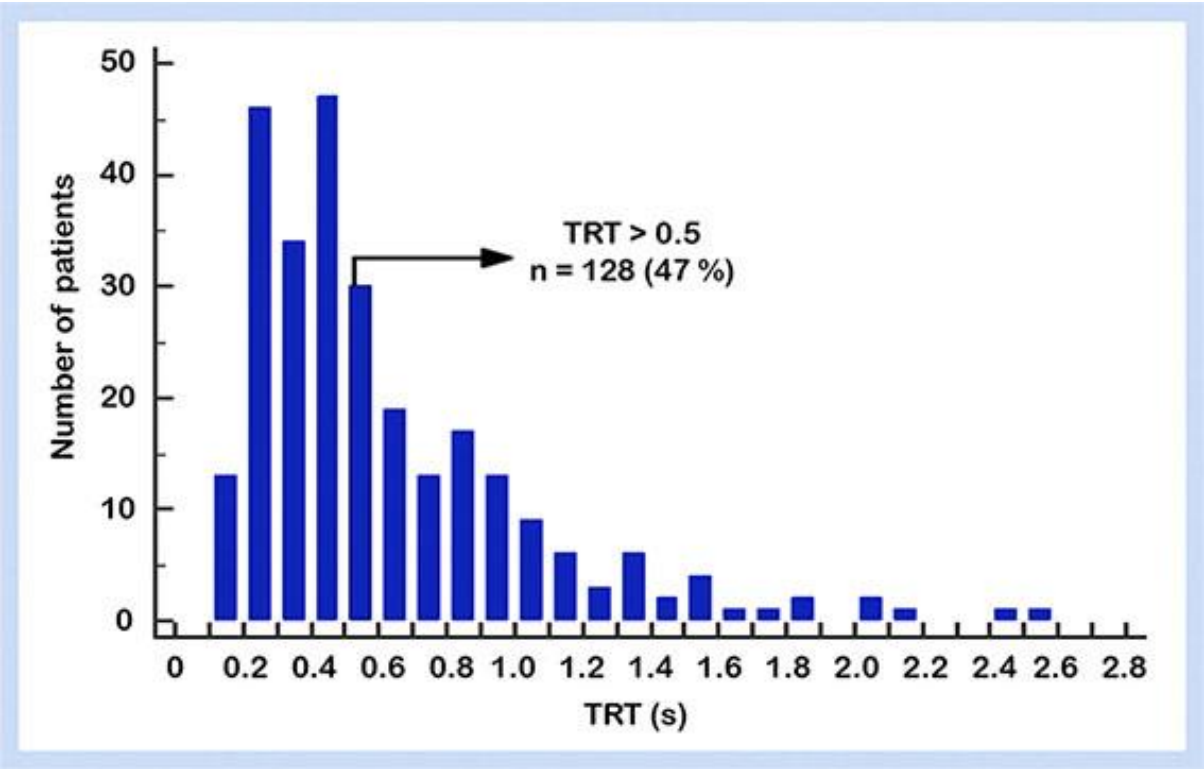
Supplementary Figure 1. Study design and patients included for retrospective derivation and prospective validation of TRT (temperature recovery time).

BHF: British Heart Foundation; CMR: cardiovascular magnetic resonance imaging; PCI: percutaneous coronary interventions; STEMI: ST-segment elevation myocardial infarction; T-TIME: Trial of low-dose adjunctive alTeplase during primary PCI

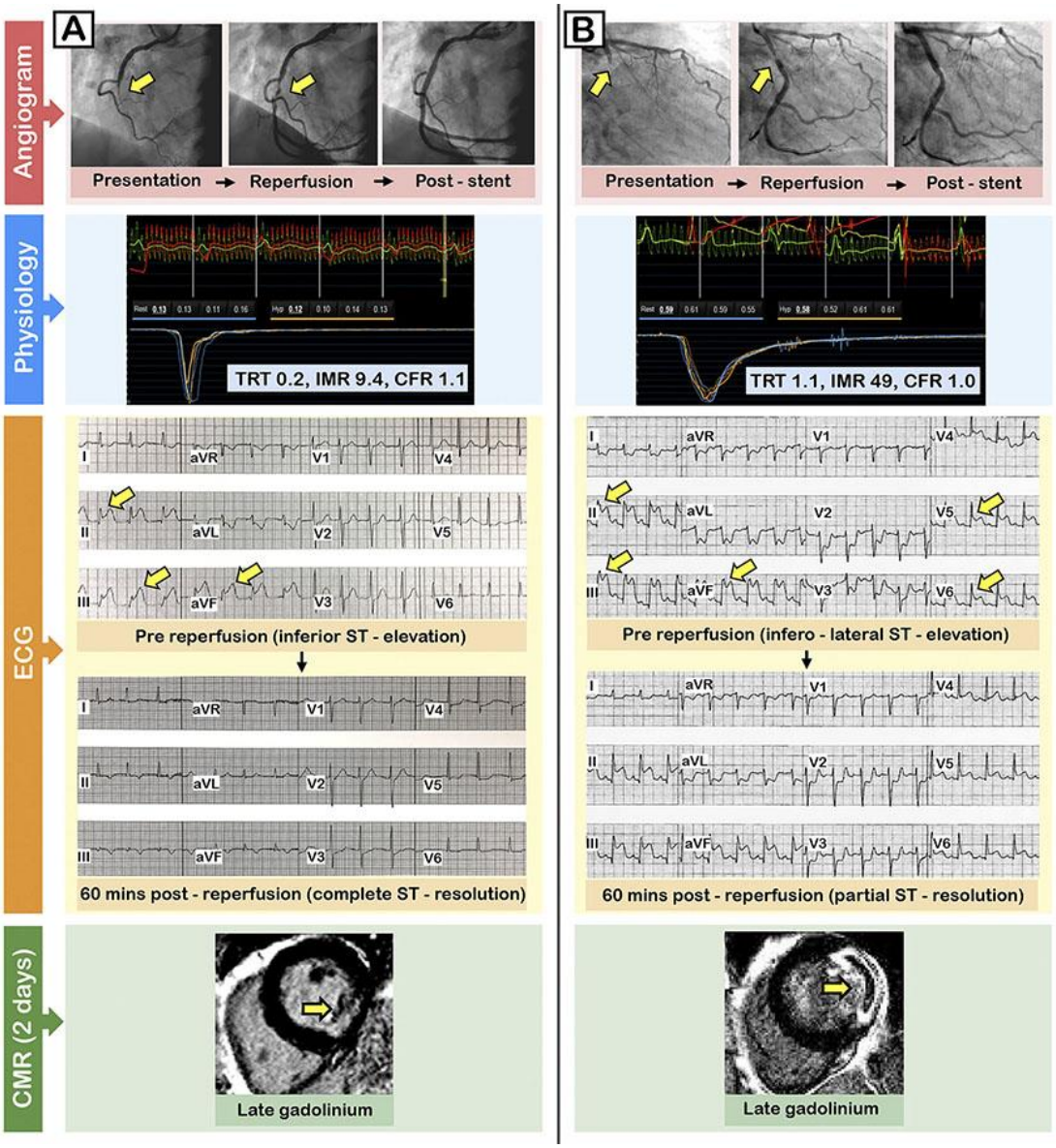


Supplementary Figure 2. Derivation of the optimal definition for TRT (temperature recovery time).

Data from the first 100 consecutive patients in the derivation cohort. Area under the curves (AUCs) from receiver operating characteristic curve analyses, for predicting: (A) microvascular obstruction (MVO) presence/absence, (B) 30-day all-cause death/heart failure hospitalisation, and (C) five-year all-cause death/heart failure hospitalisation. Five different thresholds from the end of the thermodilution curve (i.e., 7.5%, 10%, 20%, 30% and 60%) were used to calculate durations of the thermodilution recovery curve (in seconds) from nadir temperature. The dots represent AUCs. The mean was calculated from three hyperaemic thermodilution curves for each percentage threshold (i.e., 7.5%, 10%, 20%, 30% and 60%).



Supplementary Figure 3. From the derivation population, distribution of TRT (temperature recovery time) (n=271).

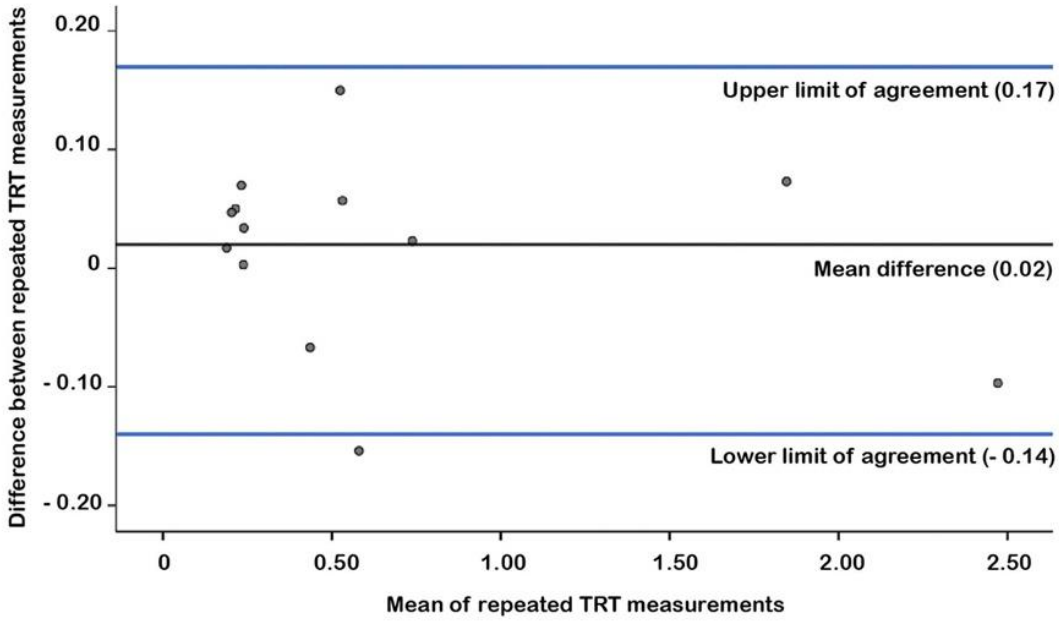


Supplementary Figure 4. Examples of clinical cases.

Two patients with acute ST-segment elevation myocardial infarction (STEMI), treated by primary percutaneous coronary intervention (PCI). Both patients had Thrombolysis In Myocardial Infarction (TIMI) coronary flow grade 3 in the culprit artery, post PCI.

A) Normal TRT (temperature recovery time). The culprit was an occluded right coronary artery. IMR (index of microcirculatory resistance) and TRT were normal, indicating successful myocardial reperfusion. ECGs (electrocardiograms) showed complete resolution of inferior ST-segment elevation. CMR (cardiovascular magnetic resonance) imaging performed two days post STEMI revealed a small subendocardial infarct without MVO (microvascular obstruction).

B) Increased TRT. The culprit was an occluded circumflex artery. Invasively measured microvascular function was abnormal (IMR 49, TRT 1.1), indicating impaired myocardial reperfusion. ECGs showed only partial resolution of inferolateral ST-segment elevation. Two days later CMR imaging revealed MVO. CFR: coronary flow reserve



Supplementary Figure 5. Bland-Altman plot of differences plotted against the averages of paired TRT measurements after primary PCI, obtained by four different cardiologists in 13 patients.

Horizontal lines are drawn at the mean difference and at the limits of agreement.

Supplementary Table 1. From the derivation population, summary of logistic and linear regression analyses, showing univariable and multivariable associations (with IMR >40 in multivariable models) between TRT and MVO, all-cause death/heart failure hospitalisations, or major adverse cardiac events.

	Univariable analysis OR/coefficient (95% CI)	*p*-value	Multivariable analysis OR/coefficient (95% CI)	*p*-value
Associations with MVO extent (%LV mass) on CMR 2-7 days post PCI*				
TRT continuous	4.38 (3.07, 5.68)	**<0.001**	4.09 (2.70, 5.48)	**<0.001**
TRT >0.5	2.84 (1.71, 3.97)	**<0.001**	1.70 (0.25, 3.15)	**0.022**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			1.53 (-0.18, 3.23)	0.080
***Other variables in multivariable model: age, ischaemic time, IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with MVO presence on CMR 2-7 days post PCI†				
TRT continuous	5.52 (2.59, 11.77)	**<0.001**	5.26 (2.36, 11.74)	**<0.001**
TRT >0.5	3.36 (2.04, 5.53)	**<0.001**	3.01 (1.75, 5.16)	**<0.001**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			1.72 (0.78, 3.77)	0.178
† *Other variables in multivariable model: age, ischaemic time, IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with 30-day mortality or heart failure hospitalisation‡				
TRT continuous	6.64 (2.90, 15.24)	**<0.001**	6.27 (1.89, 20.78)	**0.003**
TRT >0.5	8.14 (2.35, 28.20)	**0.001**	5.77 (1.44, 23.14)	**0.013**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			4.48 (1.14, 17.63)	**0.032**
‡*Other variables in multivariable model: IMR >40*				
Associations with mortality or heart failure hospitalisation at median 5 years§				
TRT continuous	3.85 (1.97, 7.51)	**<0.001**	4.14 (2.08, 8.25)	**<0.001**
TRT >0.5	3.11 (1.63, 5.93)	**0.001**	5.81 (2.16, 15.63)	**<0.001**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			5.37 (2.00, 14.43)	**0.001**
§*Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with 30-day MACE‡				
TRT continuous	6.51 (2.89, 14.69)	**<0.001**	6.06 (1.88, 19.57)	**0.003**
TRT >0.5	9.16 (2.66, 31.51)	**<0.001**	6.81 (1.74, 26.62)	**0.006**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			5.18 (1.34, 19.99)	**0.017**

‡*Other variables in multivariable model: IMR >40*				
Associations with MACE at median 5 years§				
TRT continuous	3.55 (1.79, 7.03)	**<0.001**	4.05 (2.00, 8.21)	**<0.001**
TRT >0.5	2.39 (1.21, 4.71)	**0.012**	2.65 (1.32, 5.30)	**0.006**
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			2.19 (0.76, 6.29)	0.145
§*Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				

CFR: coronary flow reserve; CI: confidence interval; CMR: cardiovascular magnetic resonance; IMR: index of microcirculatory resistance; LV: left ventricular; MVO: microvascular obstruction; OR: odds ratio; PCI: percutaneous coronary intervention; Tmn: mean transit time; TRT: temperature recovery time

Supplementary Table 2. Summary of logistic and linear regression analyses, showing univariable and multivariable associations (with IMR >32 in multivariable models) between TRT and angiogram parameters at the end of PCI.

DERIVATION COHORT				
	Univariable analysis OR/coefficient (95% CI)	***p*-value**	**Multivariable analysis OR/coefficient (95% CI)**	***p*-value**
Associations with TIMI frame count at the end of PCI*				
TRT continuous	5.68 (2.34, 9.02)	**0.001**	2.25 (-2.55, 7.04)	0.357
TRT >0.5	3.80 (0.99, 6.61)	**0.008**	-0.58 (-4.68, 3.52)	0.781
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			-1.95 (-6.00, 2.09)	0.343
***Other variables in multivariable model: IMR >32, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with TIMI coronary flow grade ≤2 at the end of PCI†				
TRT continuous	10.24 (3.84, 27.32)	**<0.001**	12.24 (3.16, 47.41)	**<0.001**
TRT >0.5	7.29 (1.6, 33.25)	**0.010**	4.67 (0.81, 26.82)	0.084
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			1.05 (0.16, 7.03)	0.961
† *Other variables in multivariable model: IMR >32*				
Associations with myocardial perfusion grade ≤1 at the end of PCI‡				
TRT continuous	3.17 (1.69, 5.95)	**<0.001**	2.99 (1.57, 5.68)	**0.001**
TRT >0.5	1.82 (1.06, 3.11)	**0.029**	1.25 (0.55, 2.84)	0.594
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			1.00 (0.43, 2.32)	0.996
‡*Other variables in multivariable model: IMR >32, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
VALIDATION COHORT				
	Univariable analysis OR/coefficient (95% CI)	***p*-value**	**Multivariable analysis OR/coefficient (95% CI)**	***p*-value**
Associations with TIMI frame count at the end of PCI*				
TRT continuous	15.18 (10.56, 19.79)	**<0.001**	13.49 (6.68, 20.30)	**<0.001**
TRT >0.5	10.98 (6.43, 15.52)	**<0.001**	4.86 (6.59, 15.63)	**<0.001**
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			4.94 (-1.41, 11.29)	0.126
***Other variables in multivariable model: IMR >32, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with TIMI coronary flow grade ≤2 at the end of PCI†				
TRT continuous	9.42 (3.32, 26.69)	**<0.001**	4.10 (1.26, 13.30)	**0.019**

TRT >0.5	17.55 (2.27, 135.88)	**0.006**	3.86 (0.37, 40.77)	0.262
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			5.33 (0.58, 48.58)	0.138
† *Other variables in multivariable model: IMR >32*				
Associations with myocardial perfusion grade ≤1 at the end of PCI‡				
TRT continuous	3.30 (1.51, 7.21)	**0.003**	1.36 (0.46, 4.02)	0.578
TRT >0.5	2.72 (1.28, 5.80)	**0.009**	0.92 (0.29, 2.95)	0.895
TRT >0.5 (IMR >32, substituted by continuous IMR in model)			0.80 (0.25, 2.53)	0.698
‡*Other variables in multivariable model: IMR >32, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				

CFR: coronary flow reserve; CI: confidence interval; CMR: cardiovascular magnetic resonance; IMR: index of microcirculatory resistance; MVO: microvascular obstruction; OR: odds ratio; PCI: percutaneous coronary intervention; Tmn: mean transit time; TRT: temperature recovery time

Supplementary Table 3. Summary of logistic and linear regression analyses, showing univariable and multivariable associations (with IMR >40 in multivariable models) between TRT and angiogram parameters at the end of PCI.

DERIVATION COHORT				
	Univariable analysis OR/coefficient (95% CI)	***p*-value**	**Multivariable analysis OR/coefficient (95% CI)**	***p*-value**
Associations with TIMI frame count at the end of PCI*				
TRT continuous	5.68 (2.34, 9.02)	**0.001**	1.00 (-4.32, 6.31)	0.712
TRT >0.5	3.80 (0.99, 6.61)	**0.008**	-1.26 (-5.44, 2.91)	0.552
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			-1.95 (-6.00, 2.09)	0.343
***Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with TIMI coronary flow grade ≤2 at the end of PCI†				
TRT continuous	10.24 (3.84, 27.32)	**<0.001**	8.65 (2.20, 33.99)	**0.002**
TRT >0.5	7.29 (1.6, 33.25)	**0.010**	3.06 (0.49, 19.00)	0.231
TRT >0.5 (IMR >, substituted by continuous IMR in model)			1.05 (0.16, 7.03)	0.961
† *Other variables in multivariable model: IMR >40*				
Associations with myocardial perfusion grade ≤1 at the end of PCI‡				
TRT continuous	3.17 (1.69, 5.95)	**<0.001**	2.99 (1.57, 5.68)	**0.001**
TRT >0.5	1.82 (1.06, 3.11)	**0.029**	1.14 (0.49, 2.62)	0.767
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			0.92 (0.38, 2.12)	0.855
‡*Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
VALIDATION COHORT				
	Univariable analysis OR/coefficient (95% CI)	***p*-value**	**Multivariable analysis OR/coefficient (95% CI)**	***p*-value**
Associations with TIMI frame count at the end of PCI*				
TRT continuous	15.18 (10.56, 19.79)	**<0.001**	12.94 (5.83, 20.05)	**<0.001**
TRT >0.5	10.98 (6.43, 15.52)	**<0.001**	5.88 (-0.56, 12.31)	0.073
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			4.94 (-1.41, 11.29)	0.126
***Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				
Associations with TIMI coronary flow grade ≤2 at the end of PCI†				
TRT continuous	9.42 (3.32, 26.69)	**<0.001**	6.65 (1.14, 38.95)	**0.038**

TRT >0.5	17.55 (2.27, 135.88)	**0.006**	4.78 (0.48, 47.69)	0.183
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			5.33 (0.58, 48.58)	0.138
† *Other variables in multivariable model: IMR >40*				
Associations with myocardial perfusion grade ≤1 at the end of PCI‡				
TRT continuous	3.30 (1.51, 7.21)	**0.003**	1.02 (0.33, 3.14)	0.975
TRT >0.5	2.72 (1.28, 5.80)	**0.009**	0.84 (0.26, 2.74)	0.771
TRT >0.5 (IMR >40, substituted by continuous IMR in model)			0.80 (0.25, 2.53)	0.698
‡*Other variables in multivariable model: IMR >40, CFR ≤2, hyperaemic Tmn >median, thermodilution waveform*				

CFR: coronary flow reserve; CI: confidence interval; CMR: cardiovascular magnetic resonance; IMR: index of microcirculatory resistance; MVO: microvascular obstruction; OR: odds ratio; PCI: percutaneous coronary intervention; Tmn: mean transit time; TRT: temperature recovery time

Supplementary Table 4. Characteristics of the validation population.

Validation population characteristics	Overall (n=144)
Age, years	59.4±10.5
Male	115 (79.9)
Current smoker	68 (47.2)
Body mass index, kg/m^2	28.4±5.1
Hypertension	41 (28.5)
Diabetes mellitus	16 (11.1)
Previous myocardial infarction	8 (5.6)
Presenting heart rate, beats per minute	73.0±15.1
Presenting systolic blood pressure, mmHg	139.7±26.1
Ischaemic time, hours, median (IQR)	2.8 (2.0-3.8)
Baseline creatinine, μmol/L	79.5±15.5
Procedural characteristics	
Culprit artery:	
Left anterior descending	54 (37.5)
Circumflex	24 (16.7)
Right coronary artery	66 (45.8)
Number of main vessels diseased	
1	83 (57.6)
2	49 (34.0)
3	12 (8.3)
Thrombus aspiration	23 (16.0)
Glycoprotein IIb/IIIa inhibitor	8 (5.6)
Study drug received:	
Alteplase 20 mg	50 (34.7)
Alteplase 10 mg	41 (28.5)
Placebo	53 (36.8)

Data are mean±SD, or n (%), unless otherwise stated.
Missing: creatinine, n=1.
IQR: interquartile range; PCI: percutaneous coronary intervention; SD: standard deviation

Supplementary Table 5. From the validation population, electrocardiogram, angiogram, and coronary physiology parameters on admission and CMR findings at 2-7 days after PCI for STEMI.

Validation population parameters	Overall (n=144)
Electrocardiogram	
ST-segment resolution:	
Complete, ≥70%	50 (35.5)
<70%	91 (64.5)
Angiogram	
Initial TIMI coronary flow grade:	
0	114 (79.2)
1	14 (9.7)
2	16 (11.1)
Final TIMI coronary flow grade:	
1	3 (2.1)
2	15 (10.4)
3	126 (87.5)
TIMI frame count post PCI, median (IQR)	18.0 (14.0-26.0)
Myocardial perfusion grade post PCI:	
≤1	45 (31.3)
≥2	99 (68.8)
Coronary physiology post PCI	
Pa, mmHg, median (IQR)	76.0 (66.0-86.0)
Pd, mmHg, median (IQR)	69.0 (60.0-78.0)
TRT, median (IQR)	0.5 (0.3-1.0)
TRT >0.5	79 (54.9)
IMR, median (IQR)	29.5 (17.0-55.0)
IMR >32	69 (47.9)
IMR >40	57 (39.6)
CFR, median (IQR)	1.4 (1.1-2.0)
CFR ≤2	115 (79.9)
Hyperaemic Tmn, median (IQR)	0.4 (0.3-0.8)
Hyperaemic Tmn >median	69 (47.9)
Waveform:	
Bimodal	13 (9.0)
Wide unimodal	56 (38.9)
Wide bimodal	75 (52.1)
CMR 2-7 days post PCI	
MVO extent (% left ventricular mass)	0.0 (0.0-3.3)
MVO present	57 (41.0)

Data are mean±SD, or n (%) unless otherwise stated.
Missing: MVO, n=5; ST-segment resolution, n=3.

CFR: coronary flow reserve; CMR: cardiovascular magnetic resonance; IMR: index of microcirculatory resistance; IQR: interquartile range; MVO: microvascular obstruction; PCI: percutaneous coronary intervention; TIMI: Thrombolysis In Myocardial Infarction; Tmn: mean transit time; TRT: temperature recovery time