MINOCA: a complex clinical scenario

MINOCA

A myriad of clinical conditions

With *different* **PATHOPHYSIOLOGY**

Requiring *different* **THERAPY**

Having a *different* **PROGNOSIS**

MINOCA: pears and apples

EDITORIAL

Myocardial infarction with non-obstructive coronary arteries: dealing with pears and apples

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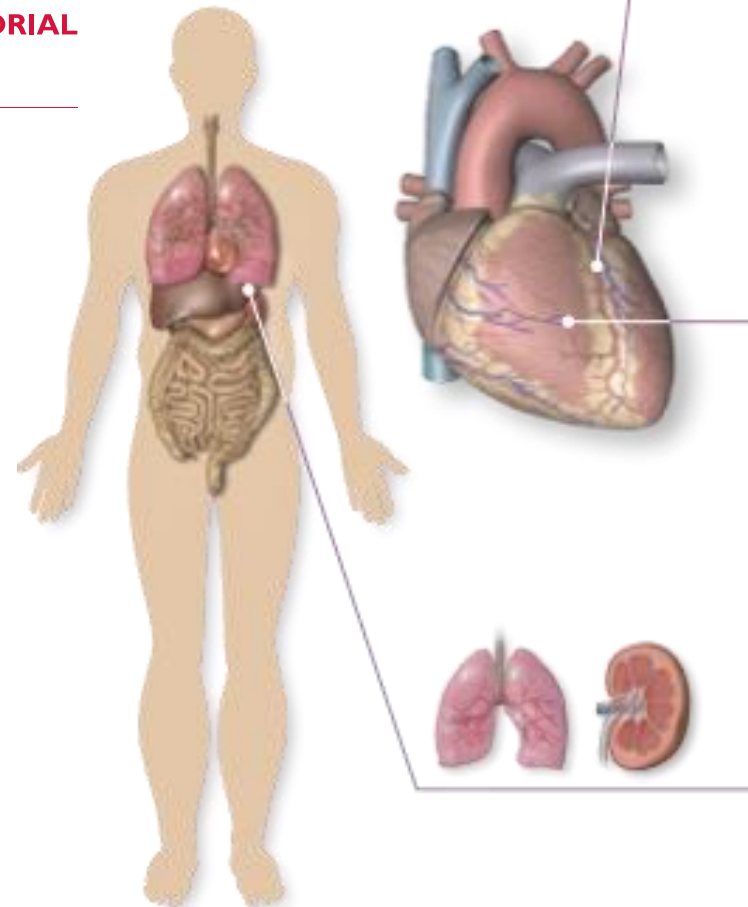
Coronary causes

- Coronary embolism
- Coronary microvascular dysfunction
- Coronary spasm
- Coronary thrombosis
- Myocardial bridging
- Plaque rupture/erosion
- Spontaneous coronary artery dissection
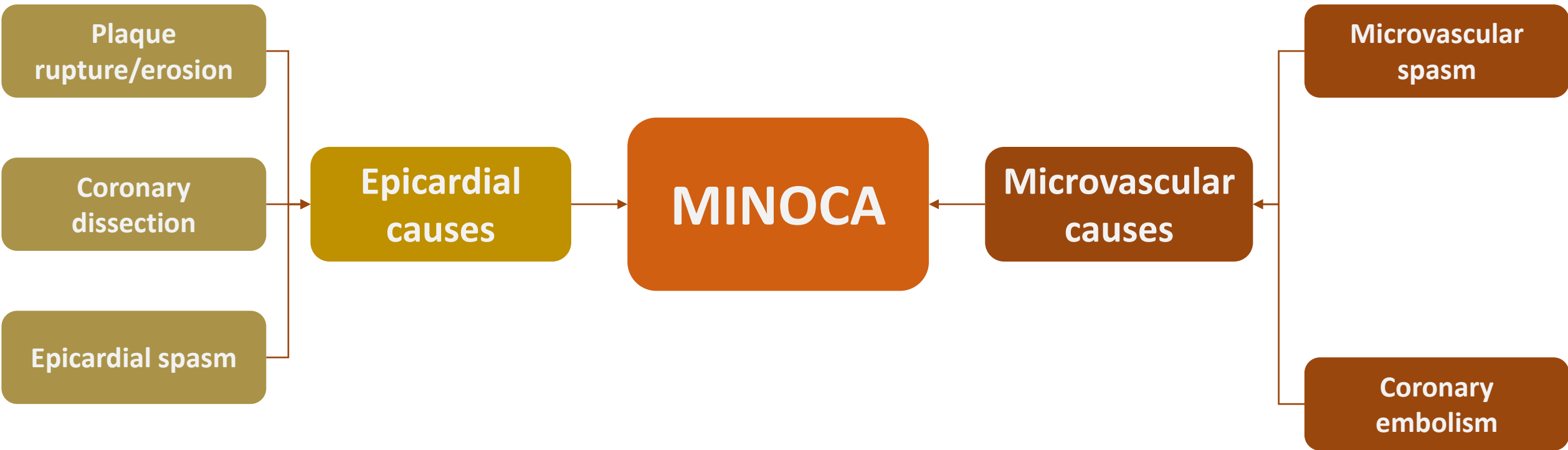
Non-coronary, cardiac causes

- Cardiac trauma
- Cardiomyopathy
- Cardiotoxins
- Myocarditis
- Strenuous exercise
- Takotsubo cardiomyopathy
- Transplant rejection

Non-cardiac causes

- Acute respiratory distress syndrome
- Allergic/hypersensitivity reactions
- End-stage renal failure
- Inflammation
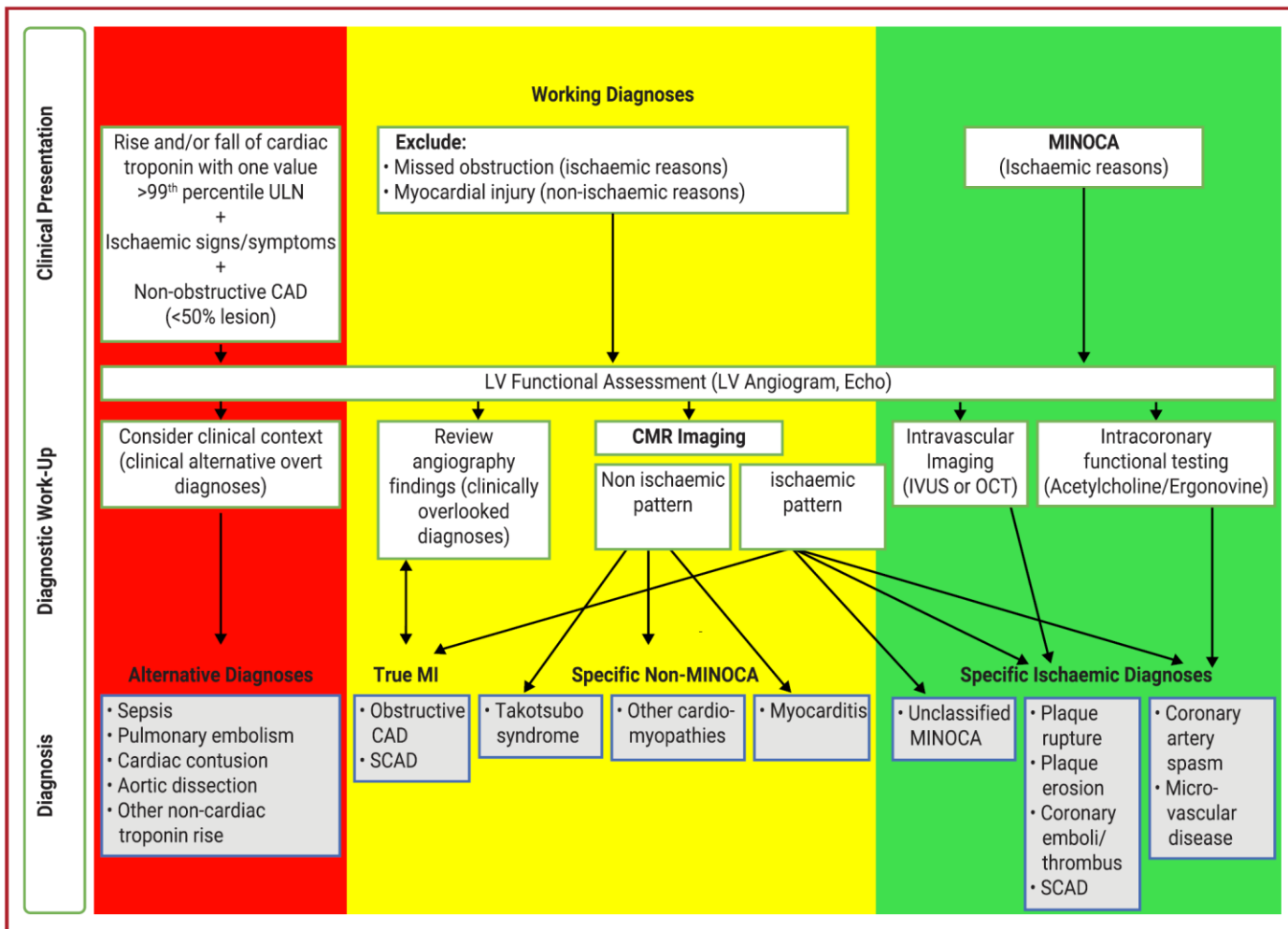- Pulmonary embolism
- Sepsis
- Stroke

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MINOCA pathophysiology

Plaque rupture/erosion

Coronary dissection

Epicardial spasm

Epicardial causes

MINOCA

Microvascular causes

Microvascular spasm

Coronary embolism

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Diagnostic algorithm in MINOCA
The "traffic light" approach and ESC 2023 Guidelines

The MINOCA diagnostic algorithm

Diagnostic pathways in MINOCA
ESC 2023 NSTE-ACS Guidelines

Recommendations	Class[a]	Level[b]
In patients with a working diagnosis of MINOCA, CMR imaging is recommended after invasive angiography if the final diagnosis is not clear.[544,545]	I	B
Management of MINOCA according to the final established underlying diagnosis is recommended, consistent with the appropriate disease-specific guidelines.[546,550,552]	I	B
In all patients with an initial working diagnosis of MINOCA, it is recommended to follow a diagnostic algorithm to determine the underlying final diagnosis.	I	C

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PROMISE Trial

PROMISE Trial

PROgnostic value of precision medicine in patients with **M**yocardial **I**nfarction and non-ob**S**tructive coronary arteri**E**s.

Principal Investigator: Dr. Rocco A. Montone

Research Grant from the Italian Ministry of Health
Ricerca Finalizzata Giovani Ricercatori

4 Italian enrolling centers:

- Fondazione Policlinico Universitario A. Gemelli IRCCS
- Centro Cardiologico Monzino
- IRCCS Policlinico San Donato
- Azienda Ospedaliero Universitaria di Ferrara

Precision medicine

Diagnostic algorithm
to assess pathogenic mechanism

Tailored therapy
Based on the pathogenic mechanism

Improved clinical outcomes

Precisione medicine in MINOCA
A step-by-step approach

1 — **Coronary angiography** demonstrating unobstructive CAD

2 — **LV angio** to esclude Takotsubo syndrome and to assess epicardial vs microvascular pattern of LWMA

3 — **OCT** to detect the presence of an unstable plaque

4 — **ACh provocation testing** to detect epicardial or microvascular spasm

5 — **Transesophageal echocardiogram** if suspected coronary embolism (presence of predisposing factors)
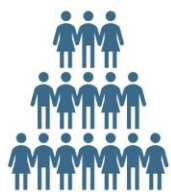
6 — **Cardiac MRI** in all cases

EuroIntervention

VISUAL ILLUSTRATION. Precision Medicine versus Standard of Care for Patients With MINOCA: Rationale and Design of the Multicentre, Randomised PROMISE Trial

180 patients

Randomization (1:1)

- MINOCA (including both STEMI and NSTE-ACS)
- Clinical history, ECG, echocardiography, cardiac biomarkers
- Coronary angiography + LV angiogram*

*Patients with Takotsubo syndrome and myocarditis (based on clinical history and CMR) will be excluded

Precision medicine approach

Personalized diagnostic approach
- OCT (to detect PR/PE or SCAD)
- ACh test (to detect coronary epicardial or microvascular spasm)
- TO-echo and/or CE-echo (if microembolization is suspected)
- CMR (suggested in all cases)

Tailored pharmacologic approach
- DAPT ± PCI, statins, beta-blockers, ACEi/ARB (if evidence of plaque instability)
- CCB and/or nitrates (if coronary spasm is detected)

Standard of care approach

Standard approach to acute coronary syndromes

Standard OMT
- DAPT and high intensity statins
- Beta-blockers (if indicated)
- ACEi or ARB (if indicated)

Primary endpoint

Angina status at 1 year (SAQSS)

Secondary endpoints

MACE at 1 year, Healthcare cost analysis CMR endpoints

ACEi: angiotensin-converting enzymes inhibitors; ACh: acetylcholine; ACS: acute coronary syndrome; ARB: angiotensin receptor blockers; CCB: calcium channel blockers; CE: contrast enhanced; CMR: cardiac magnetic resonance; DAPT: dual antiplatelet therapy; ECG: electrocardiogram; LV: left ventricle; MINOCA: myocardial infarction with non-obstructive coronary arteries; NSTE: non-ST-segment elevation; OCT: optical coherence tomography; OMT: optimal medical therapy; PCI: percutaneous coronary intervention; PE: plaque erosion; PR: plaque rupture; SAQSS: Seattle Angina Questionnaire summary score; SCAD: spontaneous coronary artery dissection; STEMI: ST-segment elevation myocardial infarction; TO: transoesophageal.

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Sample size calculation

In order to detect a mean group difference of change in SAQSS of 9 U, we calculated that a sample size of **70 patients per group (140 patients in total)** gave 80% power to detect a between-group difference in SAQSS. This calculation assumed a 2-tailed 5% significance level.
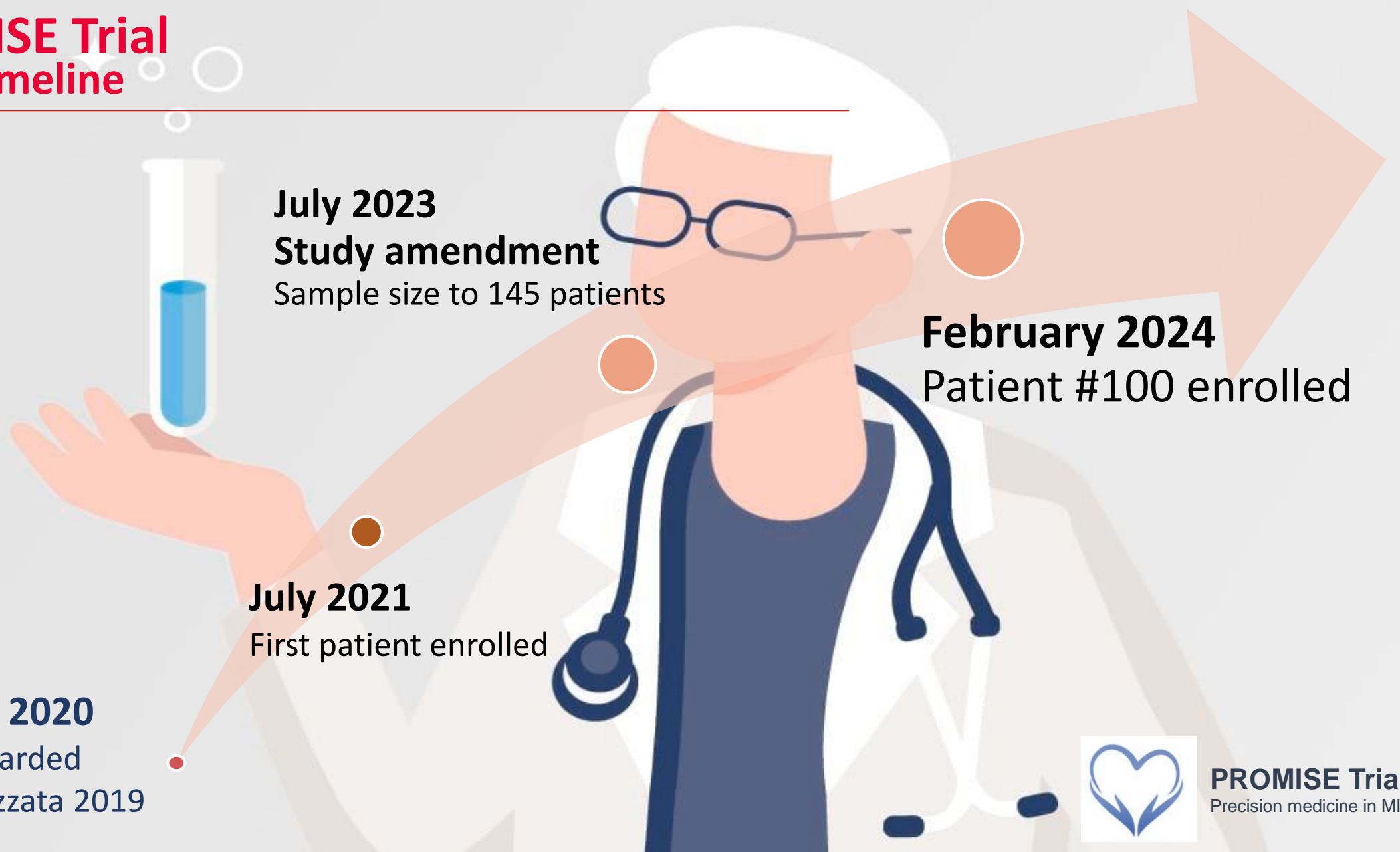
This projected calculation assumed a standard deviation (SD) of 19 U and was consistent with previous studies (CorMicA Trial).

However, we extended the sample size to 180 patients to avoid any reduction of statistical power if patients were lost to follow-up or had poor compliance to medical therapy.

Table 1. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
– Ability to give informed consent to the study	– Inability or limited capacity to give informed consent to the study

– Age ≥18 years
– MINOCA diagnosis, defined as:
  – Acute MI*
  – Evidence of non-obstructive coronary artery disease on CAG (i.e., no coronary artery stenosis >50%)
– No specific alternate diagnosis for the clinical presentation
	– Age <18 years
	– Pregnant and breast-feeding women or patients considering becoming pregnant during the study period
	– Alternate diagnosis for the clinical presentation
	– Contraindication to contrast-enhanced CMR (e.g., severe renal dysfunction [glomerular filtration rate <30 mL/min]) or non-CMR-compatible pacemaker/defibrillator
	– Contraindication to drugs administered: e.g., a history of hypersensitivity to drugs administered or its excipients, significant renal and/or hepatic disease
	– Patients with comorbidities having an expected survival <1 year will be excluded

*definition based on the Fourth Universal Definition of Myocardial Infarction Criteria. CAG: coronary angiography; CMR: cardiac magnetic resonance; MI: myocardial infarction; MINOCA: myocardial infarction with non-obstructive coronary arteries

PROMISE Trial
Study timeline

December 2024

Last patient enrolled

December 2025

Last patient ends 1-year follow up.

PROMISE Trial
Precision medicine in MINOCA

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#Grazie