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65th Annual Scientific Session & Expo

The Third DANish Study of Optimal Acute Treatment of Patients with ST-segment Elevation Myocardial Infarction: DEFERred stent implantation in connection with primary PCI: DANAMI 3-DEFER

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AT THE INTERSECTION OF SCIENCE & CHANGE

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I don’t have any diclosures with regard to this presentation

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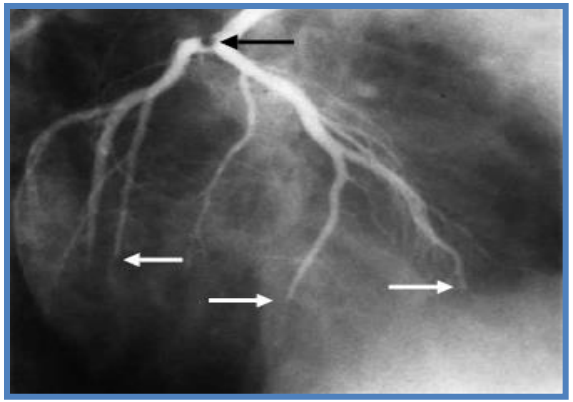
Background



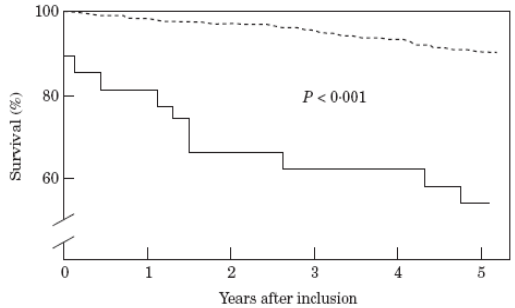
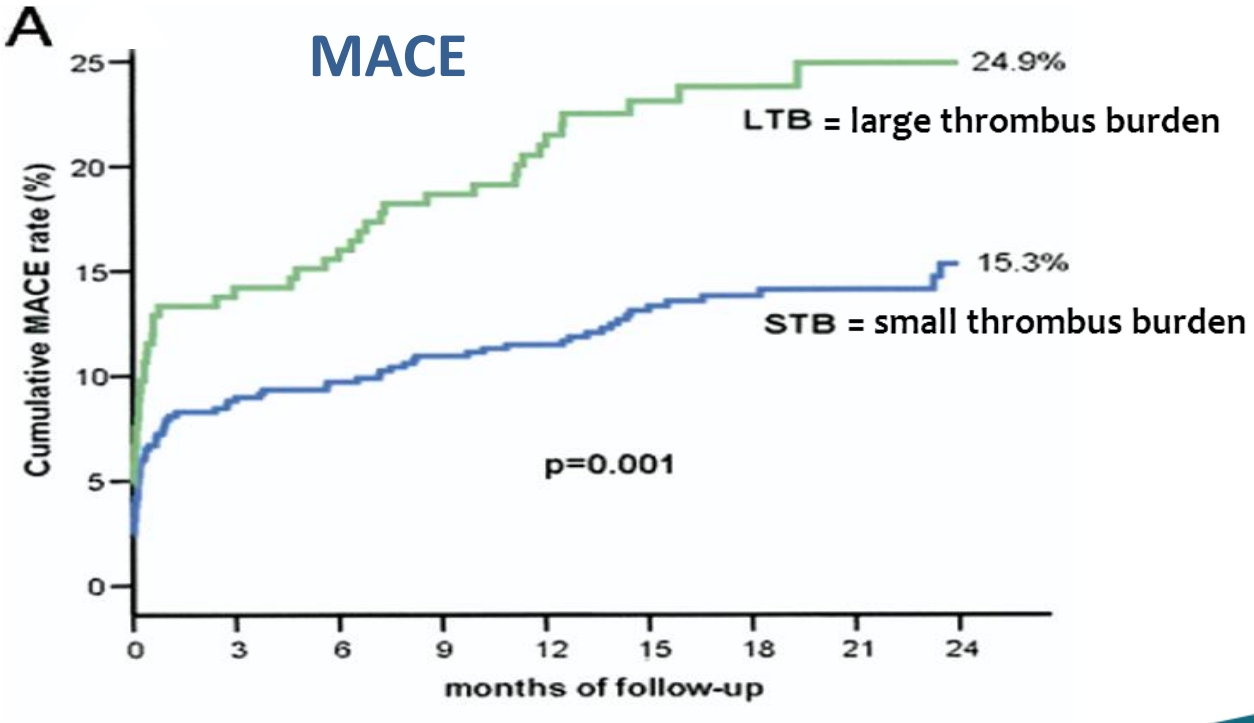


Figure 2 Long-term survival in patients with (——) or without (– – –) distal embolization (P<0·001).

During PPCI

- **Distal embolization occurs in 7% of cases**
- **Slow-/no-flow occurs in 10% of cases**

Background


A
MACE
24.9%
LTB = large thrombus burden
15.3%
STB = small thrombus burden
p=0.001
Cumulative MACE rate (%)
25
20
15
10
5
0
0
3
6
9
12
15
18
21
24
months of follow-up

Previous studies of deferred stenting

Study	n	Primary endpoint	Results
Non-randomised			
Meneveau	78	Procedural success*	↑ 18%
Isaaz	93	TIMI 3	↑ 40%
Tang	87	TIMI frame count	↓ 22%
Cafri	106	thrombotic events	↓ 23%
Ke	103	MACE	↓ 20%
Pascal	279	MACE-free survival	↑ 15%
Randomised			
DEFER-STEMI	101	no-/slow flow	↓ 23%
MIMI	140	MVO (% of LVmass)	↑ 111%**

* DS <30%, TIMI 3, no distal embolization **in favor of immediate stenting

Aim of DANAMI-3-DEFER study

To evaluate whether the prognosis of STEMI patients treated with pPCI can be improved by deferred stent implantation

Participants

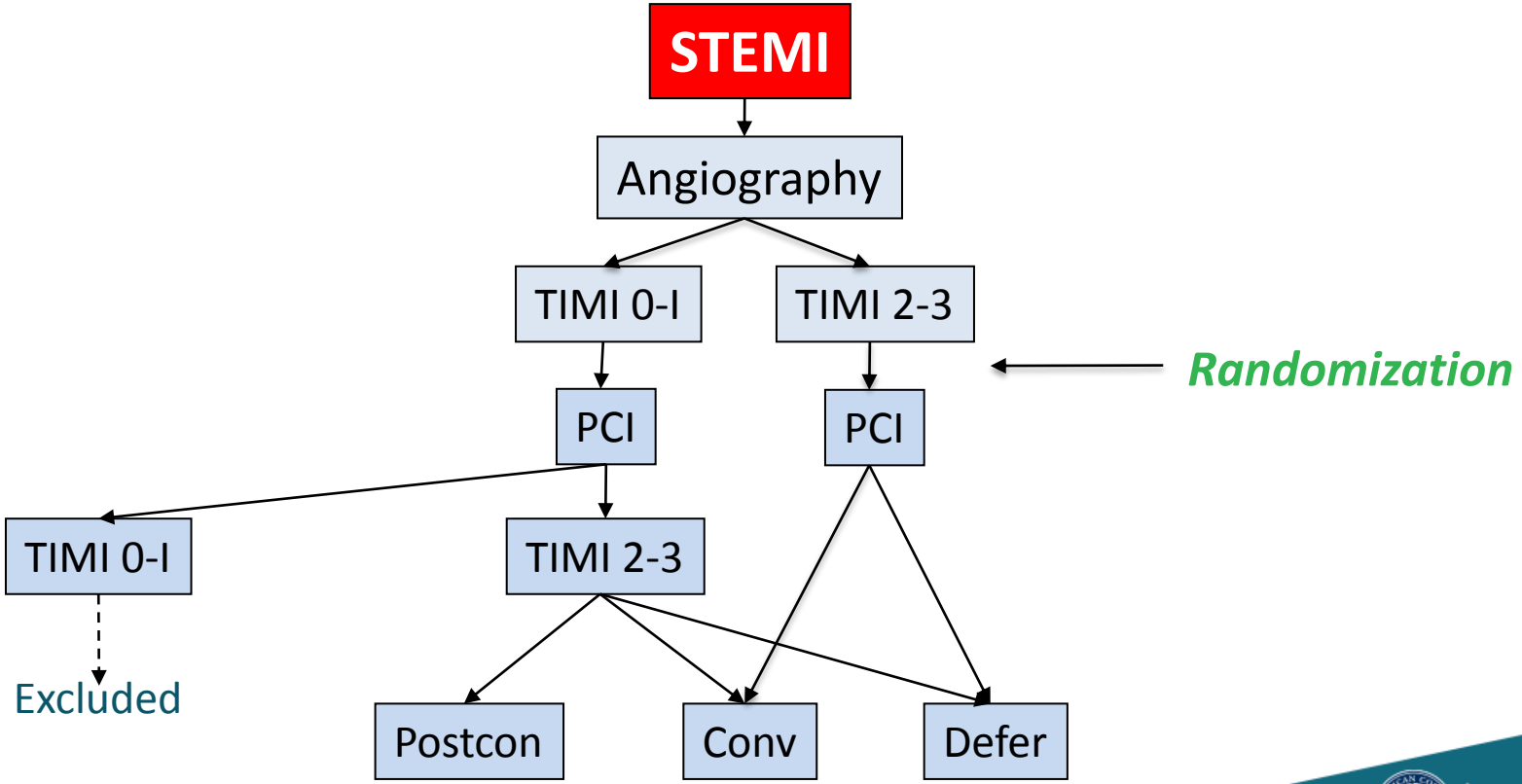
Inclusion criteria:

- chest pain of <12 hours' duration
- ST-segment elevation > 0·1 mV in at least 2 contiguous leads

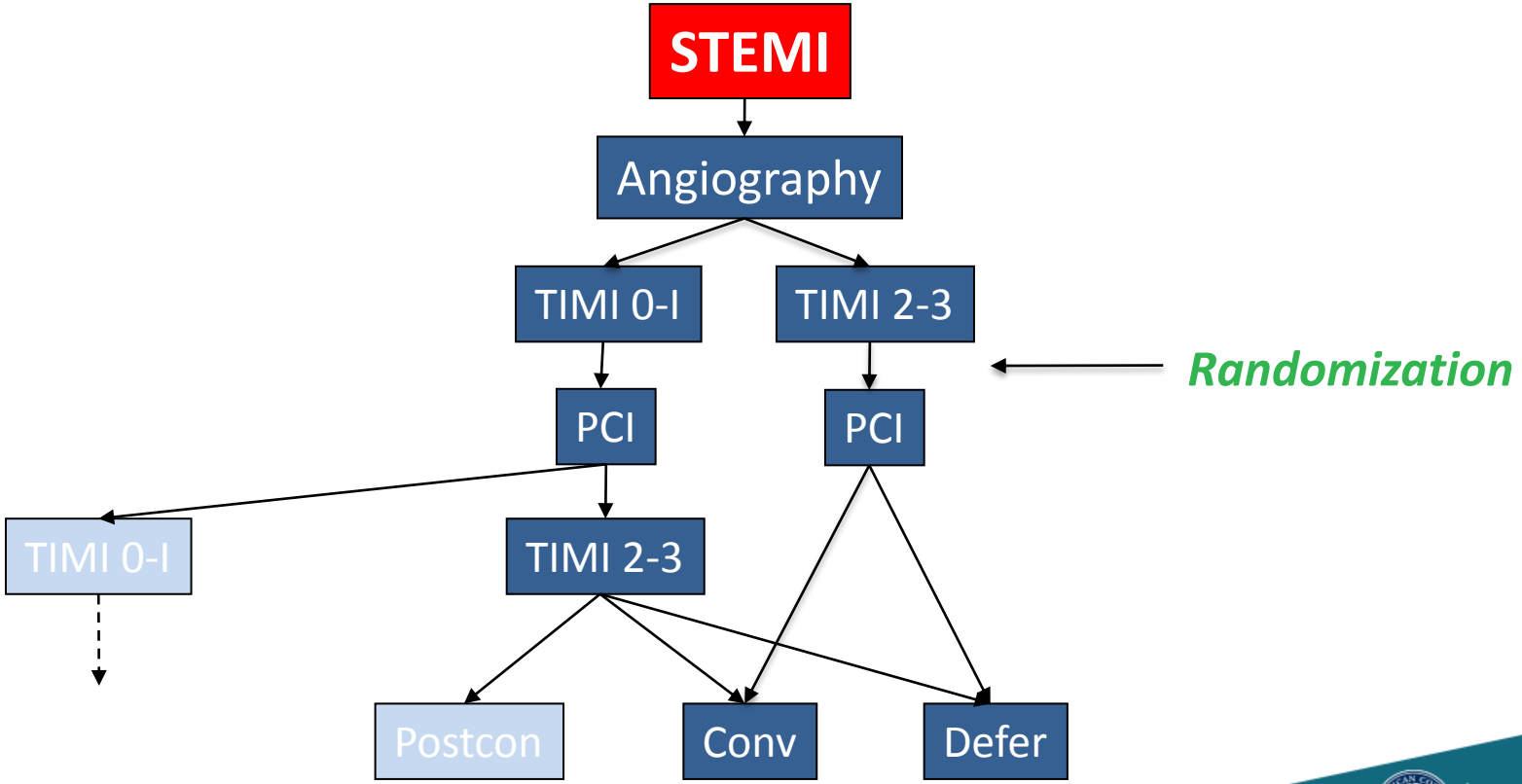
Exclusion criteria

- Known intolerance of contrast media, anticoagulant or DAPT
- unconsciousness or cardiogenic shock
- stent thrombosis
- indication for acute CABG
- increased bleeding risk

Flow Chart DANAMI-3



Flow Chart DANAMI-3



Primary endpoint

A composite of

- All cause mortality
- Hospitalization for heart failure
- Re-infarction
- Target vessel revascularization

Methods

DEFER:

- Minimal acute manipulation to restore stable flow in IRA
- Stent implantation 48 hours later

Conventional PCI:

- Immediate stent implantation

Follow up

- 1207 patients (99.3%) - 8 patients emigrated
- Median FU 42 months (IQR 33-49 months)

Baseline characteristics

	Conventional (n = 612)	DEFER (n = 603)
Median age, years	62	61
Men	74%	76%
Medical history		
Diabetes	9%	9%
Hypertension	41%	41%
Smoking	51%	54%
Previous myocardial infarction	7%	6%
Infarct location		
Anterior	47%	42%
Inferior	48%	53%
Posterior	4%	5%
Left bundle branch block	<1%	<1%
Symptom onset to intervention, min*	168	168
Multi-vessel disease	39%	41%

* Median (IQR)

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Procedural data

	Conventional (n = 612)	DEFER (n = 603)
Median stent diameter (mm)	3·5	3·5
Median stent length (mm)	22	18 *
No stenting	3%	15%*
Use of GP-inhibitor or Bivalirudin	92%	93%
Thrombus aspiration	58%	63%
TIMI flow before PCI**		
0 - 1	38%	38%
2 - 3	62%	62%
TIMI flow after PCI**		
0 - 1	1·0%	1.0%
2 - 3	99%	99%

* P < 0.001 ** self-reported

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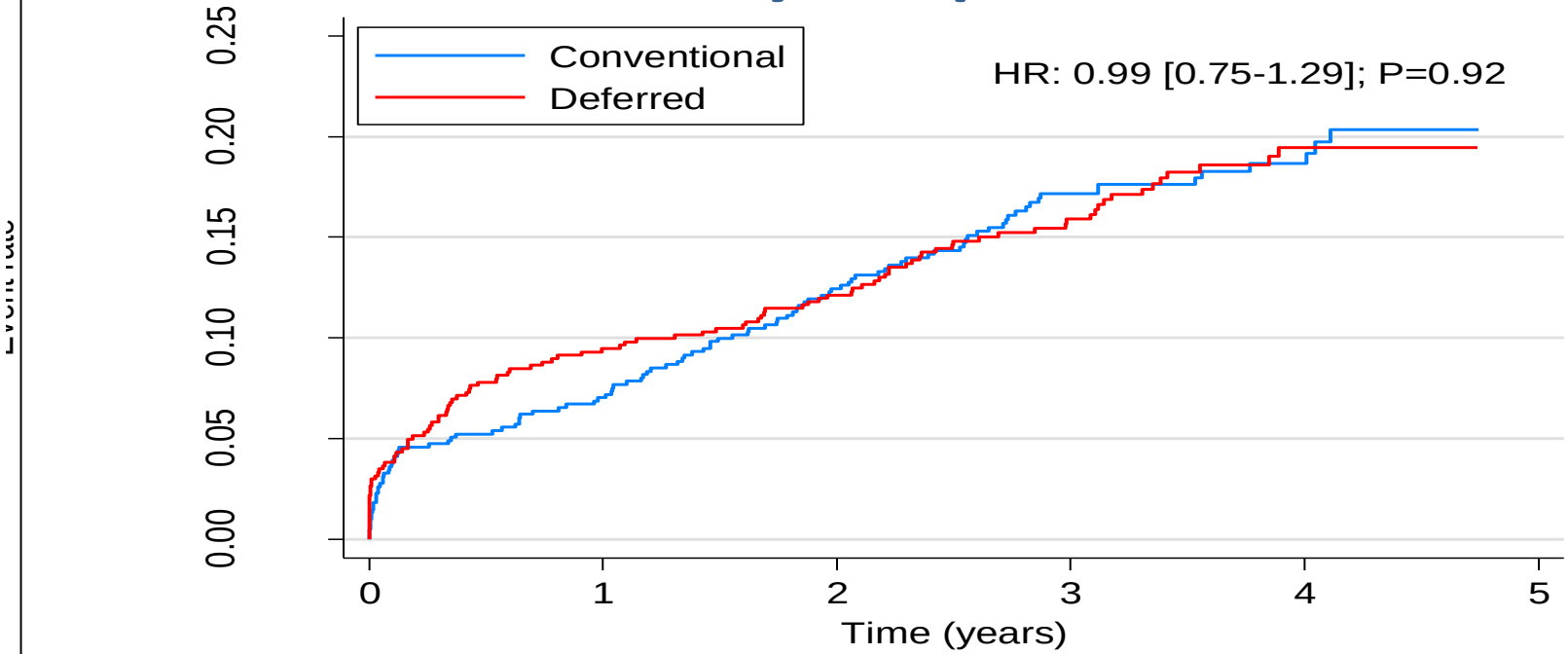
Clinical status at discharge

	Conventional (n = 612)	DEFER (n = 603)
Killip Class II - IV at any time	7%	7%
Median LVEF	50%	50%
Medical treatment at discharge		
Antiplatelet drug		
Aspirin	98%	98%
Clopidogrel /Prasugrel/Ticagrelor	99%	99%
Statin	98%	98%
Betablocker	90%	92%
ACE inhibitor or ARB	44%	41%

Primary endpoint



Number at risk

Conventional	612	568	533	360	159	0
Deferred	603	543	526	359	156	0

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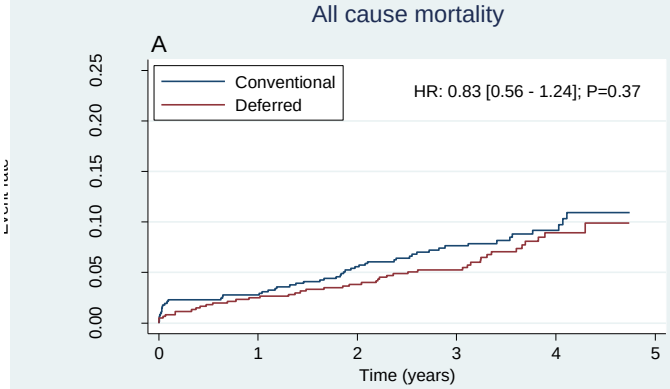
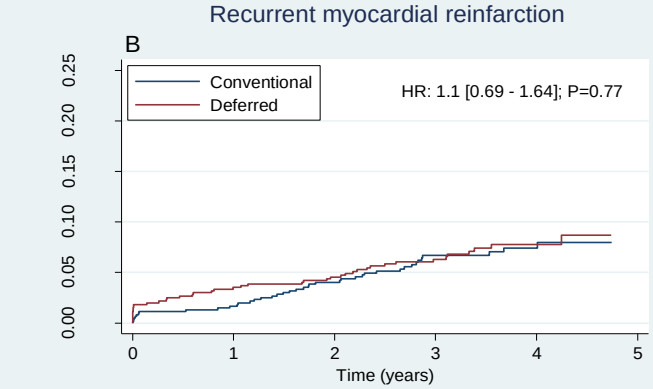
Components of the primary endpoint



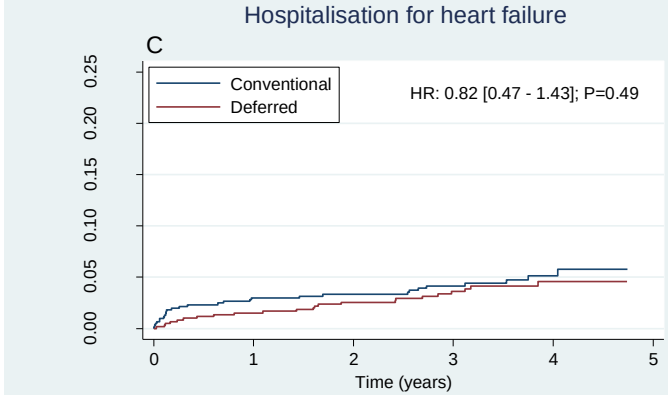
Number at risk

Conventional	612	594	575	403	173	0
Deferred	603	584	575	409	180	0



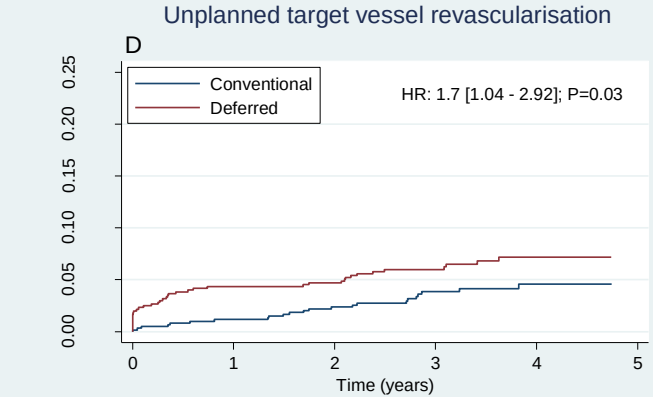
Number at risk

Conventional	612	586	554	379	165	0
Deferred	603	564	550	383	167	0



Number at risk

Conventional	612	580	560	391	167	0
Deferred	603	576	563	395	172	0



Number at risk

Conventional	612	587	561	387	170	0
Deferred	603	559	549	382	167	0

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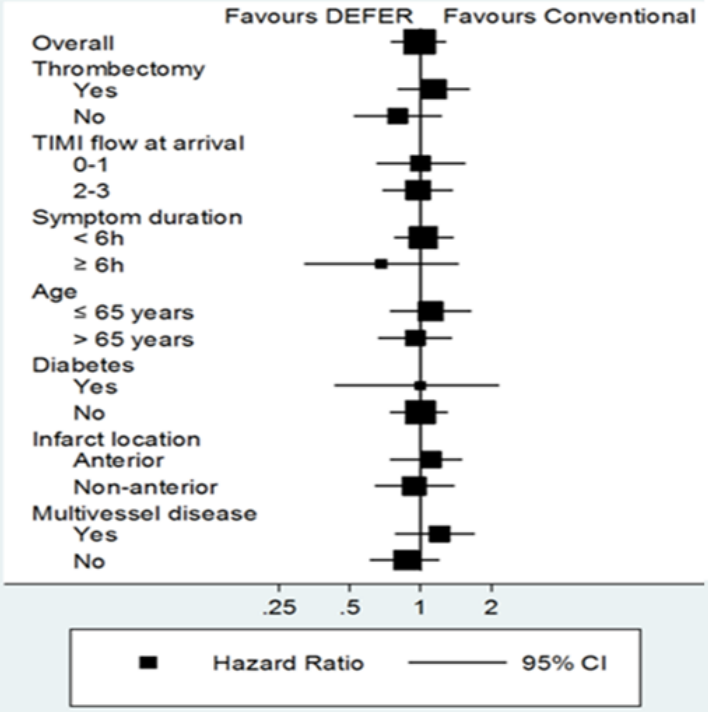
Subgroup analysis



	Hazard ratio (95% CI)	$P_{interaction}$
Overall	0·99 (0·75 – 1·29)	
Thrombectomy		
Yes	1·14 (0·80 – 1·62)	0·20
No	0·80 (0·52 – 1·23)	
TIMI flow at arrival		
0-1	1.00 (0·65 - 1·55)	0.90
2-3	0·98 (0·69 – 1·37)	
Symptom duration		
< 6h	1·03 (0·77 - 1·39)	0.30
≥ 6h	0·68 (0·32 - 1·46)	
Age		
≤ 65 years	1·10 (0·74 - 1·64)	0·60
> 65 years	0·95 (0·66 - 1·36)	
Diabetes		
Yes	0·97 (0·43 - 2·15)	0·96
No	0·99 (0·74 - 1·31)	
Infarct location		
Anterior	1·07 (0·74 - 1·55)	0·64
Non-anterior	0·94 (0·64 - 1·38)	
Multivessel disease		
Yes	1·16 (0·78 - 1·74)	0·30
No	0·87 (0·61 - 1·25)	

Secondary endpoint

Left ventricular ejection fraction (LVEF) at 18 months			
	Conventional	DEFER	P
Median LVEF	57%	60%	0·04
No of patients with LVEF ≤45%	18%	13%	0·05

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Complications

Procedure-related MI, bleeding *, contrast-induced nephropathy or stroke occurred in

28 (5%) patients in the conventional group and

27 (5%) in the DEFER group

* Requiring blood transfusion or surgical intervention

Conclusion I

Deferred stent implantation in patients with STEMI did not reduce the risk of death, heart failure, or reinfarction compared with standard immediate stent implantation

Conclusion II

Routine deferred stenting was associated with an increased rate of target vessel revascularisation, mainly due to premature stent implantation

Conclusion III

Left ventricular function is slightly better after deferred stent implantation

Questions raised

- Why did DEFER not improve prognosis ?
- If acute TVR's can be avoided, is there an indication for DEFER ?
- Will Δ LVEF in DEFER patients translate into less heart failure / improved survival ?

The study will be published ….

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Articles
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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 Eik Høfsten, Lars Køber, Steffen Helqvist, Lene Kløvgaard, Lene Holmvang, Erik Jørgensen, Frants Pedersen, Kari Saunamäki, Ole De Backer, Lia E Bang, Klaus F Kofoed, Jacob Lønborg, Kiril Ahtarovski, Niels Vejlstrup, Hans E Bøtker, Christian J Terkelsen, Evald H Christiansen, Jan Ravkilde, Hans-Henrik Tilsted, Anton B Villadsen, Jens Aarøe, Svend E Jensen, Bent Raungaard, Lisette O Jensen, Peter Clemmensen, Peer Grande, Jan K Madsen, Christian Torp-Pedersen, Thomas Engstrøm

Summary

Background Despite successful treatment of the culprit artery lesion by primary percutaneous coronary intervention (PCI) with stent implantation, thrombotic embolisation occurs in some cases, which impairs the prognosis of patients with ST-segment elevation myocardial infarction (STEMI). We aimed to assess the clinical outcomes of deferred stent implantation versus standard PCI in patients with STEMI.

Methods We did this open-label, randomised controlled trial at four primary PCI centres in Denmark. Eligible patients (aged >18 years) had acute onset symptoms lasting 12 h or less, and ST-segment elevation of 0·1 mV or more in at least two or more contiguous electrocardiographic leads or newly developed left bundle branch block. Patients were

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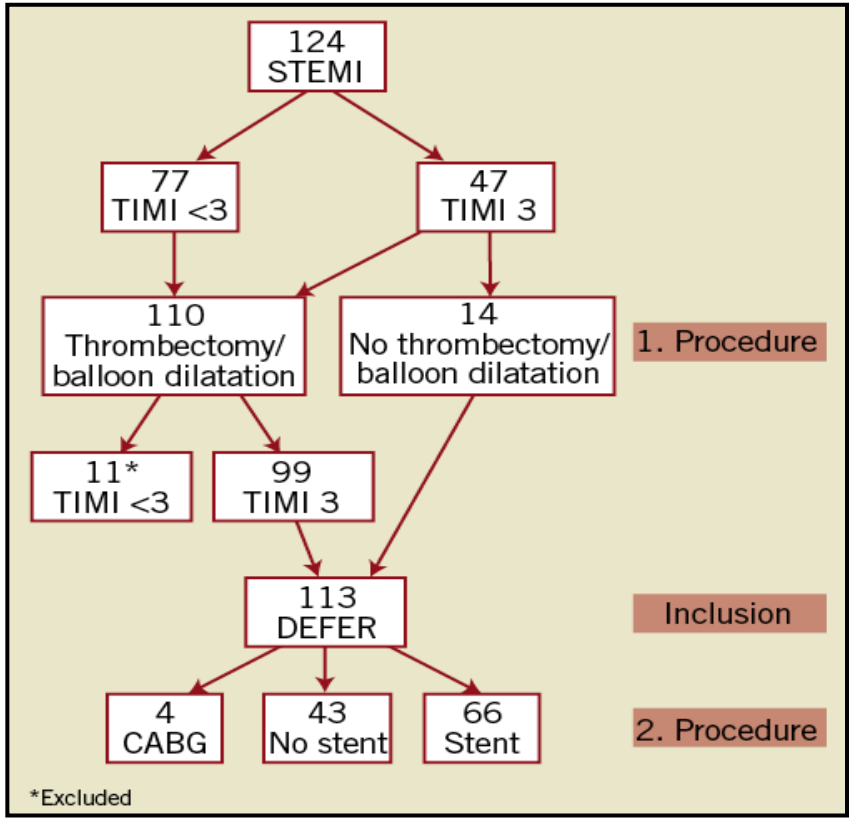
Flow chart



EuroIntervention 2013;8:1126-1133

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Angiographic findings

	Index		Day 3		3 months
	Pre	Post	Pre	Post	
	n=113		n=110		n=13
Diameter stenosis, %	95 (10.2)	58 (20.9)	49 (21.6)	16 (22.6)	28 (17.0)
Thrombus score	4.4	2.5	1.4	–	0
TIMI flow 3, % of patients	42	100	100	100	100

Mean values (SD); TIMI: Thrombolysis In Myocardial Infarction

EuroIntervention 2013;8:1126-1133

CMR after deferred stent implantation

	N=32
Final infarct size, g	11.2 (10.2)
Area at risk, g	48.8 (22.2)
LV mass, g	170.0 (40.8)
LVEF baseline, %	54.2 (9.4)
LVEF 3 months, %	64.9 (7.7)*
Final infarct size / area at risk, %	20.9 (16.6)
Final infarct size / LV mass, %	6.3 (5.2)
Myocardial salvage index	0.79 (0.17)

Mean values (SD); LV: left ventricular; EF: ejection fraction; *p <0.05 compared with LVEF baseline

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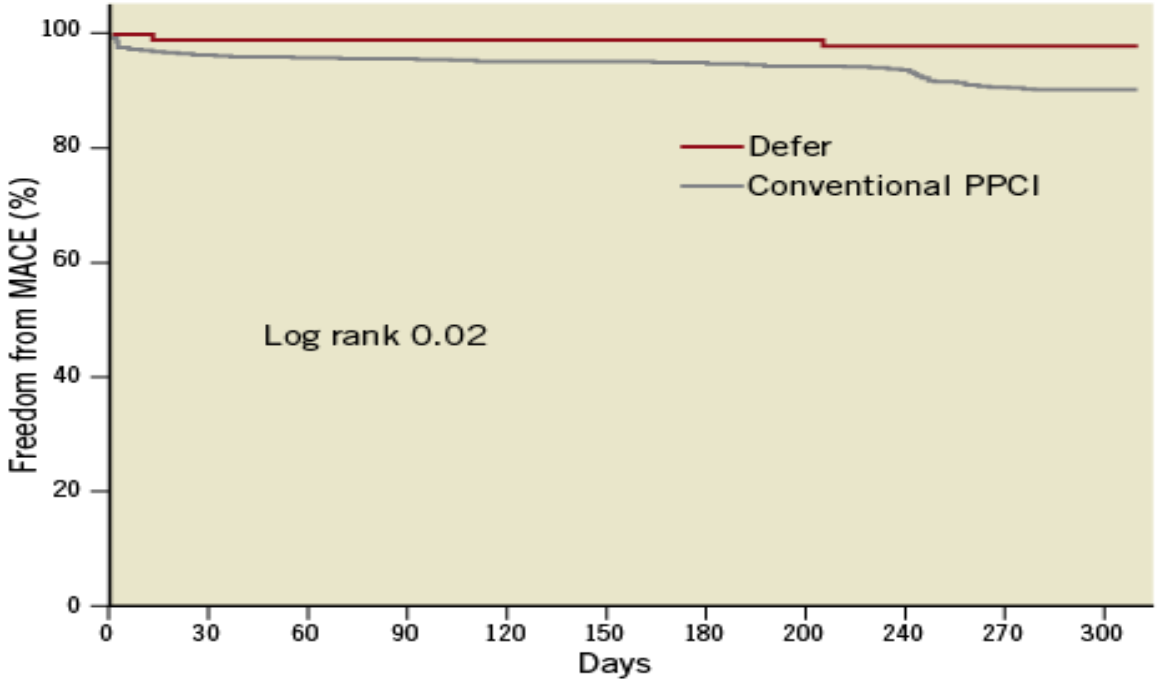
MACE-free survival



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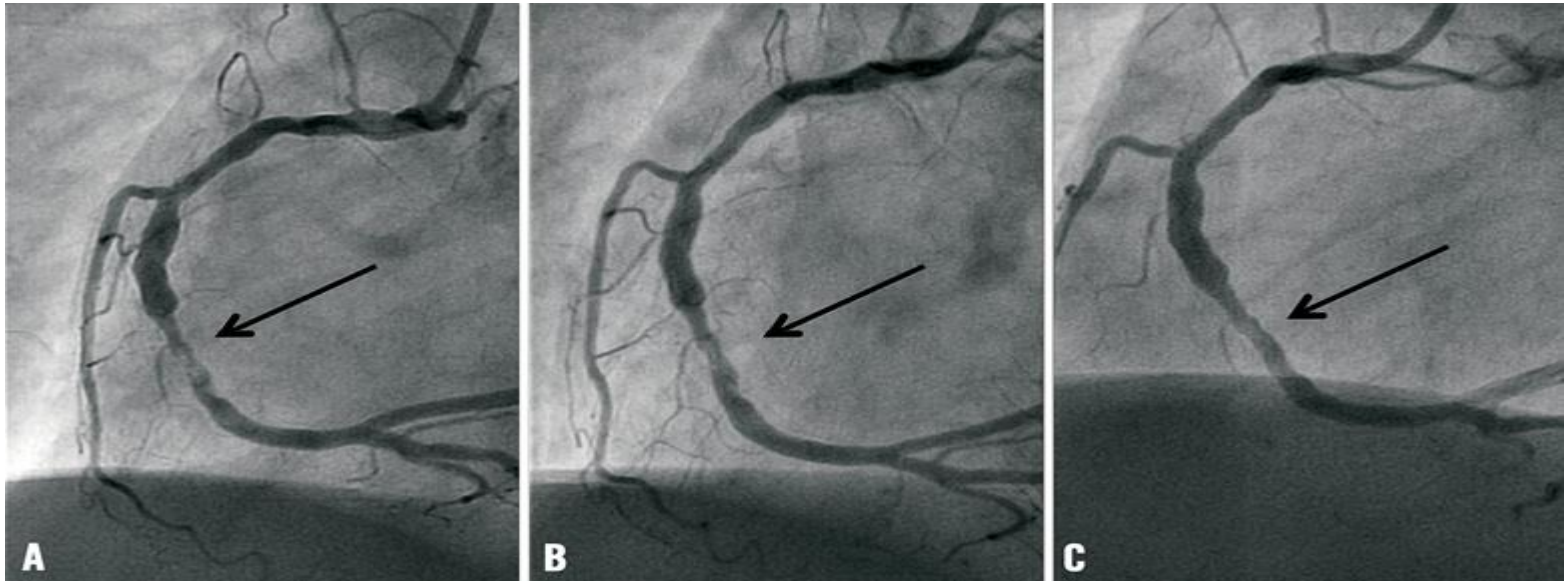
Inferior STEMI with complete ST-resolution

Baseline | *3 days later* | *3 months later*



LVEF 40% | LVEF 45% | LVEF 60%

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