

# DES in acute MI

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Bare metal stenting in acute MI  
PCI = Level I A in ESC guidelines

What about RCT with DES?

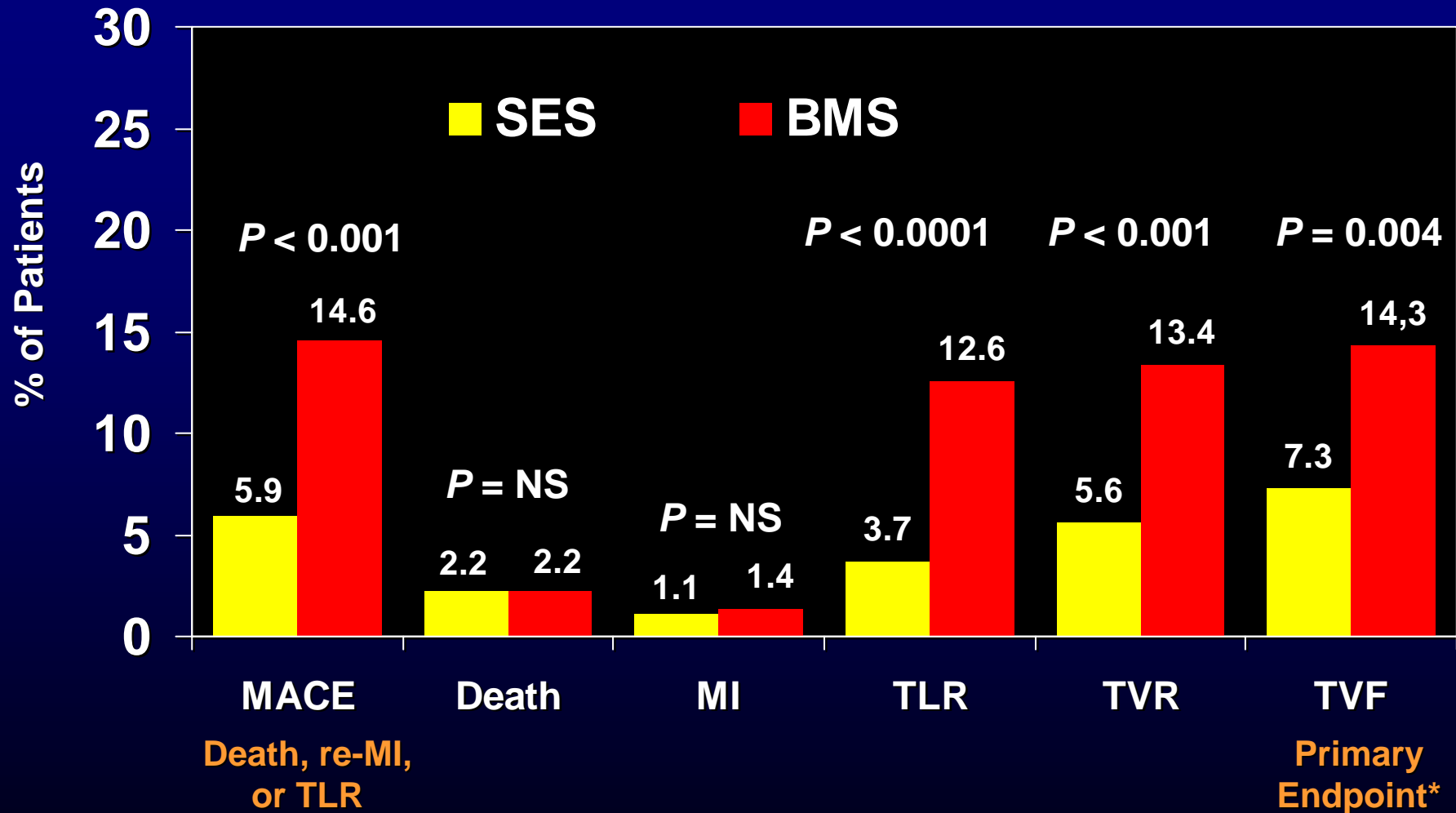
TYPHOON

# Time-to-Treatment and Procedure Characteristics

Variable	SES n=355	BMS n=357	P-value
Time to hospitalization (hours)*	3.9 ± 3.9	3.8 ± 2.6	0.659
Hospitalization to angio (min)*	38.4 ± 58	37.3 ± 51	0.777
Door-to-balloon Time (min)*	60 ± 59	60 ± 54	0.973
RVD target vessel (mm)*	2.78 ± 0.50	2.83 ± 0.61	0.469
GP IIb/IIIa use (%)	69.3	73.7	0.213
Direct stenting (%)			
attempted:	46.5	47.5	0.791
successful:	45.6	46.3	0.880
Stents per Lesion (n)*	1.1 ± 0.3	1.1 ± 0.3	0.343
Max. stent diameter (mm)*	3.0 ± 0.3	3.1 ± 0.4	0.001
Post-Dilation (%)	15.2	13.4	0.522
Total stent Length (mm)*	22.1 ± 8.6	20.2 ± 8.2	0.005

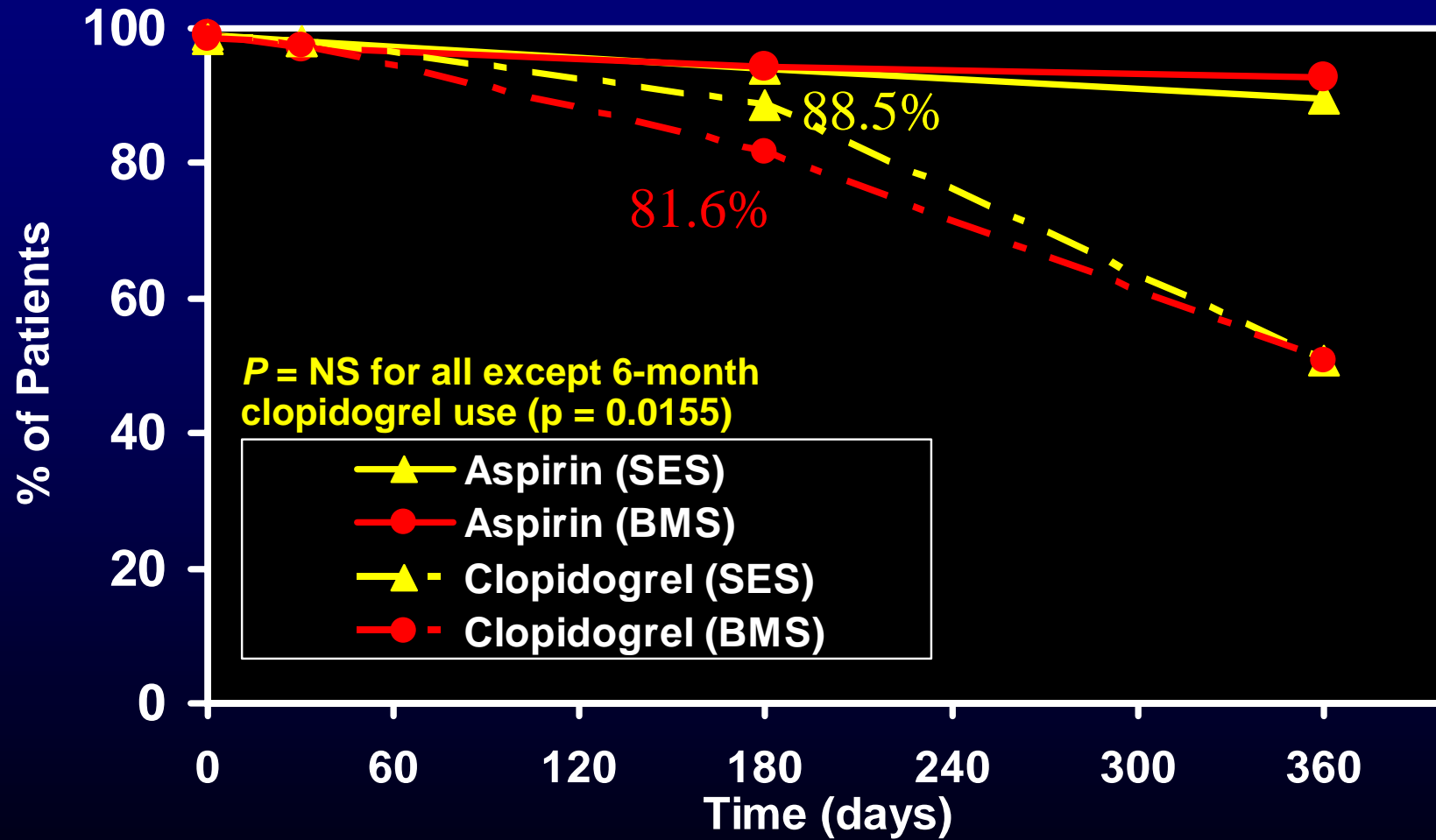
\* Mean ± SD

# Clinical Outcomes Through 360 Days



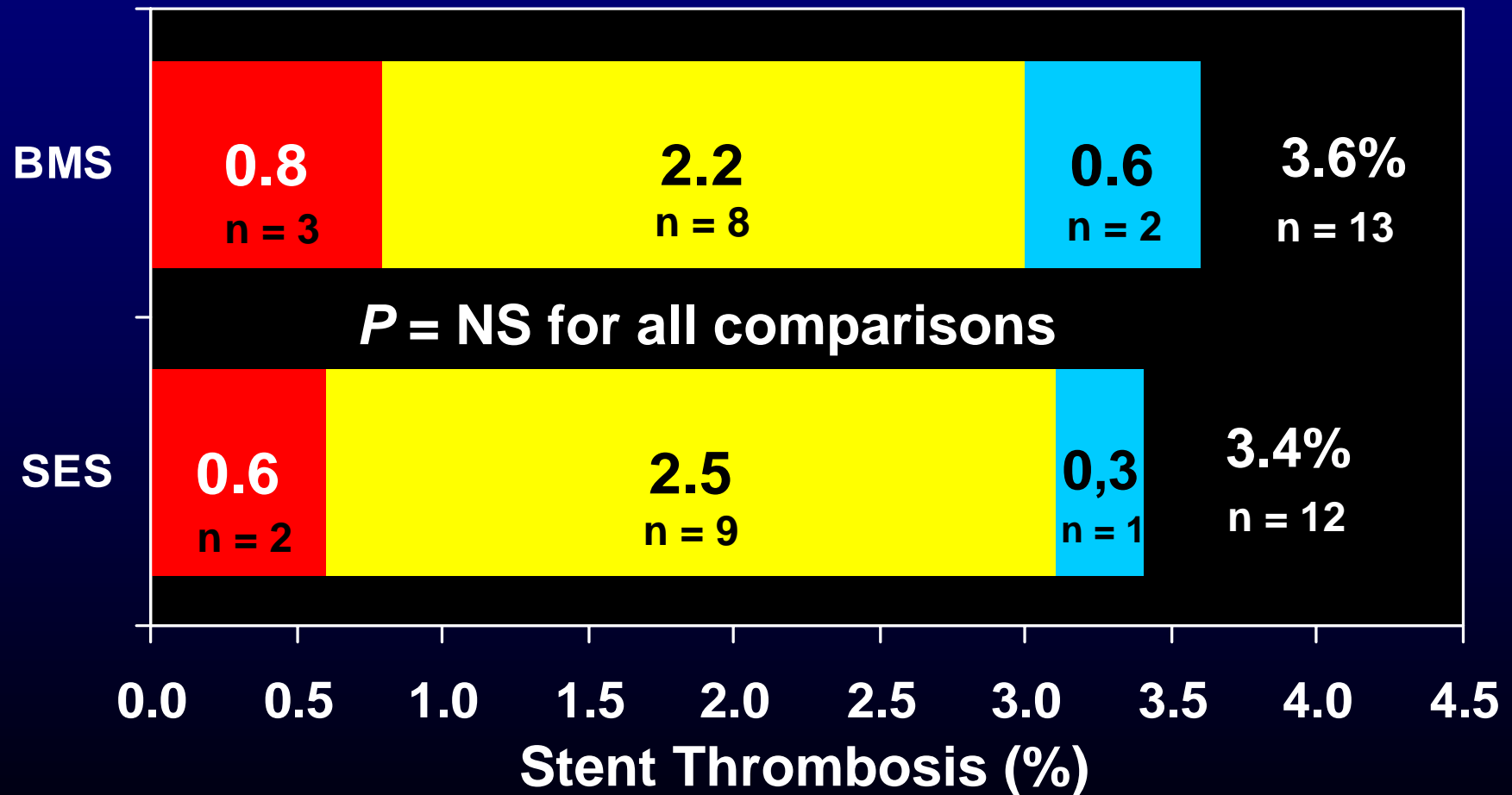
\* Defined as ischemia driven TVR, recurrent MI, or target vessel-related cardiac death

# Anti-Platelet Therapy During Follow-Up

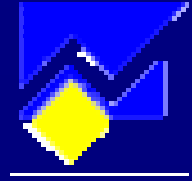


# Stent Thrombosis through 12 Months

■ Acute (< 24h)    
 ■ Subacute (1-30 Days)    
 ■ Late (> 30 days)







## PASSION: Clinical results (619 pts)

End point	Taxus	Bare-metal stent	p
Composite primary end point (%)	8.8	12.8	0.12
Death/MI	5.5	7.2	0.40
TLR*	5.3	7.8	0.23
Stent thrombosis	1.0	1.0	0.99

\*Defined as ischemia-driven PCI of target lesions, plus a 5-mm margin from the proximal and distal stent edges, or CABG of target vessel

Hypothesis: Use of the polymer-based slow-release paclitaxel eluting TAXUS stent will safely reduce the 1-year rate of ischemia-driven TVR

3400 patients with STEMI within 12 hours onset at 200 international sites

Randomized 1:1

UFH  
+IIb/IIIa inhibitor

Bivalirudin  
+ bail-out IIb/IIIa

Cath lab

Left ventriculography and coronary arteriography

# HORIZONS

TAXUS stent eligible  
(est ~88% = 3000)

Yes

No

Randomize 3:1

TAXUS  
SR stent  
(n=~2250)

Bare metal  
control stent  
(n=~750)

FDA approved

PCI, CABG, or Med Rx

1, 6, and 12 month follow-up, then yearly for 5 years total

- 1500 pt angiographic fu at 13months (stent rand pts)-



# DES or BMS

- Five randomized trials (1964 pts)
  - 3 trials with SES (SESAMI, STRATEGY, TYPHOON) showed significant reduction of MACE due to TLR reduction at 8m to 1y.
  - 2 trials with PES (PASSION, HAAMU) only showed a trend to reduce TLR
  - No trial demonstrates excess in stent thrombosis in the DES arm compared to BMS



Is restenosis a major issue in  
acute MI PCI?



## Angiographic Findings at 8-Month F/U

Variable	SES (86 patients)	BMS (81 patients)	P-value
<b>In-stent</b>			
MLD (mm)*	2.43 ± 0.58	1.78 ± 0.61	<0.0001
Late Loss (mm)*	0.13 ± 0.49	0.83 ± 0.52	<0.0001
% Diameter Stenosis*	16.4 ± 13.2	37.1 ± 16.1	<0.0001
Binary Restenosis (%)	3.5	20.3	0.0010
<b>In-lesion</b>			
MLD (mm)*	2.14 ± 0.61	1.76 ± 0.61	0.0003
Late Loss (mm)*	0.17 ± 0.47	0.56 ± 0.6	<0.0001
% Diameter Stenosis*	24.6 ± 13.8	37.9 ± 16.5	<0.0001
Binary Restenosis (%)	5.9	20.3	0.0080

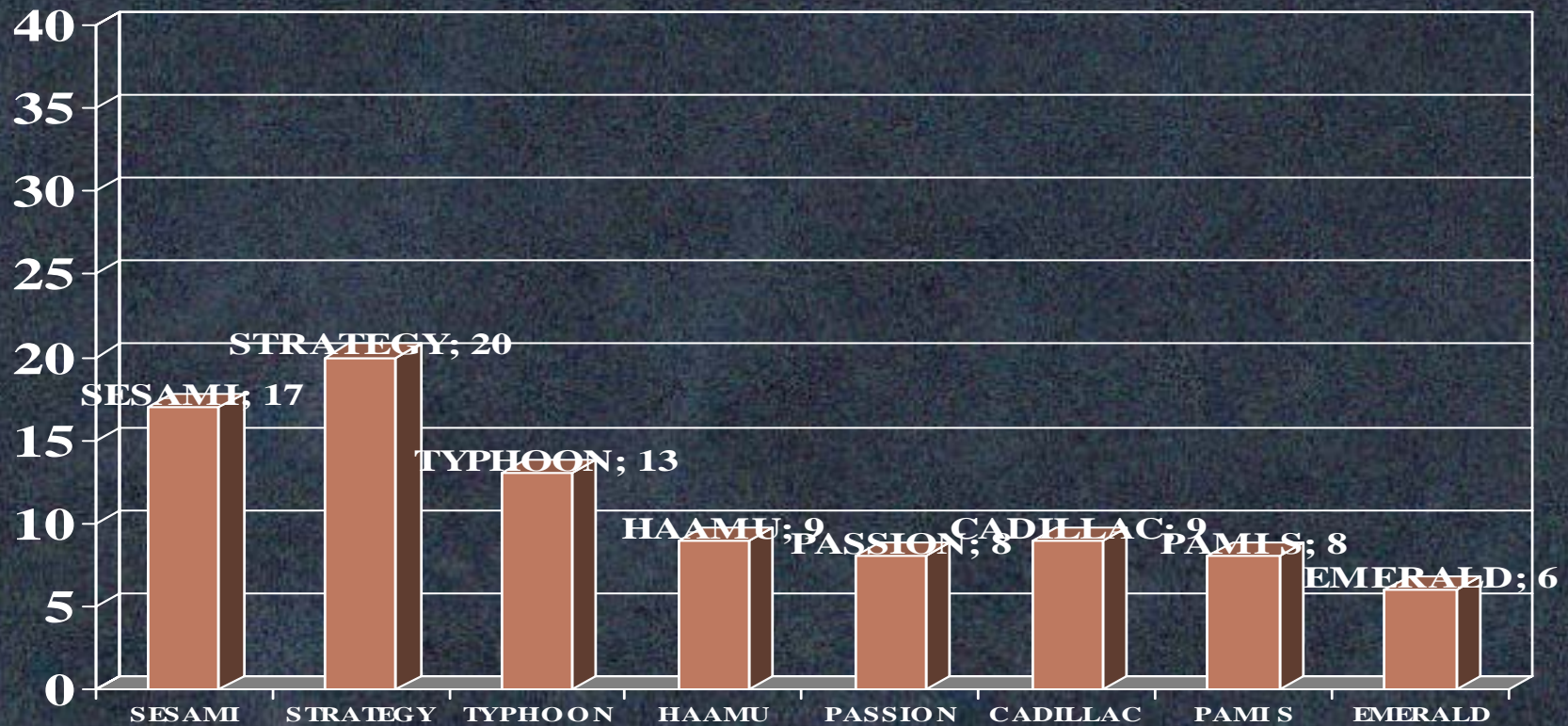
\* Mean ± SD

## Angiographic results

	BMS Group (n=75)	PES Group (n=70)	P
Lesion MLD at baseline, mm	0.74±0.61	0.67±0.58	0.49
Lesion PDS at baseline, %	78±19	78±19	0.84
In-stent MLD after PCI, mm	2.8±0.47	2.7±0.50	0.41
In-stent RD after PCI, mm	3.4±0.46	3.4±0.51	0.67
In-stent PDS after PCI, %	18±8.7	19±8.7	0.31
In-stent MLD at follow-up, mm	2.0±0.67	2.5±0.51	<0.001
In-stent RD at follow-up, mm	3.1±0.58	3.2±0.51	0.22
In-stent PDS at follow-up, %	34±17	24±10	<0.001
Segment RD at follow-up, mm	3.2±0.58	3.2±0.57	0.87
Acute gain, mm	2.0±0.70	2.1±0.76	0.78
Late loss, mm	0.73±0.56	0.26±0.45	<0.001



# BMS in RCT: TVR (%)





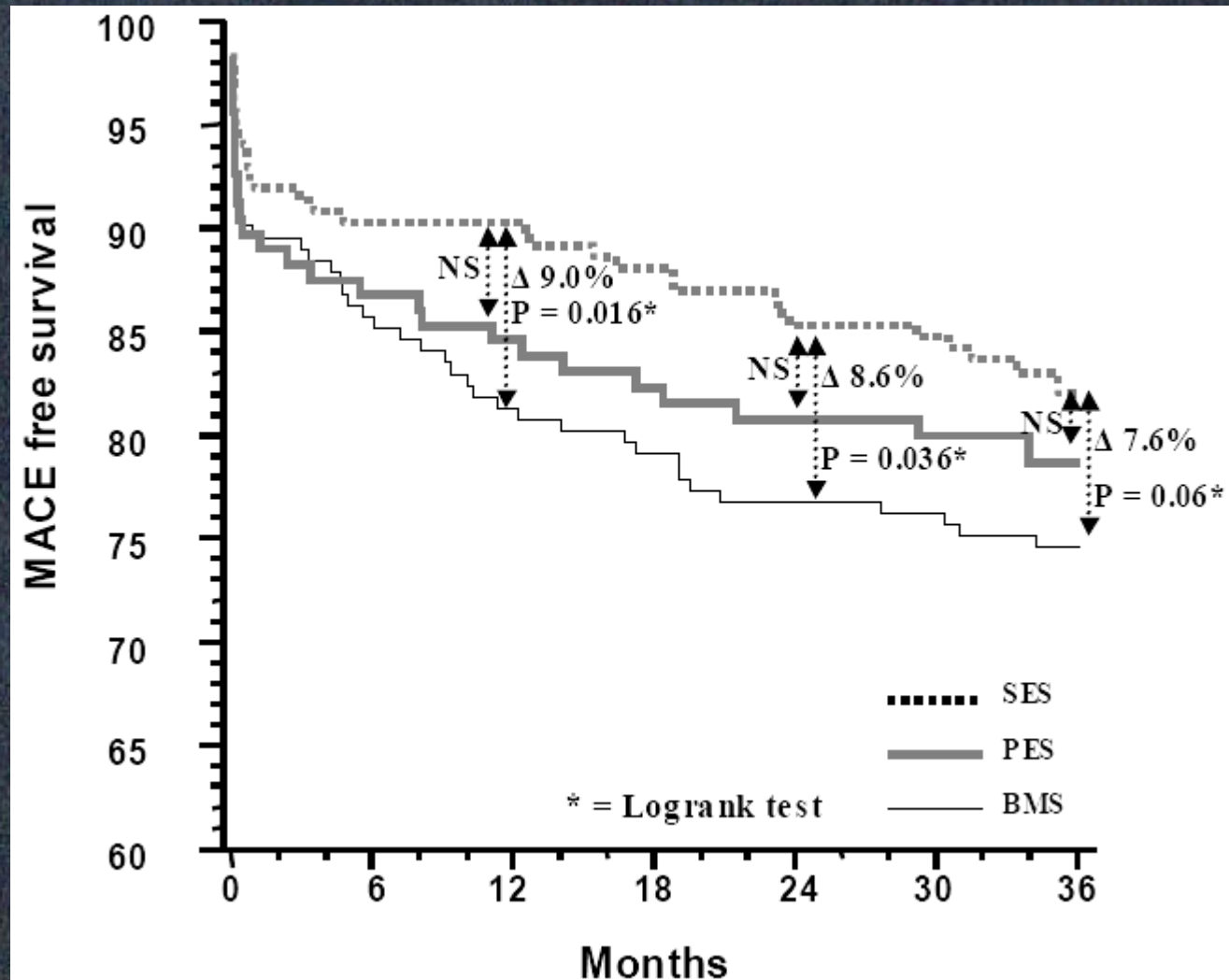
# The stent thrombosis concern

# Stent Thrombosis in Patients Receiving Primary Stenting for AMI

Study	# of Patients	Duration of F/U (months)	SES Rate	BMS rate	PES Rate
CADILLAC	2,082	30 days	--	0.9	--
STRATEGY (abx)	88	30 days	--	2.3%	
STRATEGY (tir)	87	30 days	0%	--	--
Katayama	381	3 months	--	2.6%	--
Hofma, et al	186 / 136	12 months	0%	--	2.9%
Erasmus Medical Center	186	30 days	0%	1.6%	--
Abbott NW Hospital	159	6 months	0%	0%	--
RECIPE	N/A	30 days	1%	--	2%
Hartford Hospital	210	In-hospital	0%	0.9%	--
STENT	127	3 months	0%	1.7%	--
e-CYPHER	938	12 months	1.6%	--	--
Chenau, et al.,	103 / 504	6 months	0.0%	0.6%	--
RESEARCH	96	218 days	0.0	--	--
INAMI	55	30 days	--	9.1%	--
Wong	46	30 days	--	2.2%	--
PAMI-STENT	452	30 days	--	0.9%	--
Silva, et al.	104	30 days	--	5.7%	--
Hepacoat Reg	1681	30 days	--	0.9%	--
Weber	50	30 days	0.0	--	--
Monassier / STENTIM	269	In-hospital	--	4.3%	--
ACE / Antonucci	400	6 months	--	2.8%	--



# Rotterdam registries in AMI

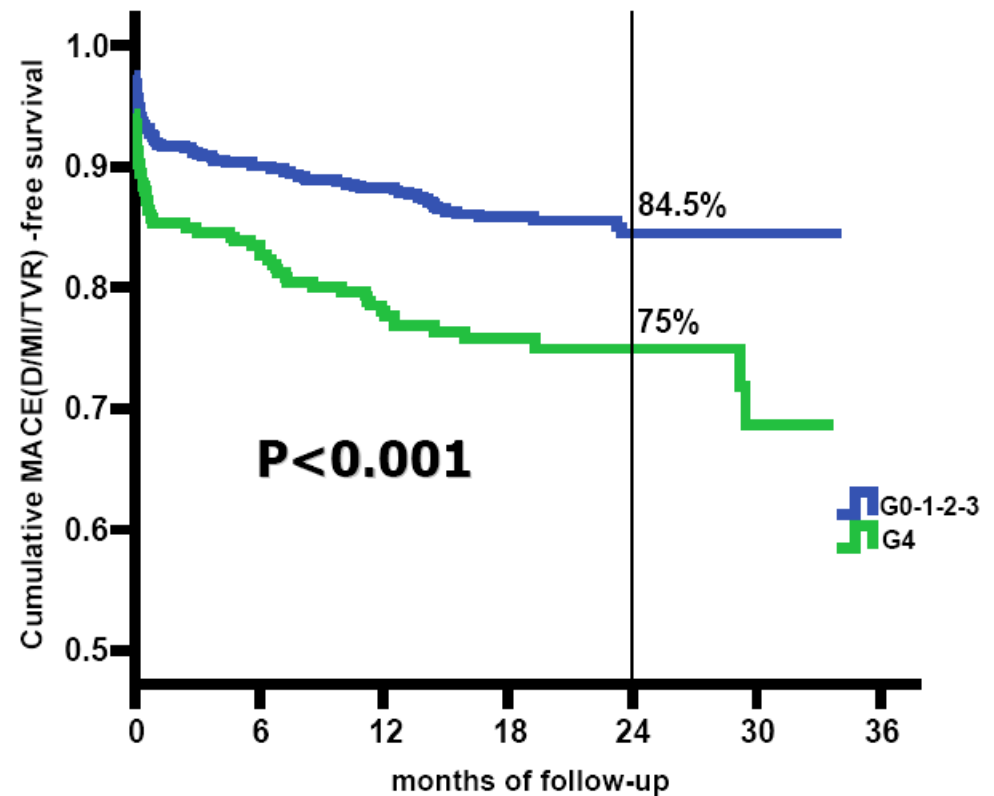


# Predictors of Mace

Independent predictor	HR	95% CI	P value
Cardiogenic Shock	5.54	3.8-8	<0.001
IRA			0.007
RCA (reference)	1.00		
LAD	1.76	1.19-2.6	0.004
Cx	1.9	1.04-3.46	0.036
Left main	3.3	1.52-7.2	0.003
Graft	2.44	0.58-10.26	0.22
Stent Thrombosis Presentation	2.14	1.12-4.1	0.021
direct stenting	0.69	0.48-0.97	0.035
Diabetes mellitus	1.69	1.07-2.67	0.025
Age (per year)	1.02	1.01-1.04	0.003
Pre Hosp Resuscitation	3.01	1.6-5.67	0.001
<b>Large thrombus burden</b>	<b>2.04</b>	<b>1.44-2.88</b>	<b>&lt;0.001</b>
Rheolytic Thrombectomy	0.4	0.2-0.77	0.006

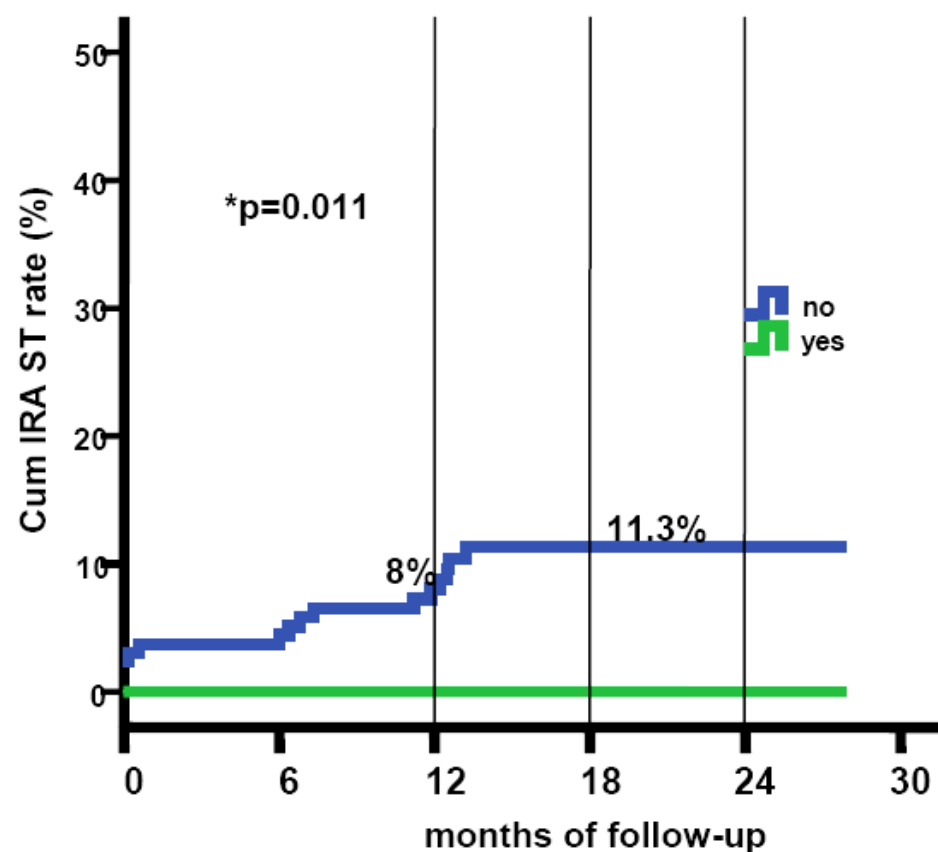
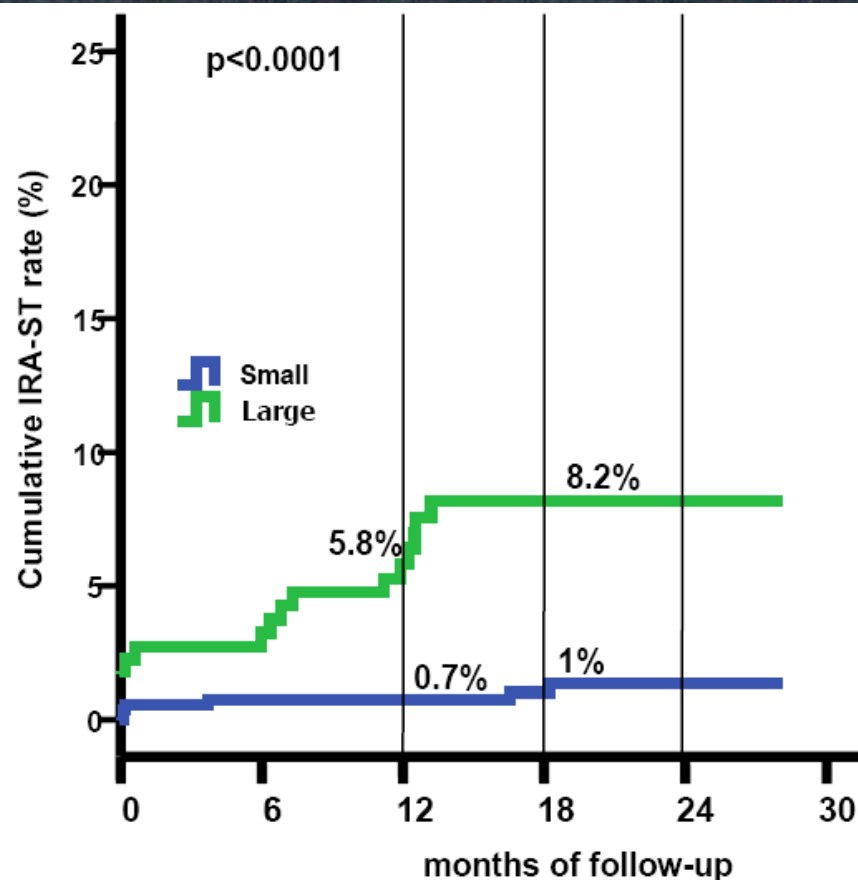


- Grade 0** : no thrombus present
- Grade 1** : possible thrombus present. Characteristics include reduced contrast density, haziness, irregular lesion contour or a smooth convex meniscus at the site of total occlusion
- Grade 2** : thrombus present, small size. Definite thrombus with greatest dimension 1/2 vessel diameter
- Grade 3** : thrombus present, moderate size. Greatest linear dimension >1/2 but < 2 vessel diameters
- Grade 4** : thrombus present, large size. Largest dimension > 2 vessel diameters
- Grade 5** : unable to assess thrombus occlusion

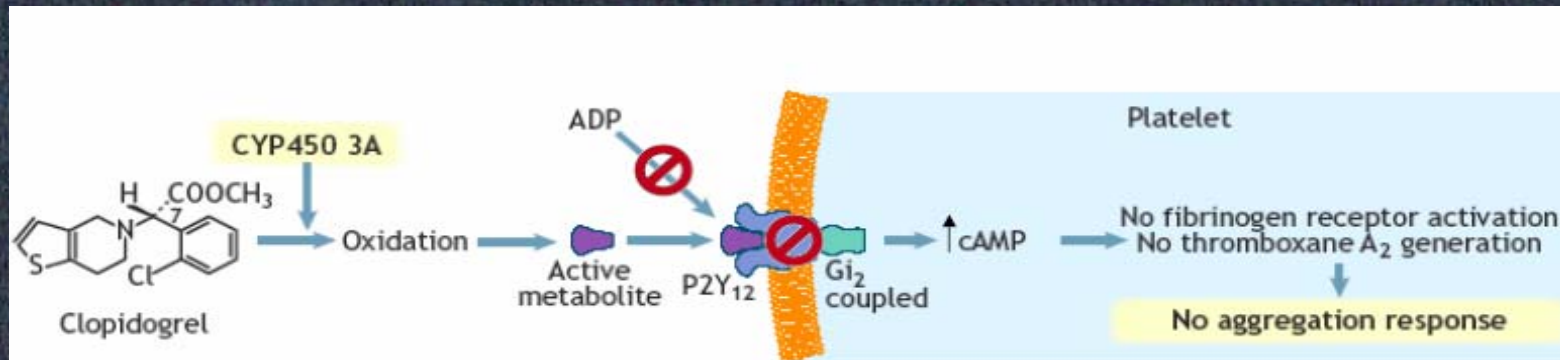




Independent predictor	HR	95% CI	P value
Stent Thrombosis Presentation	4.1	1.39-12.09	0.01
bifurcational stenting	5.51	2.32-13.07	<0.001
Rheolytic Thrombectomy	0.12	0.02-0.86	0.036
Large Thrombus burden	6.95	2.99-16.2	<0.001



# Clopidogrel responsiveness



## Generation of active metabolite

Polymorphisms of CYP 3A4  
Drug-drug interactions involving CYP 3A4  
Epigenetic influences on CYP 3A4 function

## Intestinal Absorption

## Non-compliance

Genetic and environmental influences on P2Y<sub>12</sub> receptor density and function

## Drug-distribution



The lowest quartile of percent inhibition (clopidogrel non-responsiveness) was defined by a **percent inhibition < 10%**.

### Multivariate Predictors of Non-Responsiveness:

	OR	
• Presentation with MI	<b>6.8</b> [95% CI 1.1 to 42]	p=0.038
• Heavy weight*	<b>2.0</b> [95% CI 1.1 to 3.8]	p=0.033
• Beta Blocker Use	<b>2.5</b> [95% CI 1.3 to 4.9]	p=0.006

### Multivariate Predictors of High Post-treatment Reactivity

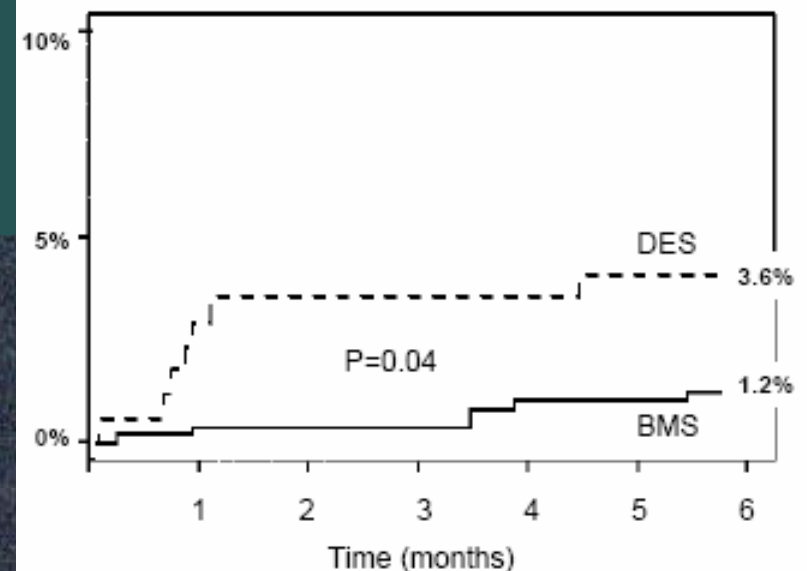
• History of CHF	<b>3.1</b> [95% CI 1.1 to 8.6]	p=0.03
• Diabetes mellitus	<b>3.3</b> [95% CI 1.6 to 7.1]	p=0.002
• Clopidogrel Non-Resp.	<b>29.4</b> [95% CI 13.7 to 63]	p<0.001

\* Wt > 100 kg

# Premier registry

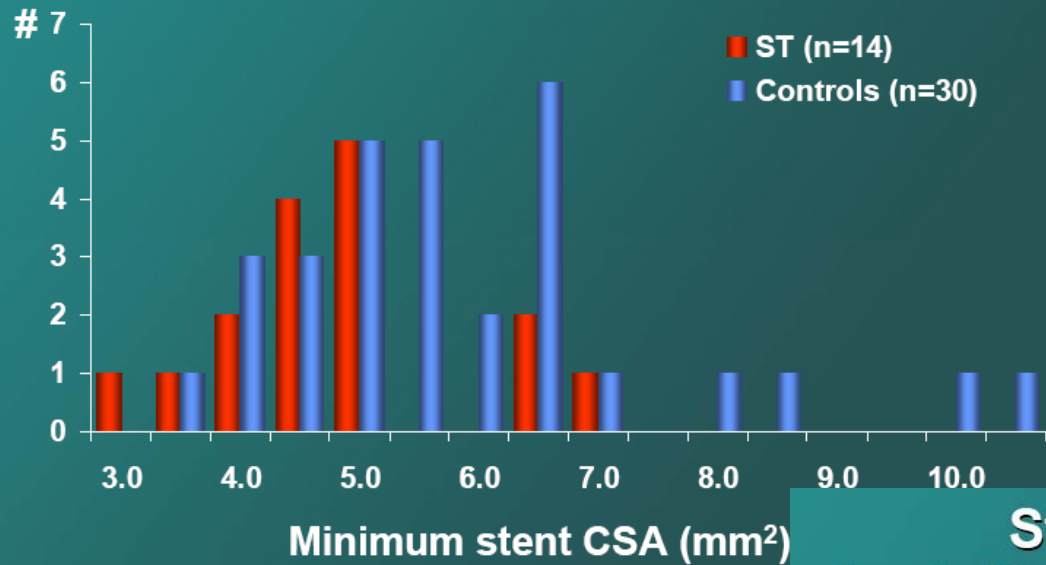
## Study Design

- **PREMIER registry**
  - 19 U.S. hospitals, predominantly major academic centers
  - Prospectively collected data
  - Consecutive patients enrolled between 1/1/03 and 6/28/04
- **6-month outcomes of primary PCI**
  - Comparing DES vs. BMS
  - Primary outcomes –
    - 6 month time to Death
    - 6 month time to CV Hospitalization





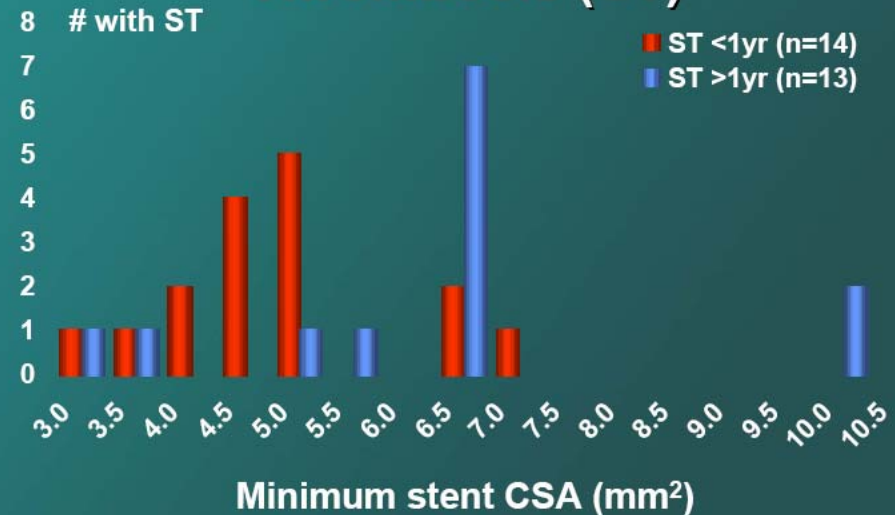
# Predictors of Acute/Subacute/Late DES Thrombosis @ WHC



(Okabe et al., Am J Cardiol. In press)

# Late malaposition

## Stent Underexpansion in Acute/Subacute/Late vs Very Late DES Thrombosis (ST)

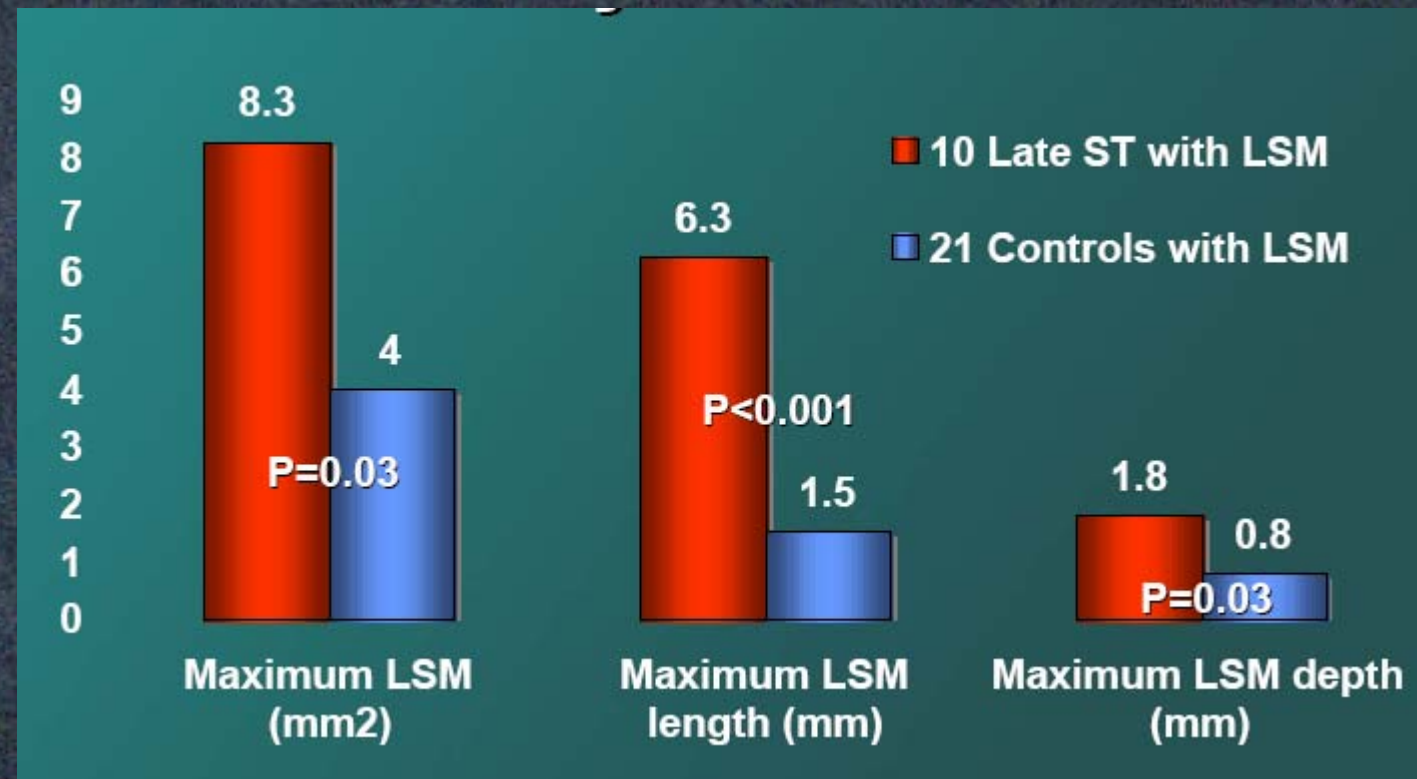


(Okabe et al., Am J Cardiol. In press)

(Cook et al. Circulation, in press)

## Late acquired malapposition in 85/705 (12.1%)

- 71/538 (13.2%) sirolimus-eluting stents
- 14/167 (8.4%) paclitaxel-eluting stents
- 25.0% (4/16) after DCA before stenting
- 27.5% (14/51) in CTO lesions
- 31.8% (7/22) after primary stenting in acute MI





# DES or BMS ?

- Cypher reduces clinical restenosis
  - Safe in association with abciximab
- Taxus needs further validation
- Endeavor might be a good candidate
  - Less inhibition
  - Less malaposition
  - But no data !!!
- Restenosis risk is not the major concern in acute MI PCI
- Stent thrombosis risk is high
  - Malaposition
  - Compliance to DAP
  - Related to thrombus burden
  - Benefit of thrombectomy?



# A personal opinion

In routine, go to BMS  
DES will be for the ISR!