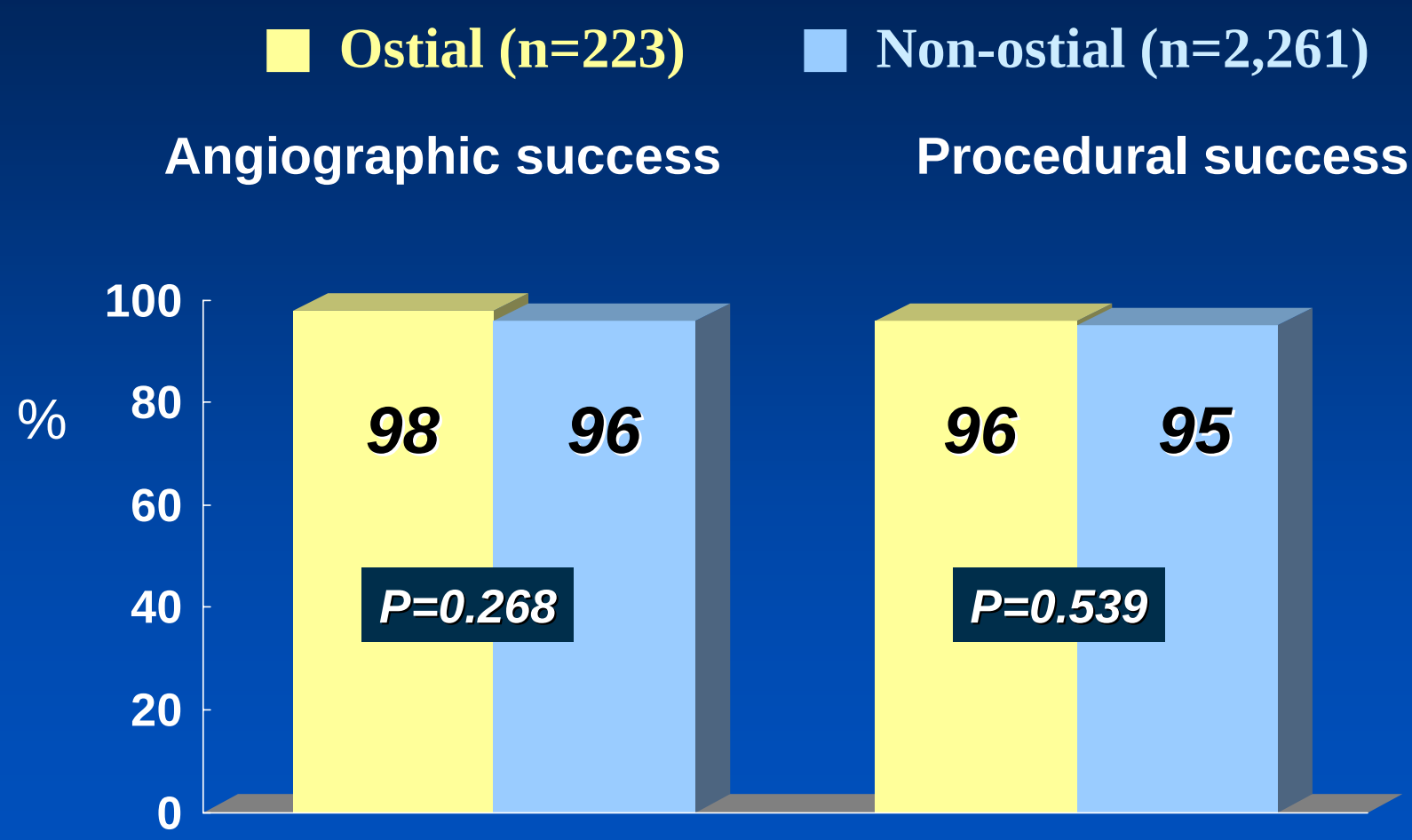
PCI for
Aorto - Ostial Disease

Limitations of PCI for the Aorto-ostial Lesion

- Technical challenges
  - Rigidity, Elastic recoil
  - Dissection, Plaque shifting
  - Guiding catheter support

- Long term outcomes
  - High restenosis rates

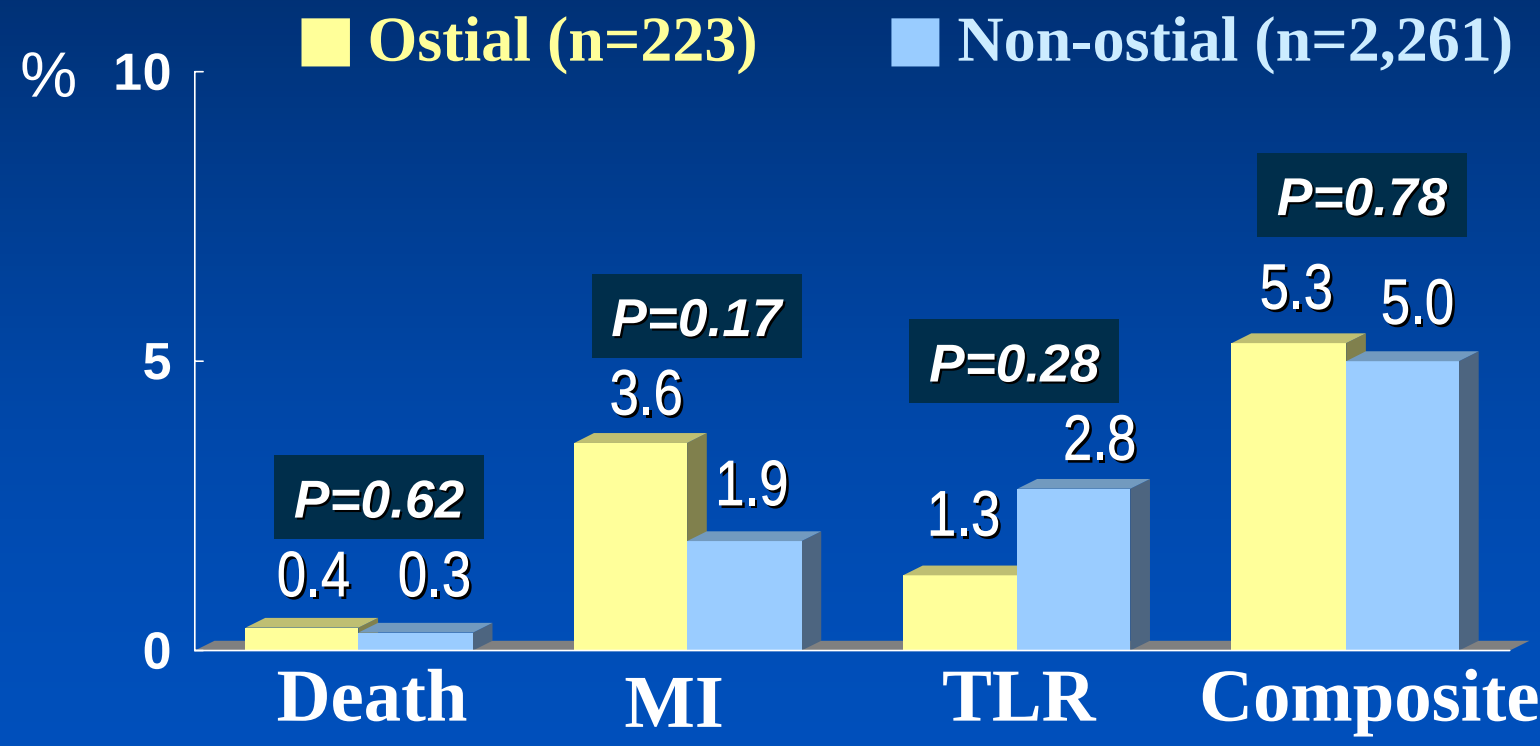
Ostial vs. Non-ostial
in the BMS Era



Mavromatis K et al, Am J Cardiol 2004;94:583

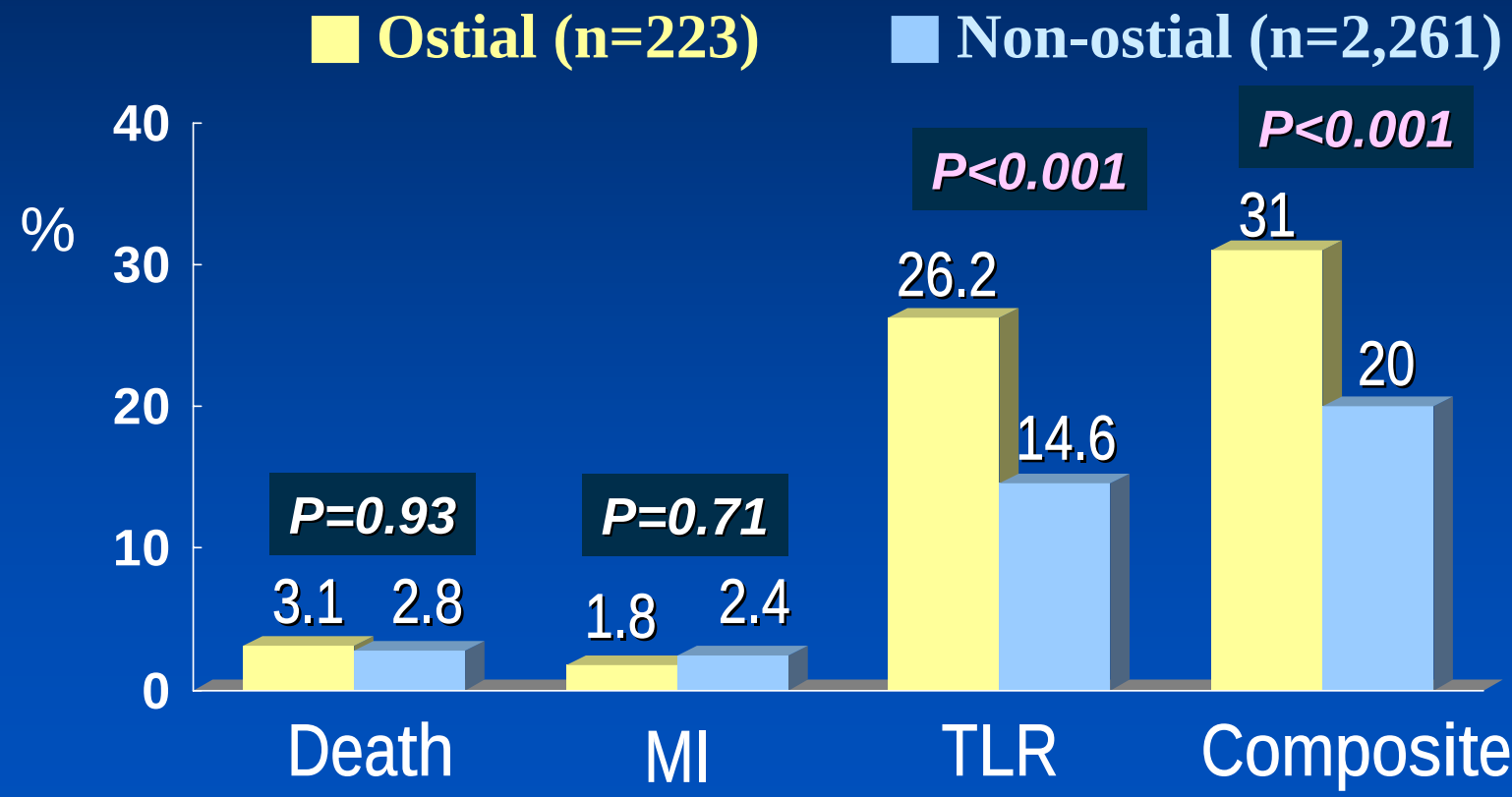
Ostial vs. Non-ostial
in the BMS Era

In-Hospital MACE



Mavromatis K et al, Am J Cardiol 2004;94:583

Ostial vs. Non-ostial
in the BMS Era
One-Year MACE



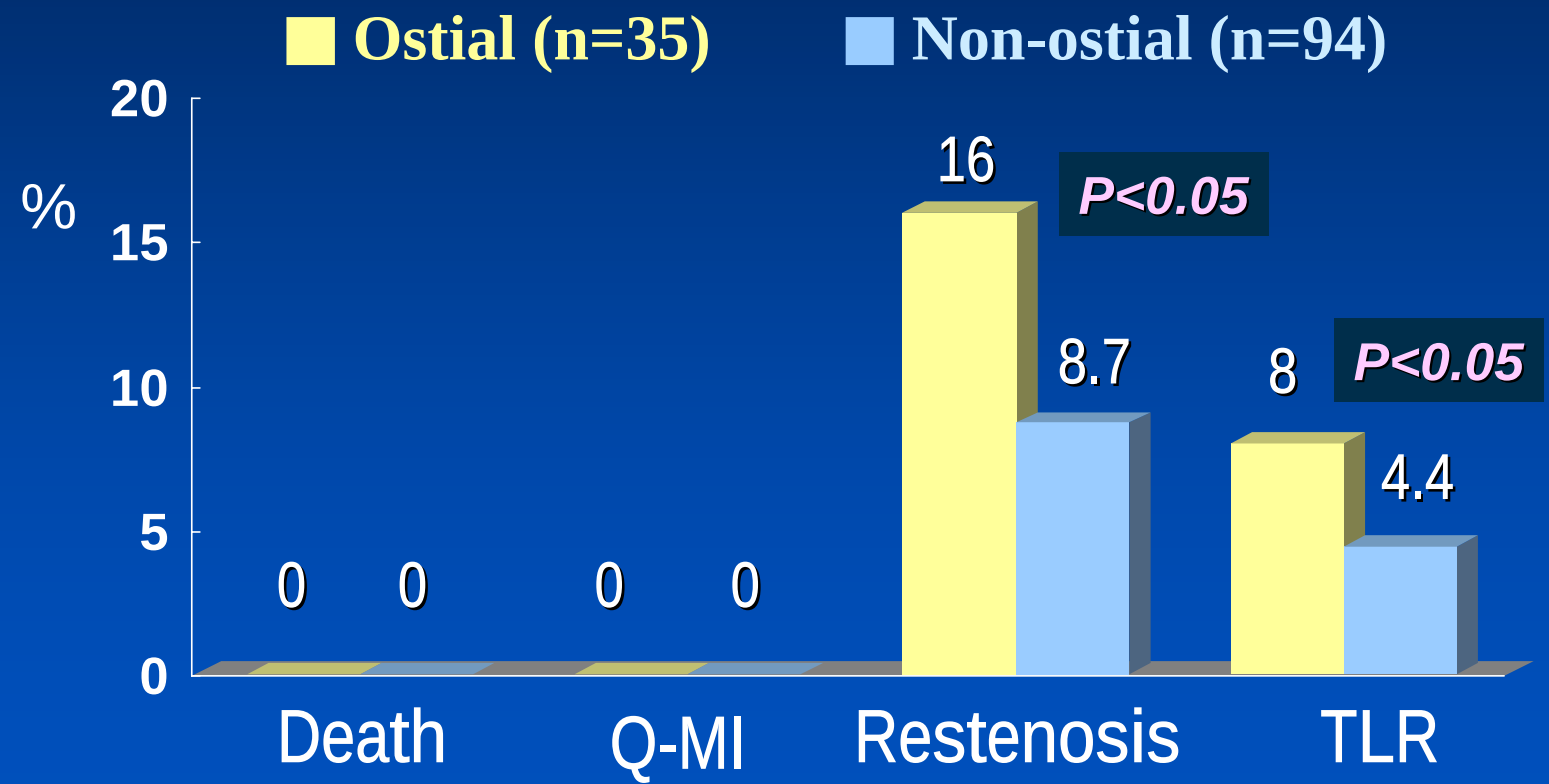
Mavromatis K et al, Am J Cardiol 2004;94:583

Ostial vs. Non-ostial
in the DES Era
Predictors of ISR from RESEARCH

Variables	Multivariate analysis		
	OR	95% CI	P
Treatment of in-stent restenosis	4.16	1.63-11.01	<0.01
Ostial locaion	4.84	1.81-12.07	<0.01
LAD lesions	0.15	0.03-0.63	<0.01
Diabetes Mellitus			0.02

P. Lemos et al. Circulation 2004; 109: 1366

Ostial vs. Non-ostial
in the DES Era
Nine-Month MACE



Kenneth Chin et al, Asian Registry

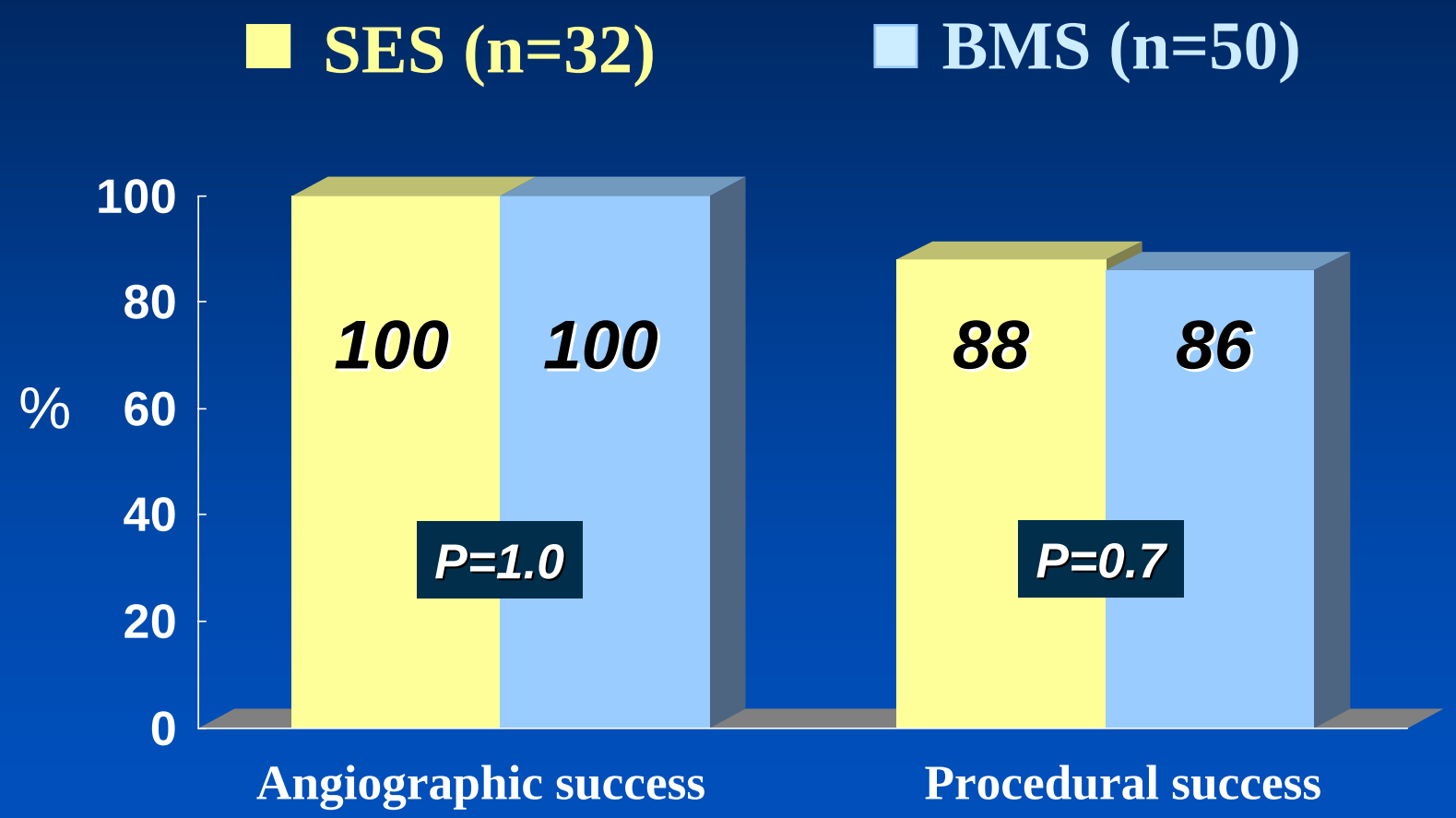
Ostial vs. Non-ostial
In Summary

- PCI of the ostial lesions appears safe.
- However, MACEs of the aorto-ostial lesions was higher than that of non-ostial lesions in both BMS and DES era.

Aorto-Ostial Disease in the DES era

Reduce MACEs Compared with BMS?

BMS vs DES
in Aorto-Ostial Disease From Milan

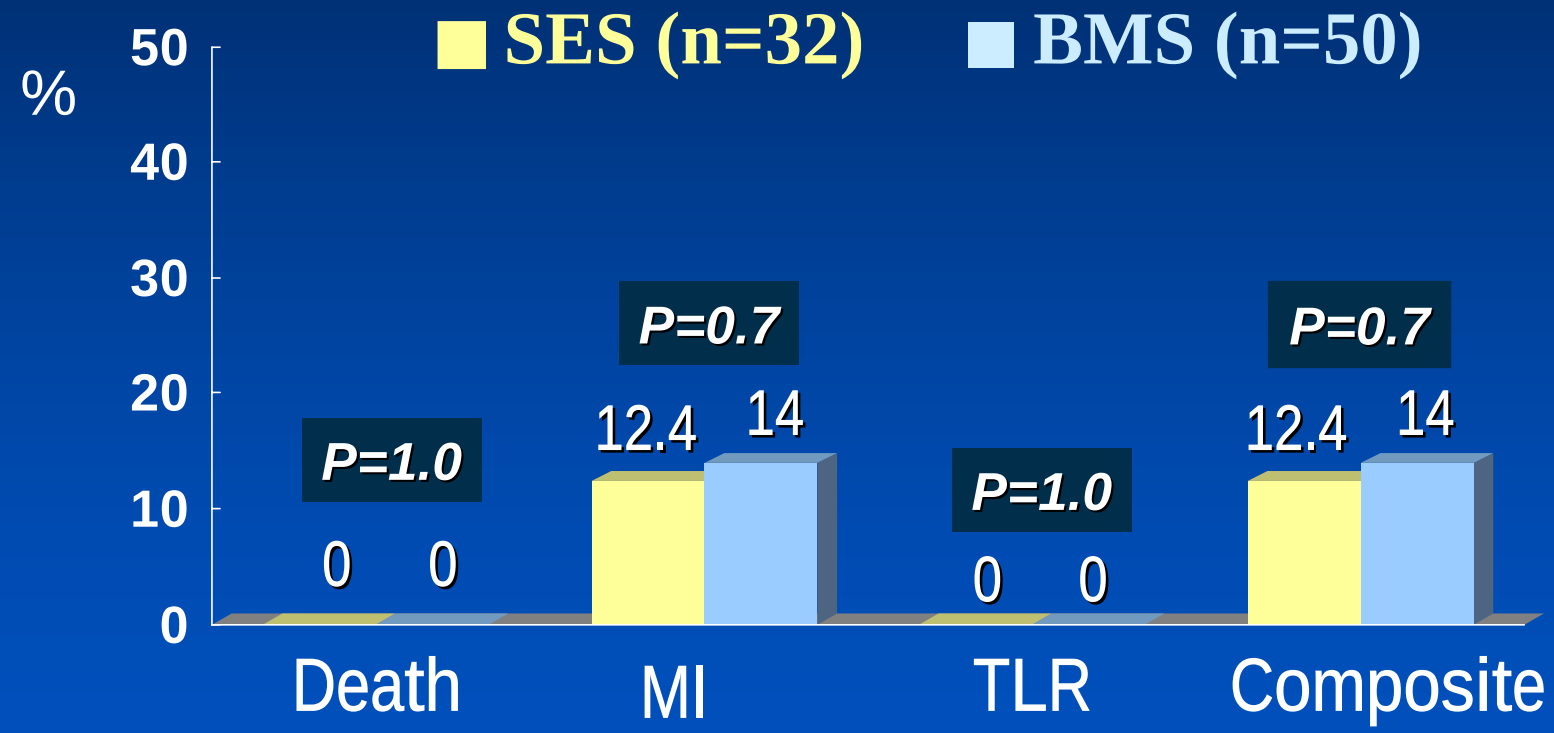


Iakovou et al, J Am Coll Cardiol 2004;44:967

BMS vs DES in the Aorto-Ostial Disease

In-Hospital MACE

From Milan

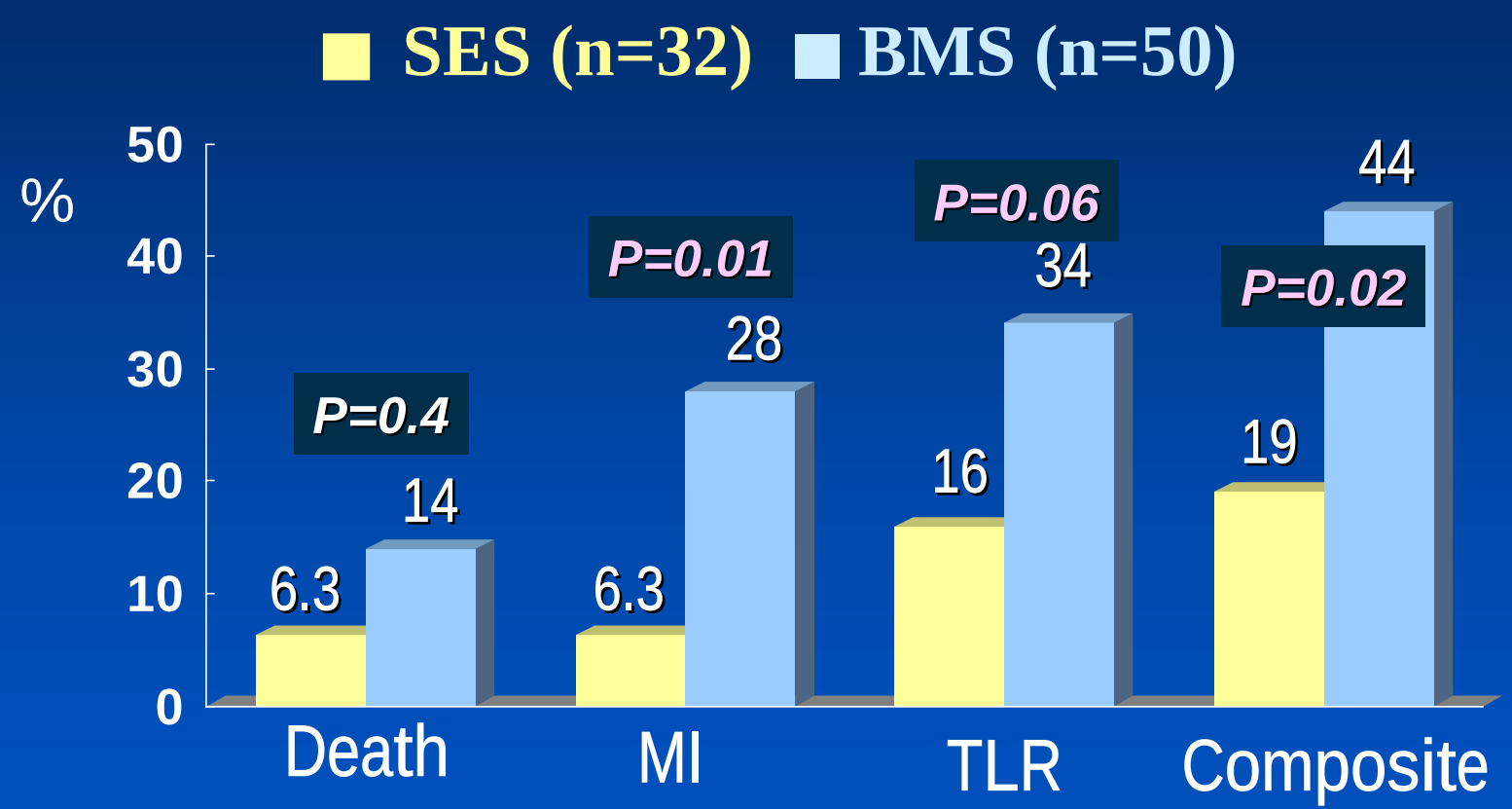


Iakovou et al, J Am Coll Cardiol 2004;44:967

BMS vs DES in the Aorto-Ostial Disease

Ten-Month MACE

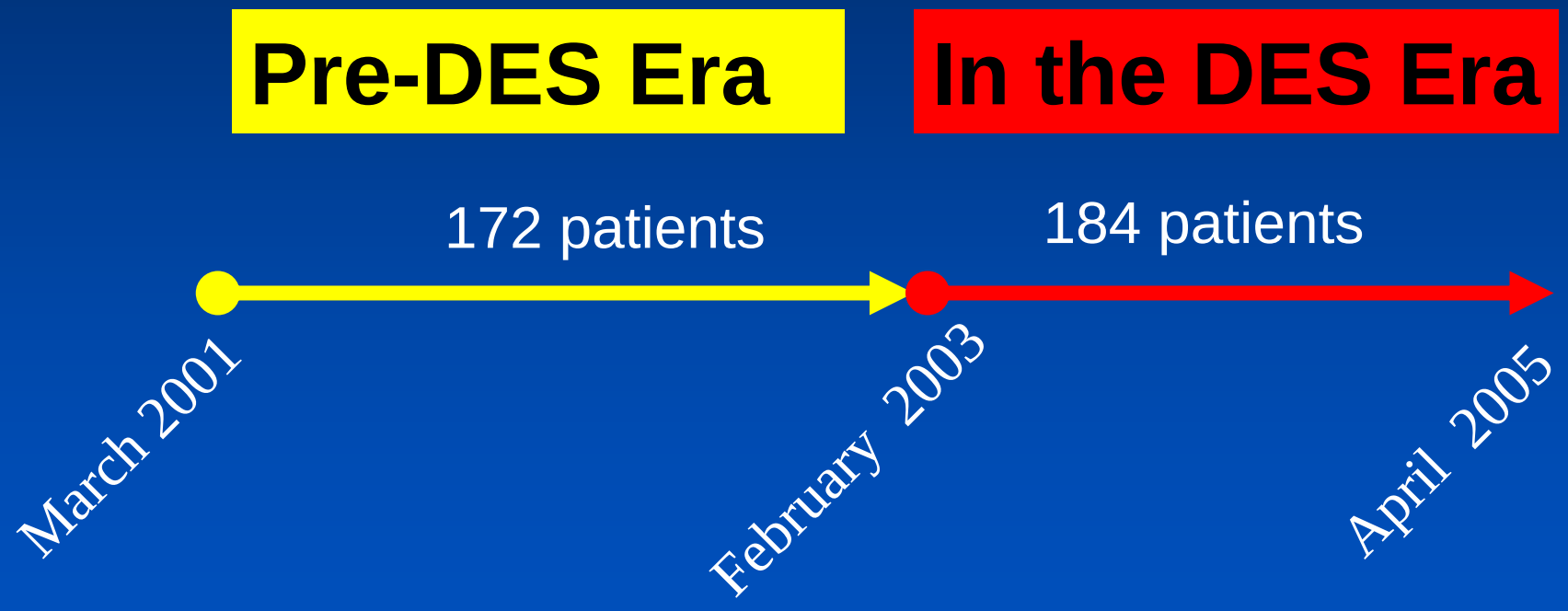
From Milan



Iakovou et al, J Am Coll Cardiol 2004;44:967

Aorto-Ostial Stenting in AMC

Comparison of DES with BMS



Park DW et al. Am J Cardiol 2007;99:760-65

Aorto-Ostial Stenting in AMC

Lesions Characteristics

	DES (n=184)	Pre-DES (n=172)	P
Multivessel CAD	153 (83%)	132 (77%)	0.1
Left main	98 (51%)	94 (53%)	0.7
Right	83 (44%)	76 (43%)	0.9
Bypass graft	10 (5%)	7 (4%)	0.6
Saphenous/free arterial	10/0	5/2	

Park DW et al. Am J Cardiol 2007;99:760-65

Aorto-Ostial Stenting in AMC

In-hospital Outcomes

	DES (n=184)	Pre-DES (n=172)	P
Death	1 (0.5%)	0	1.0
Q-wave MI	0	0	NS
Non-Q MI	29 (11%)	13 (8%)	0.3
Stroke	0	0	NS
Stent thrombosis	0	0	NS
Urgent TLR	0	0	NS

Park DW et al. Am J Cardiol 2007;99:760-65

Aorto-Ostial Stenting in AMC

Cumulative 1-year MACE

	DES (n=184)	Pre-DES (n=172)	P
Death	3 (1.6%)	4 (2.3%)	0.7
Q-wave MI	1 (0.5%)	2 (1.2%)	0.6
Stent thrombosis	1 (0.5%)	2 (1.2%)	0.6
TLR	8 (4.3%)	20 (11.6%)	0.011
Total MACEs	12 (6.5%)	23 (13.4%)	0.030

Park DW et al. Am J Cardiol 2007;99:760-65

Aorto-Ostial Stenting in AMC

Predictors of ISR after DES Implantation

Variables	Multivariate analysis		
	OR	95% CI	P
Treatment of Bypass graft	10.09	1.28-45.26	0.037
Treatment of In-stent restenosis	4.38	1.12-19.39	0.048
Reference vessel diameter	0.15	0.03-0.63	0.010

Park DW et al. Am J Cardiol 2007;99:760-65

Aorto-Ostial Stenting

BMS vs. DES

In Summary

- The DES implantation for aorto-ostial lesions is associated with a significant decrease in ISR & MACEs compared with the pre-DES phase.

- Treatment of bypass graft & ISR and reference vessel size were identified as predictors of restenosis and/or long term MACEs after aorto-ostial DES implantation.

Ostial LAD Disease

DESs Reduce the MACEs Compared with BMS?

BMS vs DES
in the LAD-Ostial Disease From Milan

	DES (n=43)	BMS (n=43)	*P*
Maximum balloon diameter, mm	3.3±0.3	3.5±0.3	<0.001
Maximum balloon inflation, atm	16.1±2.8	14.7±2.7	0.018
Stent length/lesion, mm	22.7±8.0	18.0±9.9	0.031
Stents/lesion	1.1±0.3	1.1±0.4	0.17
Cutting balloon	2 (4.6%)	2 (4.6%)	1.00
Gp IIb/IIIa inhibitors	9 (21%)	10 (23%)	0.84

Colombo et al, Am J Cardiol 2006;97:187–191

BMS vs DES in the Ostial LAD

Procedure Complications

From Milan

	DES (n=43)	BMS (n=43)	P value
IABP	3 (7%)	3 (7%)	1.00
Acute ST	0	0	-
TIMI 0-2 flow	0	0	-
Perforation	0	0	-

Colombo et al, Am J Cardiol 2006;97:187–191

BMS vs DES in the Ostial LAD

In-Hospital Outcomes

From Milan

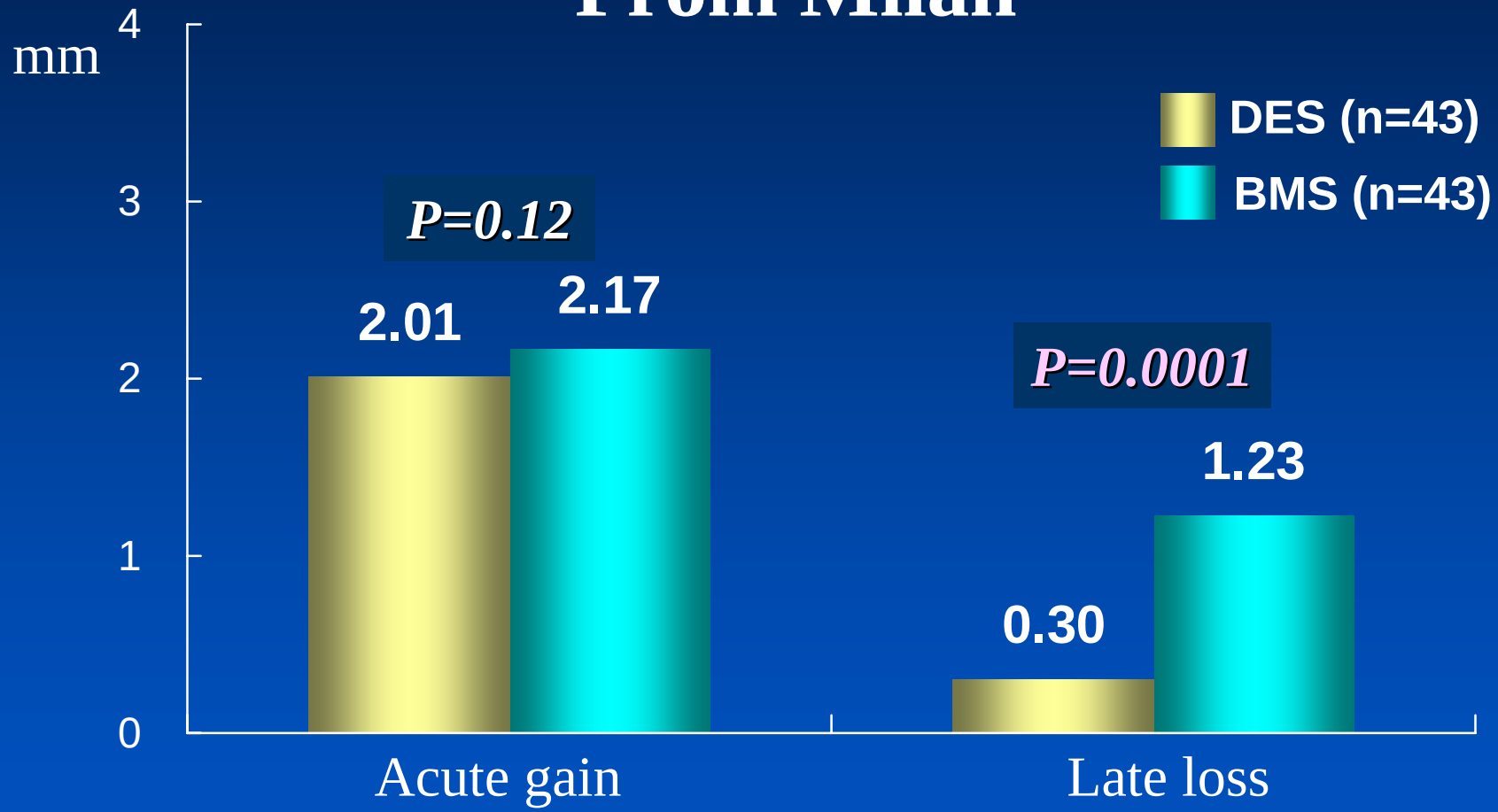
	DES (n=43)	BMS (n=43)	P
Angiographic success	43 (100%)	43 (100%)	1.00
Death	0	1 (2.3%)	0.31
Q wave MI	0	0	-
Non Q wave MI	1 (2.3%)	2 (4.7%)	0.84
Emergency bypass	0	0	-
Repeat PCI	0	0	-

Colombo et al, Am J Cardiol 2006;97:187–191

BMS vs DES in the Ostial LAD

Acute Gain & Late Loss

From Milan

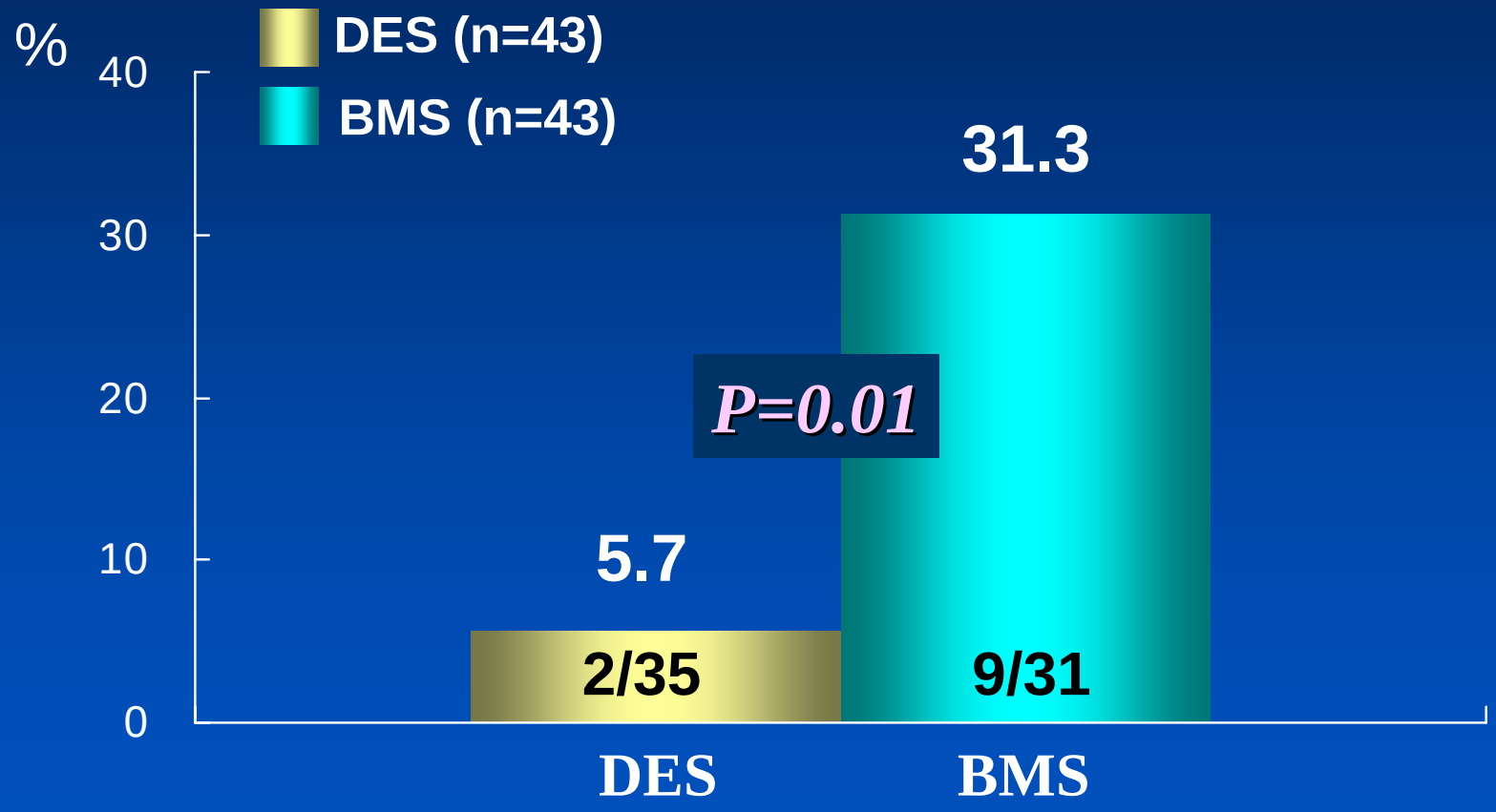


Colombo et al, Am J Cardiol 2006;97:187–191

BMS vs DES in the Ostial LAD

Restenosis Rate

From Milan

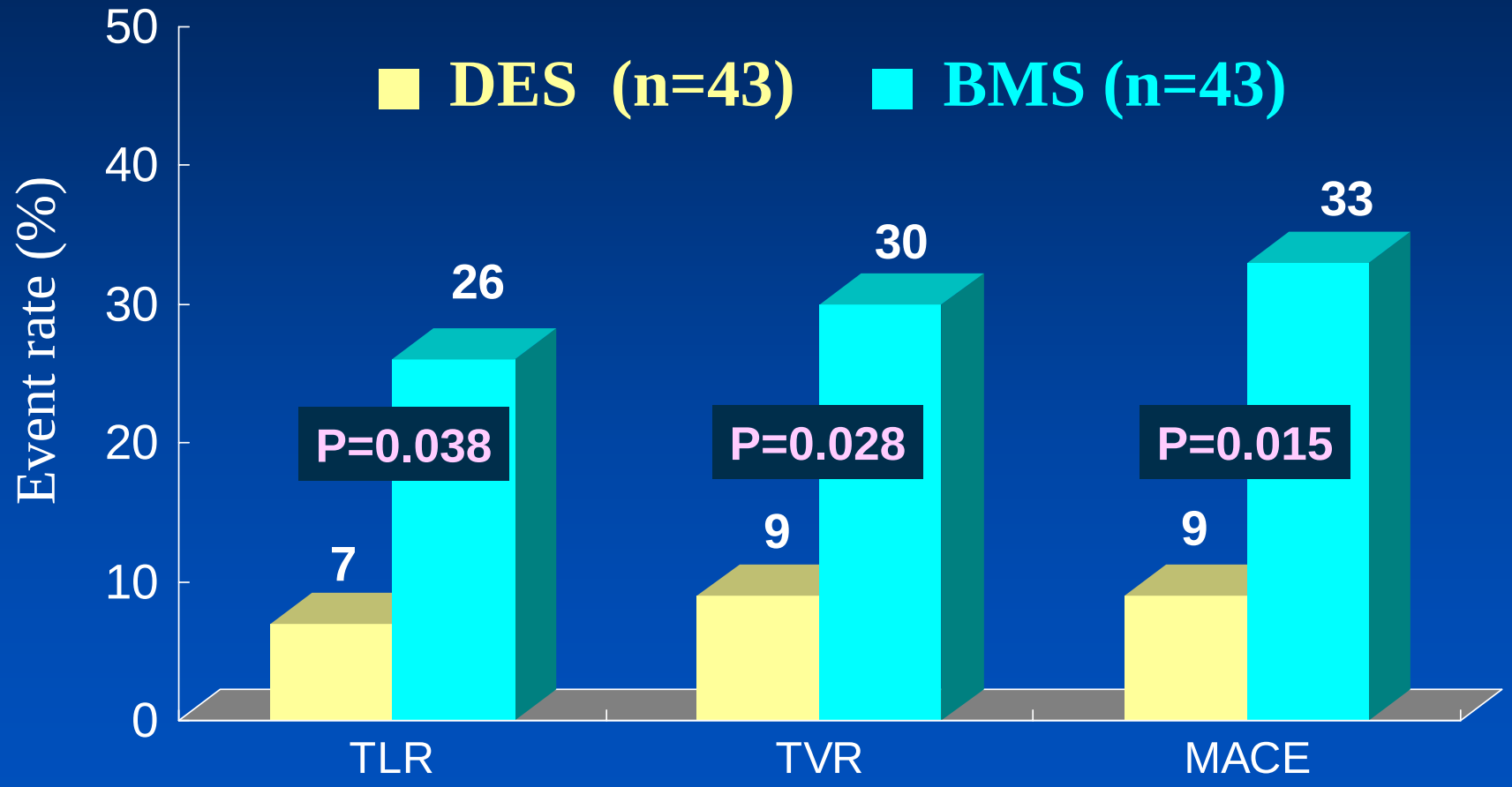


Colombo et al, Am J Cardiol 2006;97:187–191

BMS vs DES in the Ostial LAD

Nine-month Outcomes

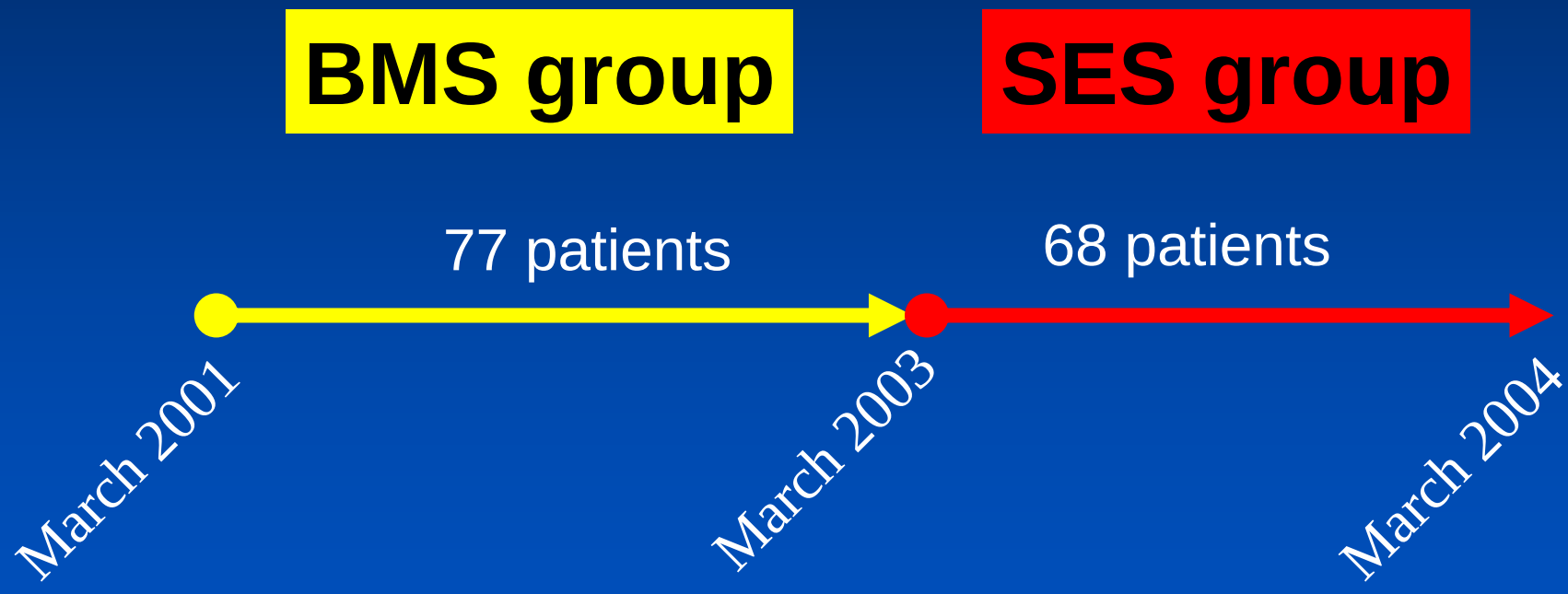
From Milan



Colombo et al, Am J Cardiol 2006;97:187–191

Ostial LAD Stenting in AMC

Matched Comparison with BMS



Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC

Procedural Comparison

	SES (n=68)	BMS (n=77)	*P*
Multivessel PCI	19 (27.9)	7 (9.1)	0.003
Direct stenting	24 (35.3)	0 (0)	<0.001
Debulking atherectomy	1 (1.5)	38 (49.4)	<0.001
IVUS guidance	61 (89.7)	59 (76.6)	0.037
GP IIb/IIIa inhibitor	1 (1.5)	2 (2.6)	1.000

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC

Procedural Comparison

	SES (n=68)	BMS (n=77)	*P*
Stents per lesion	1.4±0.6	1.0±0.2	<0.001
Total stent length, mm	31.2±19.3	16.6±5.2	<0.001
Final balloon size, mm	3.8±0.4	3.9±0.6	0.0037
Inflation pressure, mm	17.6±3.1	14.9±2.6	<0.001
Final kissing balloon	12 (17.6)	4 (5.2)	0.0031

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC

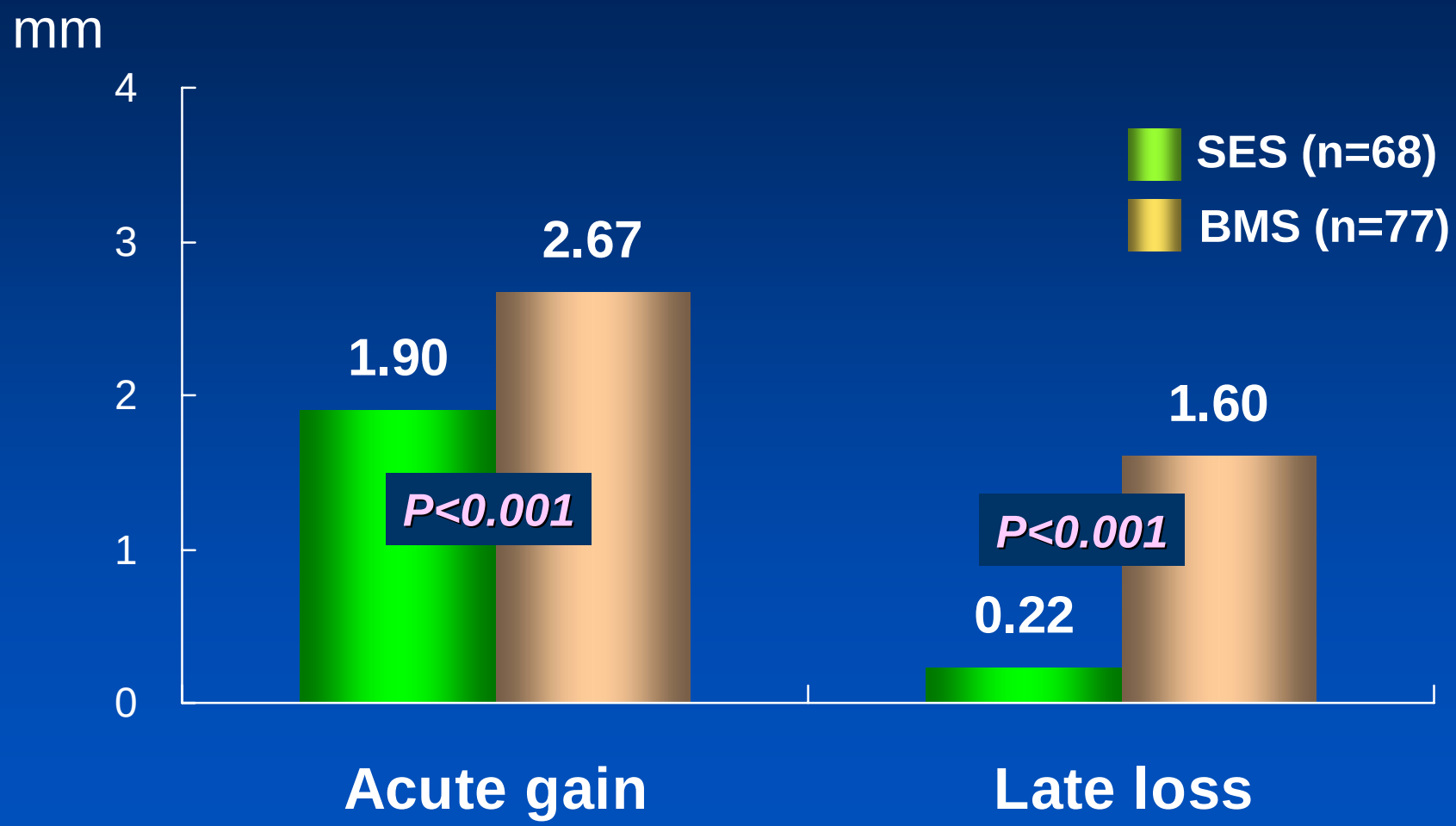
In-hospital Outcomes

	SES (n=68)	BMS (n=77)	*P*
Procedural success	68 (100)	77 (100)	1.0
Death	0	0	1.0
Non-Q MI	5 (7.4)	4 (5.2)	0.591
Stent jail (≥ 50%)	1 (1.5%)	7 (9.1%)	0.067
Stent thrombosis	0	0	1.0
TLR	0	0	1.0

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC

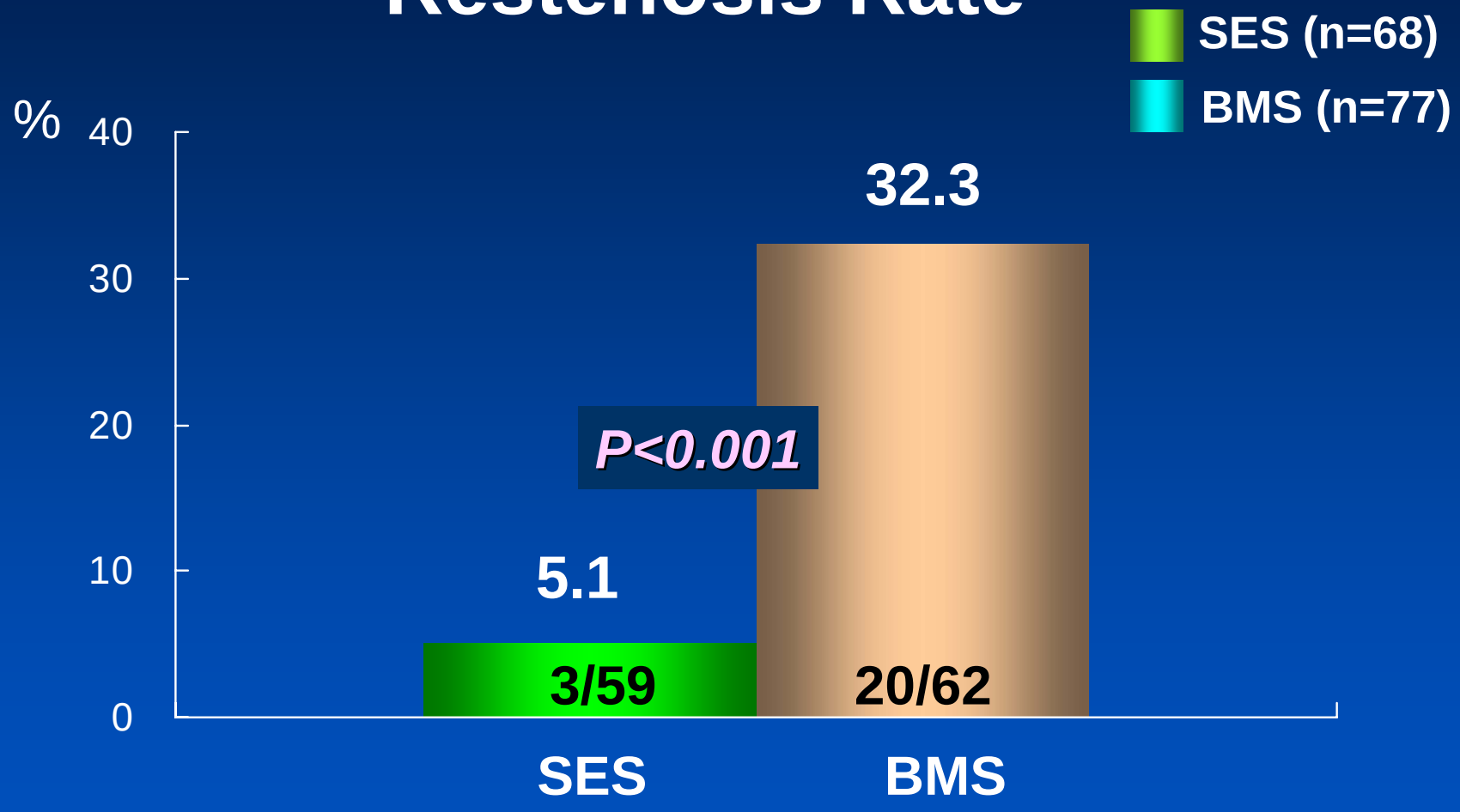
Acute Gain & Late Loss



Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC

Restenosis Rate



Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting in AMC
Nine- Months MACE

	SES (n=68)	BMS (n=77)	*P*
Death	0	0	1.0
MI Q MI	0	0	1.0
Non-Q MI	0	0	
Stent thrombosis	0	0	1.0
TLR	0	13 (16.9%)	<0.001
MACE	0	13 (16.9%)	<0.001

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Disease

Stenting Technique

In the DES Era

Two Stenting Strategy

According to Lesion Characteristics

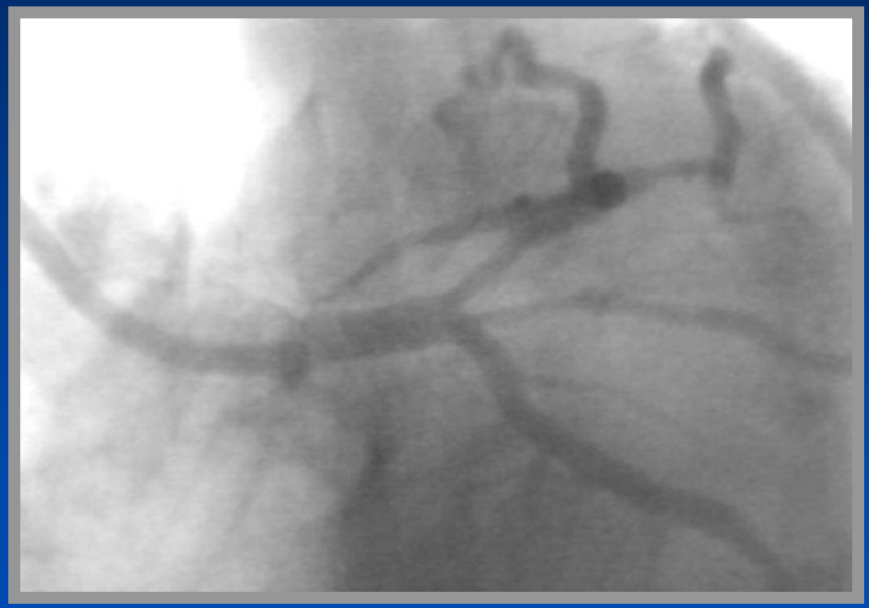
1. Precise Location at Ostial LAD

2. Stenting Covering the Distal LMCA

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

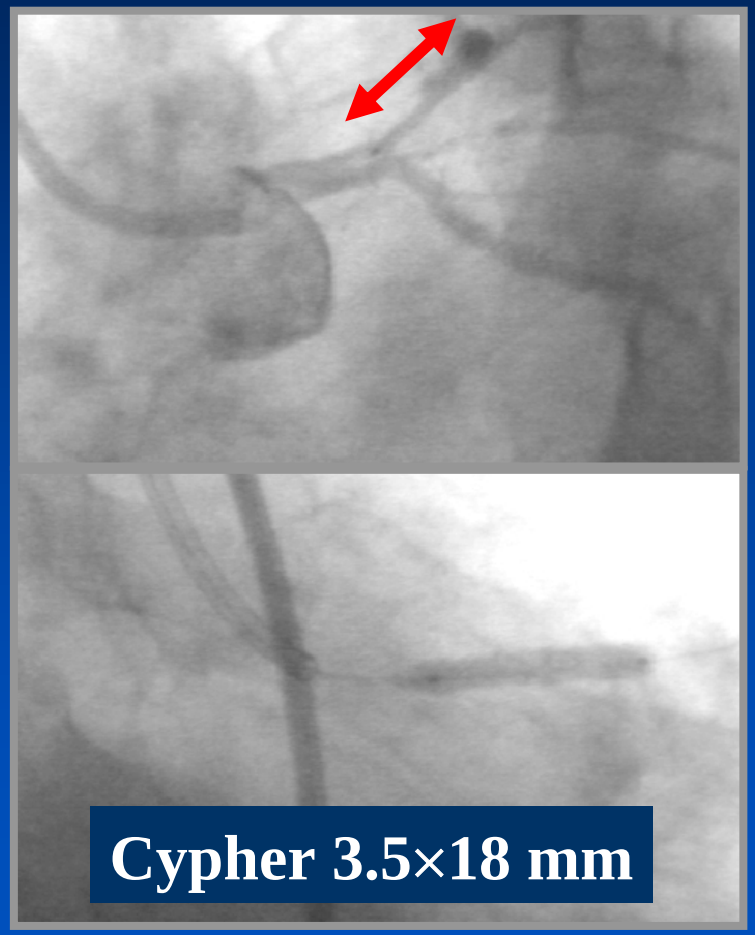
Precise Location

at the Ostial LAD Lesion

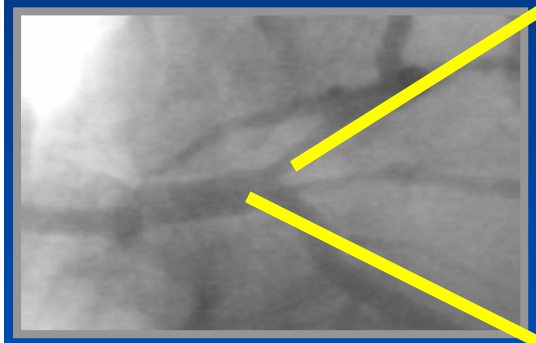


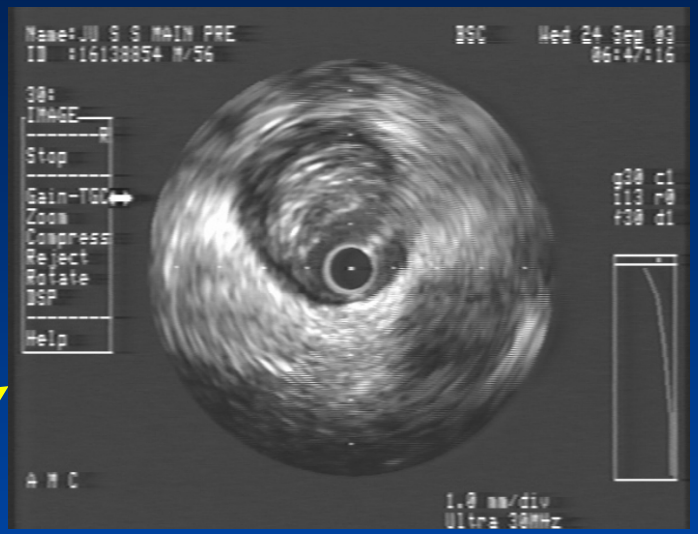
Precise Location

Stenting and Final Result



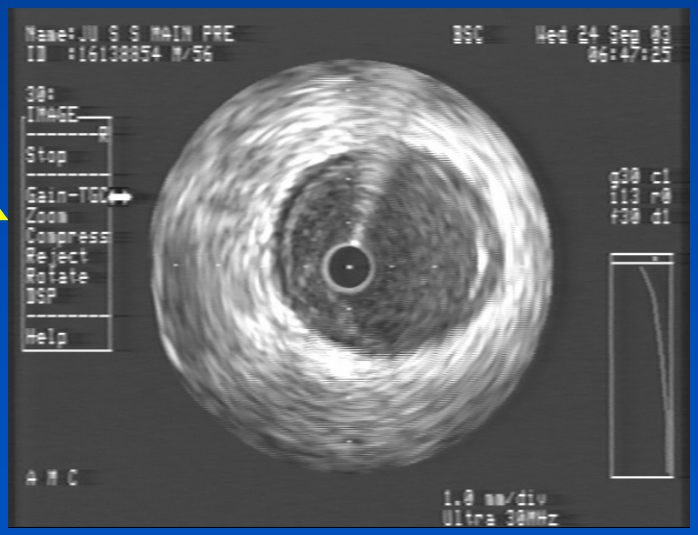
Precise Location
IVUS Evaluation





Ostial LAD

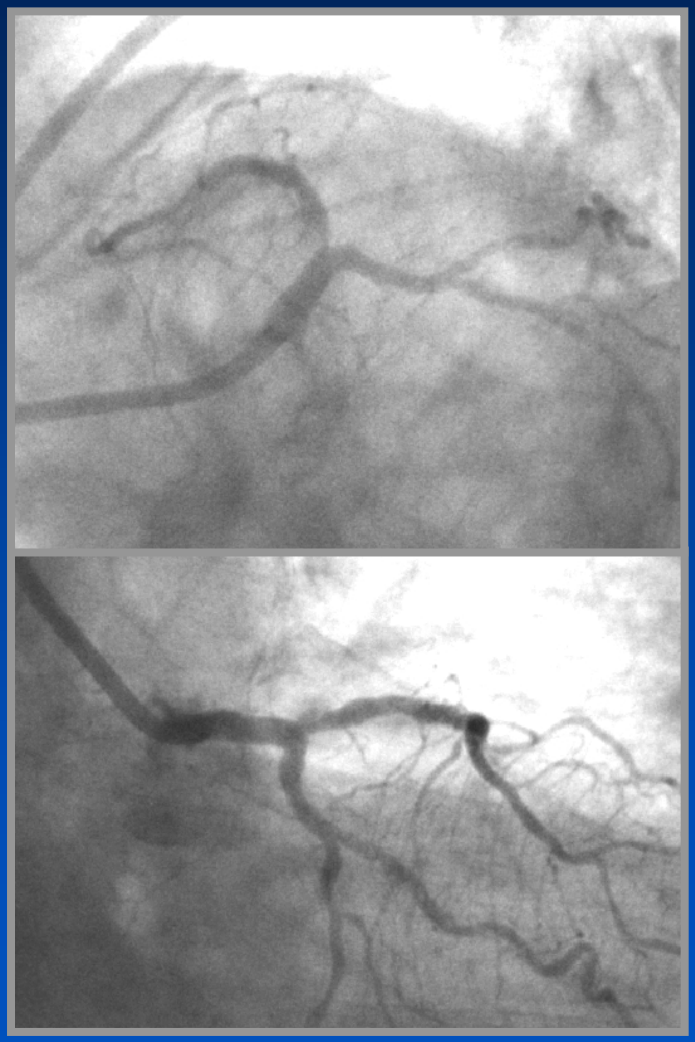
- Lumen CSA:2.86 mm^2
- EEM CSA:14.38 mm^2
- Plaque burden:80%



Distal LMCA

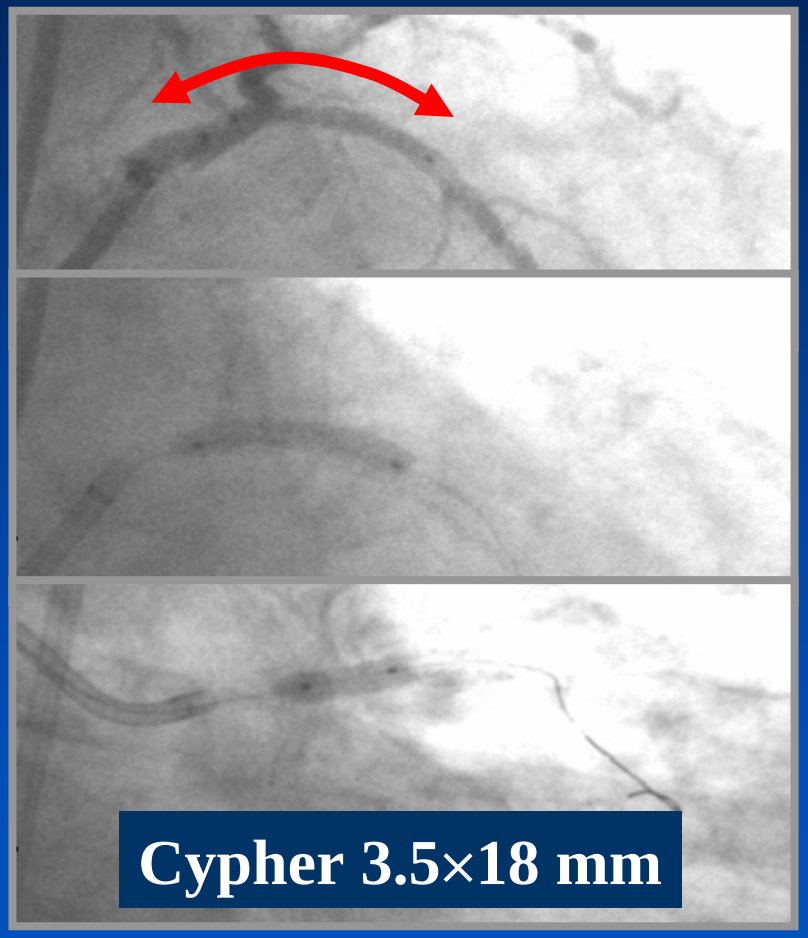
- Lumen CSA: 16.28mm^2
- EEM CSA: 17.89mm^2
- **Plaque burden:10%**

Stenting Covering the Distal LMCA



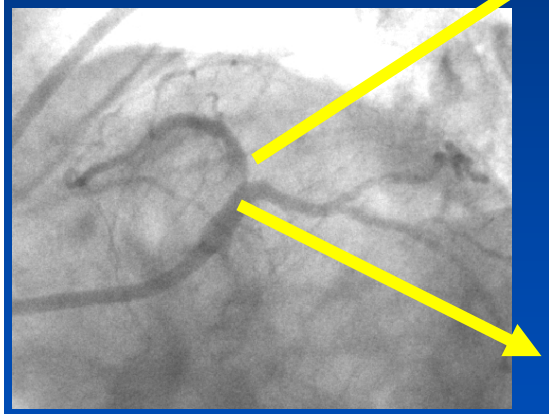
Stenting Crossover the LCX

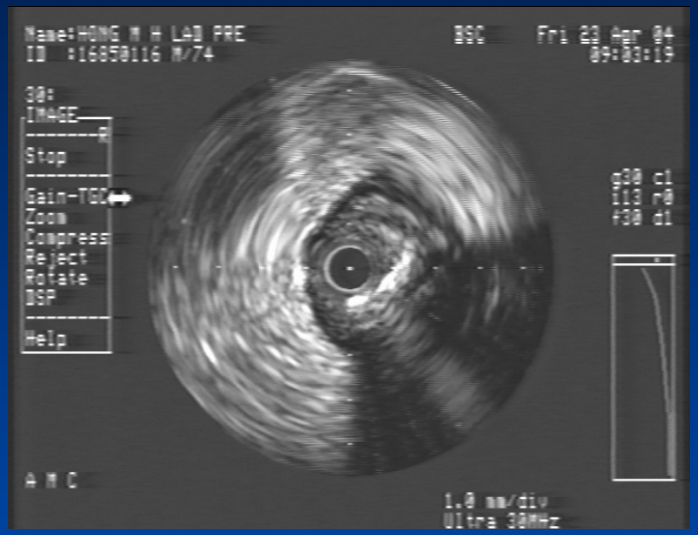
Stenting and Final Result



Stenting Covering the Distal LMCA

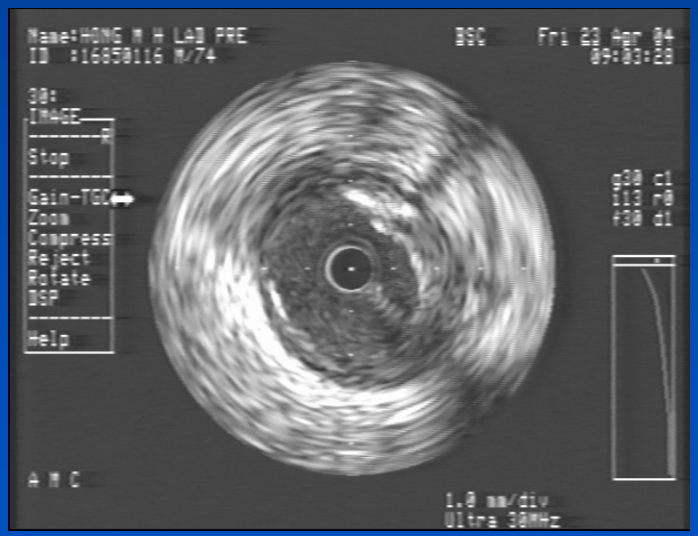
IVUS Evaluation





Ostial LAD

- Lumen CSA: 2.23mm^2
- EEM CSA: 14.35mm^2
- Plaque burden: 85%



Distal LMCA

- Lumen CSA: 8.27mm^2
- EEM CSA: 17.17mm^2
- **Plaque burden: 52%**

Stenting Covering the Distal LMCA
Indications

- Patients with intermediate narrowing at the LMCA bifurcation
  - **Diameter stenosis ≥ 30% on QCA**
  - **Plaque burden ≥ 40% on IVUS**

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

QCA in the Distal LMCA

Two Stenting Strategy

	LM cover (n=23)	Precise (n=45)	*P*
Reference diameter, mm	3.78±0.66	4.00±0.54	0.157
MLD, mm	2.38±1.01	3.67±0.62	<0.001
Diameter stenosis, %	33.8±25.8	7.7±13.7	<0.001

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

IVUS in the Distal LMCA

Two Stenting Strategy

	LM cover (n=23)	Precise (n=45)	*P*
Before procedure			
EEM CSA, mm^2	19.64±6.33	20.57±5.38	0.574
Lumen CSA, mm^2	9.86±2.83	12.39±3.71	0.014
Plaque burden, %	48.01±11.47	39.75±8.22	0.004

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

QCA in the Ostial LAD
Two Stenting Strategy

	LM cover (n=23)	Precise (n=45)	p
Lesion length, mm	21.7 ± 12.9	26.1± 18.8	0.32
Reference diameter, mm	2.87 ± 0.48	2.85 ± 0.53	0.87
Minimal lumen diameter			
Baseline, mm	1.00 ± 0.54	0.88 ± 0.52	0.40
Final, mm	2.97 ± 0.35	2.97 ± 0.42	0.94

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

IVUS in the Ostial LAD

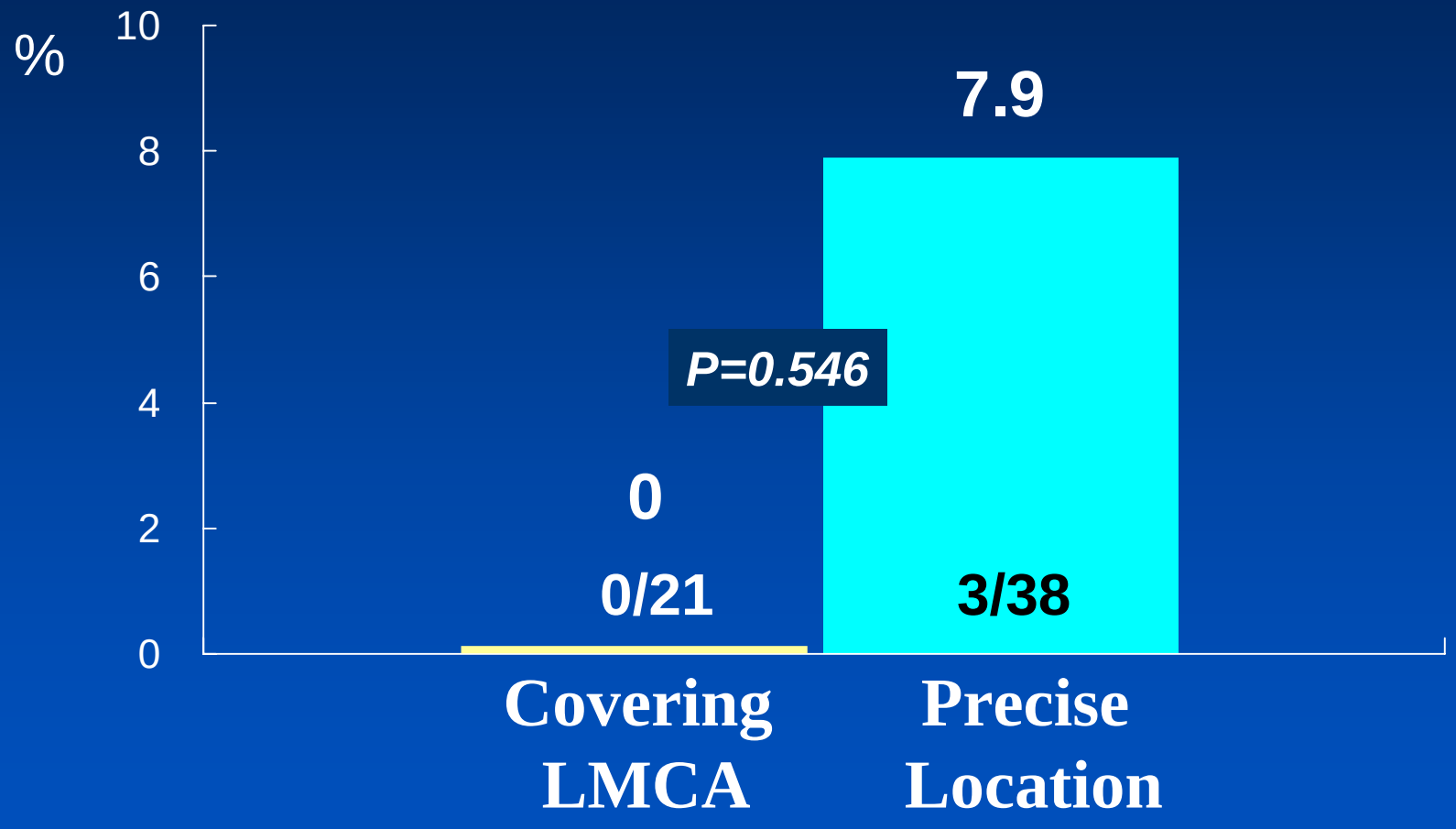
	LM cover (n=20)	Precise (n=41)	P
Before procedure			
EEM CSA, mm^2	13.68 ± 4.34	14.03 ± 3.85	0.770
Lumen CSA, mm^2	2.26 ± 0.50	2.39 ± 0.76	0.532
Plaque burden, %	82.28 ± 5.06	82.30 ± 5.06	0.993
After procedure			
EEM CSA, mm^2	15.41 ± 3.11	16.11 ± 3.03	0.420
Lumen CSA, mm^2	7.35 ± 1.69	7.42 ± 1.25	0.866
Plaque burden, %	52.16 ± 6.37	53.44 ± 5.84	0.451

Seung KB et al, J Am Coll Cardiol 2005;46:787–92

AMC

Restenosis Rate

Two Stenting Strategy



Seung KB et al, J Am Coll Cardiol 2005;46:787–92

Ostial LAD Stenting with SES

Two Stenting Strategy

In Summary

- The SES implantation appears effective in reducing restenosis and TLR for the ostial LAD lesions, compared to the BMS.

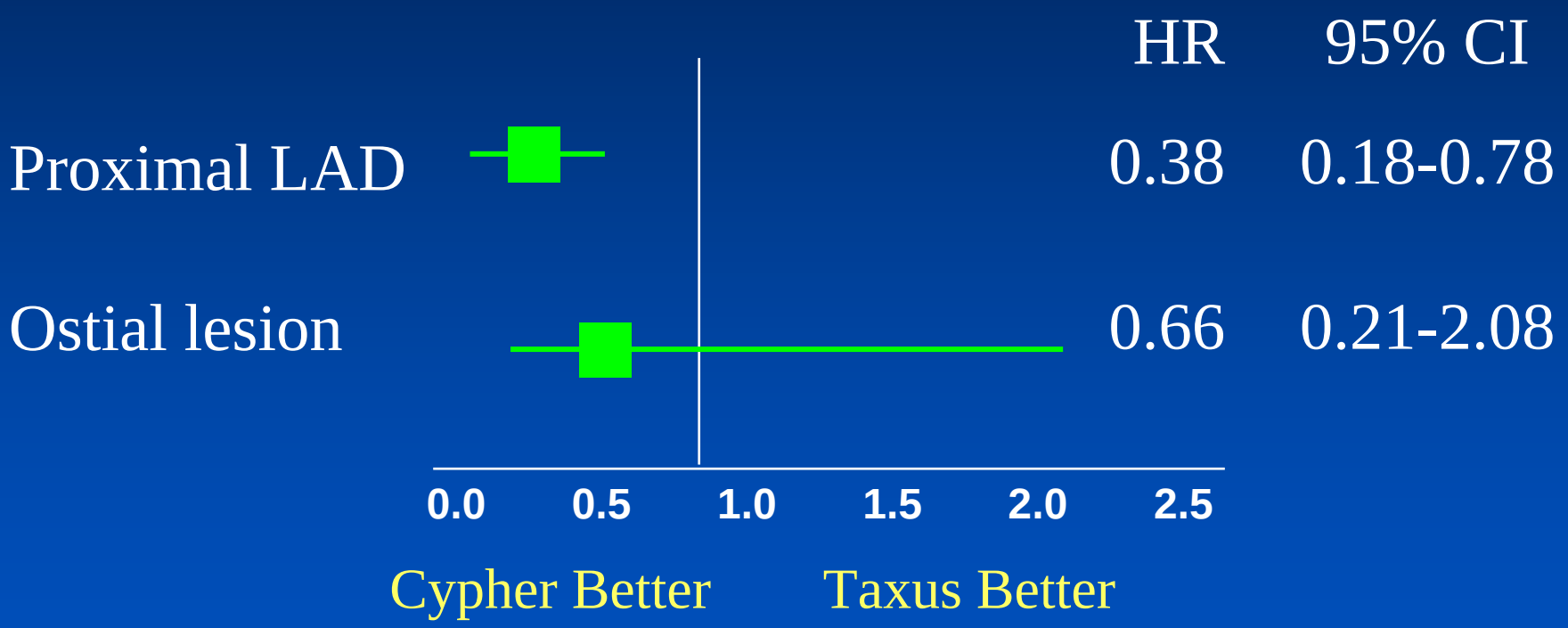
- SES implantation covering the LMCA for intermediate distal LCMA narrowing achieves complete lesion coverage and lead to favorable clinical outcomes.

Aorto-Ostial Disease in the DES era

Cypher vs. Taxus

Cypher vs Taxus

Results From a Large Multicenter Registry



Francesco Saia et a. JACC 2006; 48: 1312