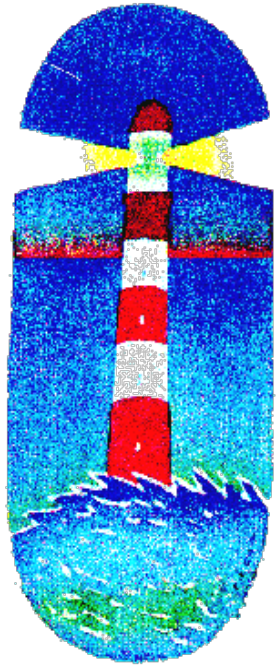
Underlying MINOCA Mechanisms and Diagnostic Tools



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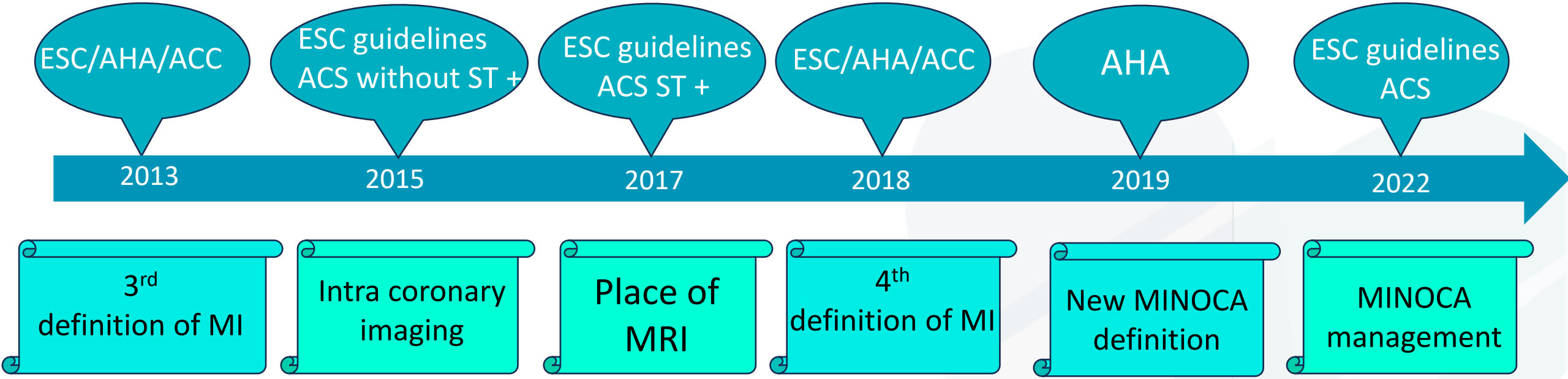
MINOCA evolving definitions

MINOCA

Myocardial **I**nfarction with **N**on-**O**bstructive **C**oronary **A**rteries



Evolution of the concepts and recommendations from guidelines and position papers

MINOCA last definition

MINOCA was defined based on the following criteria:

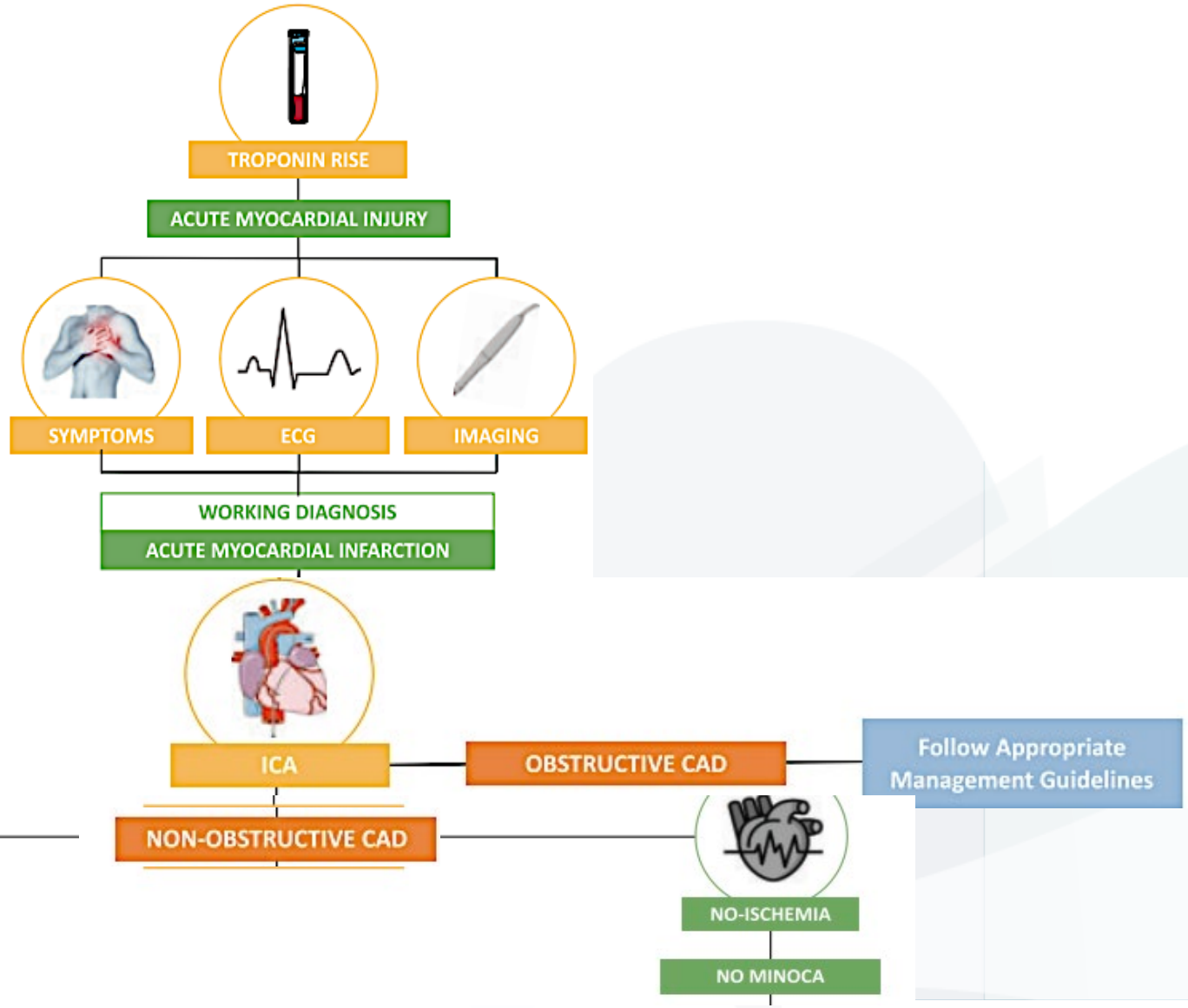
AMI according to the fourth universal definition

excluding - unnoticed obstructive CAD

- clinically overt causes of elevated cardiac troponin

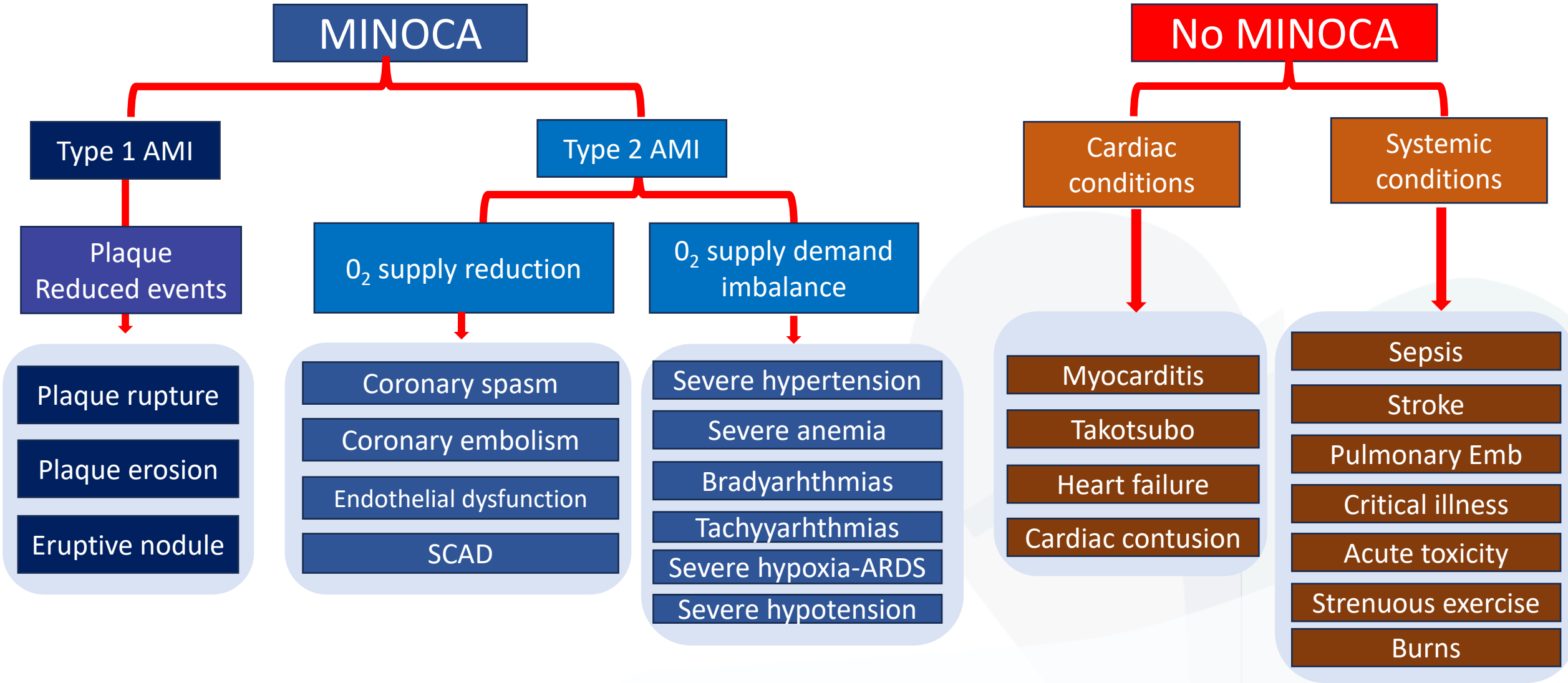
- Non-ischaemic mechanisms of myocyte injury that can simulate an AMI

MINOCA last definition



Occhipinti et al Eur Heart J Acute Cardiovasc Care. 2021;10:813-822

MINOCA last definition



Occhipinti et al Eur Heart J Acute Cardiovasc Care. 2021;10:813-822

MINOCA epidemiology

Incidence: 6-15%

Generally observed in relatively **young patients** with lower prevalence of traditional cardiovascular **risk factors**

More frequent in women

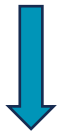
Lower pick of Troponin

Small **increase** during summer and autumn seasons

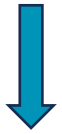
Mahajan, A. M. et al. Int. J. Cardiol. 2019;274:16–20
Smilowitz, N. R. et al Circ. Cardiovasc. Qual. Outcomes 2017;10: e003443
Safdar B et al J Am Heart Assoc 2018;7:1–14
Pizzi C et al J Am Heart Assoc 2016;5:1–14
ACS guidelines Eur Heart J 2023; 44:3720–3826
Pasupathy S et al Circulation 2015;131:861–870
Barr PR et al Hear Lung Circ 2018;27:165–174

MINOCA diagnostic

When diagnosis is not established following coronary angiography



It is vital to **perform further assessments** and **investigations**



To establish the **underlying cause** of the MINOCA

To **manage appropriately** the patient

MINOCA diagnostic

Step 1

Cath lab assessment

Step 1

Assessments to consider[a]

Clinical history

Physical exam

ECG assessment

Detailed angiographic assessment ± LV angiography (incl. LVeDP)

Intravascular imaging (IVUS/OCT)

Assess for coronary microvascular dysfunction ± vasoreactivity (ACh testing)

ACS guidelines Eur Heart J 2023; 44:3720–3826

MINOCA diagnostic

Step 2

Assessments to consider[a]

Clinical history

Physical exam

ECG assessment

Echocardiography

I B

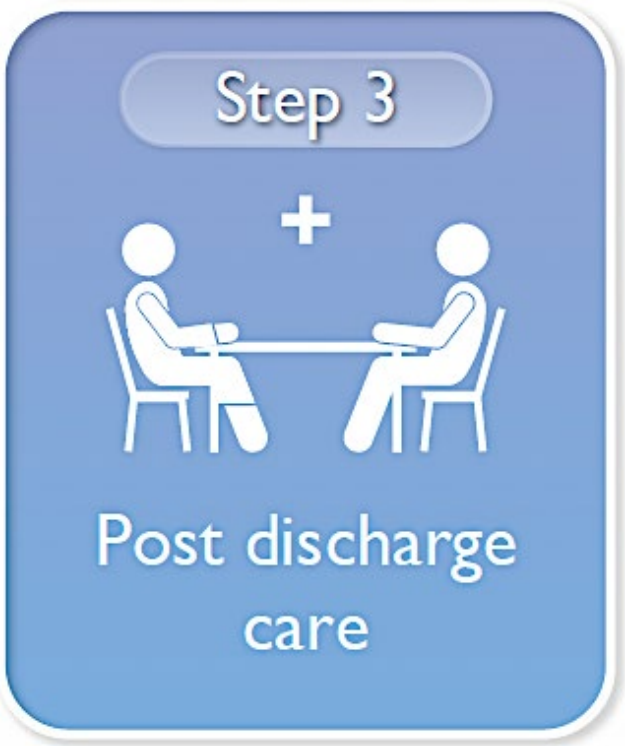
CMRI

Blood tests[b]

CTPA/CT brain[c]

ACS guidelines Eur Heart J 2023; 44:3720–3826

MINOCA diagnostic



Step 3

Assessments to consider[a]

- Follow-up clinic evaluation
- Repeat echocardiography
- Repeat CMRI
- Cardiac rehabilitation

ACS guidelines Eur Heart J 2023; 44:3720–3826

Cardiac Magnetic Resonance (CMR)

CMR can identify **an underlying aetiology in 75%** of patients presenting with MINOCA.

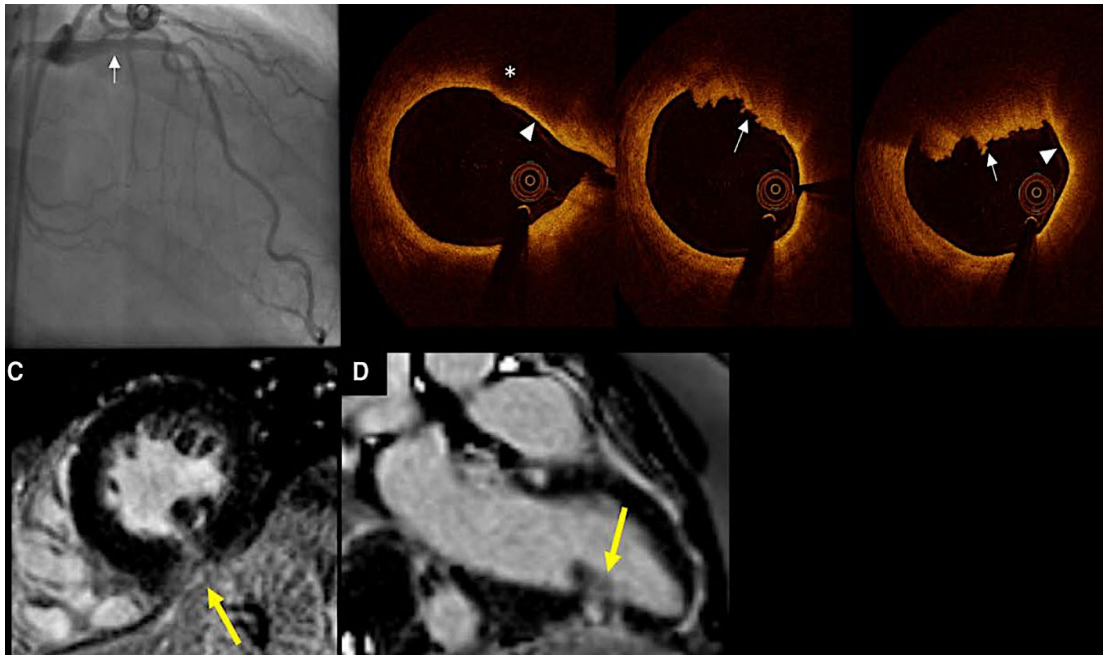
When CMR is **performed early** (<2 weeks from the acute presentation) the diagnostic yield is maximal.

Reynolds HR, et al Circulation 2020;143:624–640

Lyon AR et al Eur J Heart Fail 2016;18:8–27

Intra coronary imaging

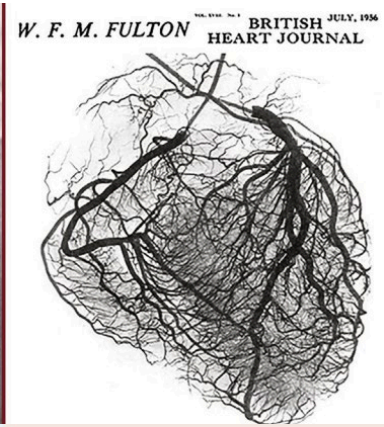
Costs and **local availability** and **expertise** may limit the application of intravascular imaging as an initial step for refining the diagnosis of MINOCA.

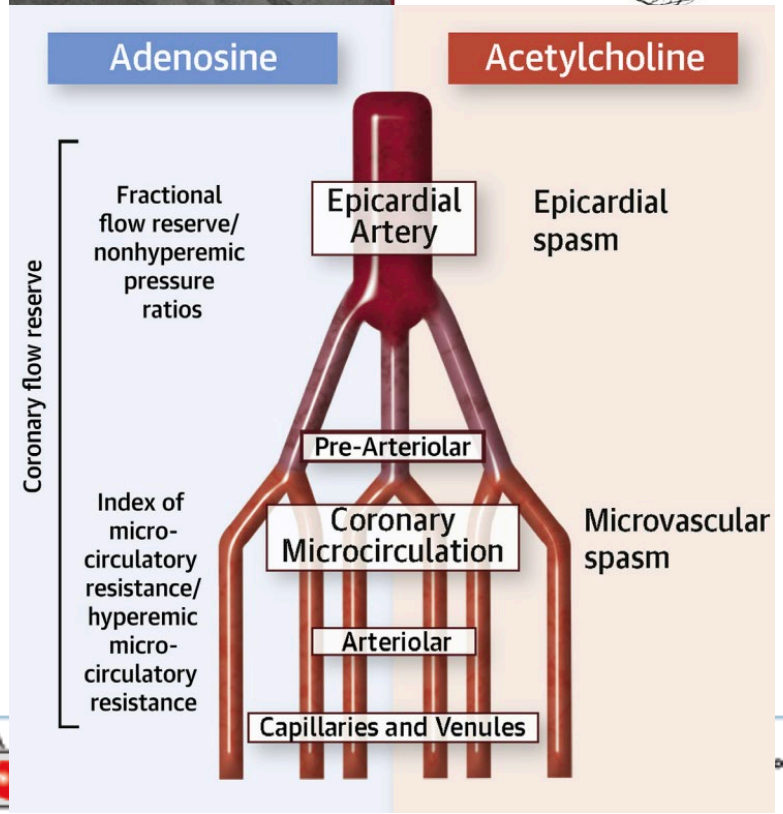


The high resolution of OCT results in identification of culprit lesions based on **evidence of suggestive signs** such as rupture, erosion, erupted nodules, cavities, layered plaque, and residual thrombus

Reynolds HR, et al Circulation 2020;143:624–640
Johnson TW et al Eur Heart J 2019;40:2566–2584
Kunadian V et al EuroIntervention 2021;16:1049–1069

Invasive functional coronary tests





Coronary microvascular dysfunction is an established cause of ischaemia with non-obstructive coronary arteries

Can also be found **in the acute context** mostly as a sequela of myocardial injury

Ford TJ et al JACC Cardiovasc Interv 2020;13:1847–1864

Kunadian V et al EuroIntervention 2021;16:1049–1069

Messages

The diverse **underlying pathophysiological mechanisms** of MINOCA contribute to the complexities in diagnostic and treatment strategies.

After coronary angiography, it is vital to **perform further assessments** and **investigations**

CMR is the gold-standard tool in differentiating between a MINOCA and no MINOCA

It is necessary **to systematize** timely diagnostic and treatment protocols for MINOCA **at each institution** to avoid underdiagnosis