

Stent or Not to Stent Dilemma in Primary PCI

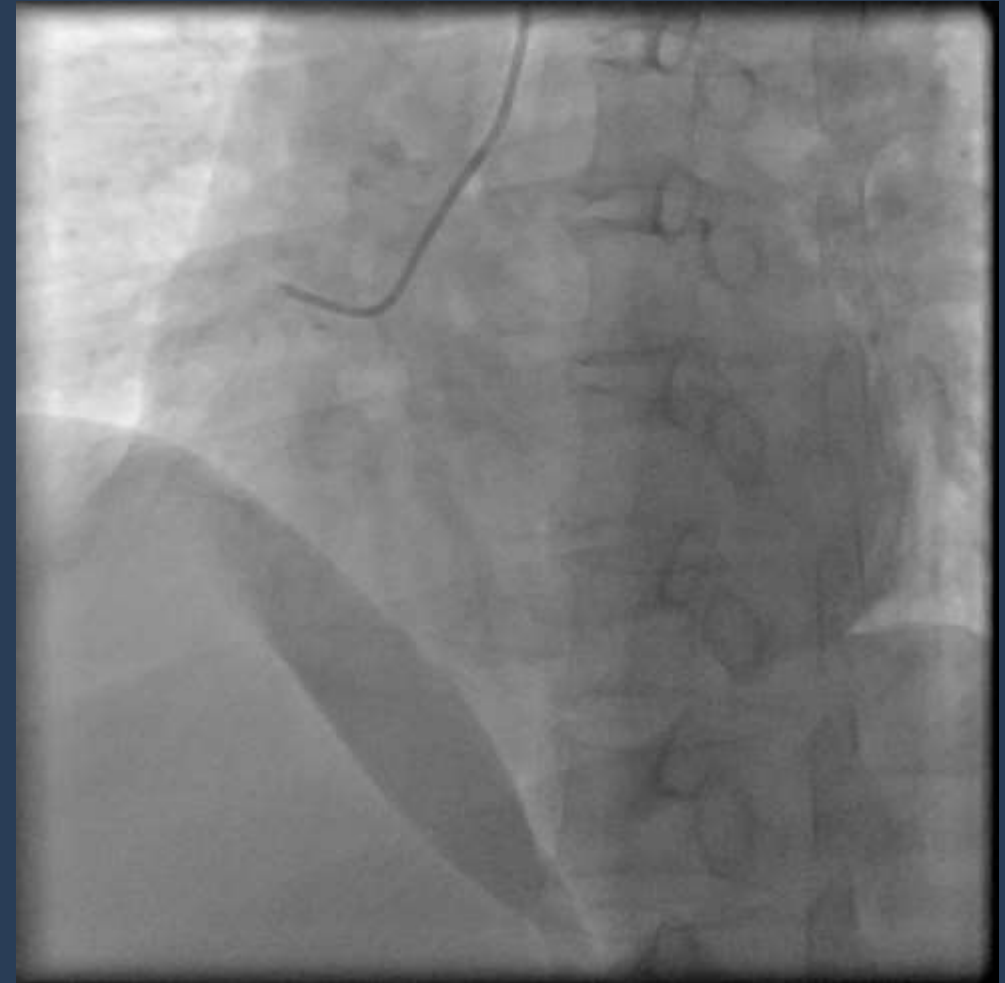
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Indonesia

CLINICAL PRESENTATION

- Female, 55 yo
- Typical angina, onset 9 hours
- Risk factor: HTN (on medication Amlodipin 1x5 mg)
- Vital signs:
T 110/80 mmhg, HR 92x/mnt, S 36C, RR 20x/mnt
- Other physical examination were normal.
- ECG: Sinus rhythm, ST elevation in V1-V5
- Lab Troponin T >2000 ng/L
- Diagnosis: STEMI Anterior

CORONARY ANGIOGRAPHY





PRIMARY PCI

Two Sion Blue guidewires were inserted to
LAD and LCx



Thrombosuction



Balloon dilation in pLAD
(Sapphire II Pro 2.0x15 mm balloon)



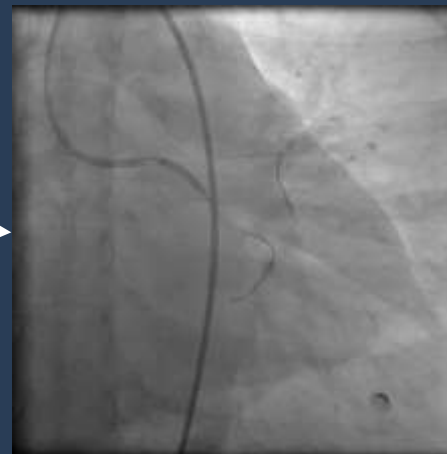
Thrombus shifted to LCx



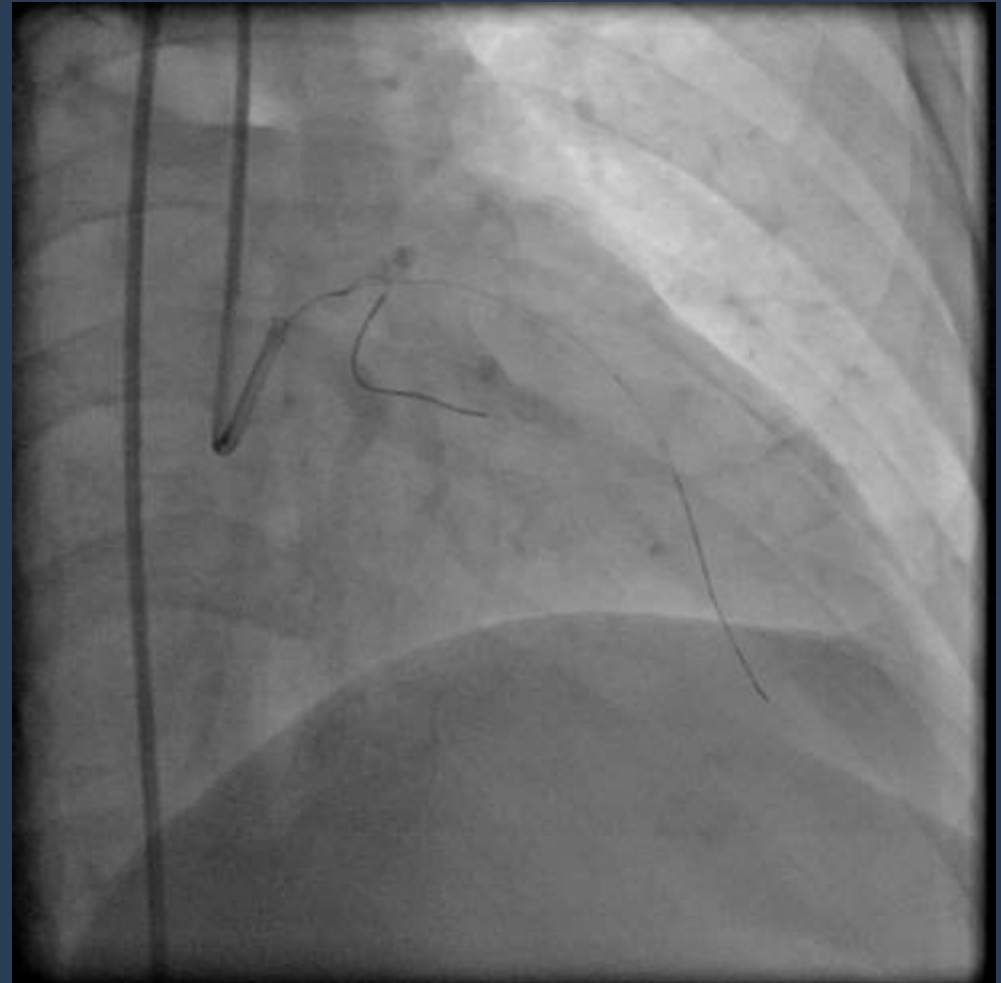
Balloon dilation in pLCx
(Sapphire II Pro 2.0x15 mm balloon)



Eptifibatide IC



RESULT



STENT or NOT TO STENT?

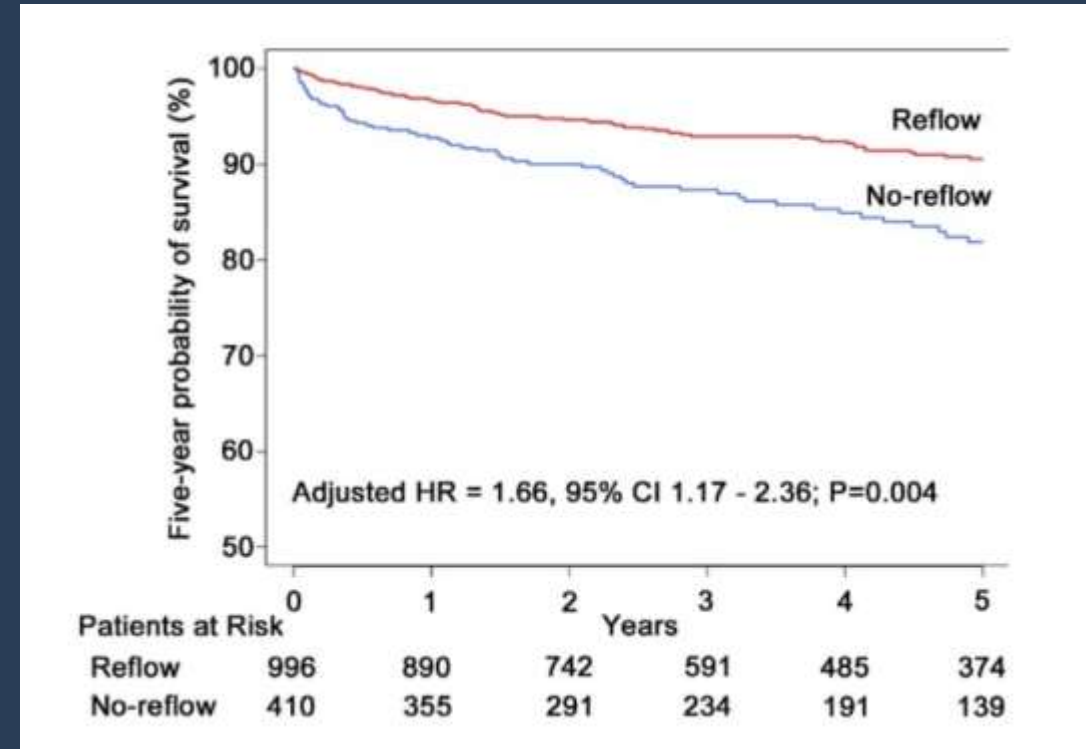
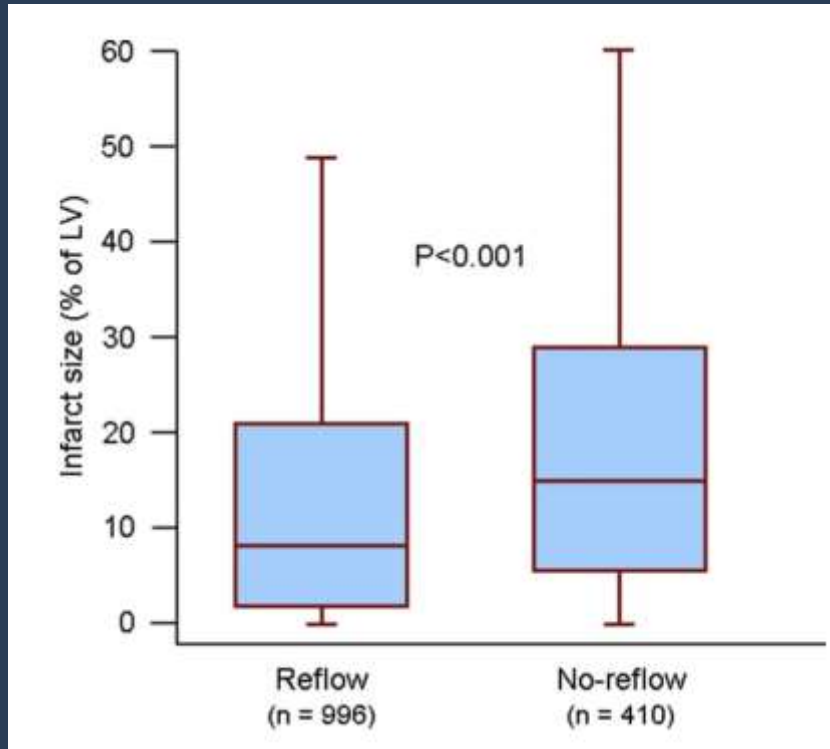
STENTING ?

- Stenting in high thrombus burden: risk of distal embolisation (to LAD and also LCx) and risk of no reflow.
- Distal embolisation occurs in 5-10% of patients and associated with impaired prognosis:¹
 - Worse TIMI flow and MBG
 - Less ST segment resolution
 - Higher incidence of new Q-waves
 - Higher enzyme level
 - Higher incidence of re-infarction at 1 year
- In 17% cases of no reflow, occurred only after stent implantation.²

1. Fokkema ML, et al. Eur H J (2009) 30:908-915.

2. Mazhar J, et al. IJCHA (2016) 8-12.

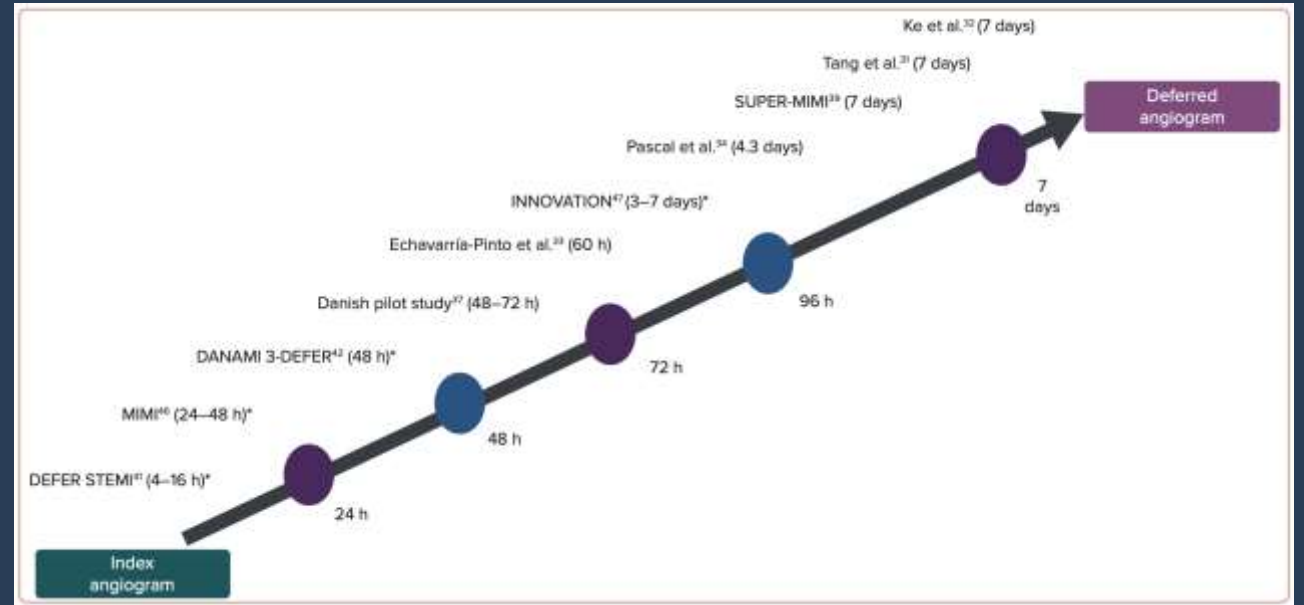
- No reflow phenomenon is strong predictor of 5 year mortality.³



3. Ndrepepa G, et al. JACC 2010;2383-9.

DEFERRED STENTING?

- Advantages:
 - Low thrombus burden
 - Slow flow / no reflow prevented
 - Larger stent size
 - Lesser number of stent implanted
 - Smaller infarct size
- Disadvantages
 - Reocclusion
 - Increased bleeding from extended anticoagulation
 - Cost
 - Prolong hospitalization
 - Risk related to repeated invasive procedures
 - Unplanned revascularization



No exact timing for second procedure

CLINICAL RESEARCH

Interventional Cardiology

A Randomized Trial of Deferred Stenting Versus Immediate Stenting to Prevent No- or Slow-Reflow in Acute ST-Segment Elevation Myocardial Infarction (DEFER-STEMI)



In high-risk STEMI patients, deferred stenting in primary PCI reduced no-reflow and increased myocardial salvage.

Deferred versus conventional stent implantation in patients with ST-segment elevation myocardial infarction (DANAMI 3-DEFER): an open-label, randomised controlled trial



In patients with STEMI, routine deferred stent implantation did not reduce the occurrence of death, heart failure, myocardial infarction, or repeat revascularisation compared with conventional PCI.



European Society of Cardiology

European Heart Journal (2017) 00, 1–66
doi:10.1093/eurheartj/ehx393

ESC GUIDELINES

2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation

The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC)

Routine use of deferred stenting is not recommended.^{153–155}

III

B

Predictor of no reflow

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DOI: 10.1111/joc.12463

ACUTE CORONARY SYNDROME

WILEY

Journal of Interventional Cardiology

Prediction of no-reflow and major adverse cardiovascular events with a new scoring system in STEMI patients

Adil Bayramoğlu¹ | Hakan Taşolar² | Ahmet Kaya¹ |
İbrahim Halil Tanboğa³ | Mehmet Yaman¹ | Osman Bektaş¹ |
Zeki Yüksel Günaydin¹ | Vecih Oduncu⁴

Age
EF ≤40
Syntax Score ≥22
Stent length ≥20 mm
Thrombus grade ≥4
Killip class ≥3
Pain to balloon time ≥4 h

European Review for Medical and Pharmacological Sciences

2022; 26: 759-770

Predicting no-reflow phenomenon prior to primary percutaneous coronary intervention using a novel probability risk score derived from clinical and angiographic parameters

Z. STAJIC¹, D. MILICEVIC¹, S. KAFEDZIC¹, A. ALEKSIC¹, M. CEROVIC¹, M. TASIC¹,
M. ANDJELKOVIC APOSTOLOVIC^{2,3}, A. IGNJATOVIC^{2,3}, N. ZORNIC^{4,6},
G. OBRADOVIC¹, V. JOVANOVIC¹, N. JAGIC¹, A.N. NESKOVIC^{1,7}, G. DAVIDOVIC^{5,6}

Risk factors	Points
Age ≥ 65 years	Yes +2; No +0
Heart rate ≥ 89 bpm	Yes +2; No +0
Killip Class ≥ II	Yes +2; No +0
Total ischemic time ≥ 268 min	Yes +3; No +0
Thrombus burden G≥4	Yes +8; No +0

HAKKT is an acronym consisting of the first letters of words Heart rate, Age, Killip class, Total ischemic time, and Thrombus burden.

Clinical and Procedural Predictors of No-Reflow Phenomenon After Primary Percutaneous Coronary Interventions — Experience at a Single Center —

Cevat Kirma, MD; Akin Izgi, MD; Cihan Dunder, MD; Ali Cevat Tanalp, MD;
Vecih Oduncu, MD; Soe Moe Aung, MD; Kenan Sonmez, MD;
Bulent Mutlu, MD; Nihal Ozdemir, MD; Vedat Erentug, MD*

Initial TIMI flow ≤ 1
Total occlusion
Long target lesion (>13.5 mm) large
Vessel diameter
Delayed reperfusion (≥4h)
High thrombus burden

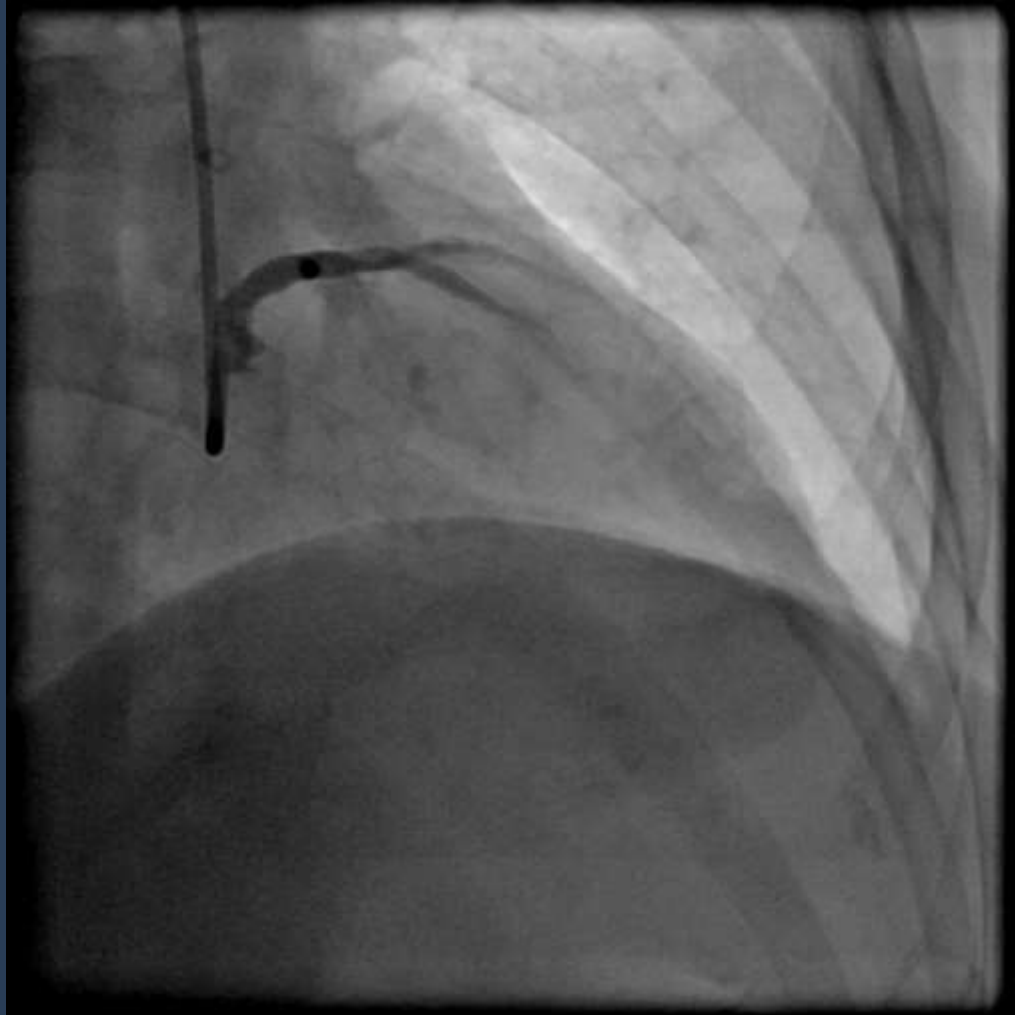
DECISION: DEFERRED STENTING...

- Continue IV Eptifibatide
- Enoxaparine 2x0.6 cc SC
- DAPT (Ticagrelor and Aspirin)

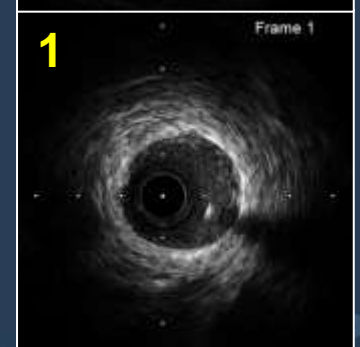
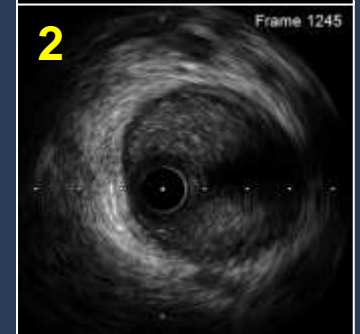
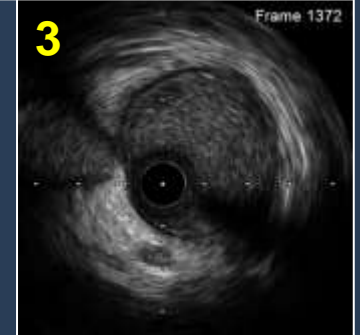
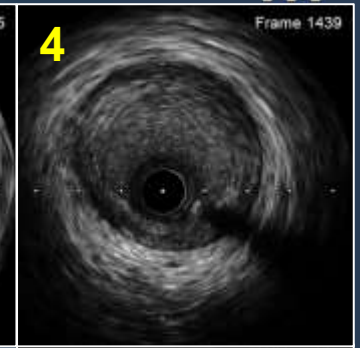
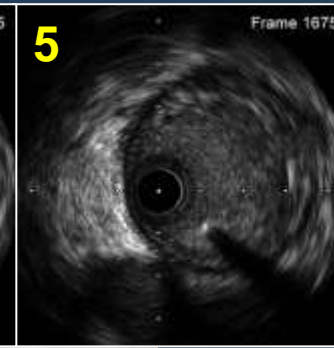
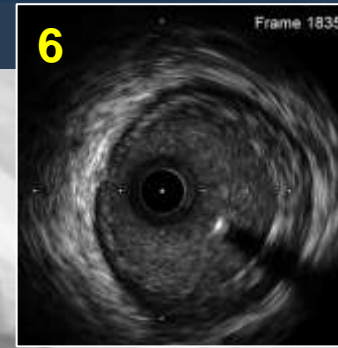
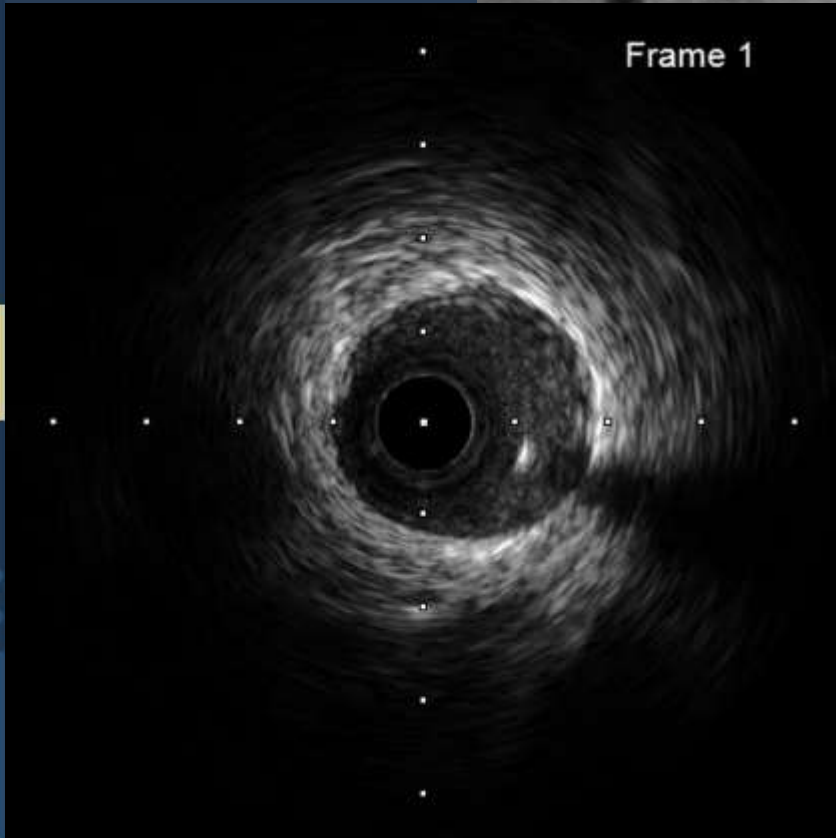
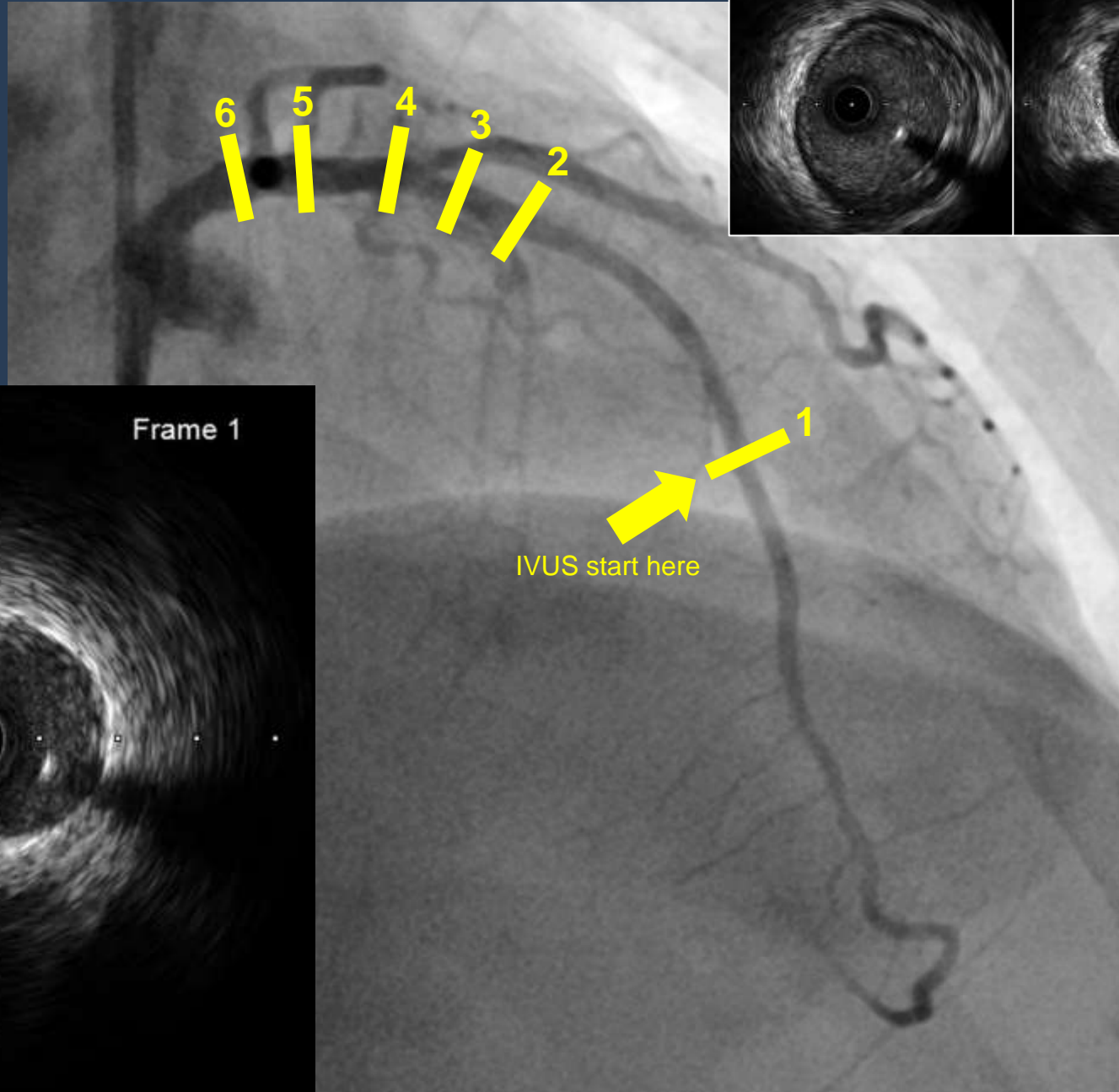
ECHOCARDIOGRAPHY EVALUATION

- Normal heart chamber dimensions
- Reduced systolic LV function with RWMA
- Hypokinetic mid anterior, anteroseptal and anterolateral with LVEF 52% (Simpson's)
- Diastolic dysfunction gr I
- Normal valves
- Normal RV contractility

REPEAT CORONARY ANGIOGRAPHY (4 weeks later)



IVUS



MINOCA?

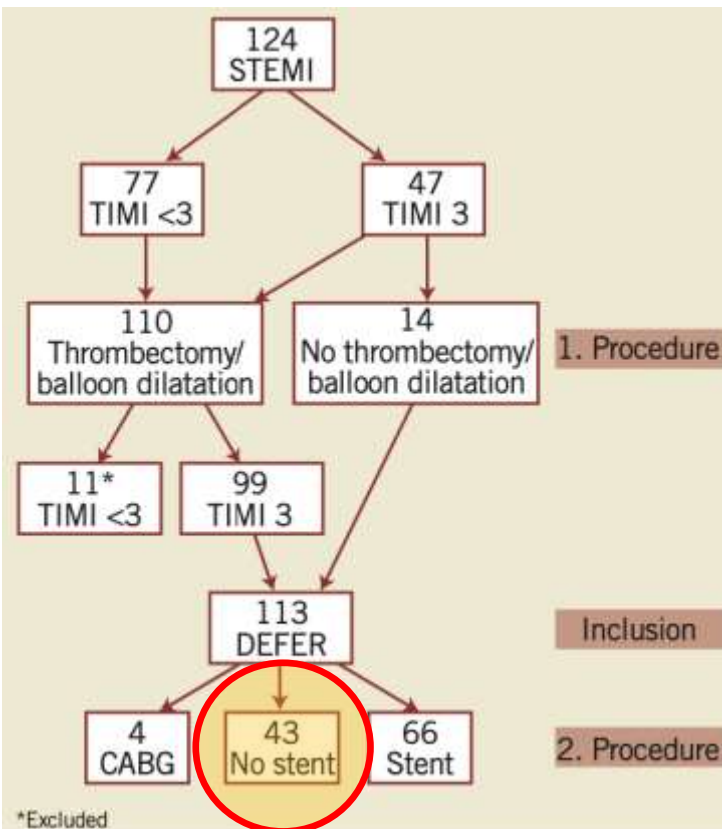
(Myocardial Infarction with No Obstructive Coronary Artery)

- In most studies >50% is women.
- Fewer traditional risk factor.
- Approximately 1/3 patient had plaque rupture on IVUS.
- Healed plaque rupture (layered plaque) can be seen in 13.1% patient.
- Long term prognosis is not always benign.
- No RCT, only based on experts opinions.
- Continue DAPT treatment is debatable.

In DEFERRED STRATEGY, second procedure may not always end with stenting

Deferred stent implantation in patients with ST-segment elevation myocardial infarction: a pilot study

Henning Kelbæk¹*, MD; Thomas Engstrøm¹, MD; Kiril A. Ahtarovski¹, MD; Jacob Lønborg¹, MD; Niels Vejstrup¹, MD; Frants Pedersen¹, MD; Lene Holmvang¹, MD; Steffen Helqvist¹, MD; Kari Saunamäki¹, MD; Erik Jørgensen¹, MD; Peter Clemmensen¹, MD; Lene Klavgaard¹, RN; Hans-Henrik Tilsted¹, MD; Bent Raungaard², MD; Jan Ravkilde², MD; Jens Aaroe², MD; Svend Eggert³, MD; Lars Køber¹, MD



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CLINICAL RESEARCH

Interventional Cardiology

A Randomized Trial of Deferred Stenting Versus Immediate Stenting to Prevent No- or Slow-Reflow in Acute ST-Segment Elevation Myocardial Infarction (DEFER-STEMI)

Characteristics	Randomly Assigned Groups	
	Immediate Stenting (n = 49)	Deferred Stenting (n = 52)
Procedure details		
Aspiration thrombectomy	42 (85.7)	46 (88.5)
Glycoprotein IIb/IIIa inhibitor therapy	46 (98.9)	51 (98.1)
Pre-dilation	36 (73.5)	46 (88.5)
Post-dilation	35 (71.4)	30 (57.7)
Final inflation pressure, kPa	17.4 ± 2.4	16.4 ± 3.2
Intracoronary adenosine therapy	4 (8.2)	3 (5.8)
No. of stents		
0	0	3 (5.8)
1	39 (79.6)	33 (63.5)
2	9 (18.4)	16 (30.8)
3	1 (2.0)	0
Contrast volume, ml	205 (172–250)	278 (238–312)

Deferred versus conventional stent implantation in patients with ST-segment elevation myocardial infarction (DANAMI 3-DEFER): an open-label, randomised controlled trial

Henning Kelbæk, Dan Erik Højsten, Lars Køber, Steffen Helqvist, Lene Klavgaard, Lene Holmvang, Erik Jørgensen, Frants Pedersen, Kari Saunamäki, Ole De Backer, Lia E Bang, Klaus F Kofod, Jacob Lønborg, Kiril Ahtarovski, Niels Vejstrup, Hans E Bøcker, Christian J Terkelsen, Eivold H Christiansen, Jan Ravkilde, Hans-Henrik Tilsted, Anton B Villadsen, Jens Aaroe, Svend Eggert, Bent Raungaard, Livette O Jensen, Peter Clemmensen, Peer Grande, Jan K Madsen, Christian Torp-Pedersen, Thomas Engstrøm

	Conventional PCI group (n=612)	Deferred stent implantation group (n=603)
PCI		
Radial access	27 (4%)	36 (6%)
Arteries treated per patient	1 (1–1)	1 (1–1)*
Implanted stents	1 (1–2)	1 (1–2)*
Stent diameter (mm)	3.5 (3.0–4.0)	3.5 (3.0–3.5)
Total stent length (mm)	22 (15–33)	18 (12–28)*
No stenting	21 (3%)	93 (15%)*
Use of glycoprotein IIb/IIIa inhibitor	96 (16%)	209 (35%)*
Use of bivalirudin	457 (75%)	349 (58%)*
Thrombus aspiration	358 (58%)	378 (63%)

CONCLUSION

- Primary PCI is standard of care for the treatment of STEMI, however in case of high load thrombus, stent placement can lead to thrombus shifting, distal embolisation and no-reflow phenomenon.
- The deferred stenting strategy is a radical change in the management of patients with STEMI and has advantages and disadvantages.
- In deferred stenting strategy, second procedure may not always ended with stenting.