

Periprocedural complications of PCI in acute MI patients

- acute stent thrombosis

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Disclosures:

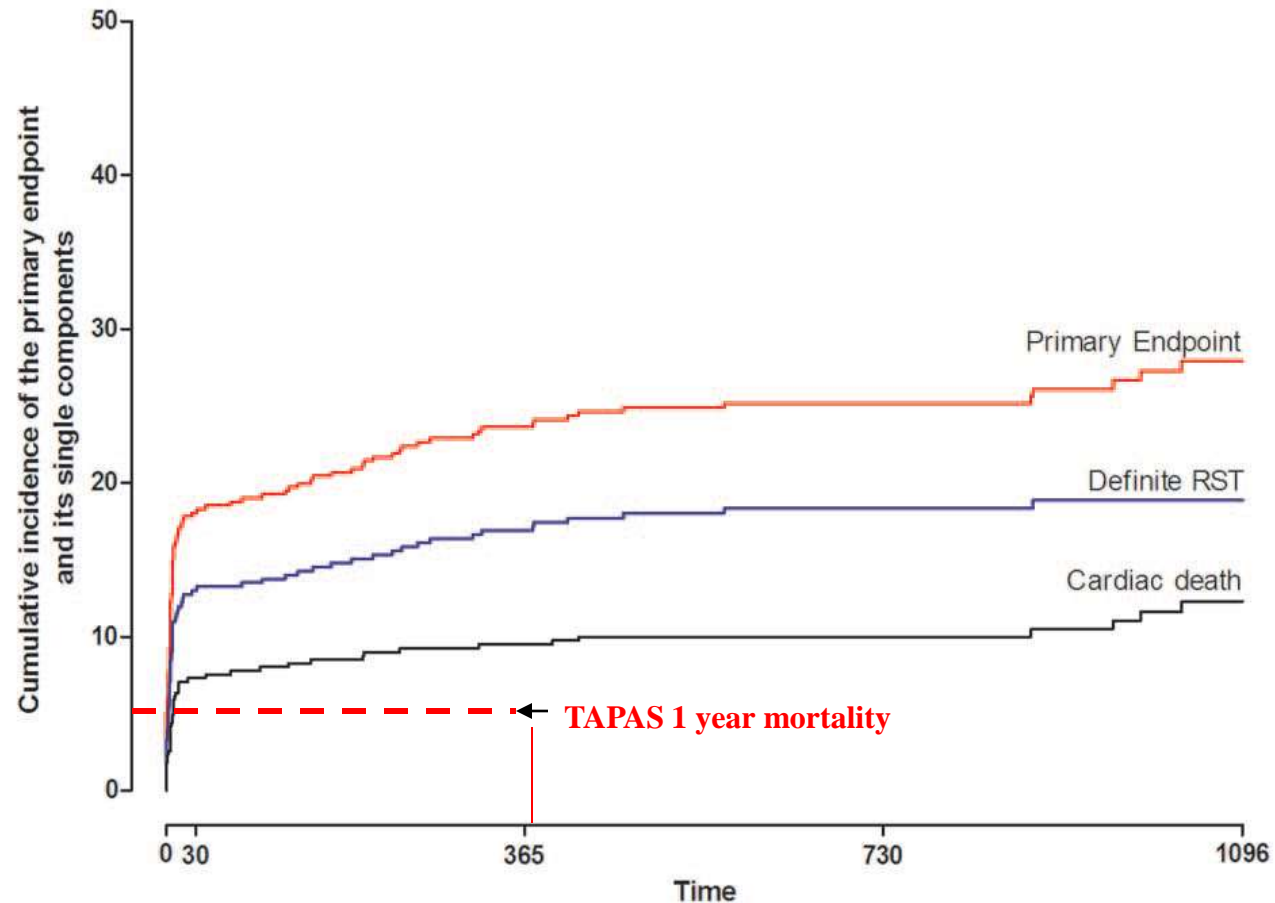
Lecture fees: AstraZeneca, Pfizer, Sanofi-Aventis, Eli Lilly, Daichii Sankyo

Advisory board member: Eli Lilly, AstraZeneca

Long-Term Clinical Outcome After a First Angiographically Confirmed Coronary Stent Thrombosis

An Analysis of 431 Cases

A Primary Endpoint and its components



No. at risk				
Primary EP	431	309	212	95
Definite RST	431	309	212	95
CV death	431	363	248	113

For comparison, 1 year cardiac mortality

TAPAS: 5.1%

HORIZONS: 3.0%

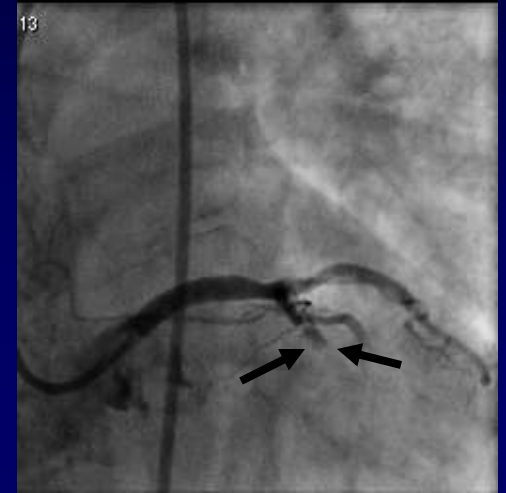
Incidence of acute stent thrombosis after primary PCI

TAPAS: 0.2%

HORIZONS: 0.9%

DEDICATION: 0.2%

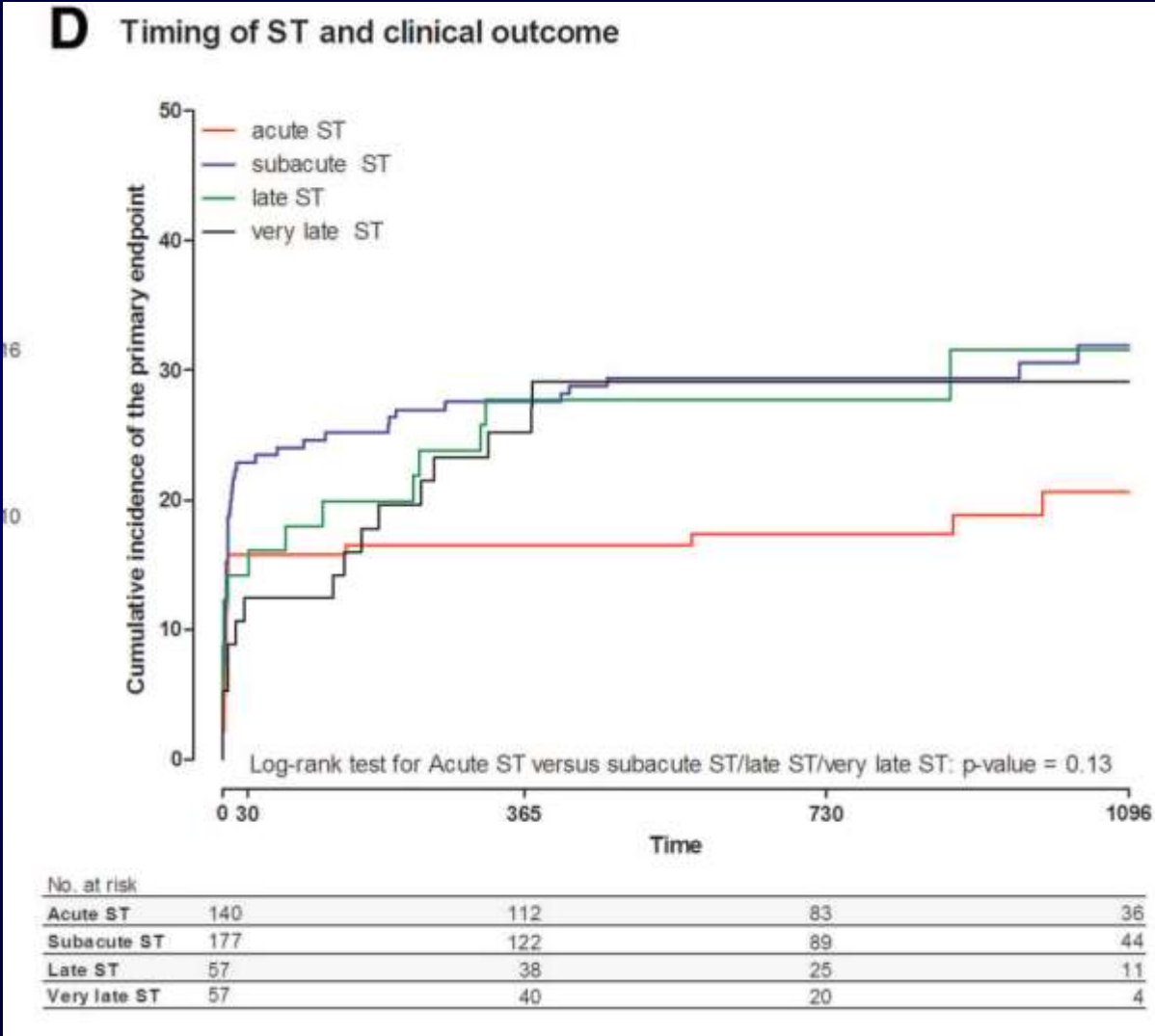
TRITON-TIMI38 (STEMI): 0.2%



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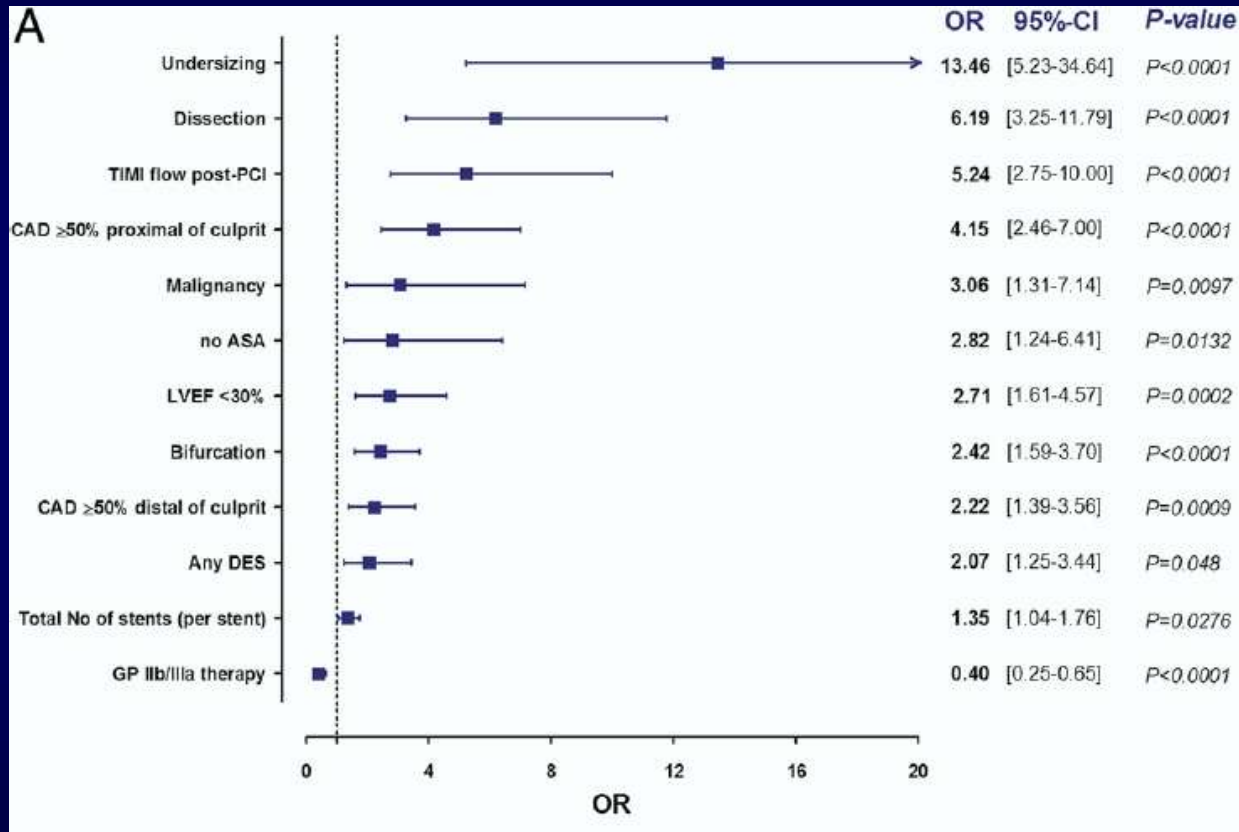
Acute ST: < 24 h after index procedure



Predictors of Coronary Stent Thrombosis

The Dutch Stent Thrombosis Registry

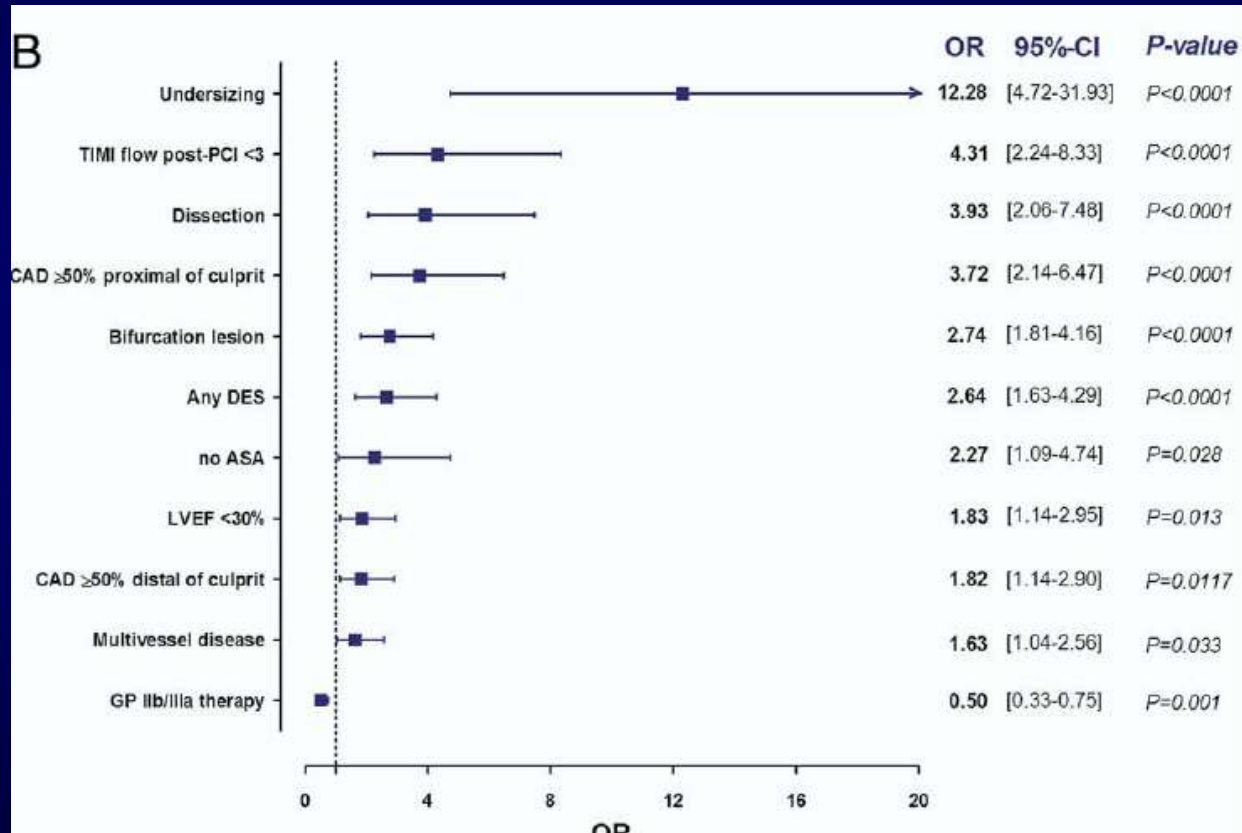
Risk factors for acute and early stent thrombosis



Predictors of Coronary Stent Thrombosis

The Dutch Stent Thrombosis Registry

Risk factors for stent thrombosis in patients with ACS



The impact of procedure related variables

Choice of stent type ?

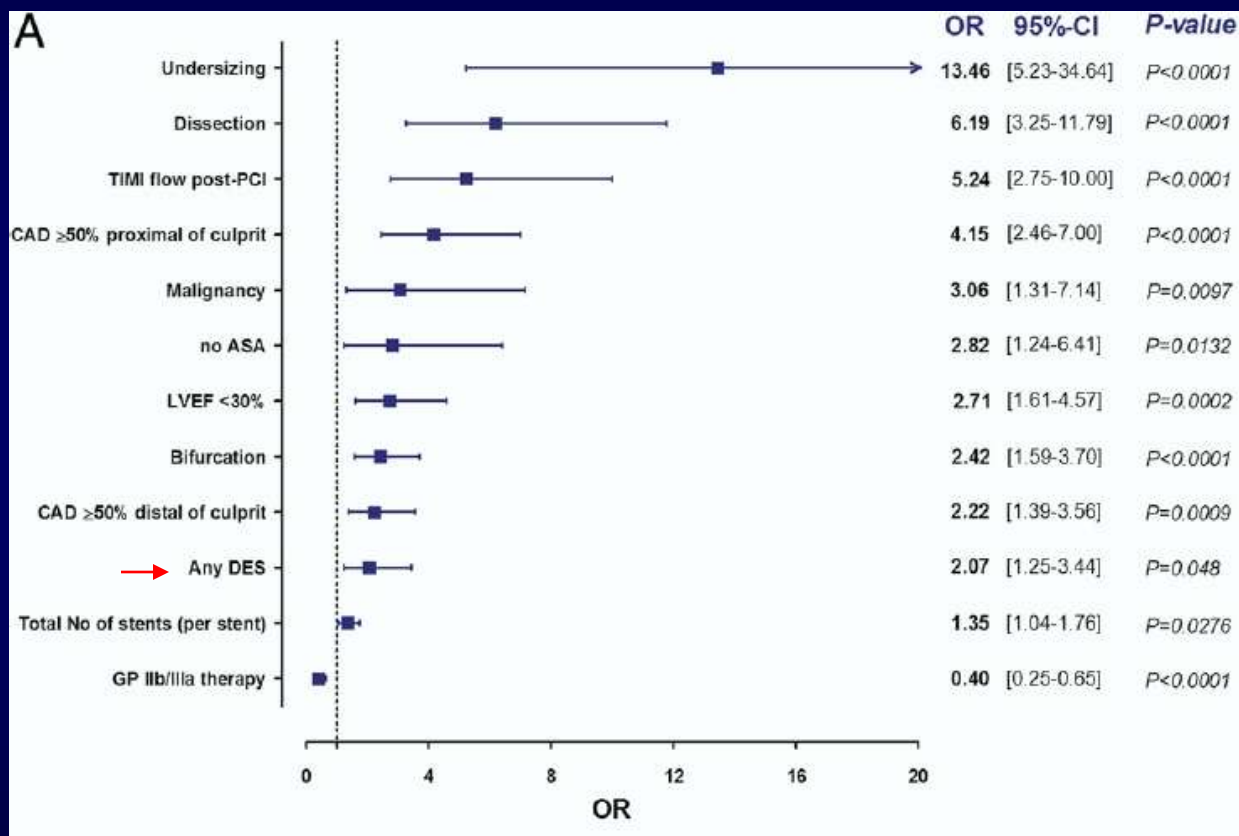
Thrombectomy/distal protection ?

IVUS guidance ?

Predictors of Coronary Stent Thrombosis

The Dutch Stent Thrombosis Registry

Risk factors for acute and early stent thrombosis



Drug-eluting stents in acute myocardial infarction: updated meta-analysis of randomized trials

Alban Dibra · Klaus Tiroch · Stefanie Schulz · Henning Kelbæk · Christian Spaulding · Gerrit J. Laarman · Marco Valgimigli · Emilio Di Lorenzo · Christoph Kaiser · Ilkka Tierala · Julinda Mehilli · Gianluca Campo · Leif Thuesen · Maarten A. Vink · Martin J. Schalij · Roberto Violini · Albert Schömig · Adnan Kastrati

Clin Res Cardiol (2010) 99:345–357
DOI 10.1007/s00392-010-0133-y

REVIEW

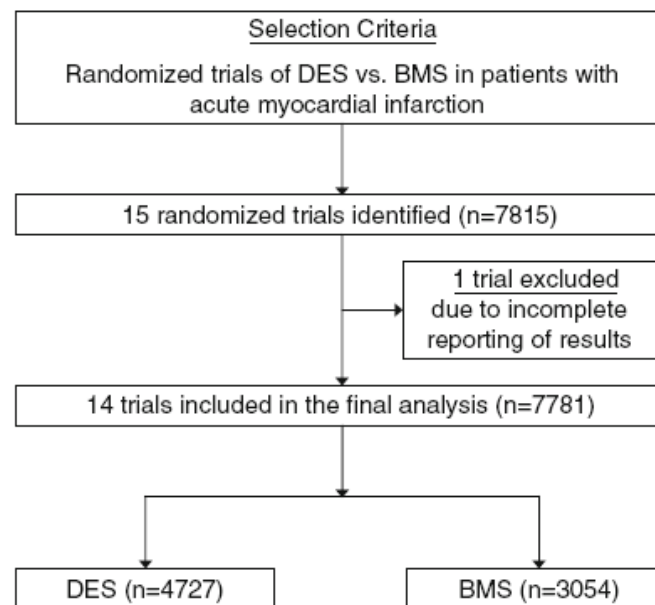
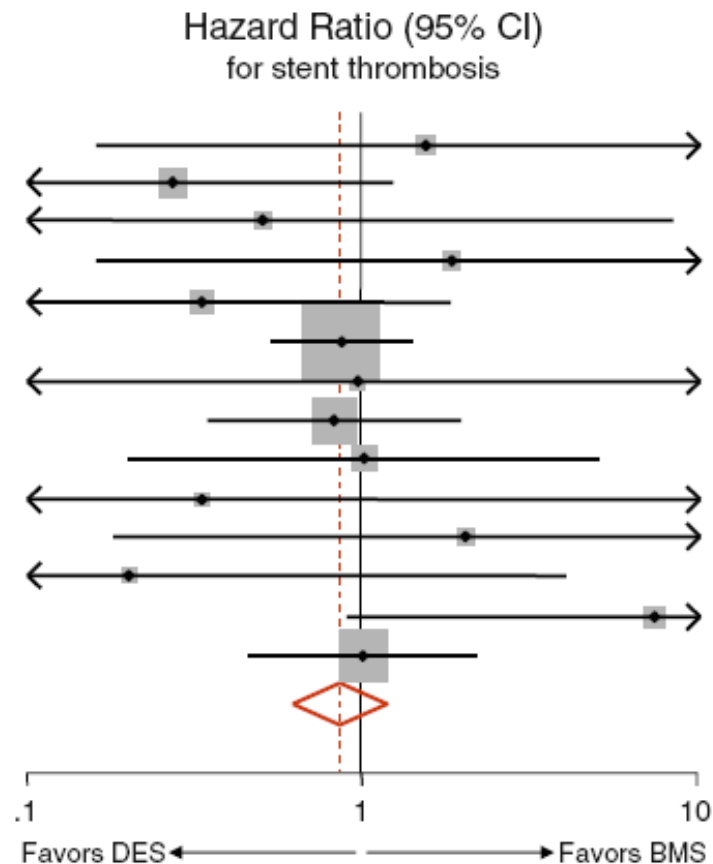


Fig. 1 Flowchart of included studies. *DES* drug-eluting stent, *BMS* bare-metal stent

Stent thrombosis

Source	No. of Patients		Hazard Ratio (95%CI)
	DES Group	BMS Group	
BASKET-AMI	142	74	1.53 (0.16-14.81)
DEDICATION	313	313	0.27 (0.06-1.23)
Di Lorenzo	180	90	0.50 (0.03-8.04)
Diaz de la Llera	60	54	1.83 (0.16-20.74)
HAAMU-STENT	82	82	0.33 (0.06-1.78)
HORIZONS-AMI	2257	749	0.86 (0.53-1.41)
MISSION	158	152	0.96 (0.06-15.52)
MULTI-STRATEGY	372	372	0.81 (0.34-1.93)
PASSION	310	309	1.00 (0.20-4.91)
SELECTION	40	40	0.33 (0.01-8.22)
SESAMI	160	160	2.01 (0.18-22.37)
STRATEGY	87	88	0.20 (0.01-4.15)
TITAX AMI	211	214	7.31 (0.89-59.93)
TYPHOON	355	357	0.92 (0.42-2.02)
OVERALL	4727	3054	0.84 (0.61-1.17)

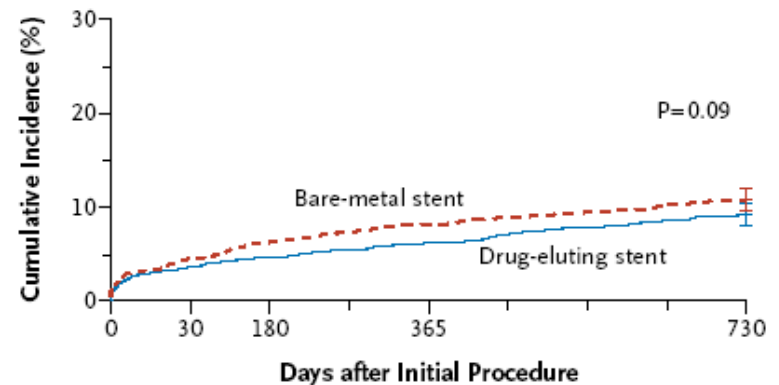
Test for Heterogeneity $P=0.70$
 Test for Inconsistency $I^2 = 0.0\%$
 Test for Overall Effect $z = 1.03$ ($P=0.30$)



Drug-Eluting or Bare-Metal Stents for Acute Myocardial Infarction

Laura Mauri, M.D., M.Sc., Treacy S. Silbaugh, B.Sc., Pallav Garg, M.B., B.S., M.Sc.
Robert E. Wolf, M.S., Katya Zelevinsky, B.A., Ann Lovett, R.N., M.A.,
Manu R. Varma, B.S., Zheng Zhou, M.D., Ph.D., and Sharon-Lise T. Normand, Ph.D

B Recurrent Myocardial Infarction



Drug-Eluting Stent

No. at risk	2570	2544	2429	2324	2243
Cumulative no. of events	26	69	117	155	227
Cumulative incidence (%)	1.0	2.7	4.7	6.2	9.3

Bare-Metal Stent

No. at risk	2570	2541	2394	2260	2167
Cumulative no. of events	29	77	155	202	263
Cumulative incidence (%)	1.1	3.0	6.2	8.2	10.8

Clinical impact of thrombectomy in acute ST-elevation myocardial infarction: an individual patient-data pooled analysis of 11 trials

Francesco Burzotta^{1*}, Maria De Vita^{1†}, Youlan L. Gu², Takaaki Isshiki³, Thierry Lefèvre⁴, Anne Kaltoft⁵, Dariusz Dudek⁶, Gennaro Sardella⁷, Pedro Silva Orrego⁸, David Antoniucci⁹, Leonardo Di Mario¹⁰, Giuseppe G.L. Biondi-Zoccai¹¹, Filippo Crea¹, and Francesco

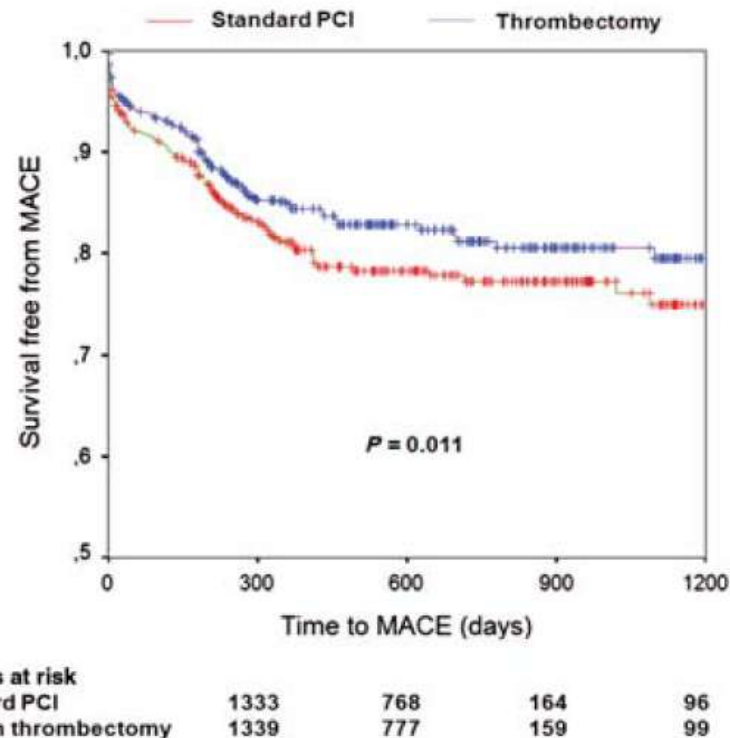


Figure 4 Kaplan–Meier curves for MACE-free survival; log-rank $P = 0.011$.

Increased Rate of Stent Thrombosis and Target Lesion Revascularization After Filter Protection in Primary Percutaneous Coronary Intervention for ST-Segment Elevation Myocardial Infarction

15-Month Follow-Up of the DEDICATION (Drug Elution and Distal Protection in ST Elevation Myocardial Infarction) Trial

Anne Kaltoft, MD, PhD,* Henning Kelbæk, MD, DMSci,† Lene Kløvgaard, RN,†
Christian Juhl Terkelsen, MD, PhD,* Peter Clemmensen, MD, DMSci,†
Steffen Helqvist, MD, DMSci,† Jens Flensted Lassen, MD, PhD,* Leif Thuesen, MD, DMSci*
Skejby and Copenhagen, Denmark

Table 4 Stent Thrombosis

	Distal Protection (n = 312)	Conventional Treatment (n = 314)	p Value
Any stent thrombosis	11, 3.5 (1.5–5.6)	4, 1.3 (0.0–2.5)	0.06
Definite stent thrombosis	9, 2.9 (1.0–4.7)	1, 0.3 (0.0–0.9)	0.01
Early (<30 days) stent thrombosis	5, 1.6 (0.2–3.0)	1, 0.3 (0.0–0.9)	0.06
Late stent thrombosis (>30 days)	4, 1.3 (0.0–2.5)	0	

Impact of Intravascular Ultrasound Guidance in Patients with Acute Myocardial Infarction Undergoing Percutaneous Coronary Intervention

Gabriel Maluenda, MD, Gilles Lemesle, MD, Itsik Ben-Dor, MD, Sara D. Collins, MD, Asmir I. Syed, MD, Rebecca Torguson, MPH, Kimberly Kaneshige, BS, Zhenyi Xue, MS, William O. Suddath, MD, Lowell F. Satler, MD, Kenneth M. Kent, MD, PhD, Joseph Lindsay, MD, Augusto D. Pichard, MD, and Ron Waksman,* MD

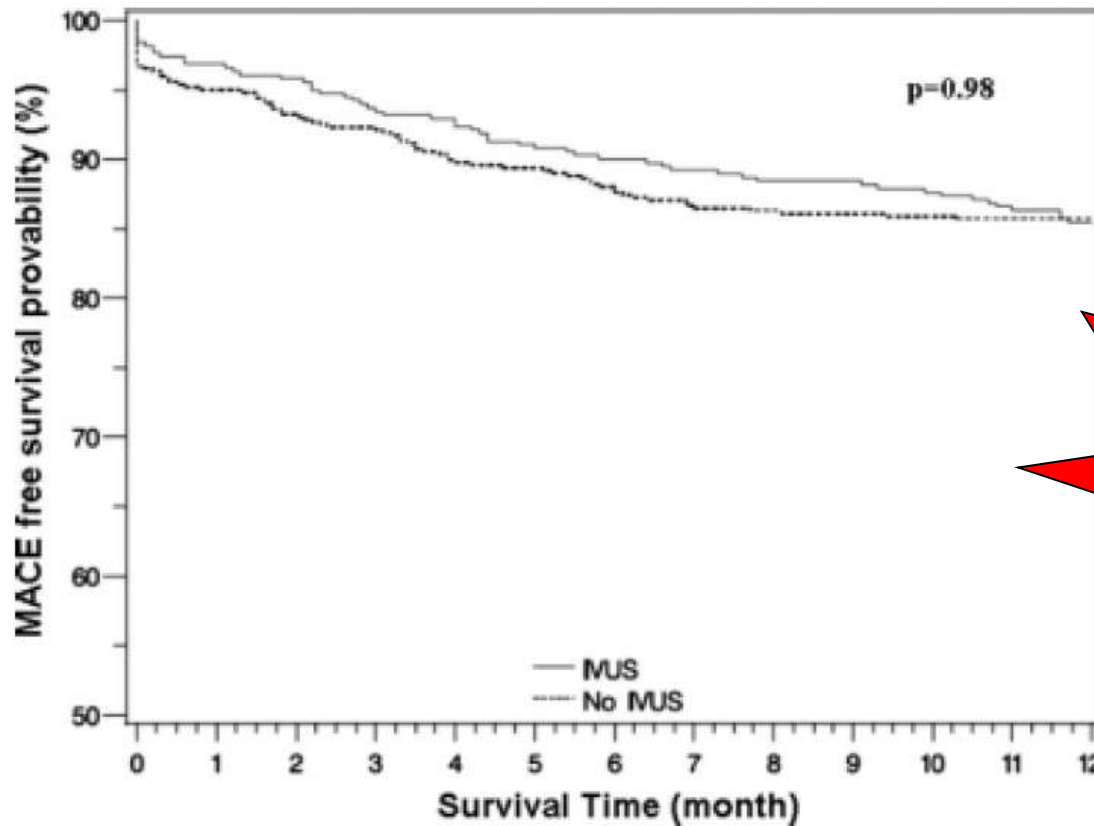


Fig. 1. Kaplan-Meier curves illustrating freedom from MACE over 12 months ($P = 0.98$).

Not randomized !

Impact of intravascular ultrasound guidance in patients with acute myocardial infarction undergoing percutaneous coronary intervention.

G Maluenda et al, Cath Cardiovasc Interv. 2009

	IVUS (n=663)	No IVUS (n=811)	P-value	
30 days				
Definite ST	0	0.8%	0.14	
Definite and probable ST	0.8%	1.1%	0.68	
1 year				
Definite ST	0	1.0%	0.08	
Definite and probable ST	2.1%	2.1%	0.99	

Not randomized !

Importance of concomitant antiplatelet/antithrombin therapy

P2Y₁₂ inhibition

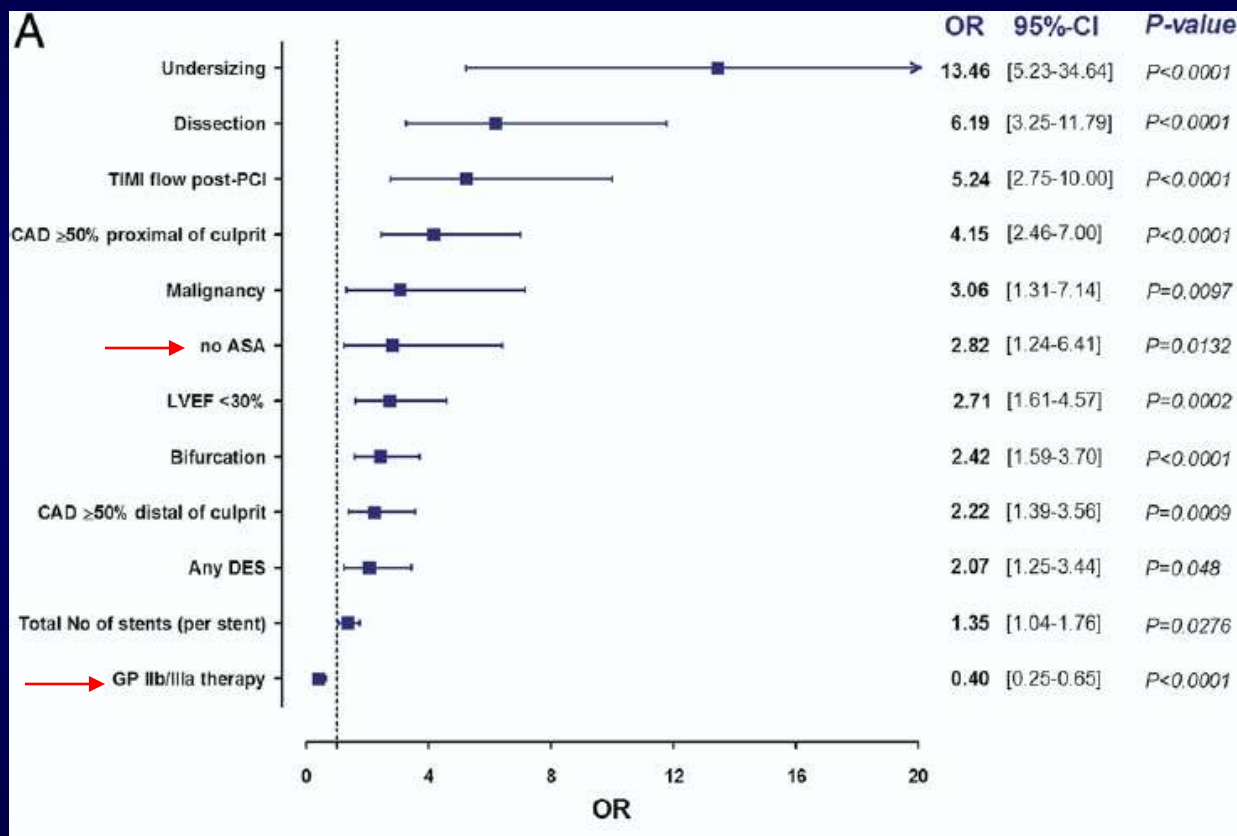
Bivalirudin

GP IIb/IIIa inhibition

Predictors of Coronary Stent Thrombosis

The Dutch Stent Thrombosis Registry

Risk factors for acute and early stent thrombosis



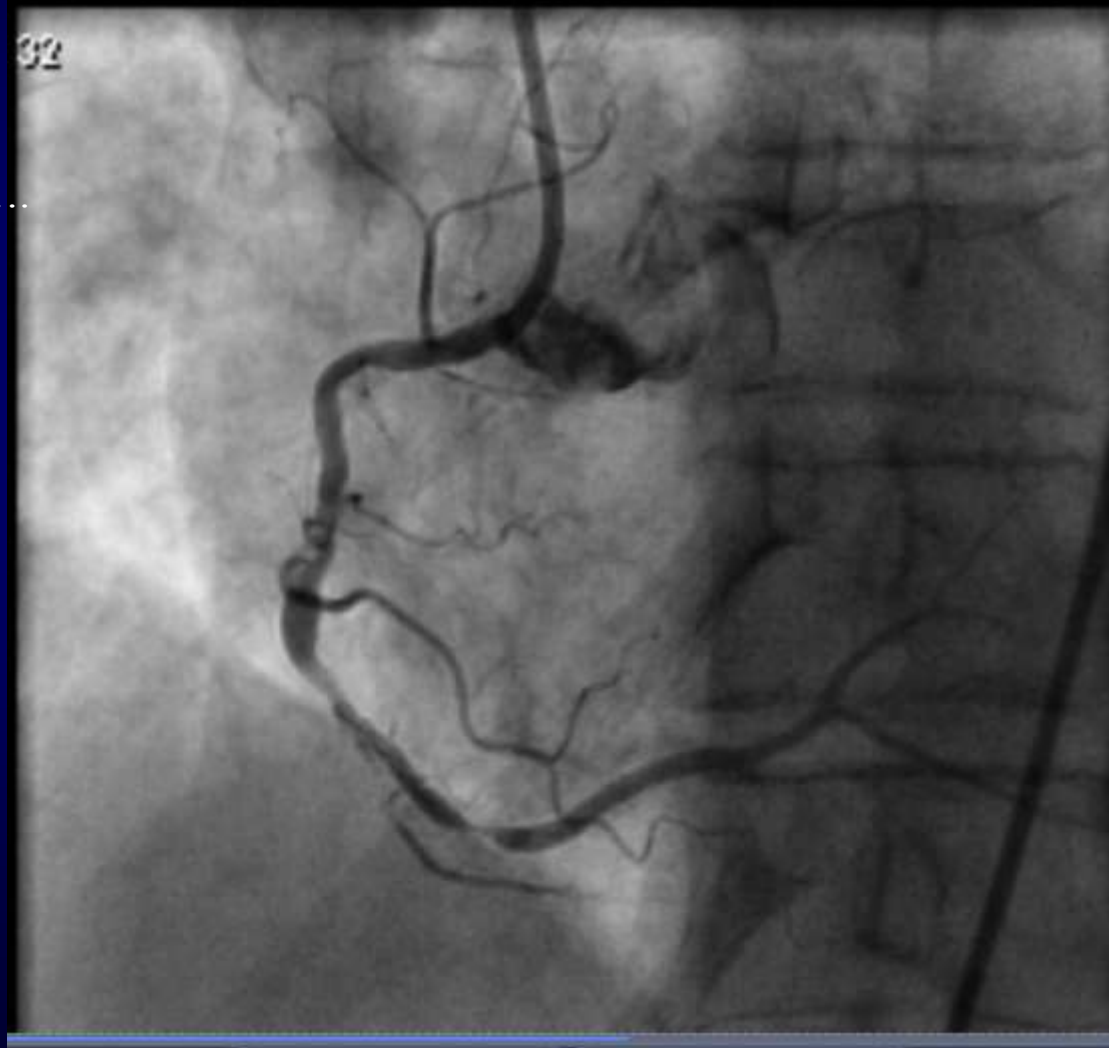
HORIZONS AMI: Effect of prerandomization heparin on incidence of acute stent thrombosis

Group	Prerandomization heparin (%)	No prerandomization heparin (%)	HR (95% CI)	p
Bivalirudin	0.9	2.6	3.07	0.006
Heparin+GP IIb/IIIa blocker	0.1	0.8	9.64	0.02

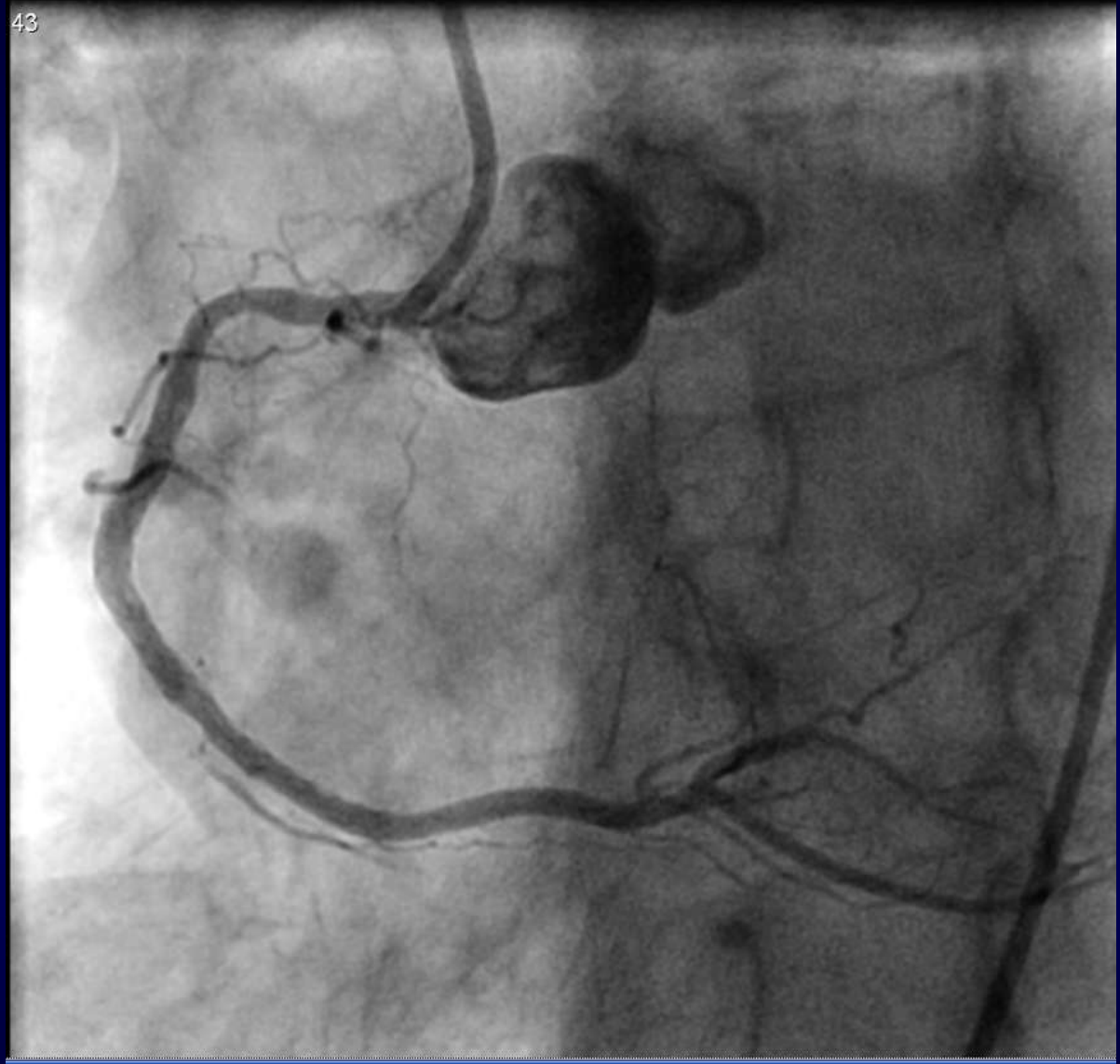
HORIZONS AMI: Independent predictors of acute stent thrombosis

Factor	HR for stent thrombosis	p
Pre-PCI TIMI flow 0-1	6.10	0.01
Lesion ulceration	4.80	0.01
Bivalirudin (vs heparin+GP IIb/IIIa)	4.65	0.005
Number of stents	1.50	0.02
Prerandomization heparin	0.27	0.002

- ❖ 63 years old female
- ❖ Hypertension, family history, previous smoker
- ❖ Arthritis for many years, frequent use of NSAID
- ❖ August 2009 inferior STEMI....
- ❖ Prehospital:
heparin, aspirin, clopidogrel (600 mg).....



PCI, thrombectomy
4x Cypher,
No GP IIb/IIIa

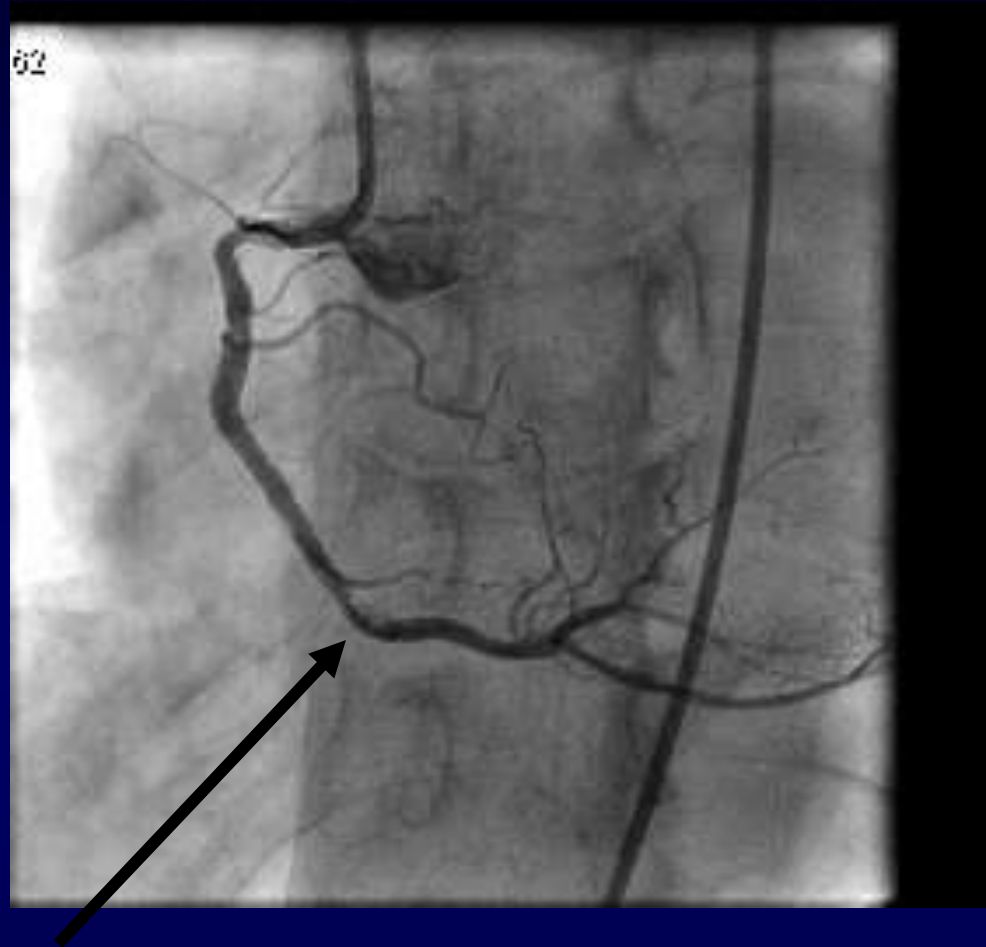


4 hours later

Chestpain and re-elevation of ST-segment in II, III and AVF

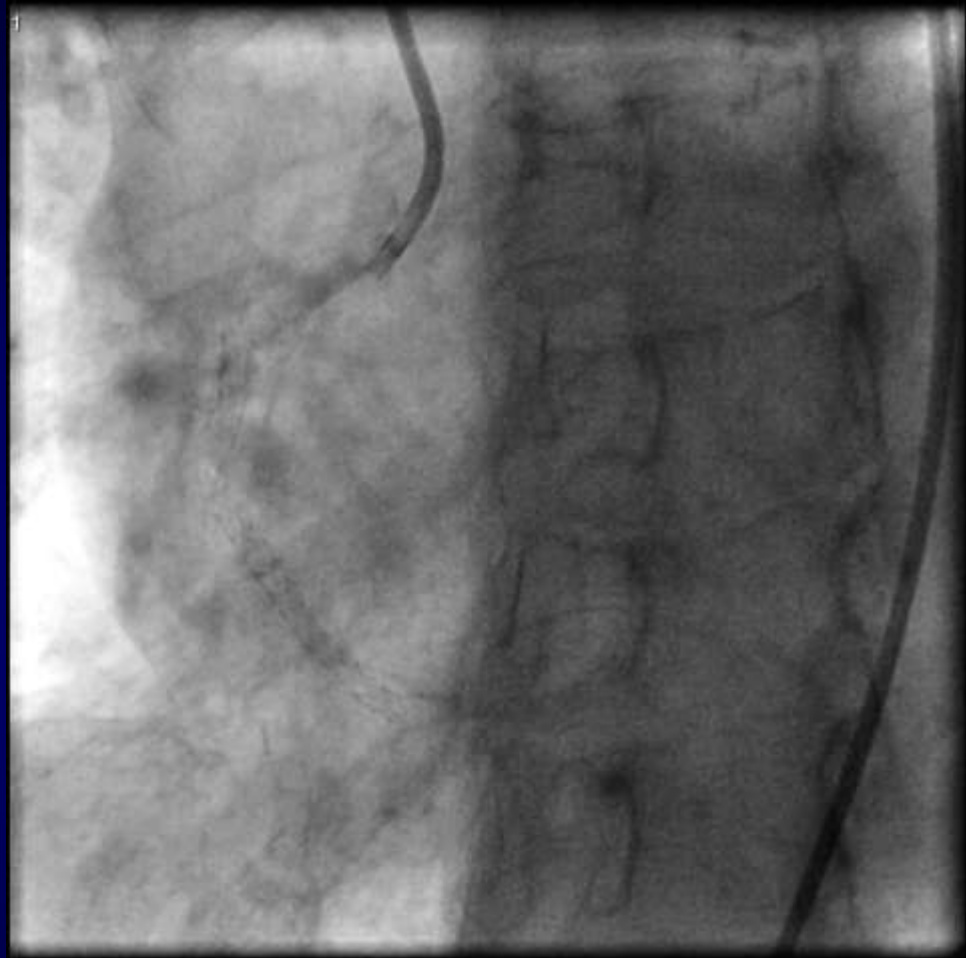
Acute re-angio....

Case 2



Stent thrombosis in RCA3

Abciximab,
thrombectomy
postdilatation,
distal Cypher
stent,

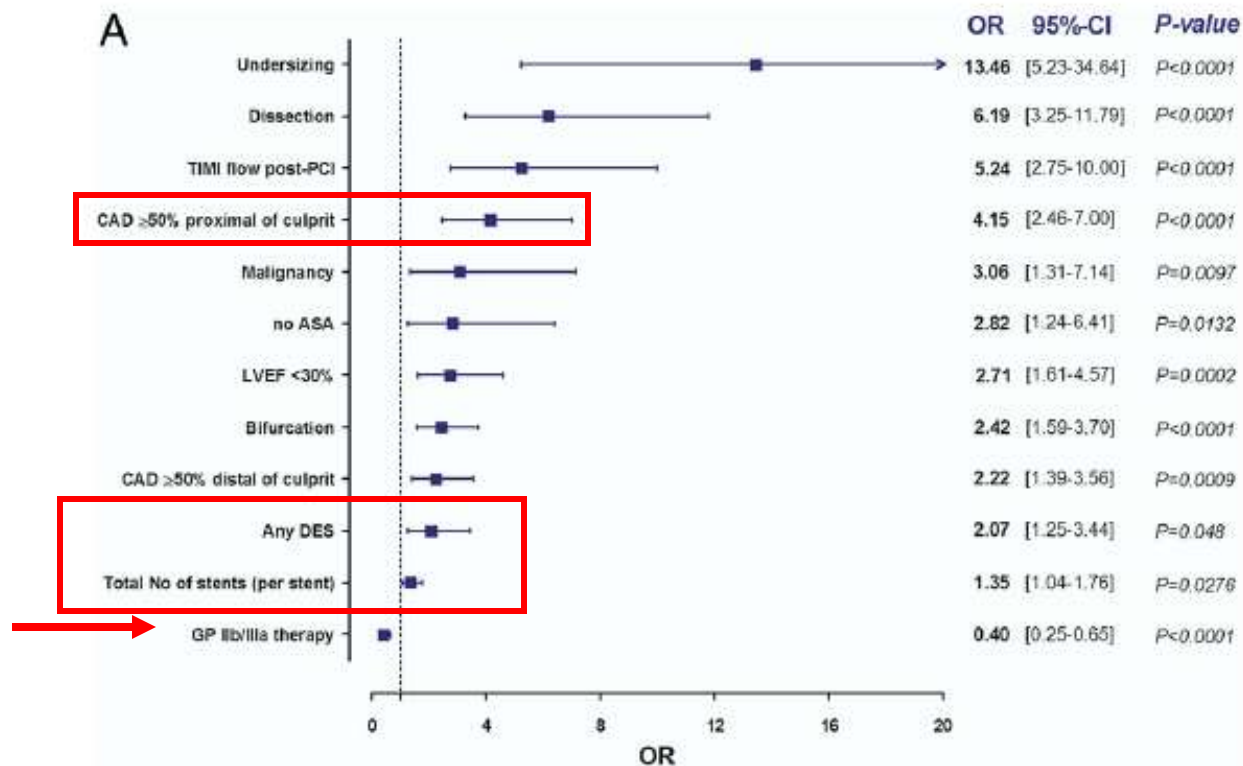


Post PCI LVEF 55%

Predictors of Coronary Stent Thrombosis

The Dutch Stent Thrombosis Registry

Risk factors for acute and early stent thrombosis



”How to prevent acute stent thrombosis in pPCI treated STEMI”

Adjunctive medical therapy

- Early clopidogrel (600 mg)

- Prasugrel

- Early heparin + (adjunctive GP IIb/IIIa or bivalirudin)

- Prolonged bivalirudin after PCI ? (Euromax)

Procedure related issues

- correct sizing (value of IVUS not fully determined)

- avoid extensive stenting in the acute setting

Most importantly.....

”Mortality and morbidity” sessions

✿ Review and learn from all cases.....

Thank you.....



ACUITY stent thrombosis substudy

Table 7. Univariate and Multivariable Predictors of ST Within 30 Days

	Univariate Predictors		Multivariable Predictors	
	Odds Ratio (95% CI)	<i>P</i>	Odds Ratio (95% CI)	<i>P</i>
Definite or probable ST (patient-level analysis)				
Insulin-requiring diabetes mellitus	2.86 (1.41–5.80)	0.004	3.48 (1.67–7.27)	0.0009
Duke jeopardy score	1.18 (1.06–1.31)	0.003	1.15 (1.03–1.29)	0.01
Preprocedural thienopyridine administration	0.49 (0.27–0.89)	0.02	0.47 (0.25–0.90)	0.02
Renal insufficiency	2.23 (1.18–4.22)	0.01	2.09 (1.07–4.07)	0.03
Definite ST (lesion-level analysis)				
Final stent MLD	0.34 (0.17–0.68)	0.003	0.32 (0.15–0.71)	0.005
Preprocedural thienopyridine administration	0.32 (0.15–0.69)	0.003	0.30 (0.13–0.72)	0.007
Extent of coronary artery disease per patient	1.01 (1.00–1.02)	0.03	1.01 (1.00–1.02)	0.02
Baseline hemoglobin	1.25 (1.01–1.54)	0.04	1.28 (1.02–1.59)	0.03

1.4% ST at 30 days (BMS or DES)

How do we best prevent stent thrombosis ?

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An Analysis of 431 Cases

Multivariate Cox Proportional Hazard Analysis of the Predictors for the Combined Point Cardiac Death and Definite Recurrent Stent Thrombosis

Table 4. Multivariate Cox Proportional Hazard Analysis of the Predictors for the Combined Point Cardiac Death and Definite Recurrent Stent Thrombosis

	Hazard Ratio (95% CI)	<i>P</i>
Clinical characteristics		
Diabetes mellitus	1.97 (1.27–3.00)	0.002
Male gender	1.64 (0.98–2.74)	0.06
LVEF after first stent thrombosis <45%	1.72 (1.08–2.71)	0.02
Angiographic characteristics		
Severe calcification	1.69 (1.21–2.35)	0.0019
ACC/AHA B2-C lesion	2.65 (1.65–4.24)	<0.0001
Stent in LAD	2.33 (1.15–4.76)	0.02
Total stent length (per mm)	1.026 (1.005–1.028)	0.006
Characteristics of emergent PCI for first stent thrombosis		
Additional stent implantation during stent thrombosis	1.73 (1.14–2.61)	<0.001
TIMI flow <3 after emergent PCI	1.27 (0.99–1.60)	0.05

LVEF indicates left ventricular ejection fraction; LAD, left anterior descending artery.

Van Werkum et al, Circulation 2009