

# PCI for Ostial LAD Disease



# Ostial Lesion

## *Limitations of PCI*

- **Technical challenges**
  - Rigidity, Elastic recoil
  - Dissection, Plaque shifting
  - Guiding catheter support
- **Long term outcomes**
  - High restenosis rates

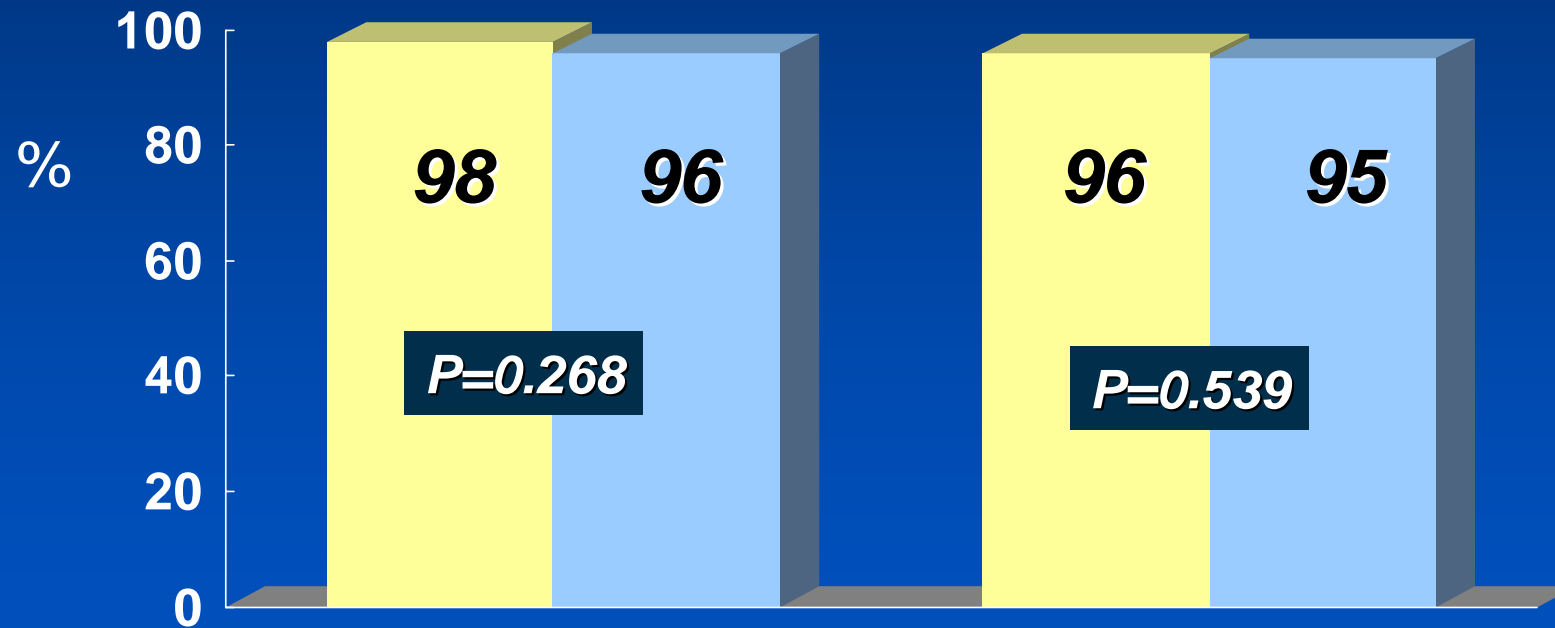
# Ostial vs. Non-ostial in the BMS Era

■ Ostial (n=223)

■ Non-ostial (n=2,261)

Angiographic success

Procedural success

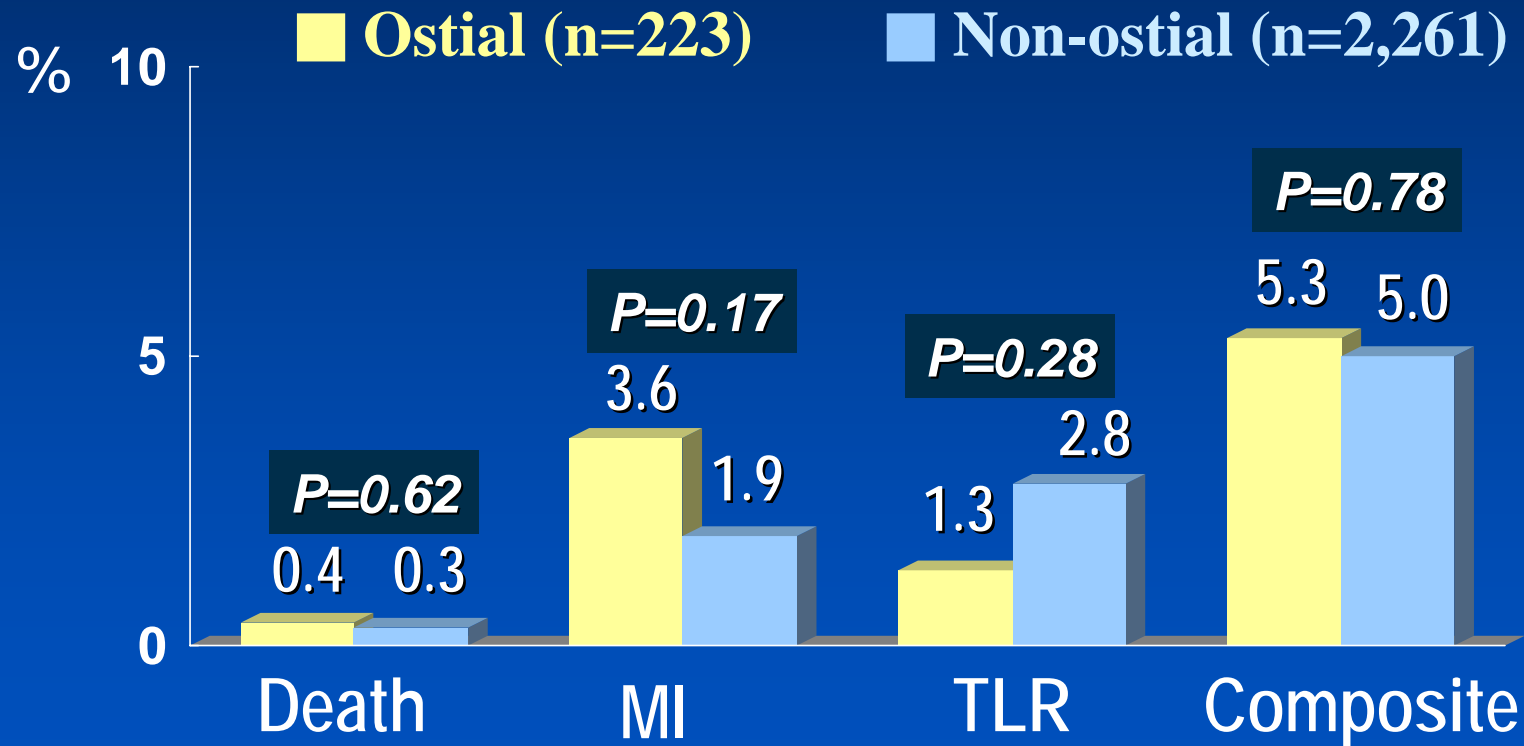


*Mavromatis K et al, Am J Cardiol 2004;94:583*

# Ostial vs. Non-ostial

in the BMS Era

## In-Hospital MACE

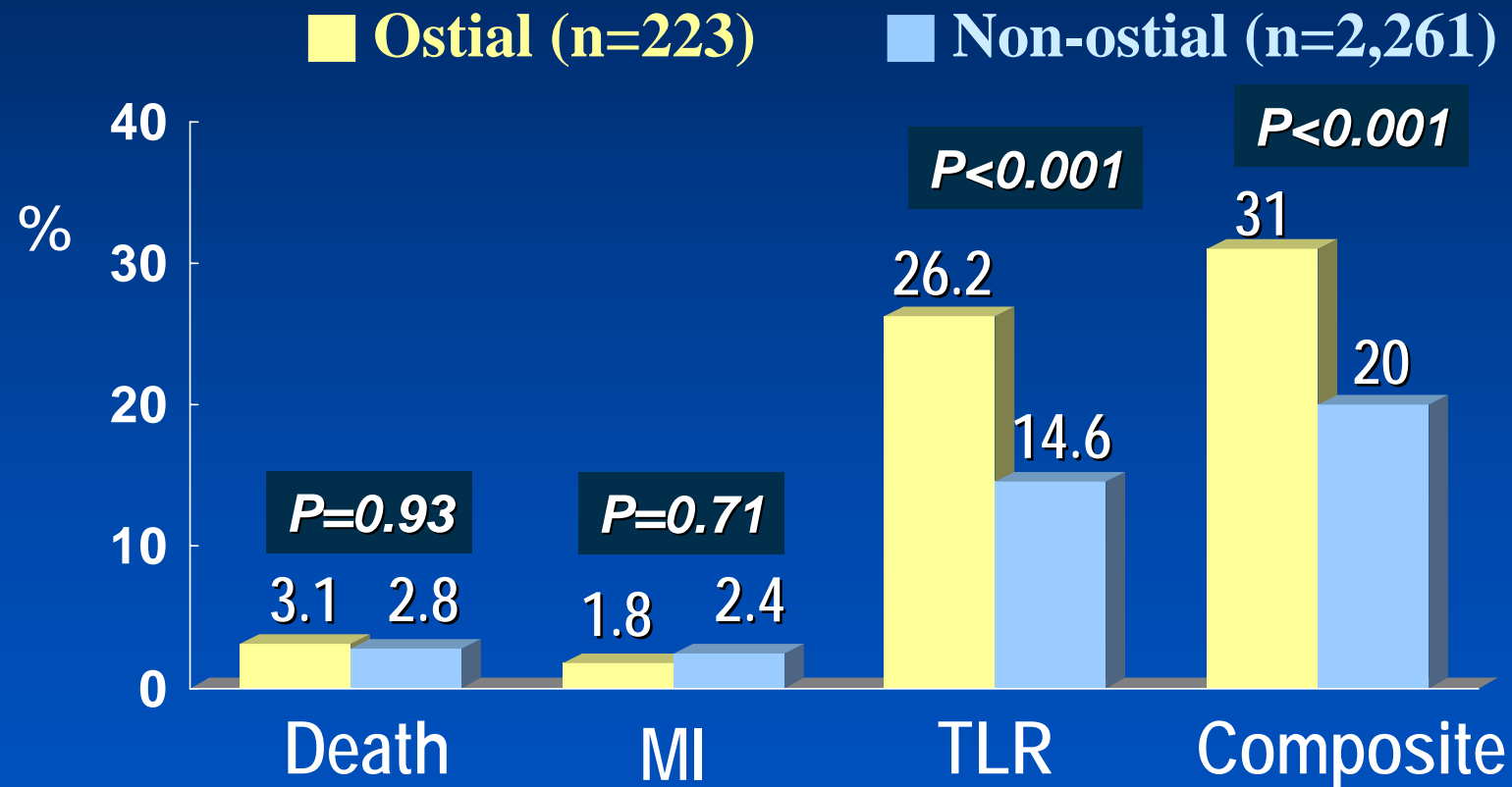


Mavromatis K et al, Am J Cardiol 2004;94:583

# 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 BMS Era

## *In Summary*

- PCI of ostial lesions appears safe.
- However, one-year MACE of ostial lesions was higher than that of non-ostial lesions

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



# **Aorto-ostial Disease in the DES era**



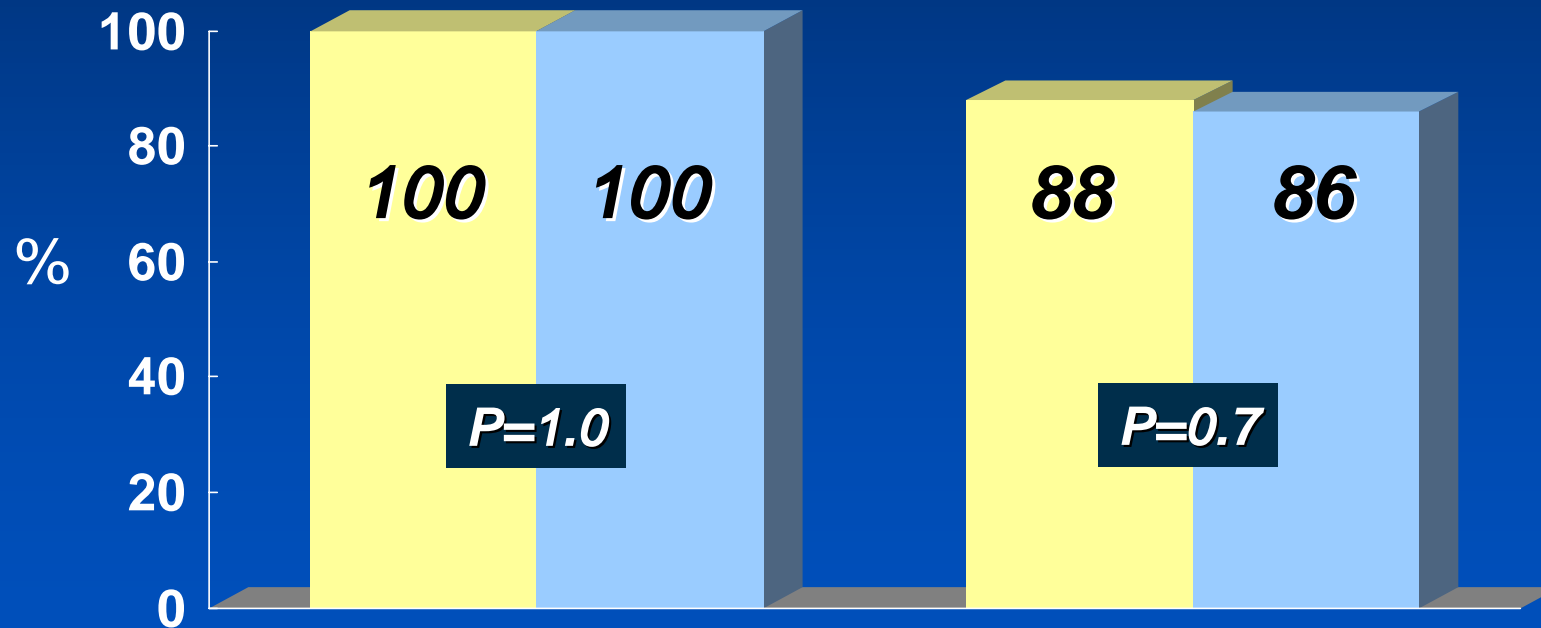
# Aorto-ostial lesions in the DES Era

■ SES (n=32)

■ BMS (n=50)

Angiographic success

Procedural success

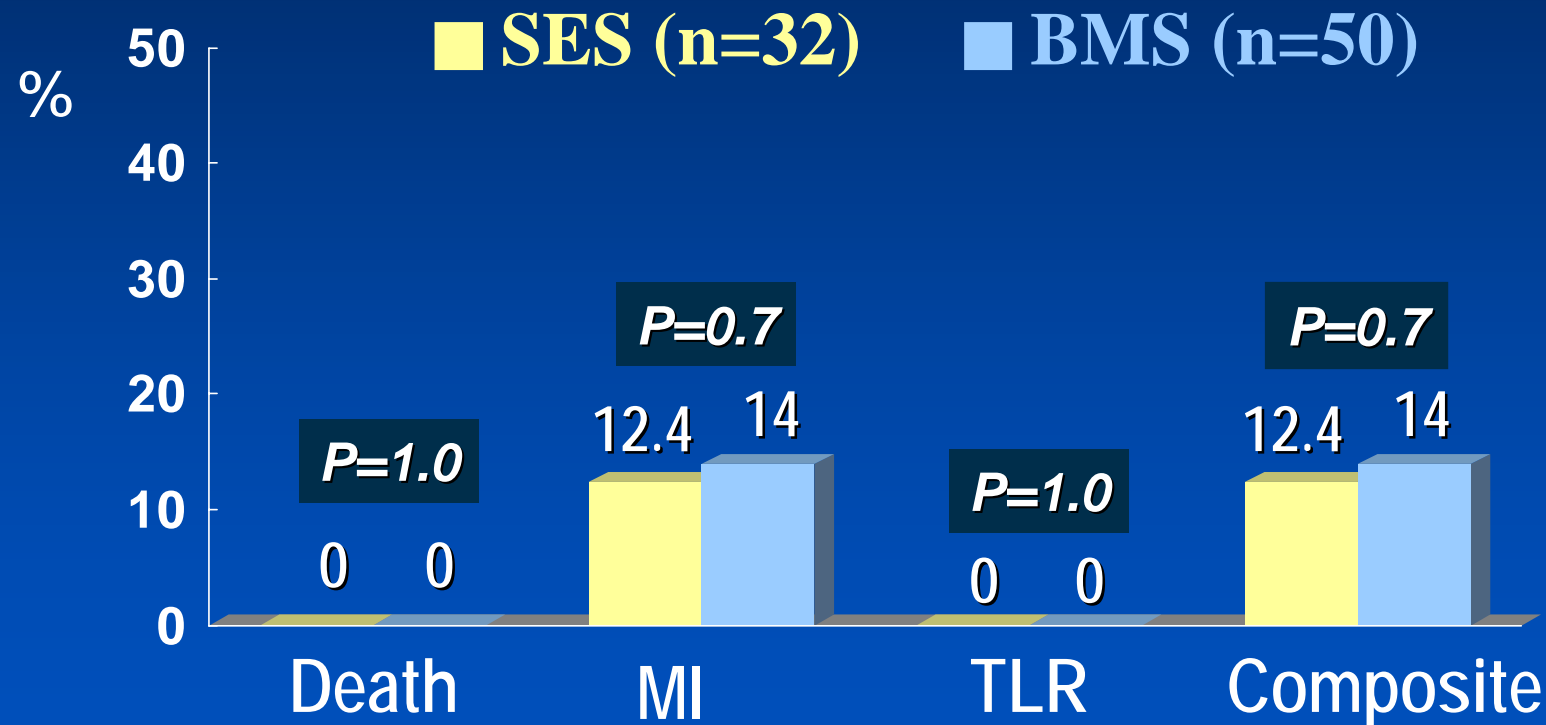


*Iakovou et al, J Am Coll Cardiol 2004;44:967*



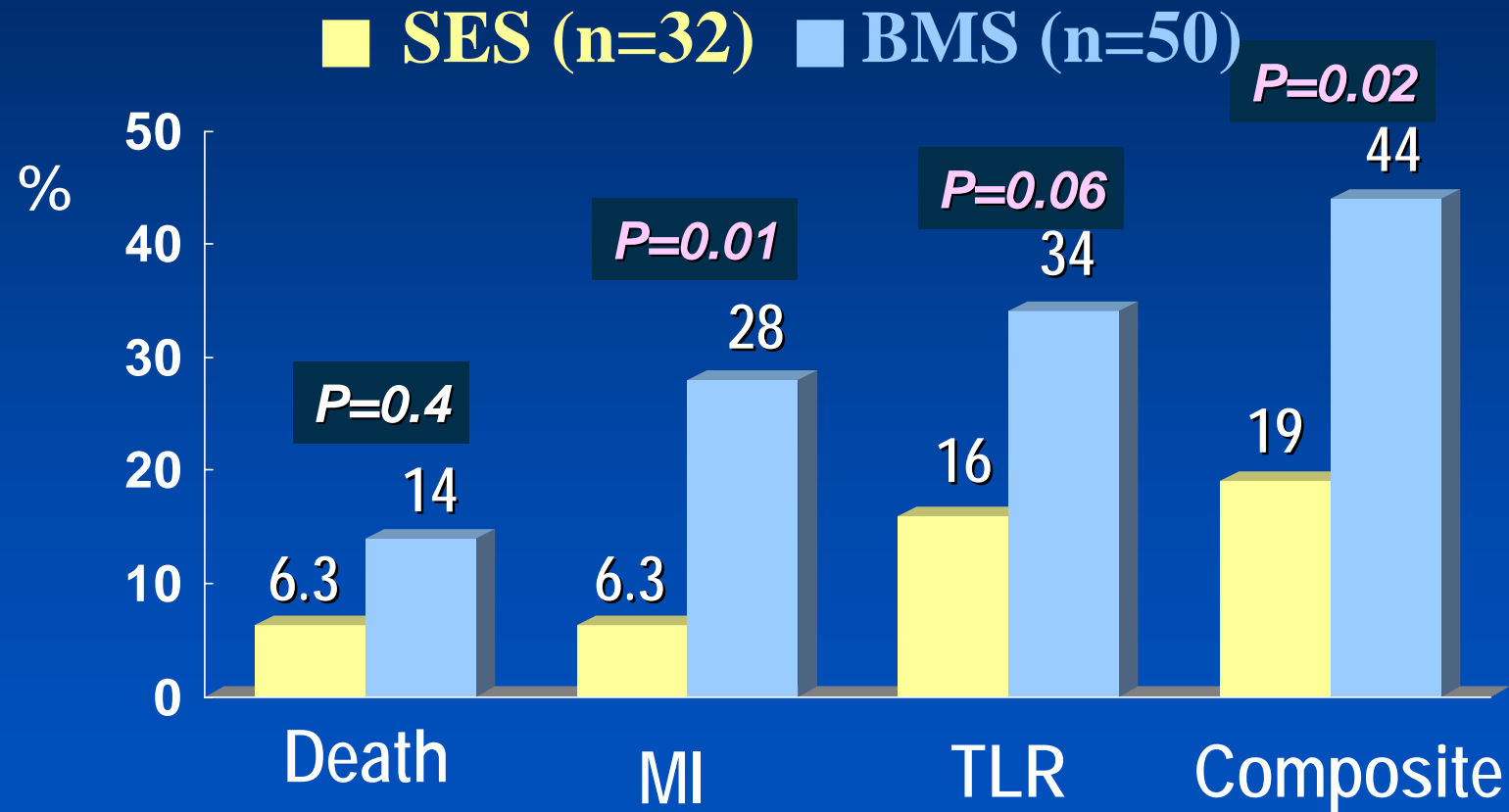
# Aorto-ostial lesions in the DES Era

## In-Hospital MACE



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

# Aorto-ostial lesions in the DES Era 10-Month MACE



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

# Aorto-ostial lesions

in the DES Era

## Follow-up QCA

	SES	BMS	P
Reference, mm	3.61±0.43	3.50±0.83	0.6
MLD, mm	3.13±0.59	1.60±1.36	<0.001
DS, %	15±13	55±34	<0.001
Late loss, mm	0.21±0.31	2.06±1.37	<0.001
Restenosis	3 (11%)	18 (15%)	0.001

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

# Aorto-ostial lesions

in the DES Era

## *In Summary*

- In comparison with the BMS, the SES in aorto-ostial lesions appears safe and effective with no increase in-hospital and 10-month MACE.

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



# Ostial LAD Disease



# Ostial LAD Disease

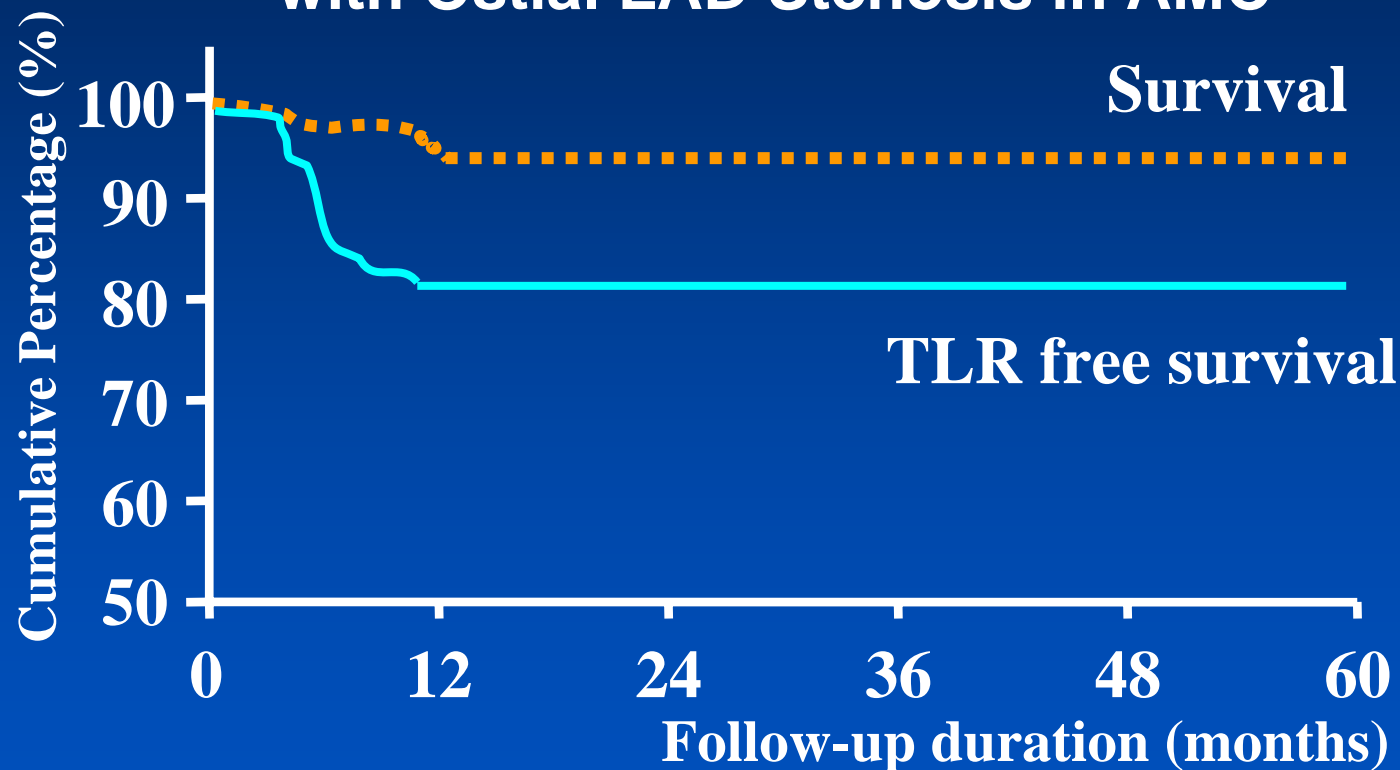
## In the BMS Era



# Long-term Outcome of BMS for LAD ostial lesion

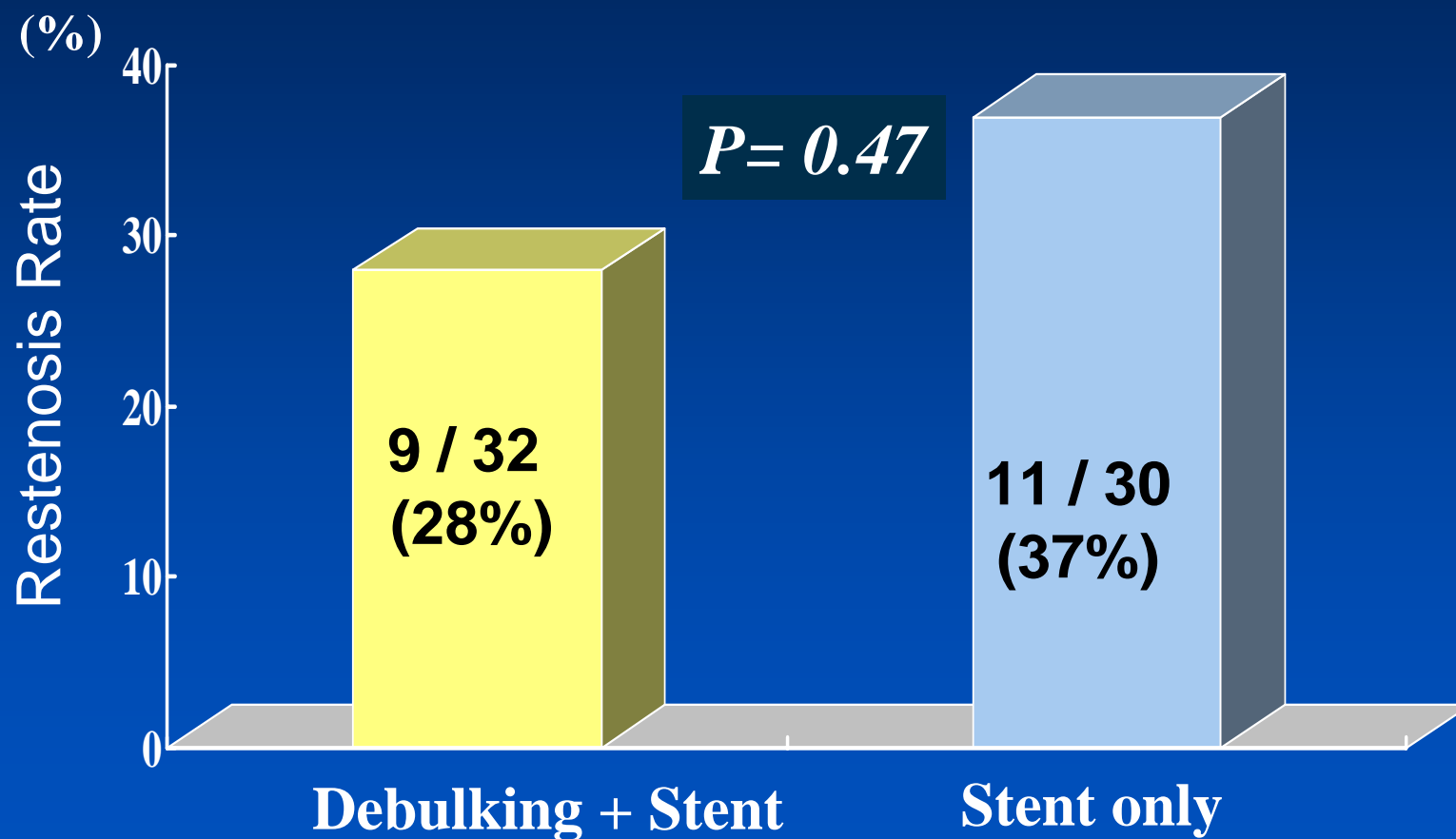
AMC

Early Experience of 111 Patients with Ostial LAD Stenosis in AMC



*Park SJ et al, Cathet Cardiovasc Intervent 2000;49:267-271*

# Role of Debulking for LAD ostial lesion



*YH Kim et al, Am Heart J 2004;148:663-9*



# Ostial LAD Disease

## In the DES Era



# Procedure Characteristics of de novo LAD ostial lesion

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

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

# Procedure Complications of Ostial LAD PCI

	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*

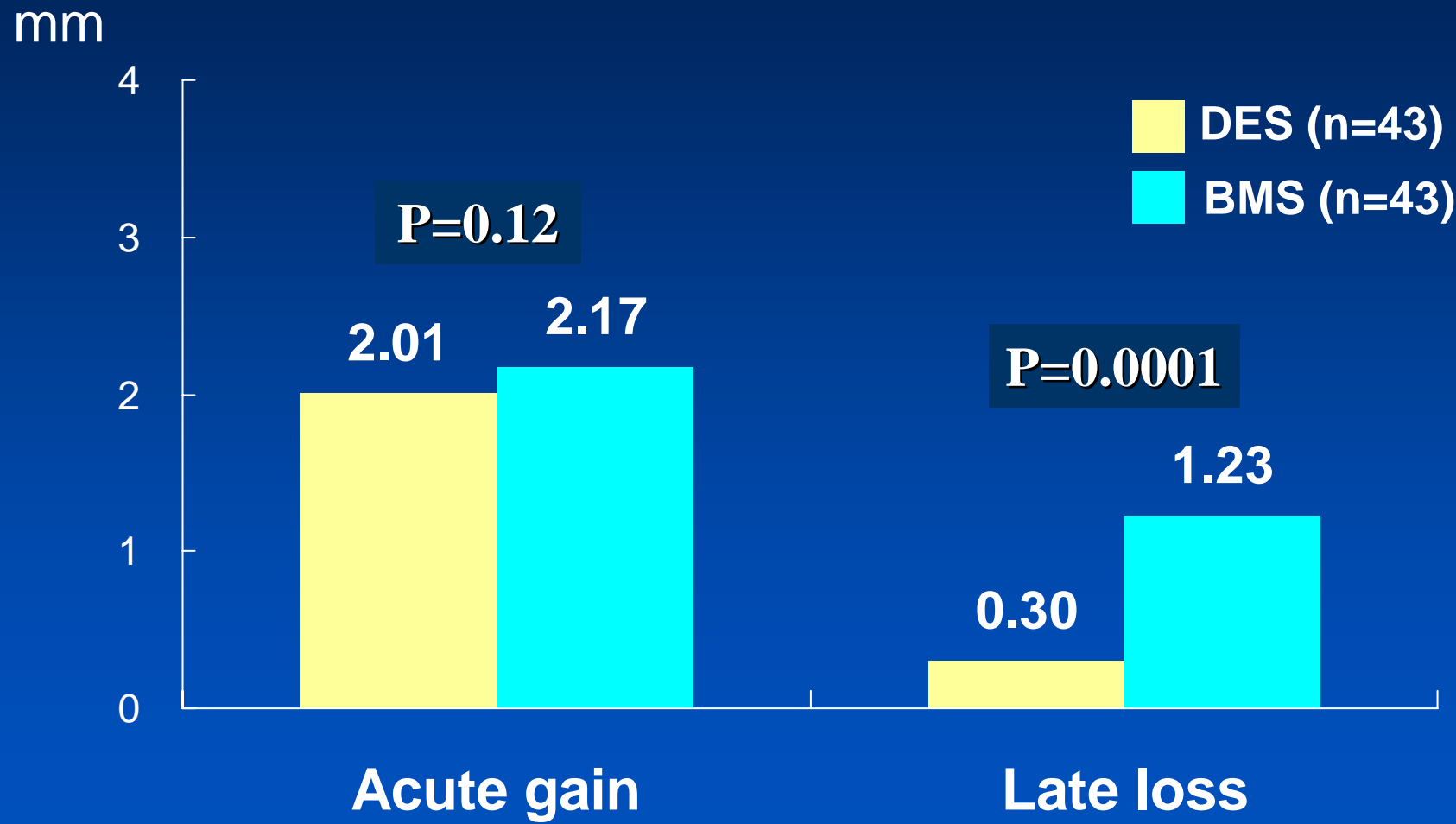
# In-Hospital Outcomes of Ostial LAD PCI

	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*

# Ostial LAD PCI

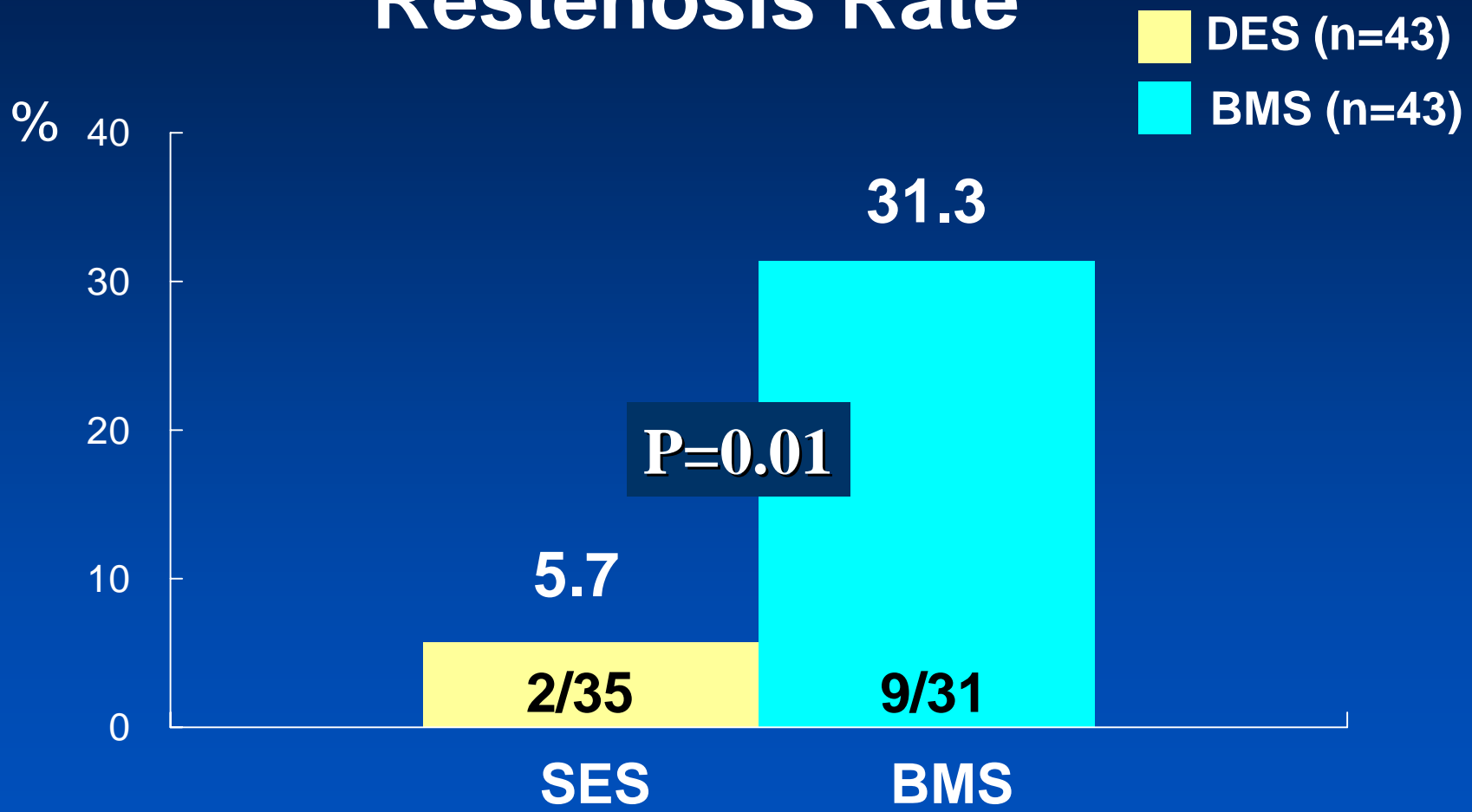
## Acute Gain & Late Loss



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

# Ostial LAD PCI

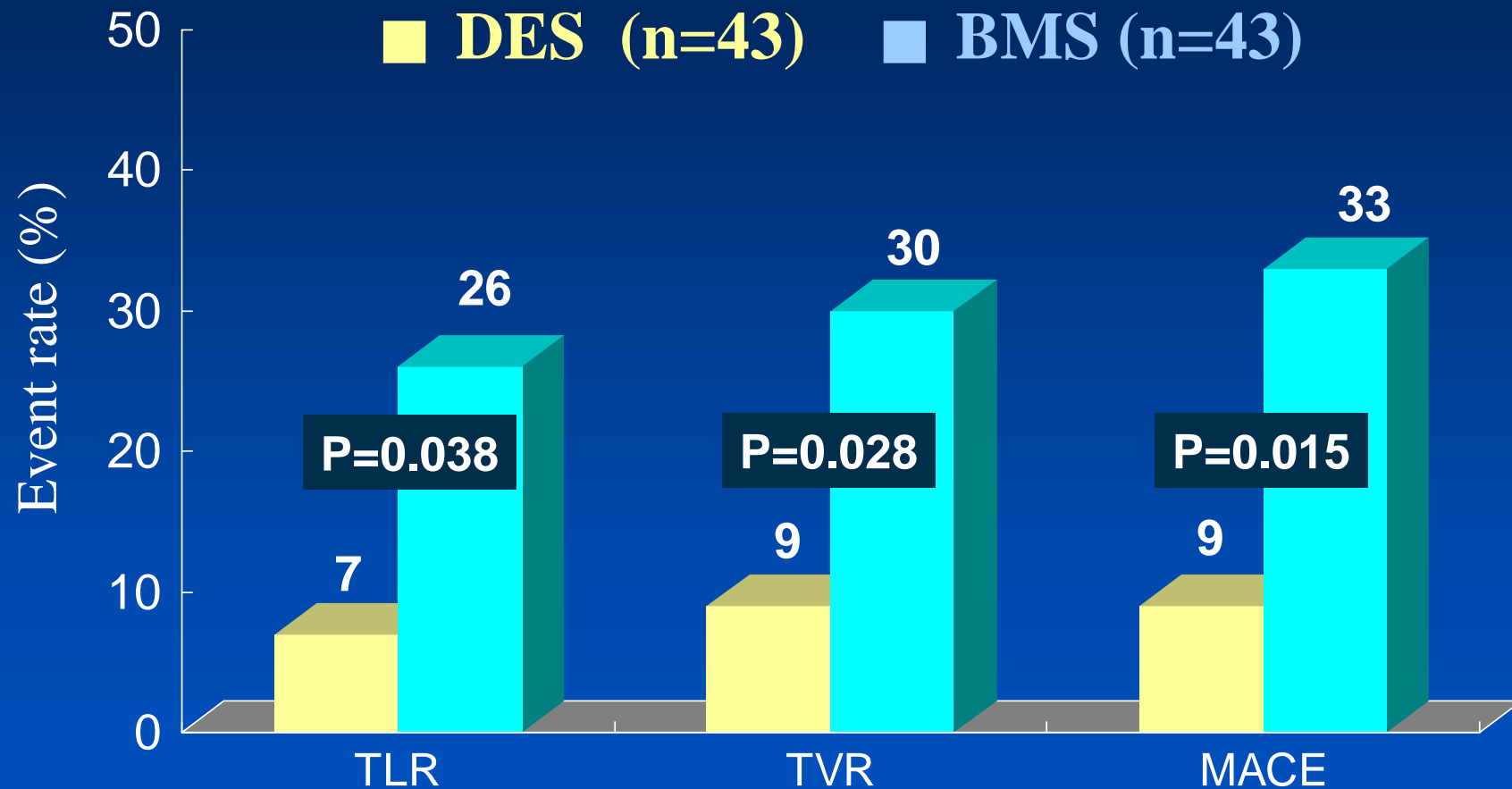
## Restenosis Rate



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

# Ostial LAD PCI

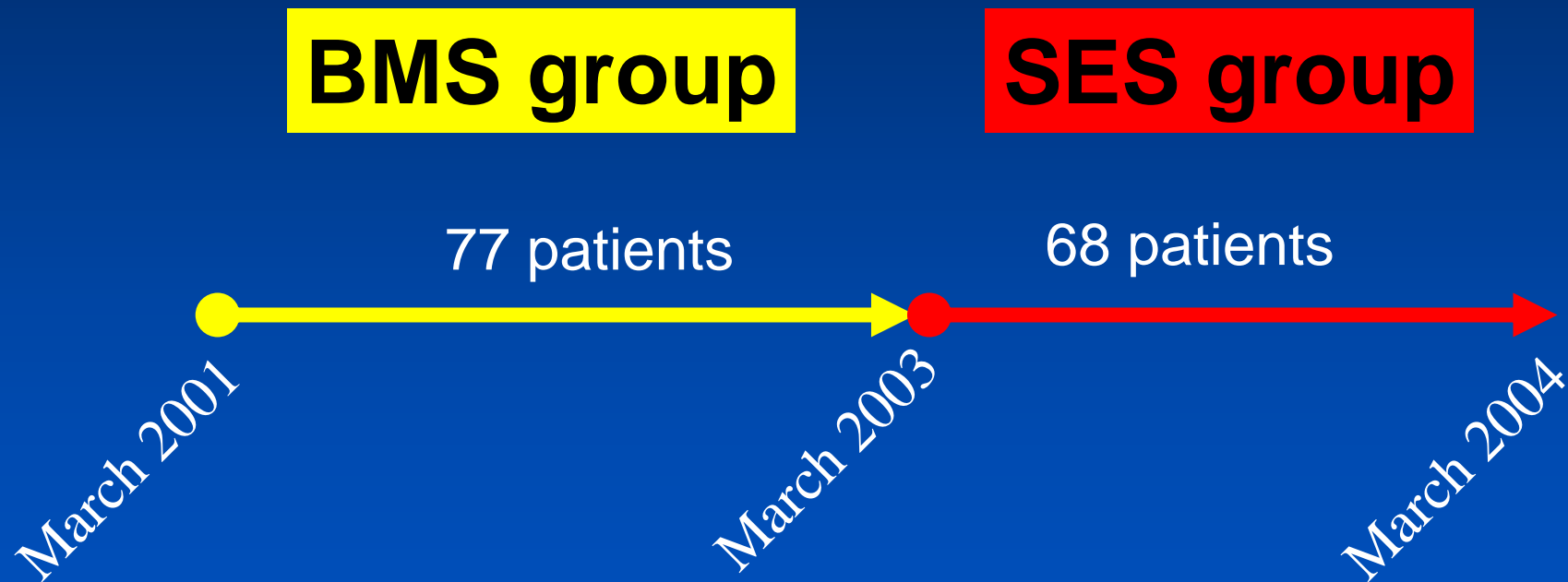
## 9 Month Outcomes



*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)	<i>P</i>
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)	<i>P</i>
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

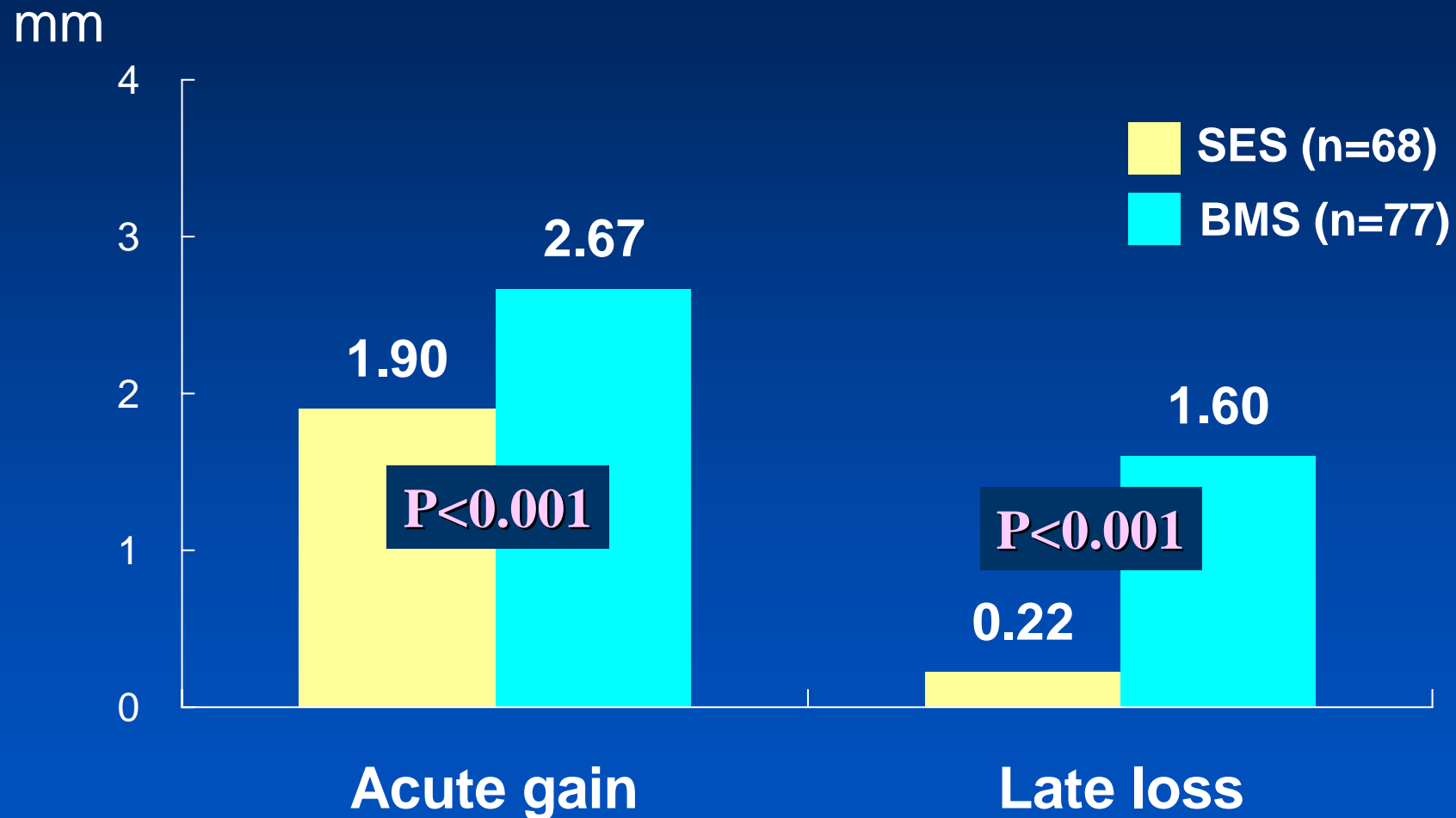
## In-hospital Outcomes

	SES (n=68)	BMS (n=77)	<i>P</i>
Procedural success	68 (100)	77 (100)	1.0
Death	0	0	1.0
MI	5 (7.4)	4 (5.2)	0.591
Q MI	0	0	
Non-Q MI	5 (7.4)	4 (5.2)	
Stent jail( $\geq 50\%$ )	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

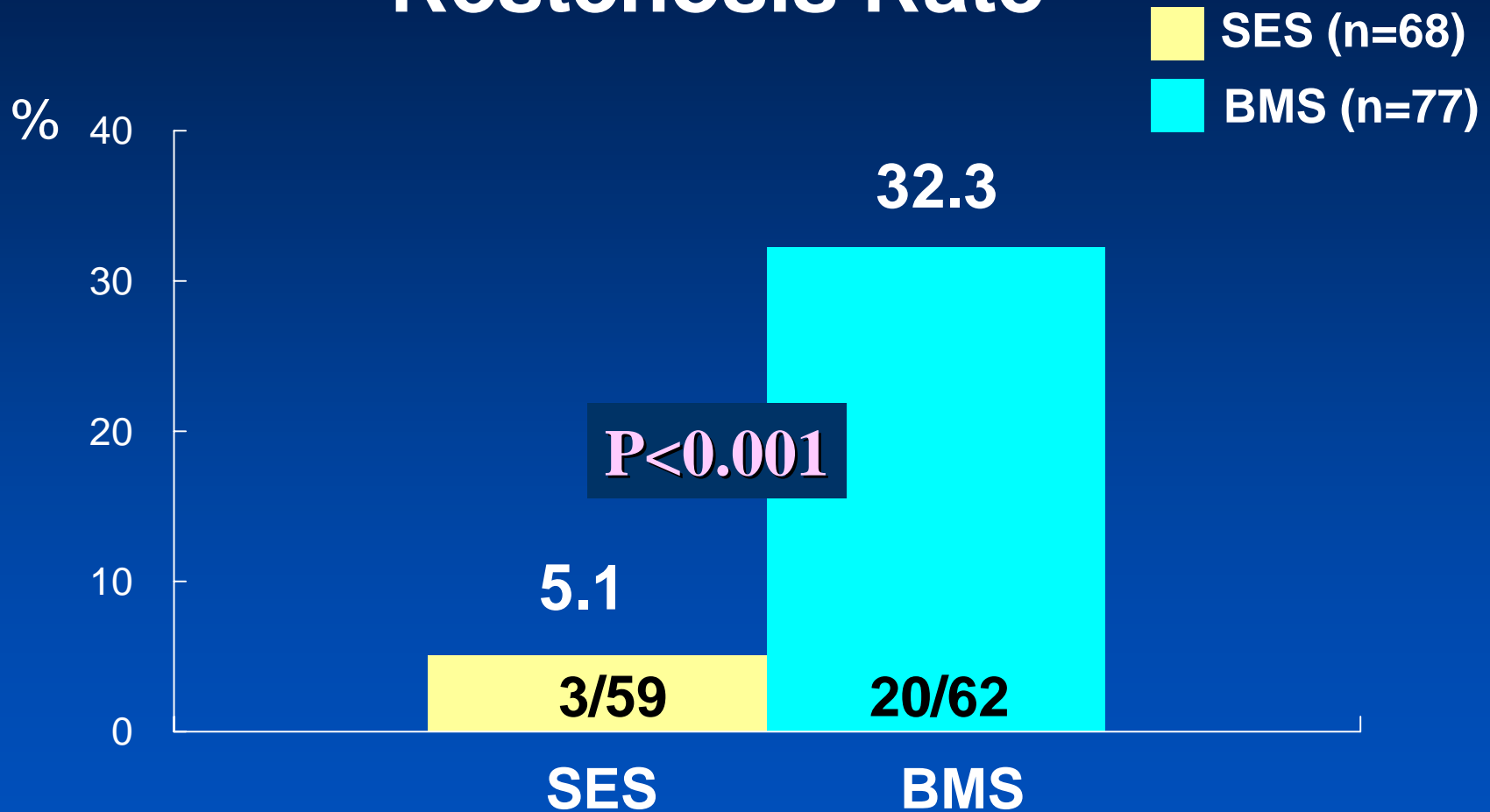
## Acute Gain & Late Loss



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 <sup>AMC</sup>

## 9 Months MACE

	SES (n=68)	BMS (n=77)	P
Patients	68	77	
Death	0	0	1.0
MI			1.0
Q MI	0	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 with SES

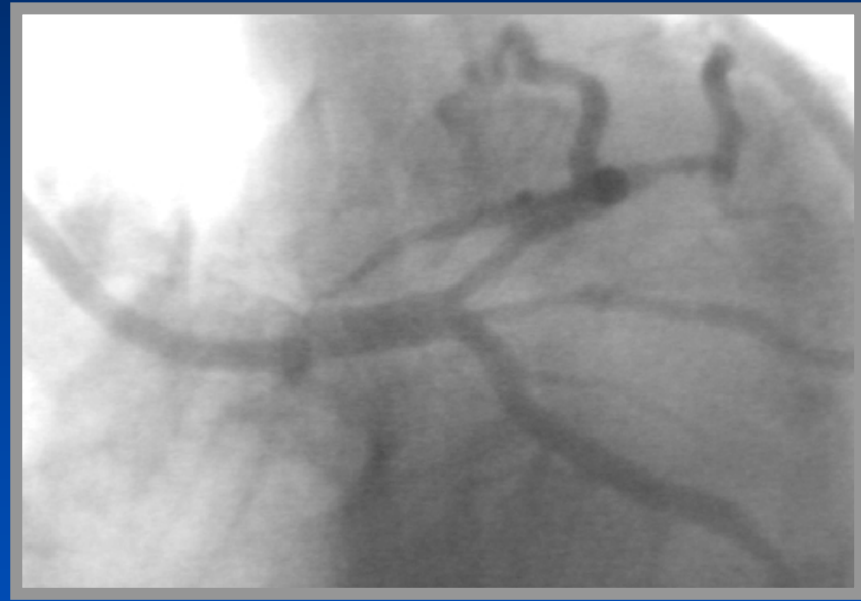
According to Lesion Characteristics

1. Precise Location at Ostial LAD
2. Stenting Covering the Distal LMCA

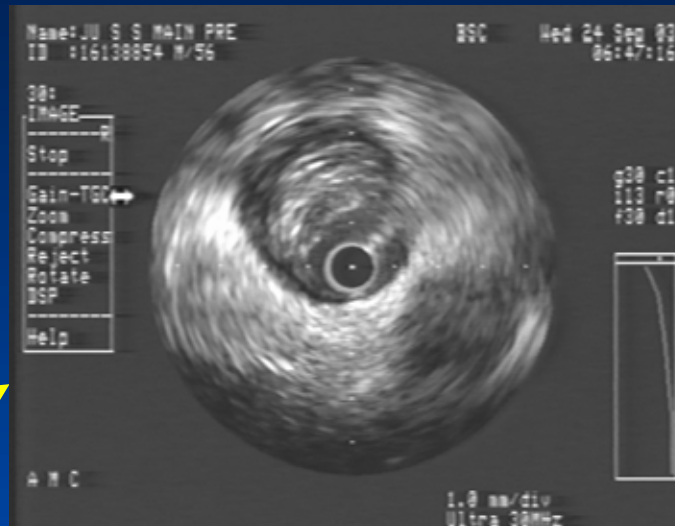
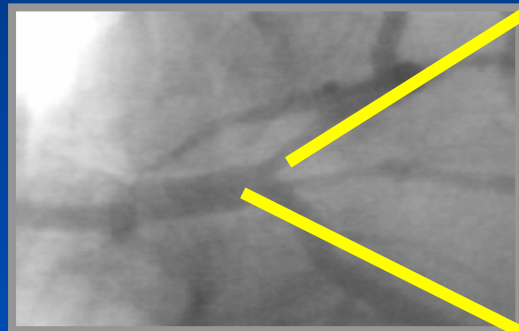
*Seung KB et al, J Am Coll Cardiol 2005;46:787-92*



# Precise Location at Ostial LAD Lesion

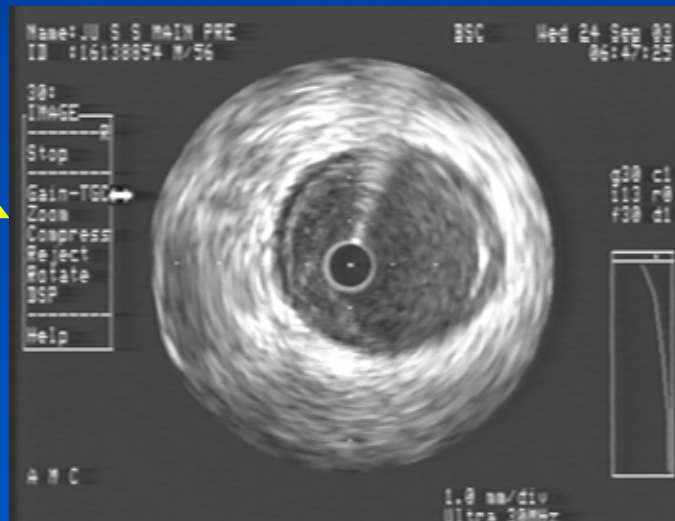


# Precise Location IVUS Evaluation



## Ostial LAD

- Lumen CSA: 2.86 mm<sup>2</sup>
- EEM CSA: 14.38 mm<sup>2</sup>
- Plaque burden: 80%

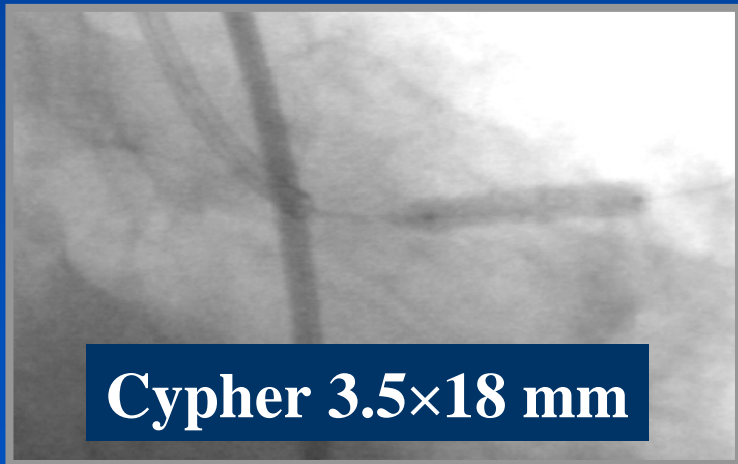
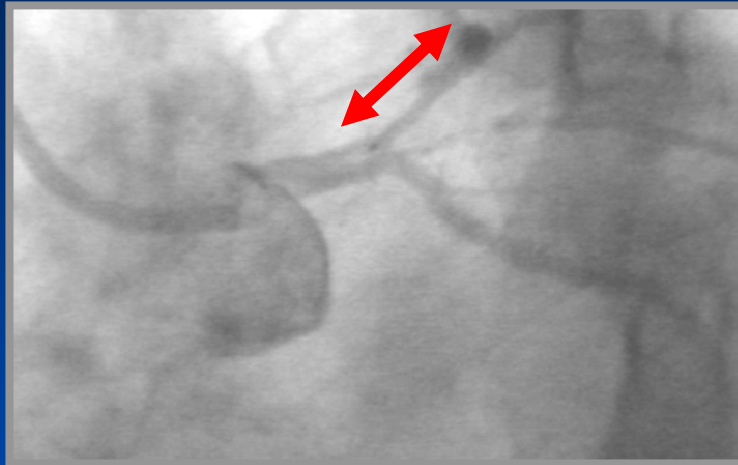


## Distal LMCA

- Lumen CSA: 16.28mm<sup>2</sup>
- EEM CSA: 17.89mm<sup>2</sup>
- **Plaque burden: 10%**

## Precise Location

# Stenting and Final Result



**Cypher 3.5×18 mm**

# Stenting Covering the Distal LMCA

- SES patients with intermediate narrowing at the LMCA bifurcation
  - **Diameter stenosis  $\geq 30\%$  on QCA**
  - **Plaque burden  $\geq 40\%$  on IVUS**

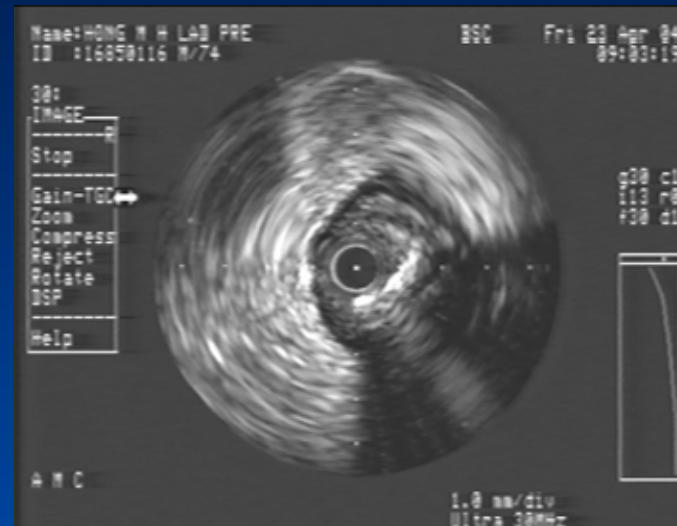
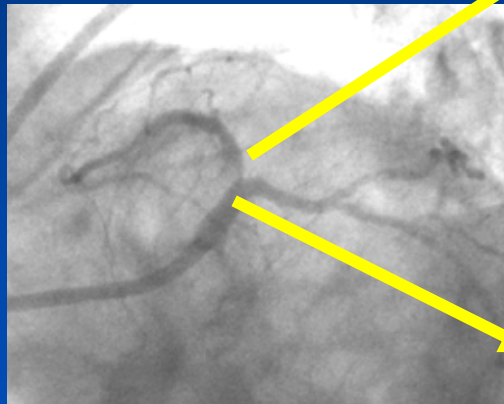
*Seung KB et al, J Am Coll Cardiol 2005;46:787-92*

# Stenting Covering the Distal LMCA



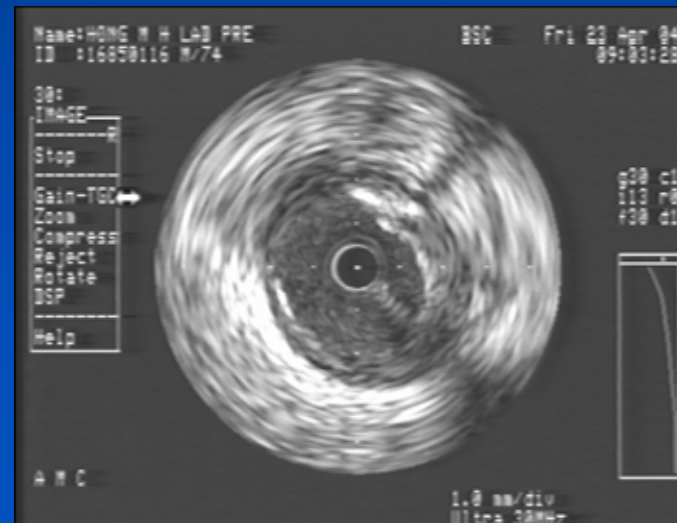
# Stenting Covering the Distal LMCA

## IVUS Evaluation



### Ostial LAD

- Lumen CSA: 2.23mm<sup>2</sup>
- EEM CSA: 14.35mm<sup>2</sup>
- Plaque burden: 85%

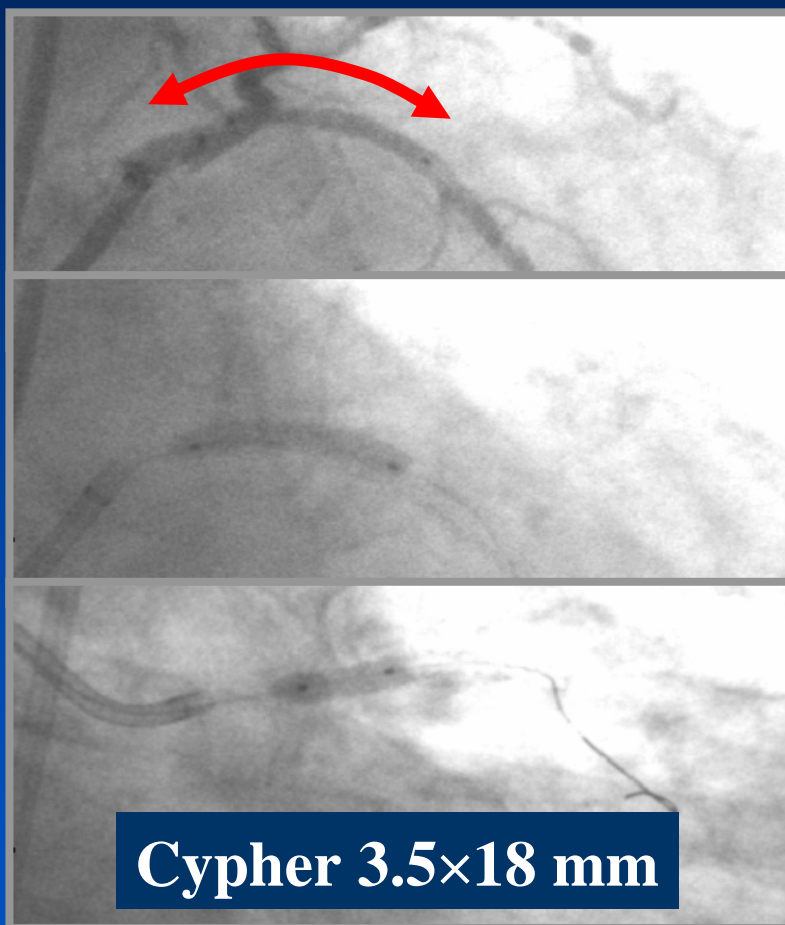


### Distal LMCA

- Lumen CSA: 8.27mm<sup>2</sup>
- EEM CSA: 17.17mm<sup>2</sup>
- **Plaque burden: 52%**

# Stenting Crossover the LCX

## Stenting and Final Result



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

# QCA in Distal LMCA

	LM cover	Precise	<i>P</i>
Patients	23	45	
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 Distal LMCA

	LM cover	Precise	<i>P</i>
<b>Patients</b>	<b>20</b>	<b>41</b>	
<b>Before procedure</b>			
<b>EEM CSA, mm<sup>2</sup></b>	<b>19.64±6.33</b>	<b>20.57±5.38</b>	<b>0.574</b>
<b>Lumen CSA, mm<sup>2</sup></b>	<b>9.86±2.83</b>	<b>12.39±3.71</b>	<b>0.014</b>
<b>Plaque burden, %</b>	<b>48.01±11.47</b>	<b>39.75±8.22</b>	<b>0.004</b>

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

# QCA in Ostial LAD

	LM cover	Precise	P
Lesion length, mm	21.7±12.9	26.1±18.8	0.321
Reference diameter, mm	2.87±0.48	2.85±0.53	0.873
MLD, mm			
Baseline	1.00±0.54	0.88±0.52	0.400
Final	2.97±0.35	2.97±0.42	0.936

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

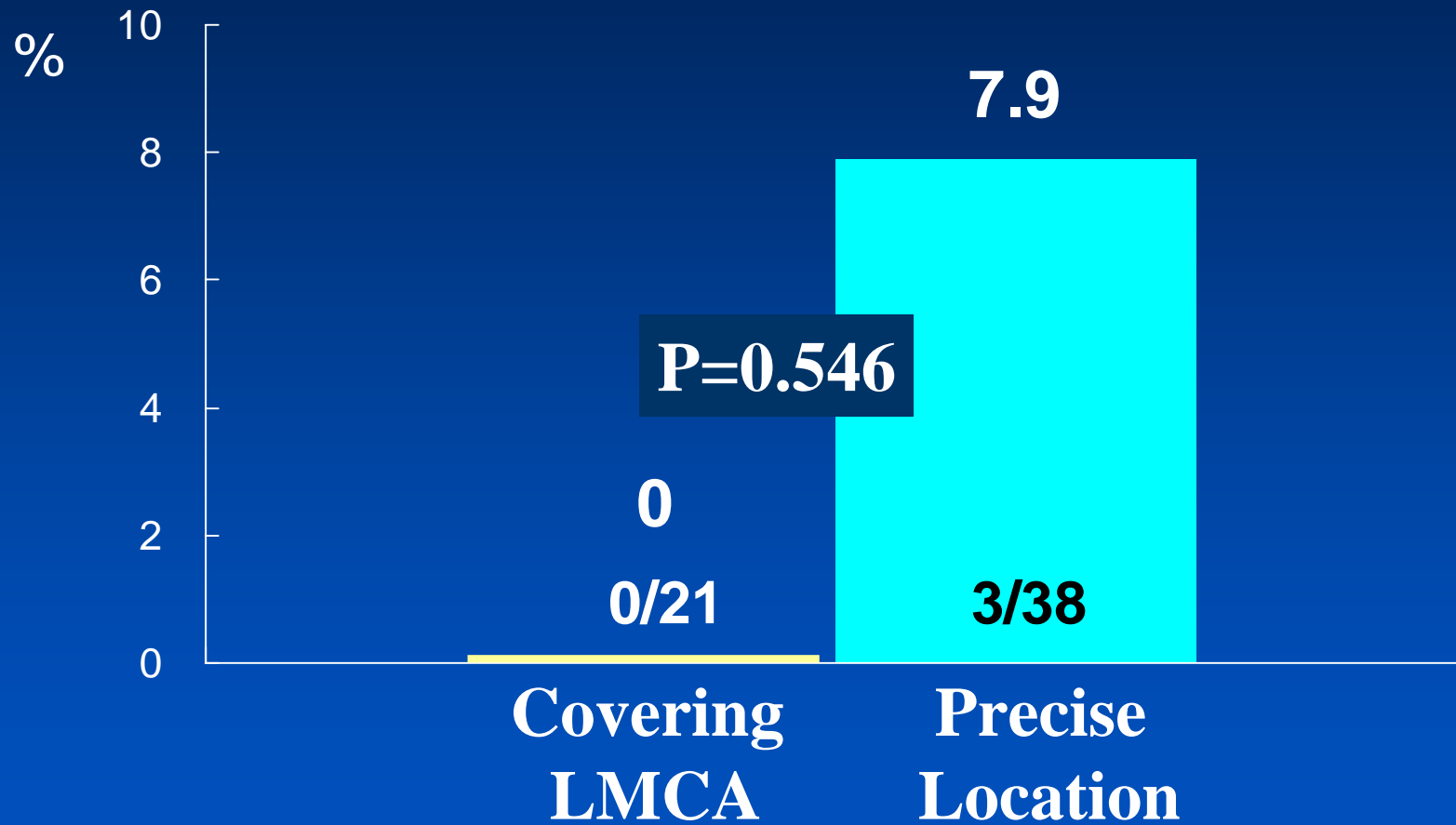
# IVUS in Ostial LAD

	LM cover	Precise	P
<b>Patients</b>	<b>20</b>	<b>41</b>	
<b>Before procedure</b>			
EEM CSA, mm <sup>2</sup>	13.68±4.34	14.03±3.85	0.770
Lumen CSA, mm <sup>2</sup>	2.26±0.50	2.39±0.76	0.532
Plaque burden, %	82.28±5.06	82.30±5.06	0.993
<b>After procedure</b>			
EEM CSA, mm <sup>2</sup>	15.41±3.11	16.11±3.03	0.420
Lumen CSA, mm <sup>2</sup>	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*

# Ostial LAD Stenting in AMC

## Restenosis Rate



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

# Conclusions

- The SES implantation appears effective in reducing restenosis and TLR for 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.