

Reperfusion therapies in STEMI. Current best practices

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Key Message

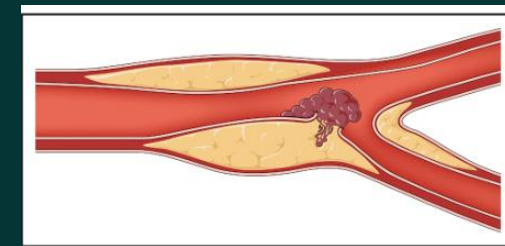
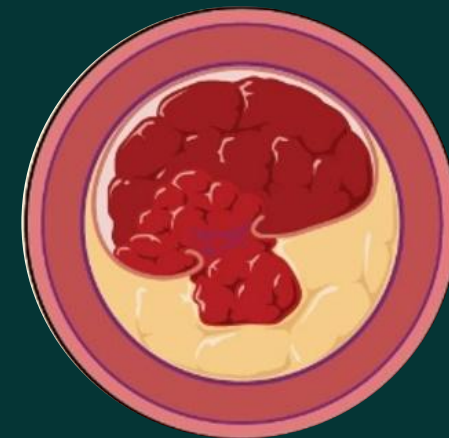
"The optimal reperfusion approach in PCI is strategy-driven, not device-limited — tailored to lesion, patient risk, and ischemic time."

Time is Muscle

STEMI = Complete coronary occlusion

Every minute counts: rapid reperfusion improves survival

It's not just PCI or fibrinolysis — it's WHEN it's done!



90 Minutes

↓ Reduces reinfarction, stroke, mortality



90 Minutes

Patient experiences symptoms and goes directly to a PCI capable hospital

ECG performed within 10 minutes of patient arrival

PCI is performed within 90 minutes of arrival to the PCI hospital



Guideline-Based Strategy (ACC/AHA 2025)

- Primary PCI: Preferred if within 120 min of first medical contact
- Fibrinolysis: If PCI is not feasible within time window
- Routine early angiography (2–24 h) after fibrinolysis

Critical Timings = Mortality Predictors

Door-to-balloon: ≤ 90 min

Door-to-needle: ≤ 30 min

First-medical-contact-to-device: ≤ 120 min

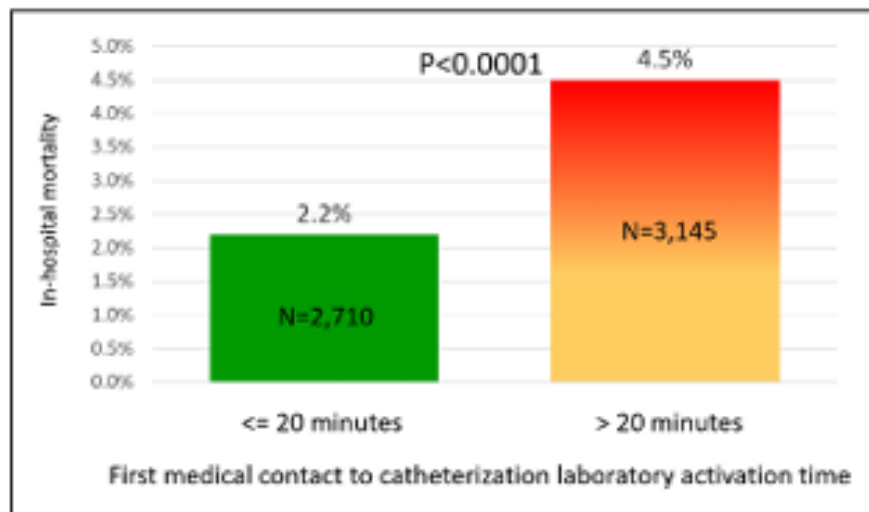


Figure 5. First medical contact to activation time and in-hospital mortality.

Jollis et al

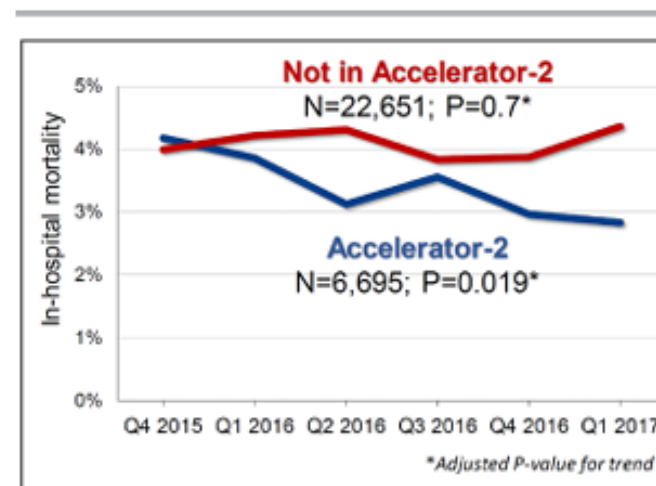


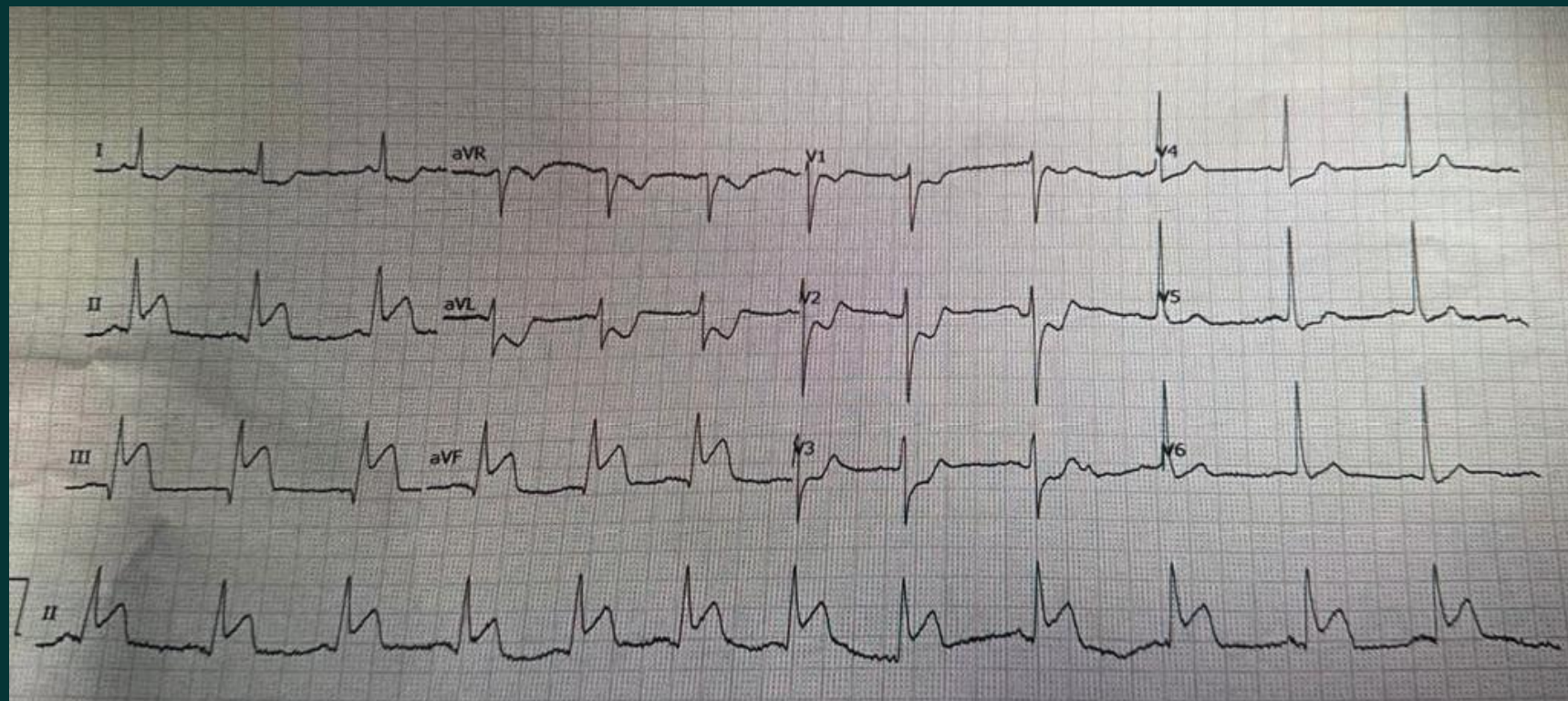
Figure 4. In-hospital mortality according to hospital participation in Accelerator-2.

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Sources of Funding, see page 386

CLINICAL CASE

- MALE 54 YEARS OLD. SMOKER.
- CHEST PAIN. INFERIOR STEMI.
- Patient arrives to PCI center – with 2 labs non available



Pharmaco-Invasive Strategy

If PCI delay >120 min → fibrinolysis

Early angiography within 2–24h

Proven by STREAM, FAST-MI

Fibrinolysis Remains Valid (within 30 min of arrival)

**CLINICAL CASE: D2B > 90
MIN -- TNK**

Modern Adjunctive Pharmacotherapy

- DAPT: Aspirin + ticagrelor/prasugrel (preferred over clopidogrel)
- Anticoagulants: Heparin, enoxaparin, bivalirudin
- Post-PCI: Statins, beta-blockers, ACEIs/ARBs



Table 3. Best practices for arterial access in ST-elevation myocardial infarction.

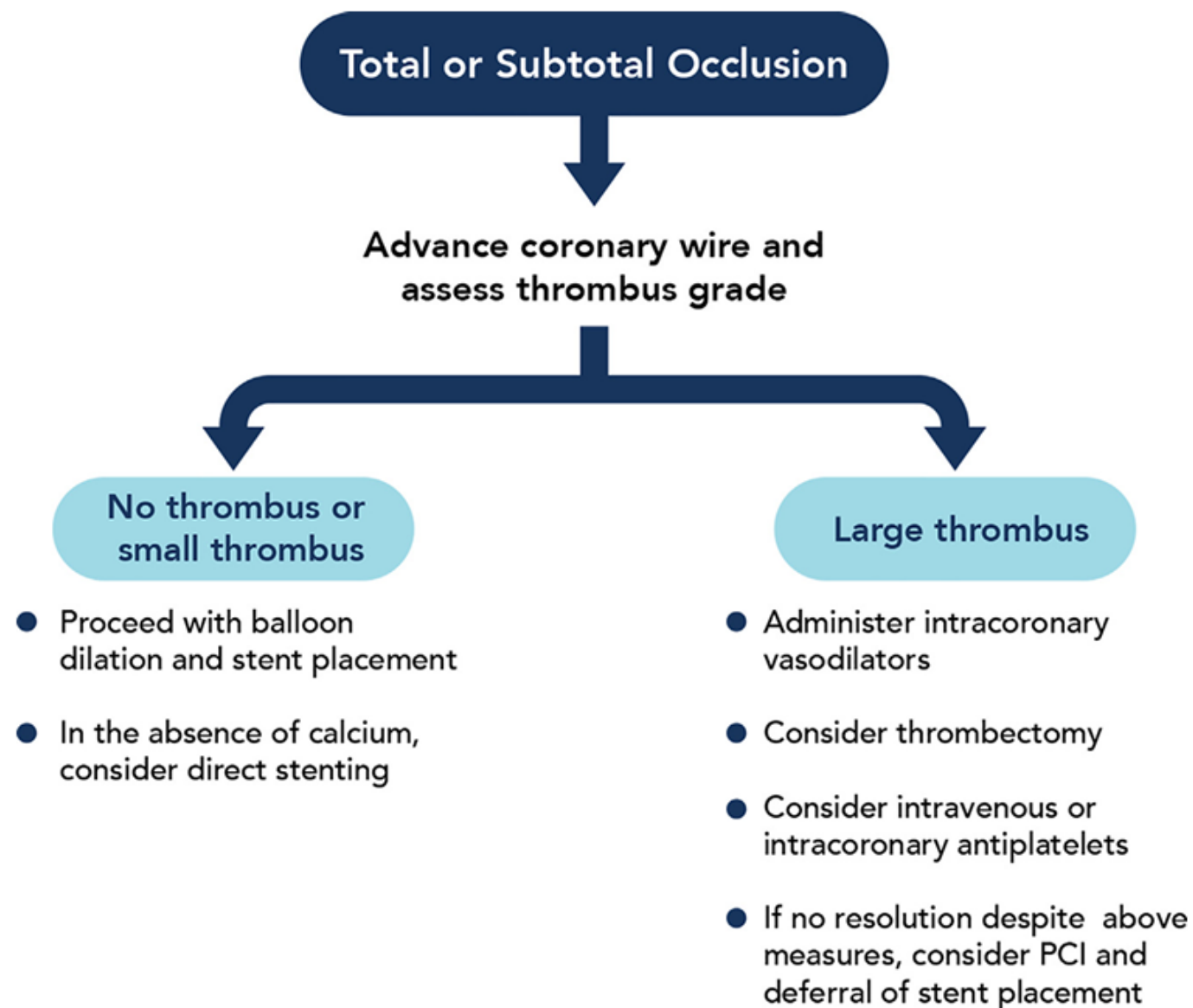
Radial artery access

- Preprocedure assessment to consider right vs left radial access
- Ultrasound guidance
- Radial artery puncture 1-2 cm proximal to the styloid process
- Use of hydrophilic sheath and arterial vasodilators to avoid spasm
- Limited angiography of the artery when there is resistance with wire advancement after sheath placement
- Patent hemostasis for sheath removal

Femoral artery access

- Fluoroscopic guidance to identify the lower half of the femoral head
- Ultrasound guidance
- Micropuncture needle
- Fluoroscopic guidance when advancing wire
- Femoral angiography to confirm the proper location
- Vascular closure devices (especially with large-bore access)

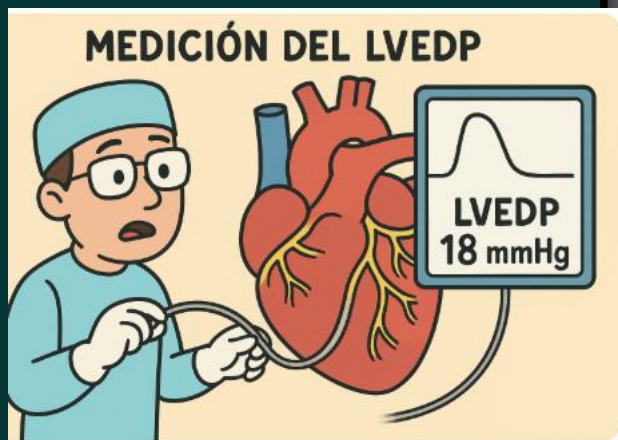
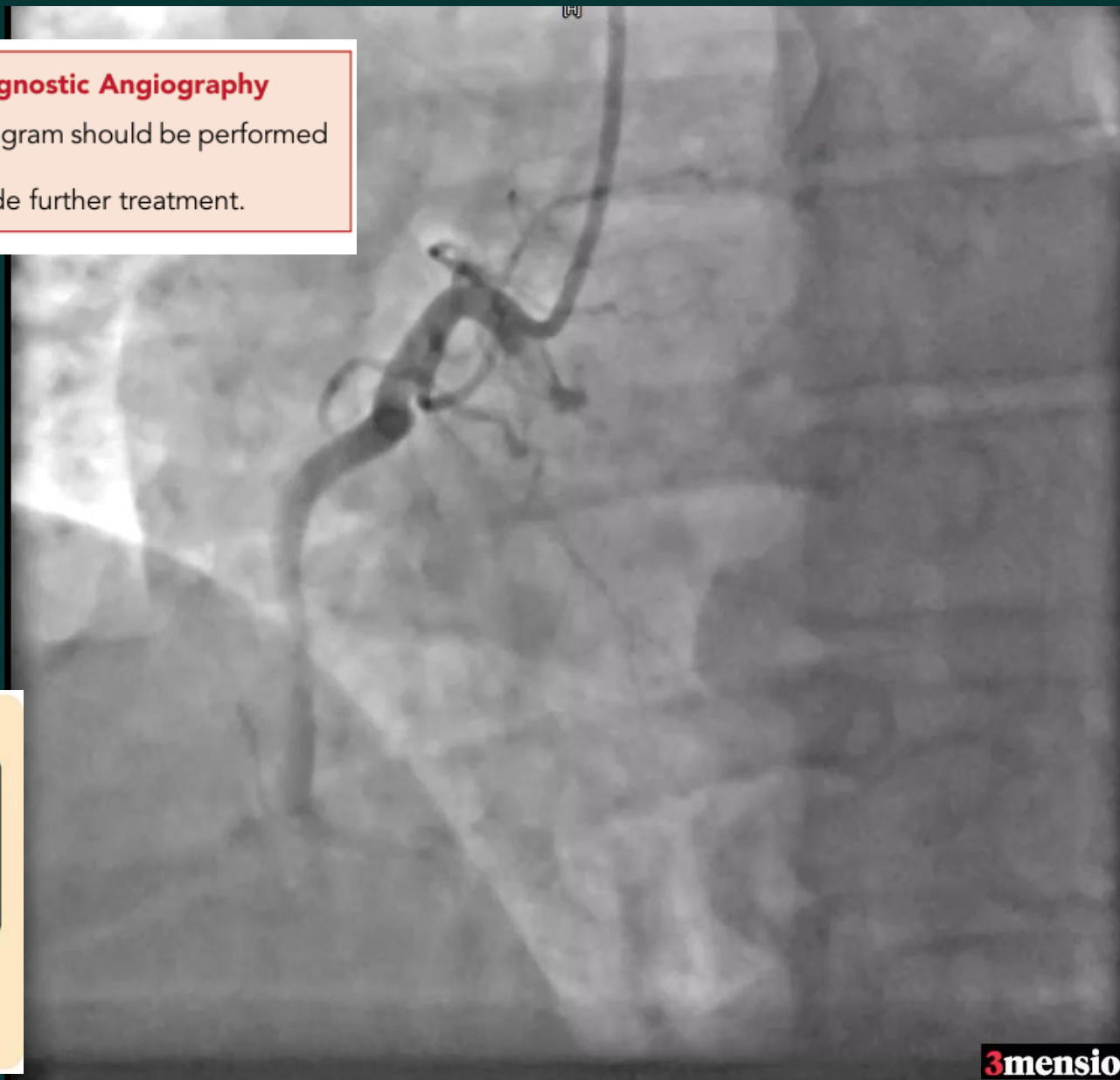
Managing Thrombus



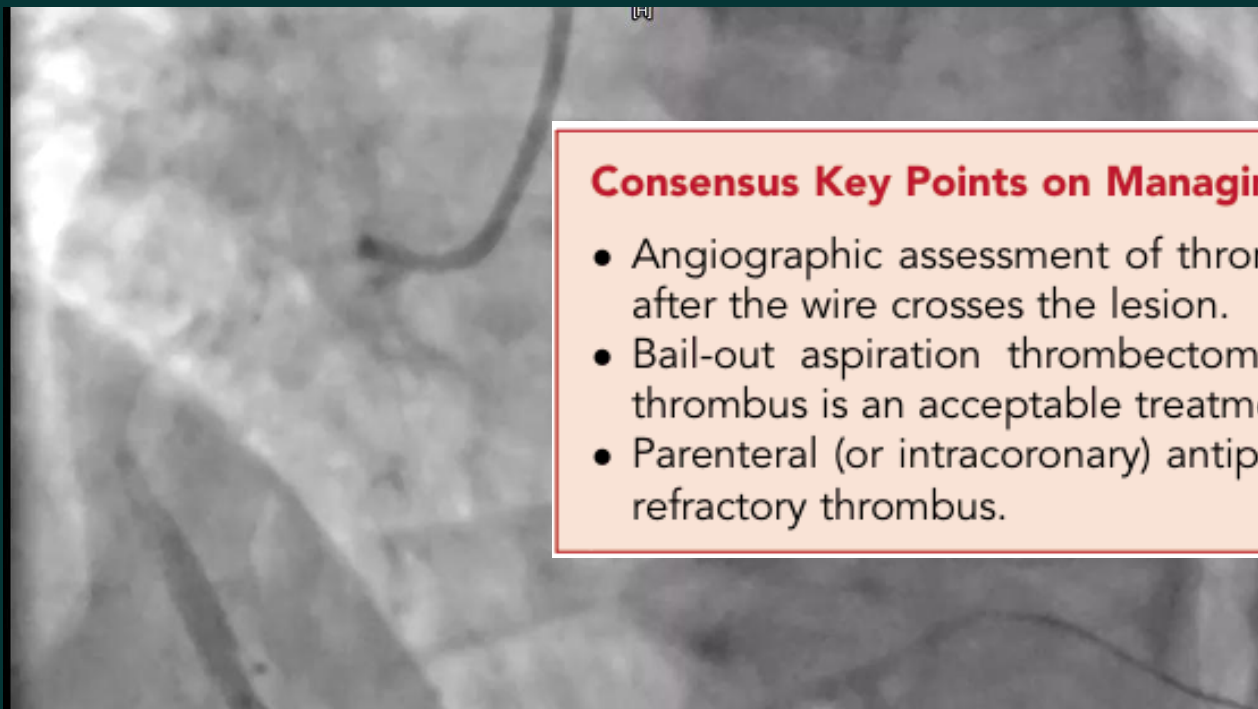
DIAGNOSTIC PROCEDURE

Consensus Key Points Regarding Diagnostic Angiography

- A complete diagnostic coronary angiogram should be performed during the index procedure.
- Measurement of LVEDP can help guide further treatment.



WIRING AND SEE



Consensus Key Points on Managing Thrombus

- Angiographic assessment of thrombus burden should be made after the wire crosses the lesion.
- Bail-out aspiration thrombectomy in selected cases of large thrombus is an acceptable treatment strategy.
- Parenteral (or intracoronary) antiplatelet agents can be used for refractory thrombus.

Consensus Key Points for Management of No-Reflow

- Use intracoronary arteriolar vasodilators delivered to the distal bed
- Maximize coronary perfusion pressure with augmentation of mean arterial pressure and reduction of LVEDP

Calcio

Ángulo tot

Consensus Key Points for Intracoronary Imaging

- Routine use of intracoronary imaging is encouraged to guide PCI.
- In case of stent thrombosis or stent failure, intracoronary imaging is an essential step to investigate the mechanism.
- In cases when there is a suspicion of a nonatherosclerotic cause of STEMI, intracoronary imaging can be helpful in assessing ambiguous lesions and delineating the mechanism.

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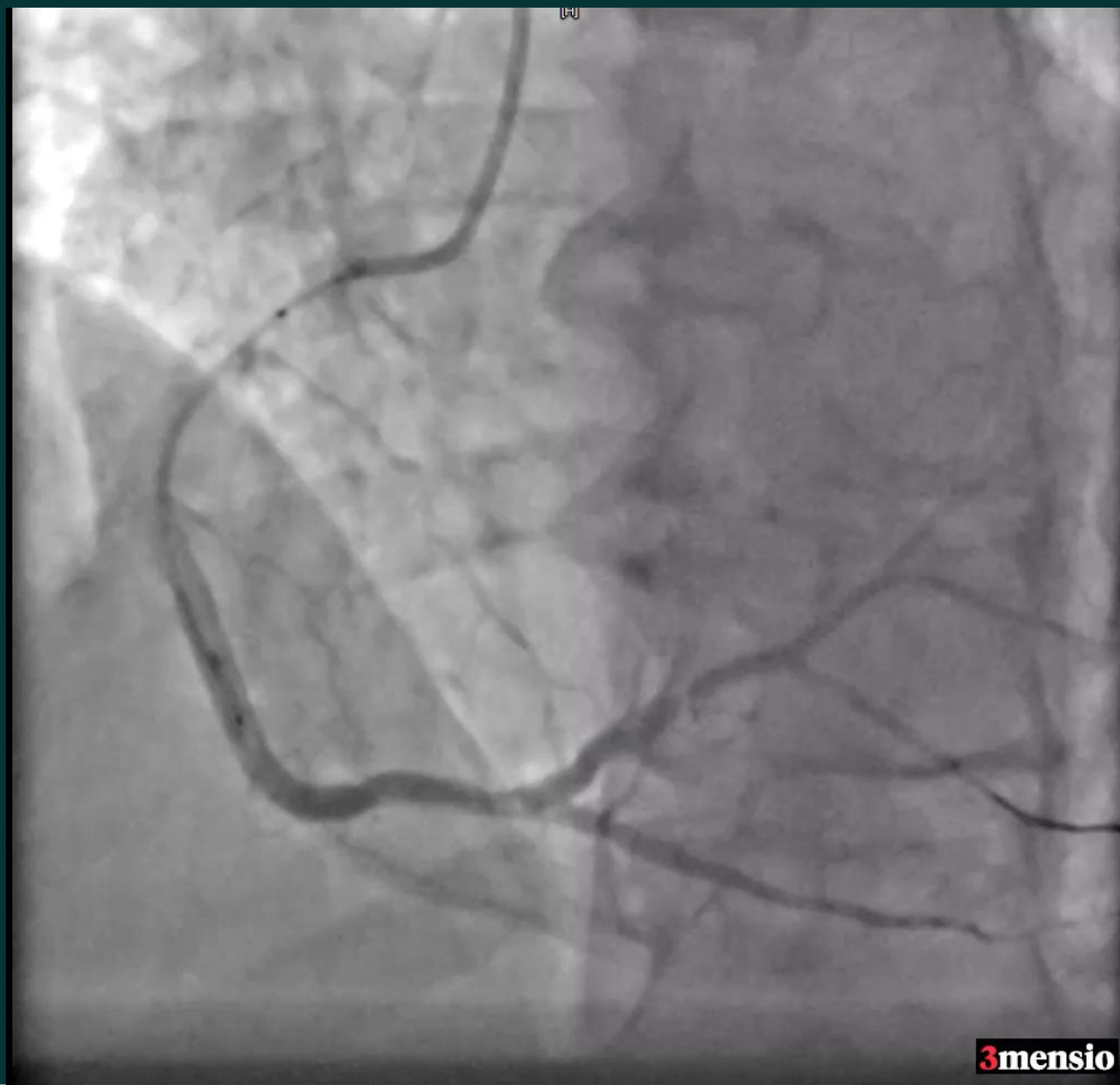
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■ $\geq 180^\circ$

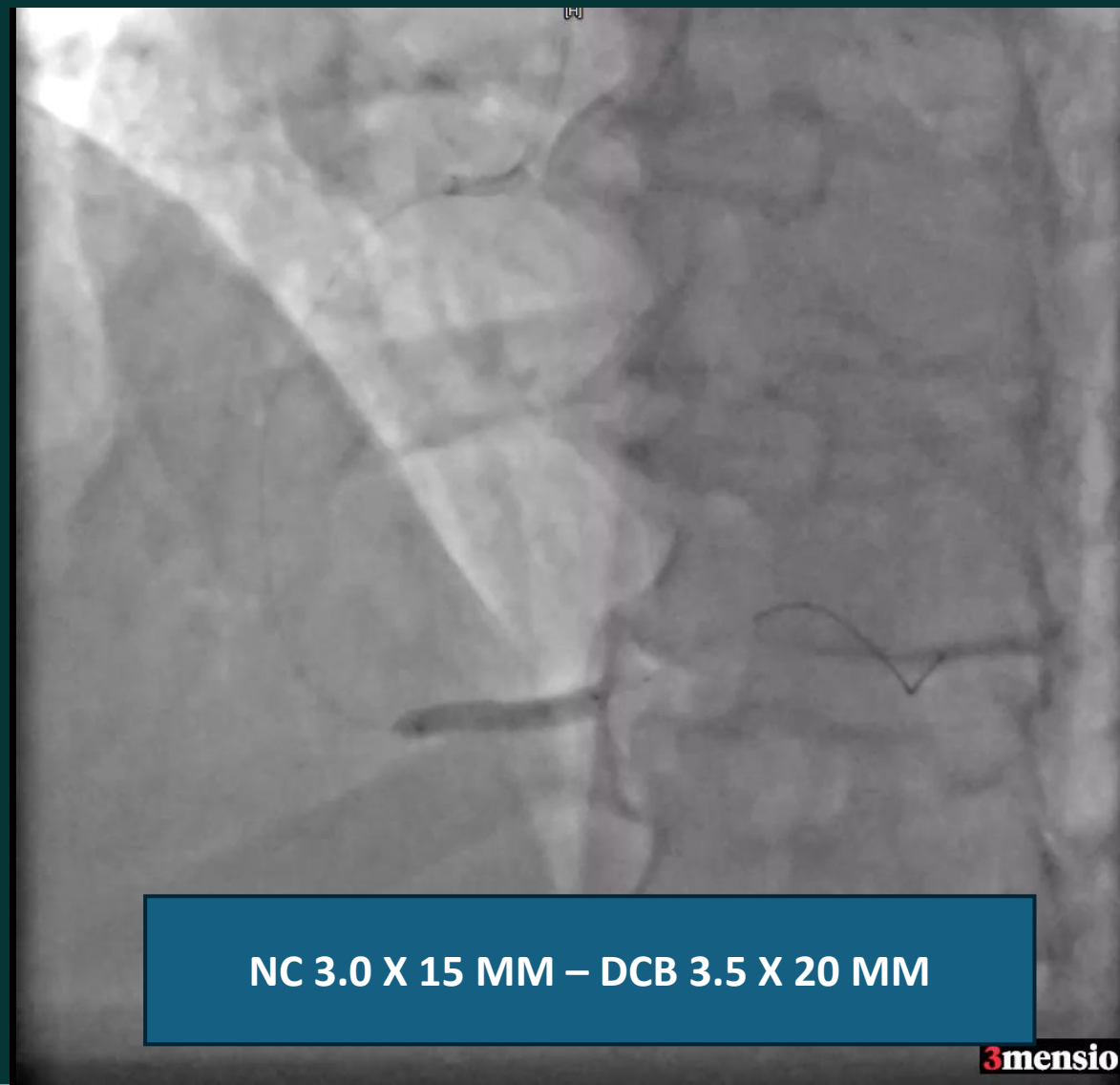
PBK1: RCA, Distal, Post-PCI

Anonymous Anonymous

SUMMARY OF THE PROCEDURE



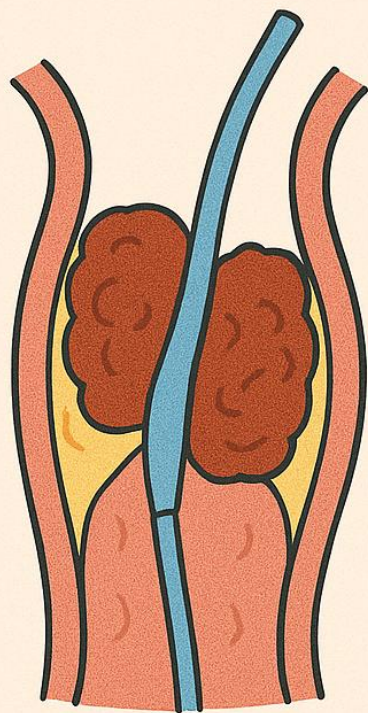
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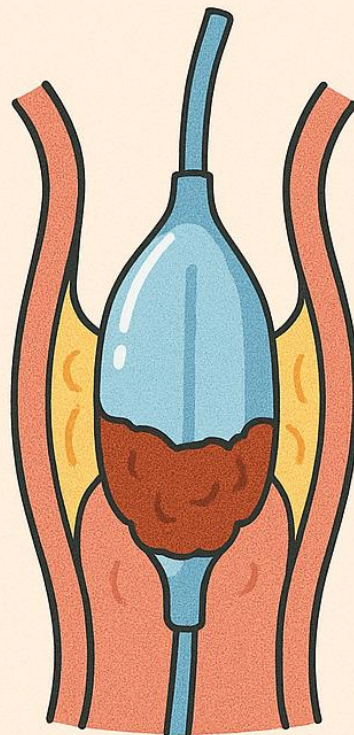
NC 3.0 X 15 MM – DCB 3.5 X 20 MM

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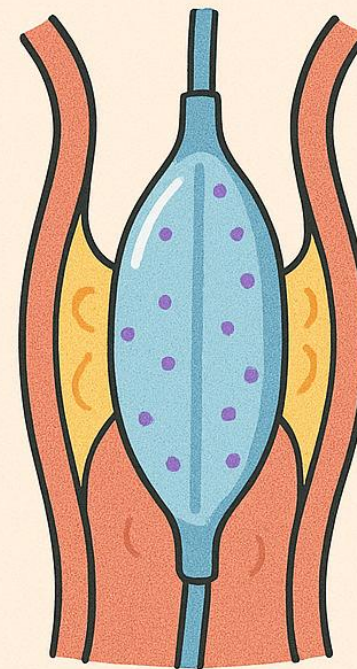
SUMMARY OF THE PROCEDURE



**TROMBO-
ASPIRACIÓN**



**ANGIOPLASTIA
CON BALÓN**



**ANGIOPLASTIA
CON BALÓN
DE DROGAS**

Managing non reflow

- Identify high-risk features: large thrombus burden, delayed presentation, complex lesions.
- Ensure proper anticoagulation and ACT levels.
- Use manual aspiration selectively.
- Handle wires and balloons with care to prevent embolization.

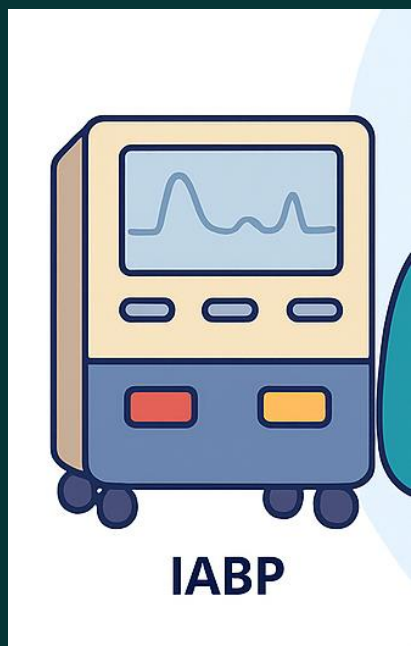
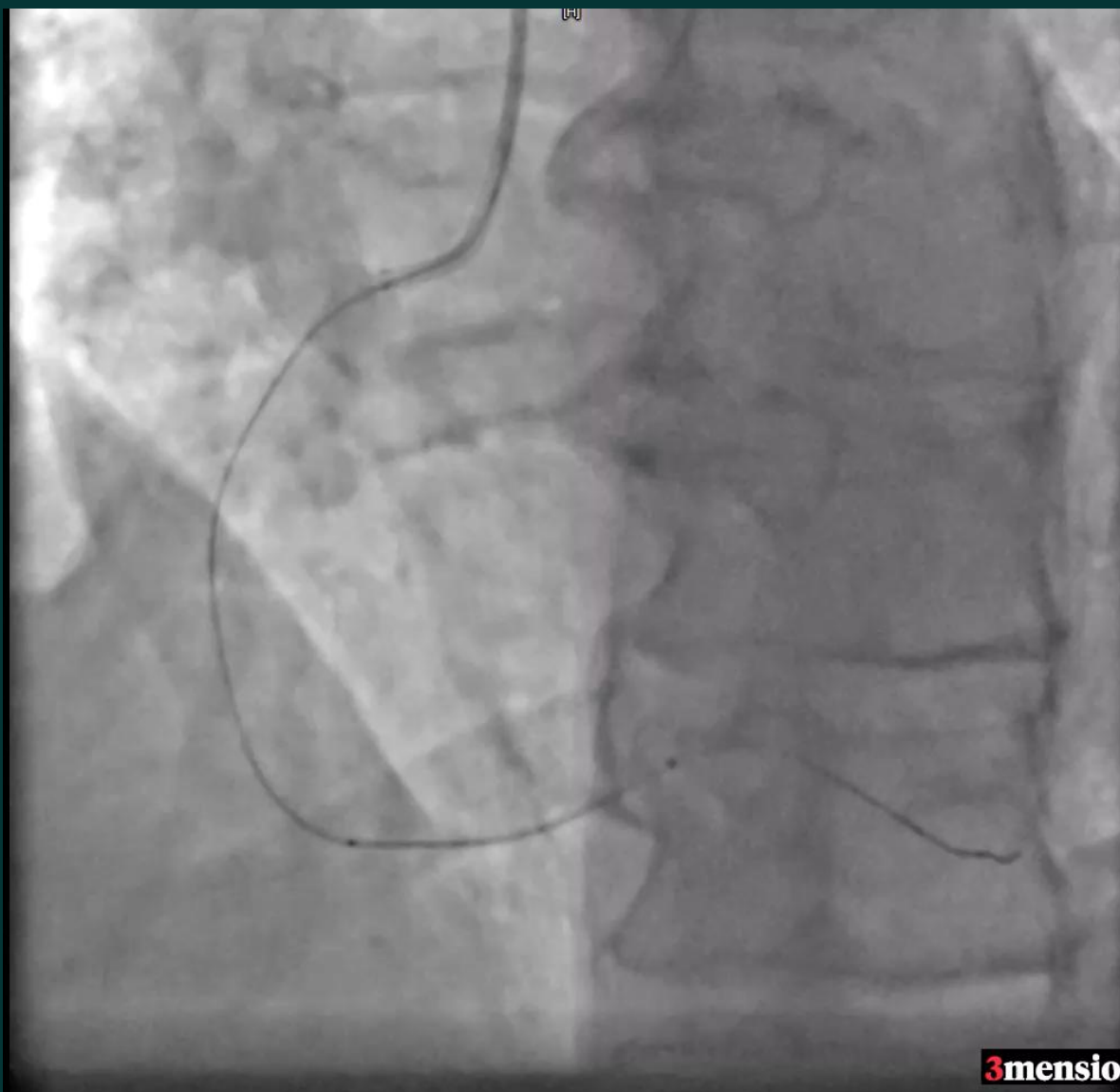


Table 4. Suggested dosing for intracoronary administration of drugs used for no-reflow.

Agent	Dose	Comments
Adenosine	50-200 µg	Avoid in heart block
Nitroprusside	50-200 µg	Avoid in severe aortic stenosis or hypertrophic cardiomyopathy
Diltiazem	400 µg	Avoid in cardiogenic shock or heart block
Verapamil	100-250 µg	Avoid in cardiogenic shock or heart block
Nicardipine	50-200 µg	Avoid in severe aortic stenosis
Epinephrine	50-200 µg	Avoid in ventricular arrhythmias

Final Result



Final result



Volume Rendering



Devices

DES: Drug-Eluting Stents

Gold standard in most lesions
Low restenosis, thrombosis
Indicated in complex anatomy

DCB: Drug-Coated Balloons

BENEFIT STEMI, REVELATION:
Comparable to DES

PEPCAD NSTEMI: Effective in non-
stent strategy

PEBSI: BMS+DCB better than BMS
alone

Drug-Coated Balloon (DCB) Use in STEMI

- Emerging evidence supports DCBs in selected STEMI cases
 - BENEFIT STEMI Trial (2024): DCB non-inferior to DES in selected STEMI lesions
 - PEPCAD NSTEMI (2020): in NSTEMI, DCB showed lower TLF (3.8%) vs stents (6.6%)
 - PEBSI RCT (STEMI): BMS+DCB vs BMS alone → lower LLL (0.31 vs 0.80 mm) and MACE (3.6% vs 12.5%)
 - REVELATION Trial: DCB vs DES in STEMI → similar FFR at 9 months (0.92 vs 0.91)

When to Use DCB??

Recent registries support DCB use in plaque erosion

- Small vessels
- High bleeding risk
- In-stent restenosis (ISR)
- Plaque erosion – plaque rupture in **Non-Obstructive plaque????**

Limitations: Careful lesion selection, **operator expertise required**

- Improves stent sizing, expansion, and long-term outcomes
- Assessing plaque erosion vs rupture
- OCT preferred for visualizing thrombus and DCB result assessment
- Stent thrombosis or stent failure, IVI is an essential step to investigate the mechanism.



Recommendation for Use of Intracoronary Imaging
Referenced studies that support recommendation are summarized in the Evidence Table.

Class	Level	Recommendation
1	A	1. In patients with ACS undergoing coronary stent implantation in left main artery or in complex lesions, intracoronary imaging with intravascular ultrasound (IVUS) or optical coherence tomography (OCT) is recommended for procedural guidance to reduce ischemic events.* ¹⁻¹¹

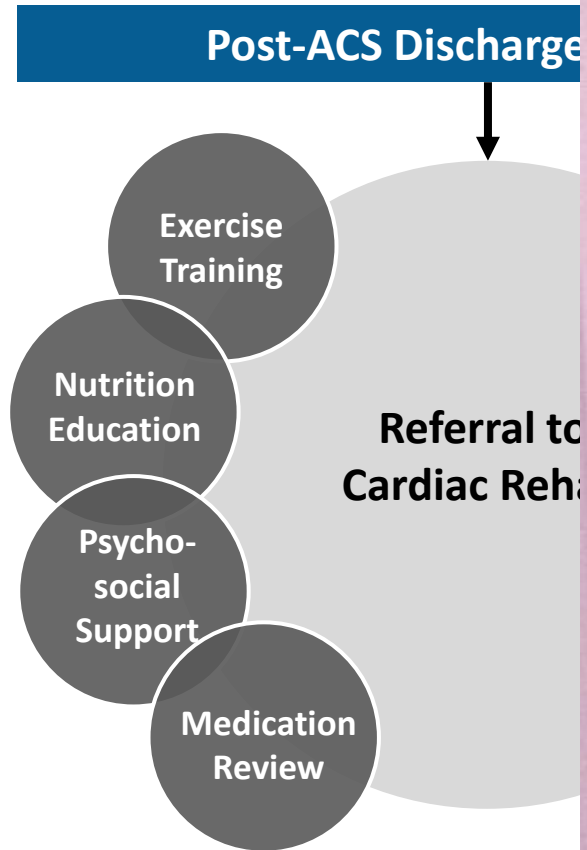
*Adapted from the "2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization."¹²



Consensus Key Points for Special Circumstances

- RHC should be performed in STEMI with CS during the index procedure.
- Microaxial flow pumps can be beneficial in patients with STEMI and CS.
- Immediate catheterization and rescue PCI are essential when fibrinolytic therapy has failed.
- In stable patients, early catheterization within 24 hours of fibrinolytic therapy is indicated.
- Intracoronary imaging should be routinely performed in cases of stent thrombosis to investigate the mechanism.
- Complete revascularization with treatment of significant non-infarct stenosis should be performed in patients with STEMI and MVD.

Cardiac Rehabilitation for Pat



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Abbreviations: ACS indicates acute

Rao, S.V., et al. 2025 AHA/ACC/A

Take Home Messages

- Strategy must match lesion, timing, and risk
- Total ischemic time is strongest predictor of survival
- Avoid delays, ensure coordination
- DES first-line, DCB rising
- Imaging and physiology tools are now integral to modern PCI decision-making

Primary PCI = preferred if timely

References

2025 ACC/AHA/ACEP/NAEMSP/SCAI Guidelines for ACS (Circulation. 2025;151:e771–e862)

STREAM Trial, DANAMI-3, COMPLETE Trial

2024 JACC Meta-analysis on Ischemic Delay

OMI Manifesto (Smith SW, et al., 2023)

Circulation 2024 – Remote Ischemic Conditioning Trials

BENEFIT STEMI Trial (EuroIntervention 2024)

Journal of the Society for Cardiovascular Angiography & Interventions 3 (2024) 102294

Muchas gracias.

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