

LM stenting - Cypher

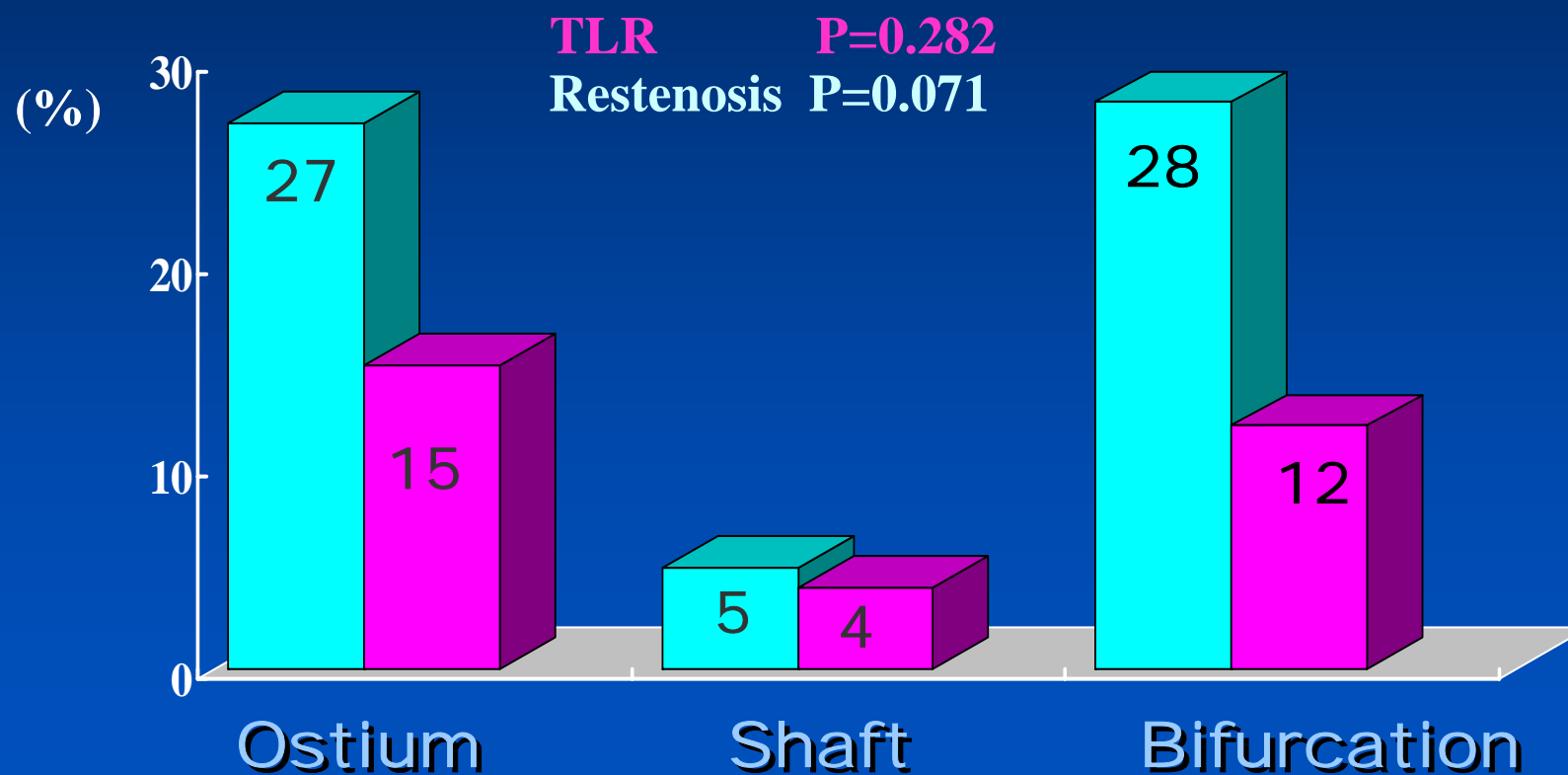
Left main stenting with BMS

Since 1995...



Issues in BMS era...

Restenosis and TLR



Left main stenting with DES

Not enough data,
But promising...



Published Data using DES

- Arampatzis CA, et al. Catheter Cardiovasc Interv. 2004;62:292-6
Elective sirolimus-eluting stent implantation for left main coronary artery disease: six-month angiographic F/U and 1-year clinical outcome.
- Arampatzis CA, et al. Am J Cardiol. 2003;92:327-9.
Effectiveness of sirolimus-eluting stent for treatment of left main coronary artery disease.
- Chieffo A, et al. Circulation 2005;111:791-5
Early and mid-term results of drug-eluting stent implantation in unprotected left main.
- Park SJ, et al. J Am Coll Cardiol. 2005;45:351-6.
Sirolimus-eluting stent implantation for unprotected left main coronary artery stenosis: comparison with bare metal stent implantation.

SES Implantation from RESEARCH

16 Elective (9 unprotected) LMCA Intervention

In-hospital outcome

Deaths	0
MI	1 (6%)
TLR	0
Overall MACE	1 (6%)

Late outcome at 1 year

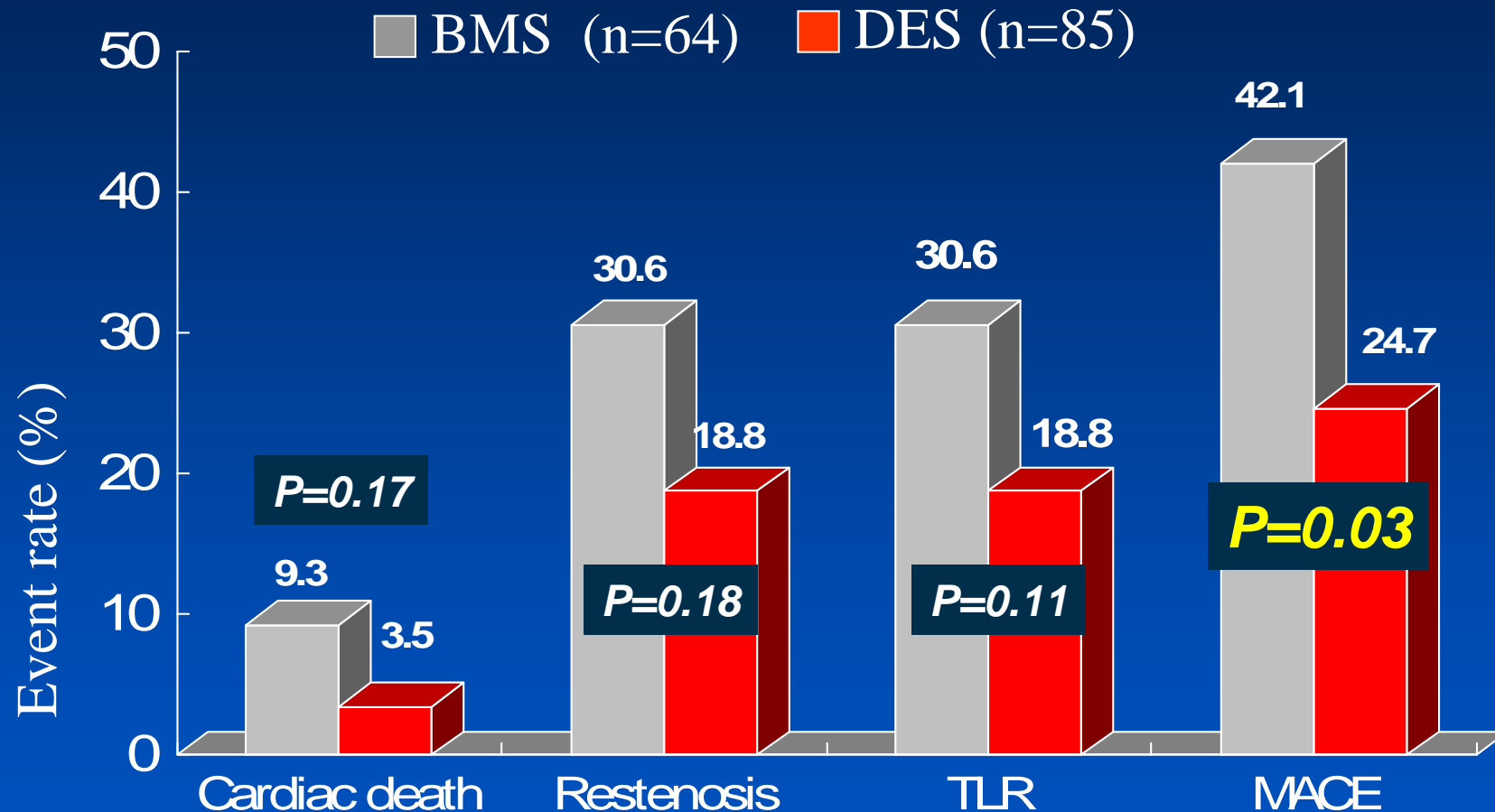
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Arampatzis CA et al. Catheter Cardiovasc Interv 2004;62:292



DES vs. BMS in Milan

Six-month clinical and angiographic follow-up

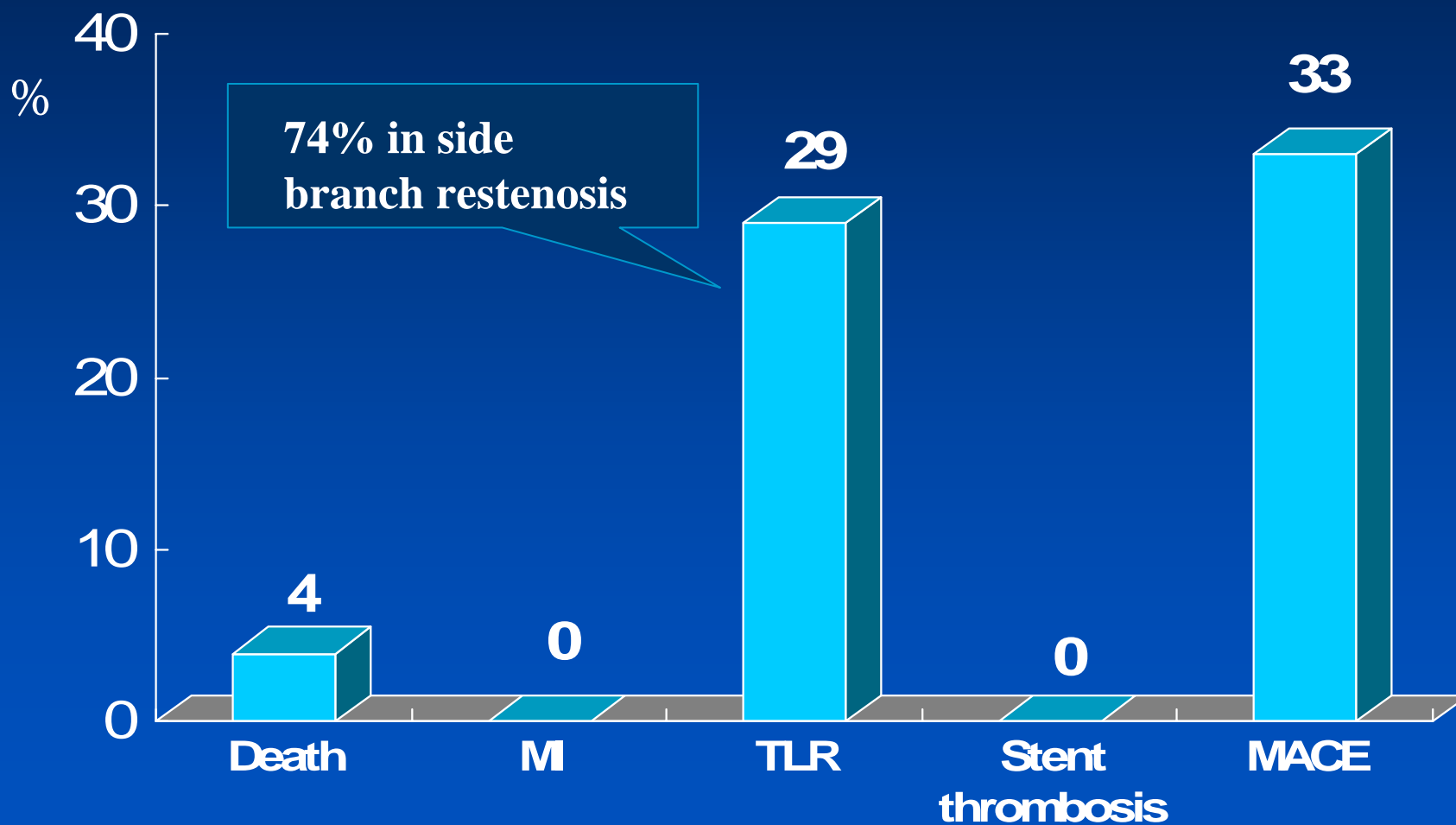


Chieffo A et al. Circulation 2005;111:791

Teirstein PS et al, TCT 2004

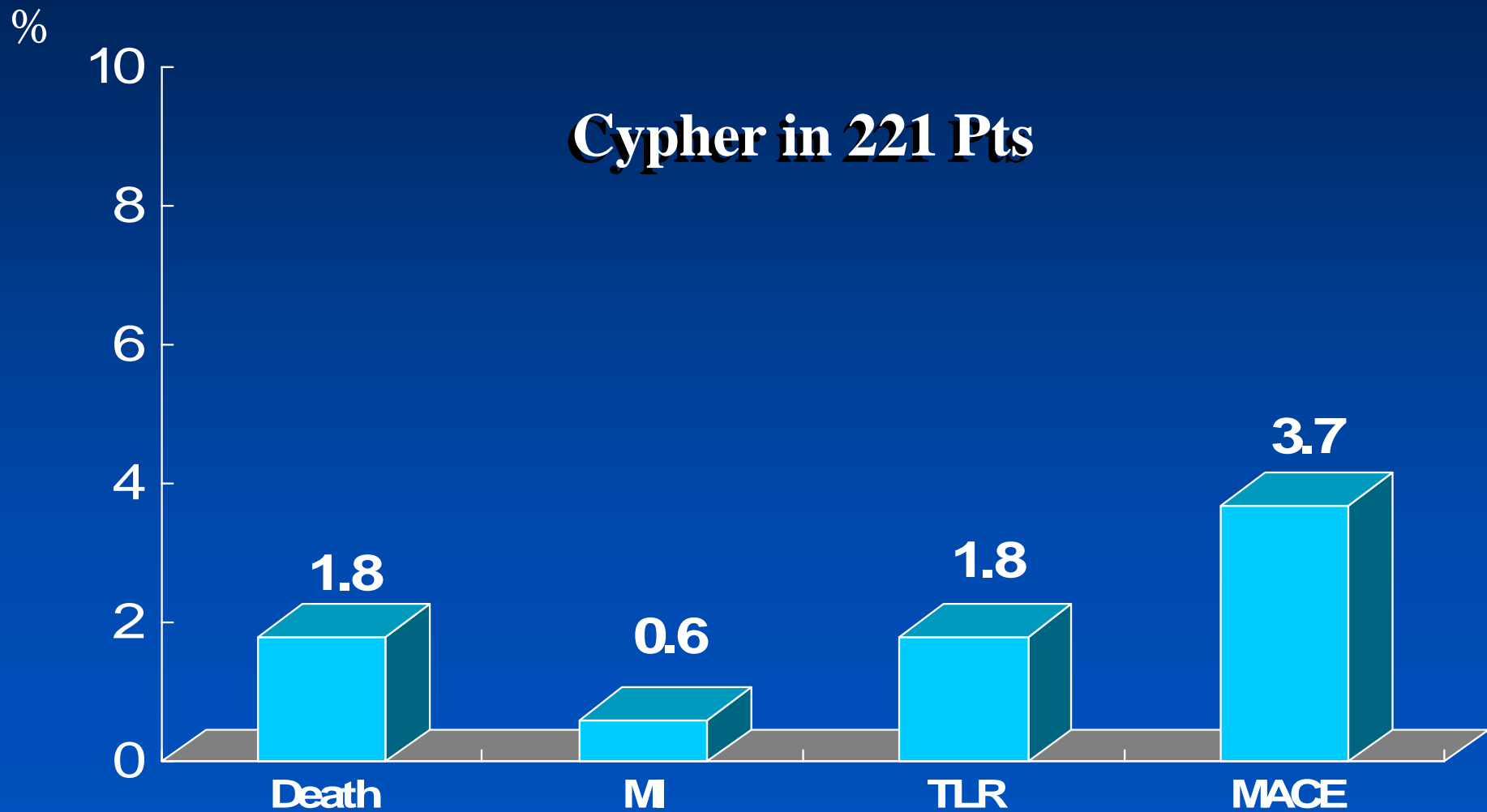
29% TLR at 3 Months

Cypher in 49 Pts



e - Cypher Registry, *Barragan P et al, AHA 2004*

Very low clinical event rates at 6 months



Summary...

DES for LMCA Stenosis

- Much improved early mortality : 0 – 4 % compared to that of BMS era
- Various TLR rates from 1.8 – 29%
- Stenting on the LM trunk would be good enough in real practice
- Left circumflex ostium is main TLR site
- LM bifurcation PCI should be needed appropriate treatment strategy

LM Cypher Study in AMC

- Comparison with BMS

Unprotected LMCA Cypher in AMC

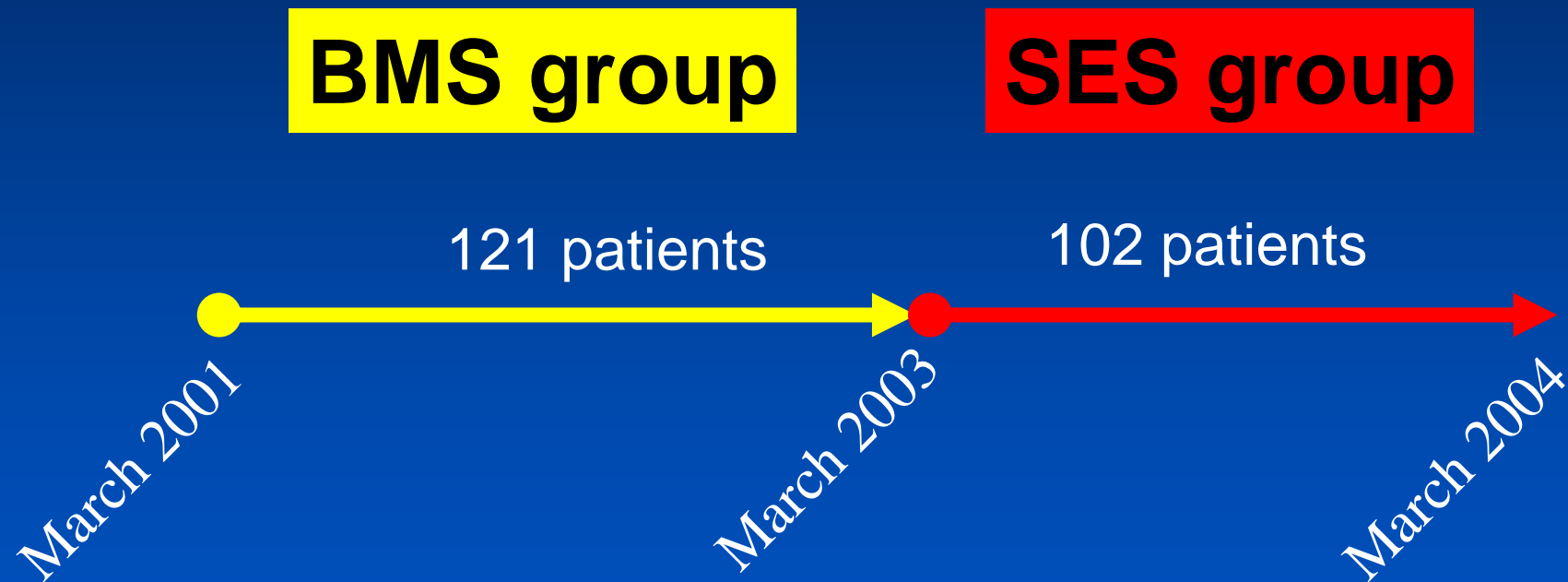
From Feb 2003 till Dec 2004

Total 178 patients

Proximal involvement	47 (26 %)
Ostium	41
Shaft	6
Distal involvement	131 (74 %)

LMCA Intervention in AMC

Matched Comparison with BMS

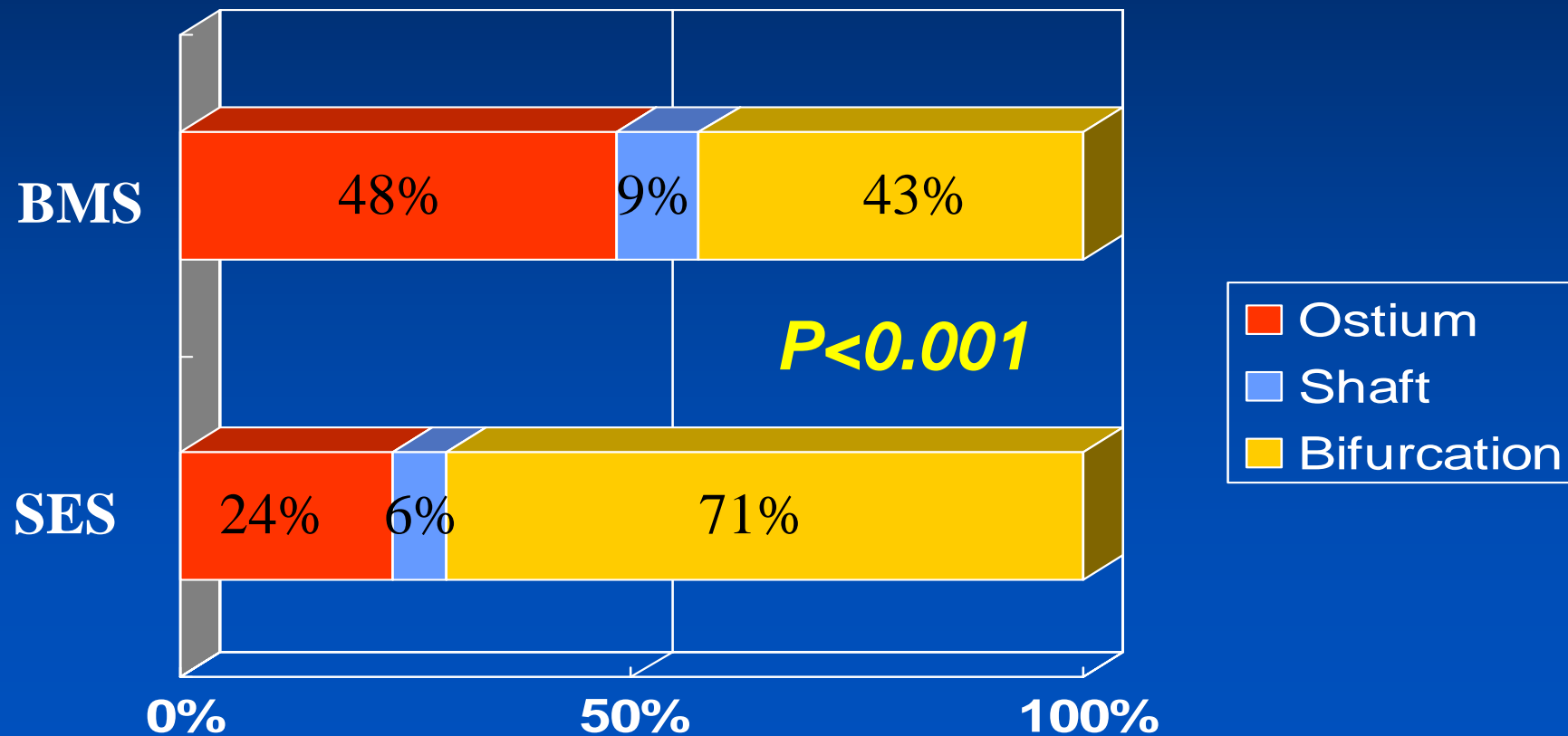


Park SJ et al, J Am Coll Cardiol 2005;45:351

More LM Bifurcation stenting...

149 pts with SES (Feb 2003-Sep 2004)

121 pts with BMS (Feb 2001-Jan 2003)



Park SJ et al, J Am Coll Cardiol 2005;45:351

Multiple & Longer Stents

	SES	BMS	P
Reference diameter, mm	3.46±0.65	3.98±0.69	<0.001
Stents per patient	2.1±1.0	1.6±0.7	<0.001
Stents per lesion	1.6±0.9	1.1±0.4	<0.001
Total stent length, mm	26.6±18.1	13.3±5.5	<0.001
Final balloon size, mm	3.90±0.44	4.39±0.55	<0.001
Inflation pressure, mm	18.5±2.8	14.0±2.6	<0.001
Balloon/Artery ratio	1.1±0.3	1.1±0.2	0.290

Park SJ et al, J Am Coll Cardiol 2005;45:351



Fewer Debulking, More Direct Stenting

	SES	BMS	P
Patients	149	121	
Multivessel PCI	63 (42.3)	42 (34.7)	0.254
Direct stenting	67 (45.0)	21 (17.4)	<0.001
Debulking atherectomy	3 (2.0)	40 (33.1)	<0.001
IVUS guidance	129 (86.6)	91 (75.2)	0.039
GP IIb/IIIa inhibitor	10 (6.7)	6 (5.0)	0.376
IABP support	6 (4.0)	5 (4.1)	0.782

Park SJ et al, J Am Coll Cardiol 2005;45:351



In-Hospital Outcomes

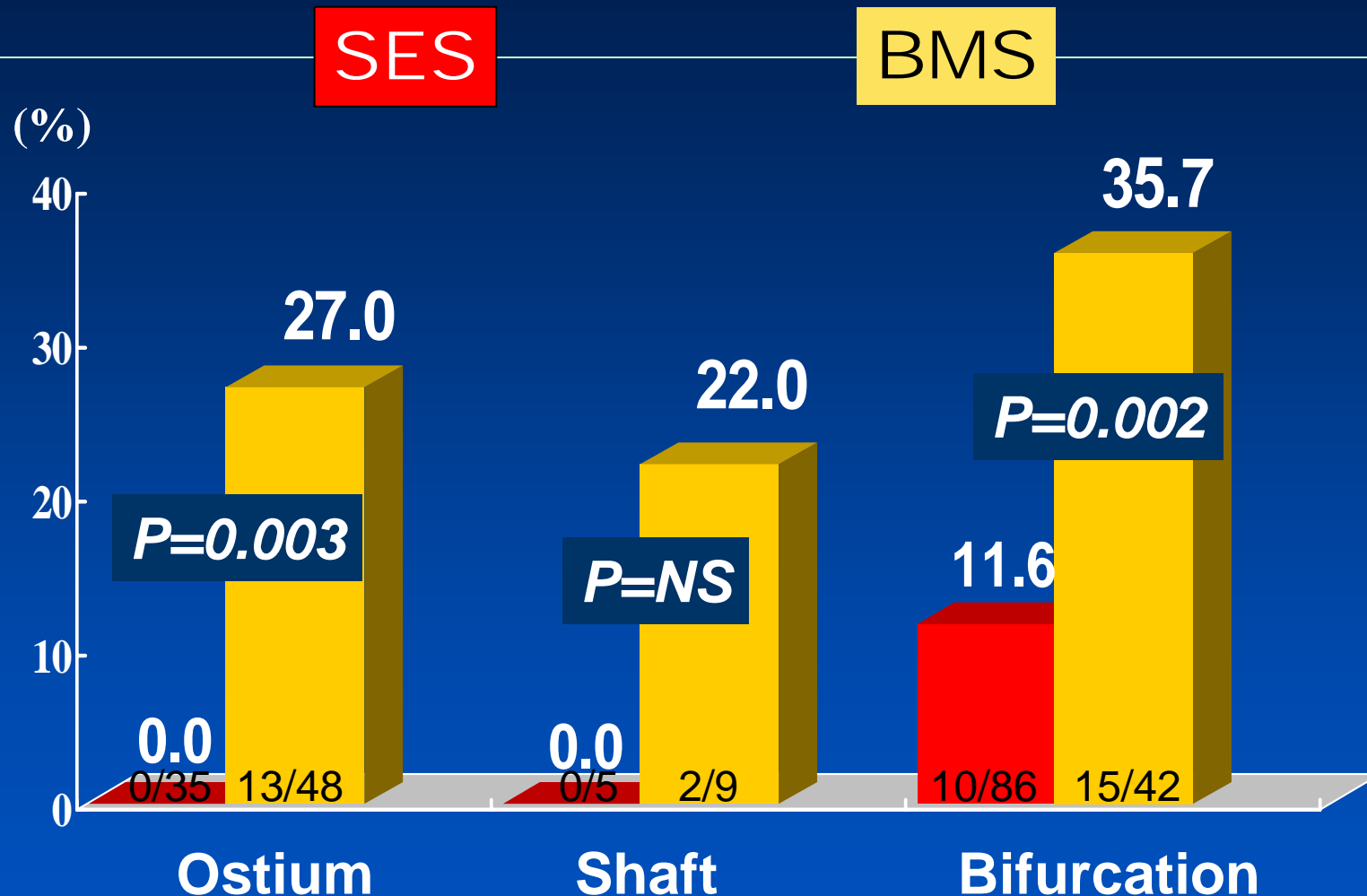
	BMS N=121	SES N=149
Procedure Success (%)	100	100
Death	0	0
Q MI	0	0
Non-QMI	10 (8.3%)	11 (7.4%)
SAT	0	0
Emergent CABG	0	0
Repeat PCI	0	0

* All procedure related, CK-MB \geq 3 times normal value

Park SJ et al, J Am Coll Cardiol 2005;45:351



Overall Restenosis Rate : 7.9 %



Park SJ et al, J Am Coll Cardiol 2005;45:351

Left main stenting with DES

Ostial and Shaft lesions intervention



LM ostial or shaft lesions

Total 47 patients

Age	61 ± 13
Male	28 (60%)
Hypertension	17 (36%)
Diabetes	12 (26%)
Smoking	11 (23%)
Hypercholesterolemia	10 (21%)
Previous PCI	10 (21%)
Acute coronary syndrome	27 (57%)
LV EF (%)	60 ± 10

Procedural Findings

Used stent	Single in all pts
IVUS guidance	38 (81%)
Stent size	
3.0 mm	10 (21%)
3.5 mm	37 (79%)
Mean stent length, mm	13.6±5.3
Maximal device diameter, mm	4.0±0.4
Cutting balloon	1 (2.1%)
Use of reopro	1 (2.1%)
Debulking atherectomy	1 (2.1%)

Angiographic Analysis

Lesion length, mm	9.3 ± 5.4
Reference, mm	3.49 ± 0.53
Minimal lumen diameter, mm	
Before procedure	1.37 ± 0.6
After procedure	3.55 ± 0.37
At follow-up	3.53 ± 0.35
Acute gain, mm	2.18 ± 0.66
Late loss, mm	0.02 ± 0.23
Restenosis	0 (0%)

Clinical Outcome

Mean F/U duration, months	13.1 ± 6.8
Death	0
Myocardial infarction	
Q-wave	0
Non-Q-wave *	2 (4.3%)
Stent thrombosis	0
Target lesion revascularization	0

* procedure-related, no event after discharge

DES for Ostial and Shaft LMCA stenosis

No Mortality
No Restenosis
No TLR rate

Left main stenting with DES

Bifurcation lesions intervention



103 patients with LMCA bifurcation lesions

Demographic data

Age, yr	59.6±10.6
Male	79 (78%)
Hypertension	48 (47%)
Diabetes mellitus	29 (28%)
Hypercholesterolemia	23 (22%)
Current smoking	26 (25%)
Previous PCI	15 (15%)
Acute coronary syndrome	57 (55%)
Multivessel except LMCA	55 (53%)
Left ventricular ejection fraction, %	60.4±7.7

Different Treatment Strategy

Unprotected Left Main Bifurcation Stenting

Stenting Cross Over

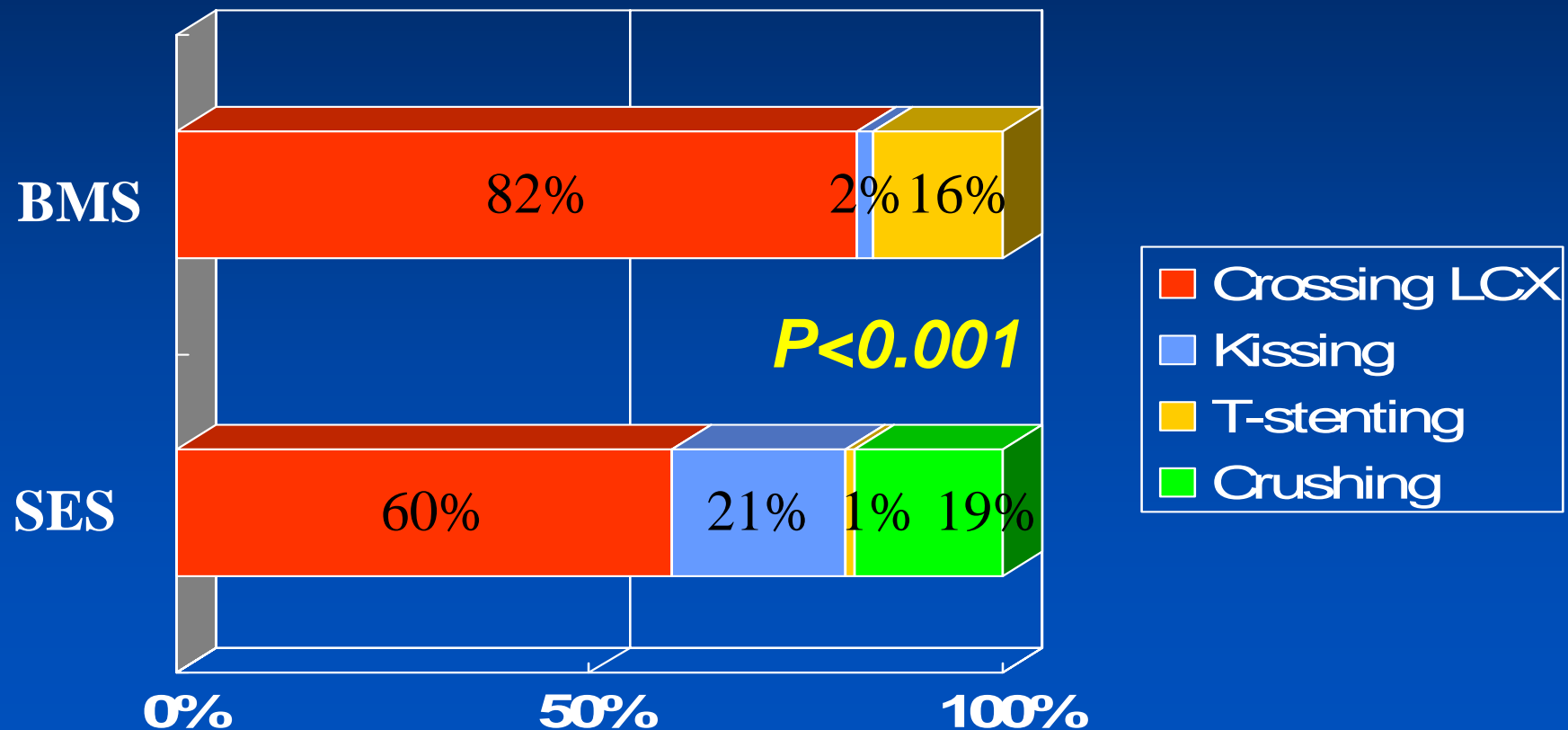
Kissing Stenting

Stent Crushing

T-stent technique

More Complex LM Bifurcation Stenting

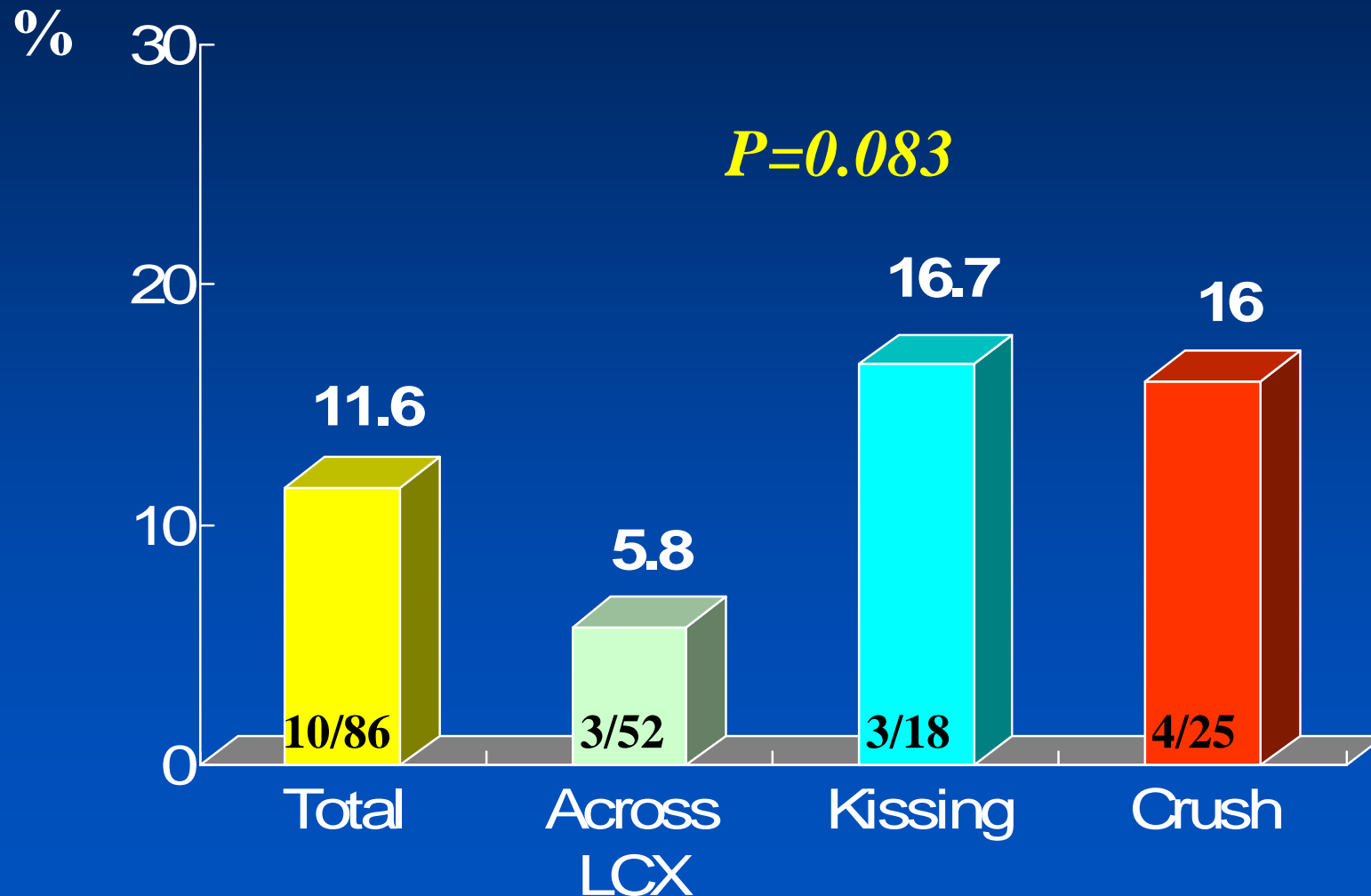
103 pts with SES vs. 51 pts with BMS for bifurcation LM disease



Park SJ et al, J Am Coll Cardiol 2005;45:351

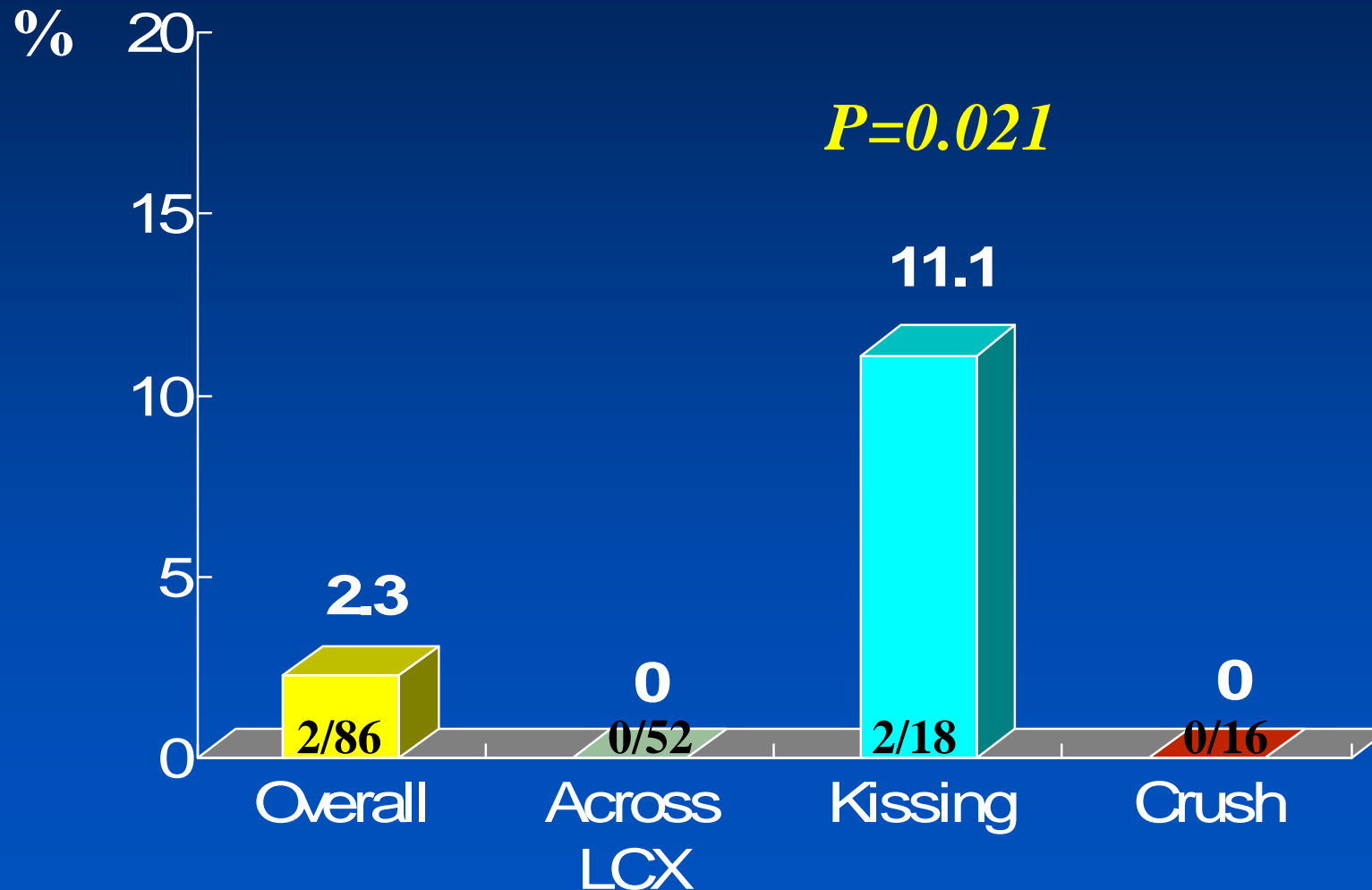
Restenosis Rate of Bifurcation

Overall



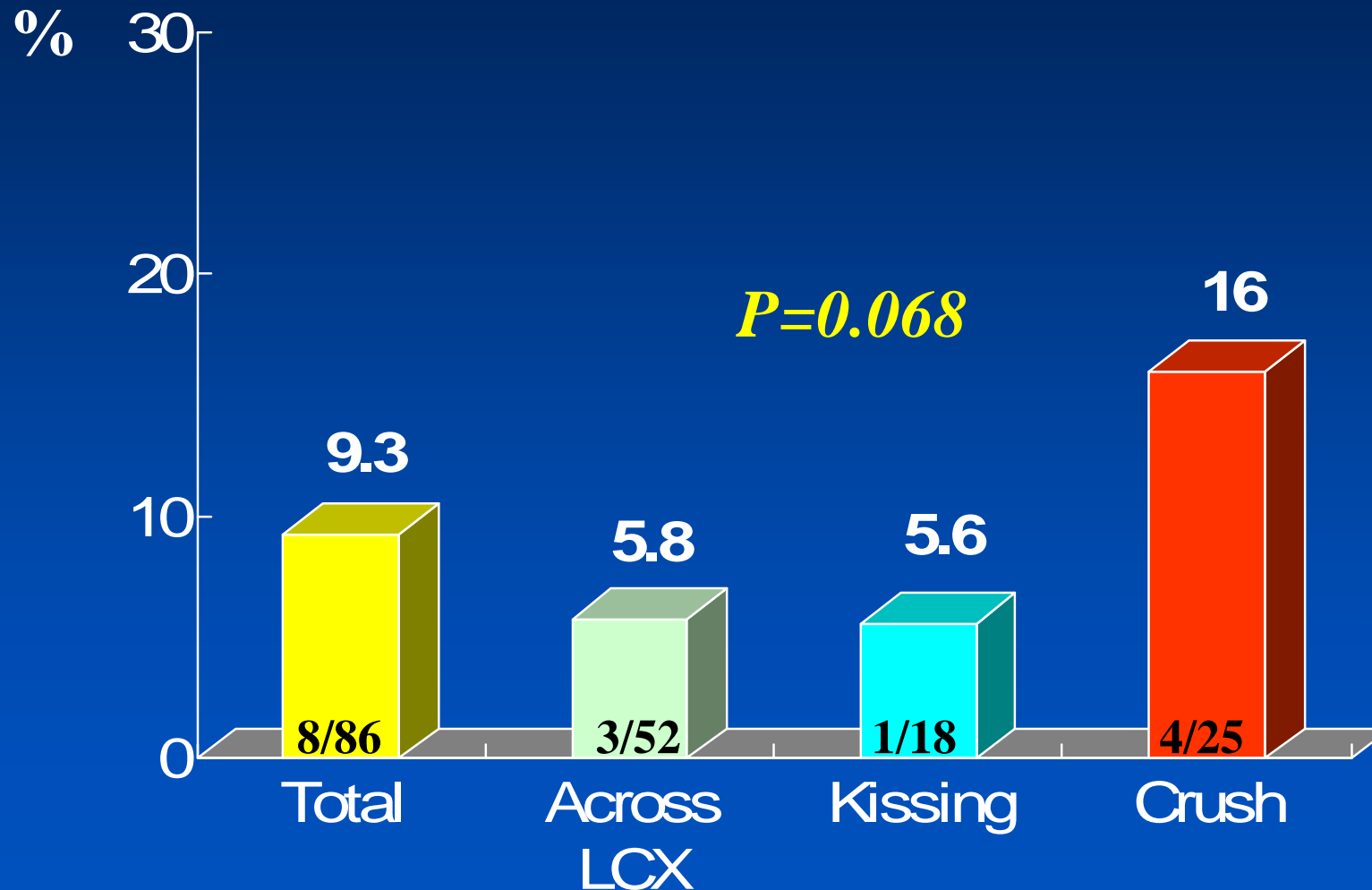
Restenosis Rate of Bifurcation

Main Vessel



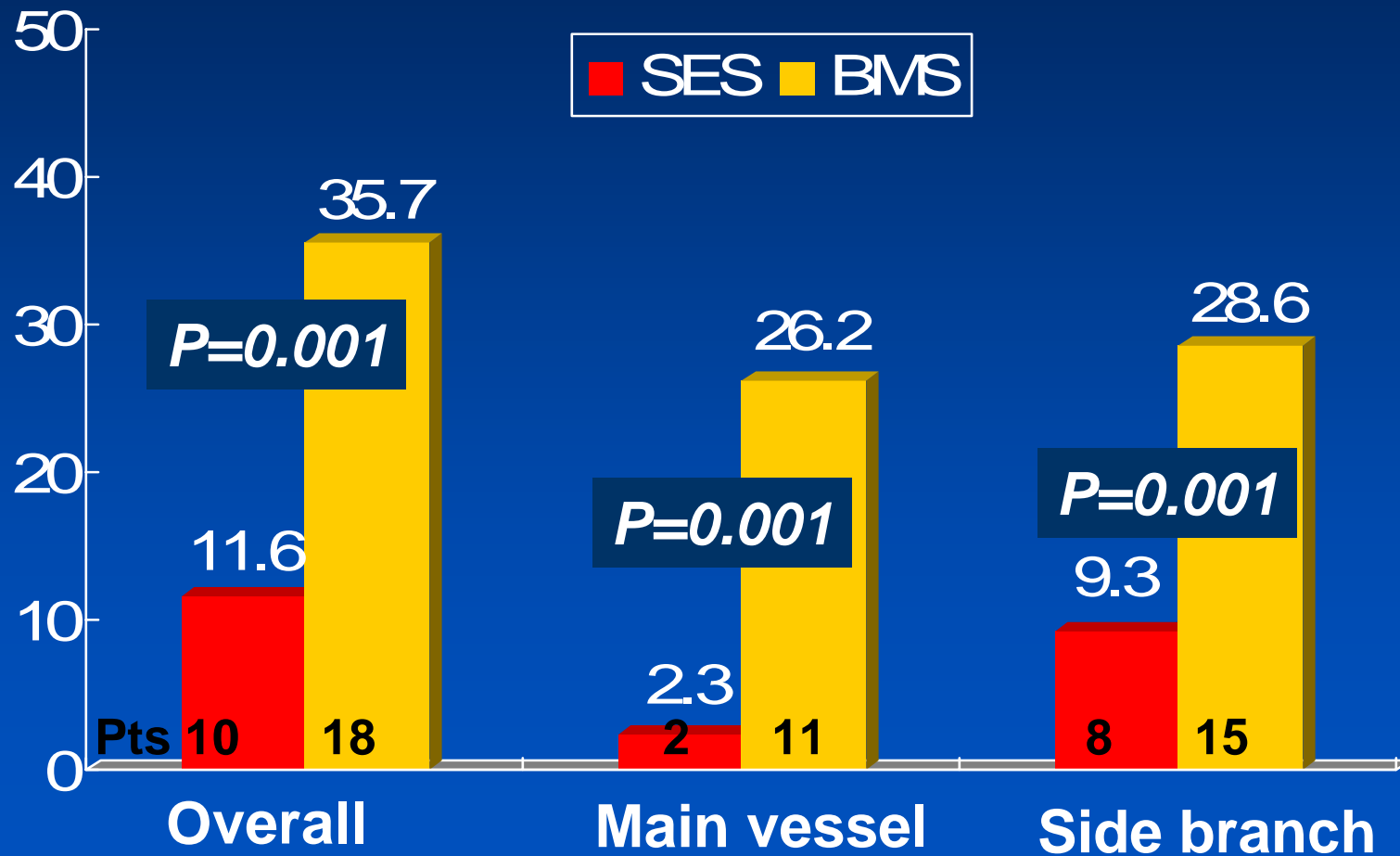
Restenosis Rate of Bifurcation

Circumflex Ositum



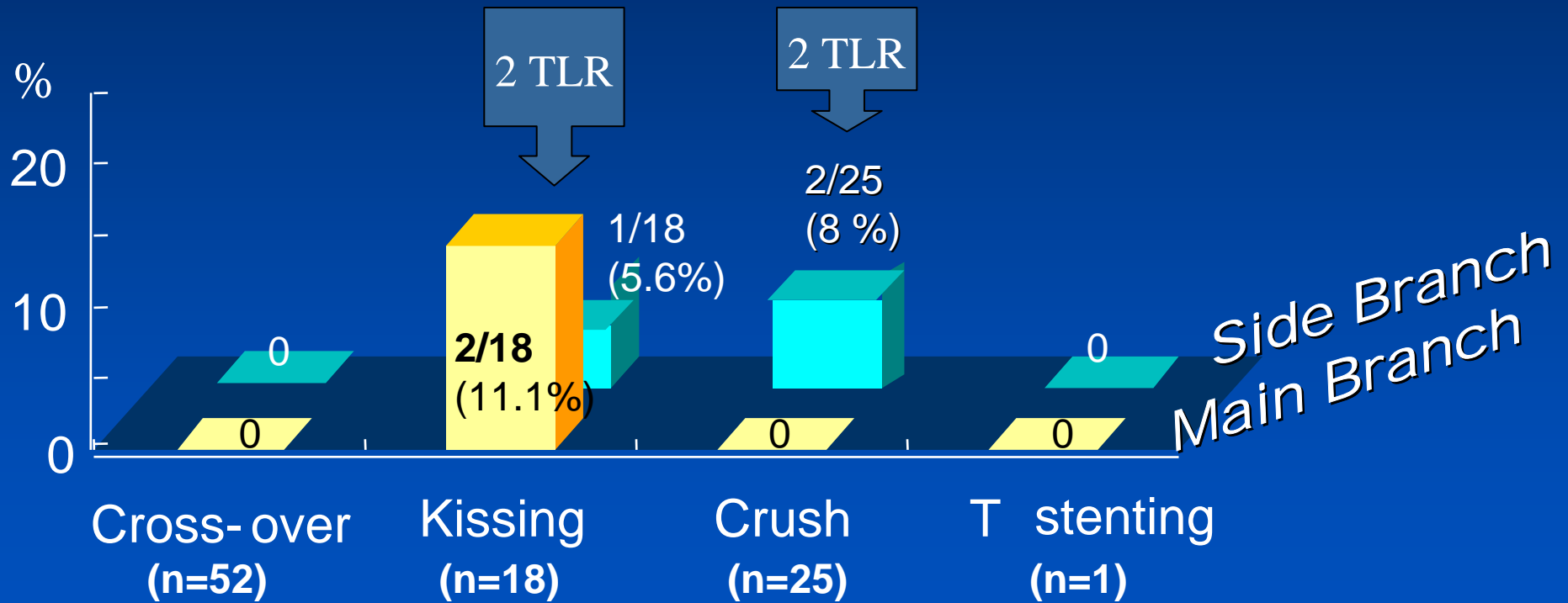
Restenosis Rate of LM Bifucation DES vs BMS

86 pts with SES vs. 42 pts with BMS



TLR : 4.7% in LM Bifurcation PCI

4/ 86 patients



Left main stenting with DES

Over-all

6-months Clinical Outcomes

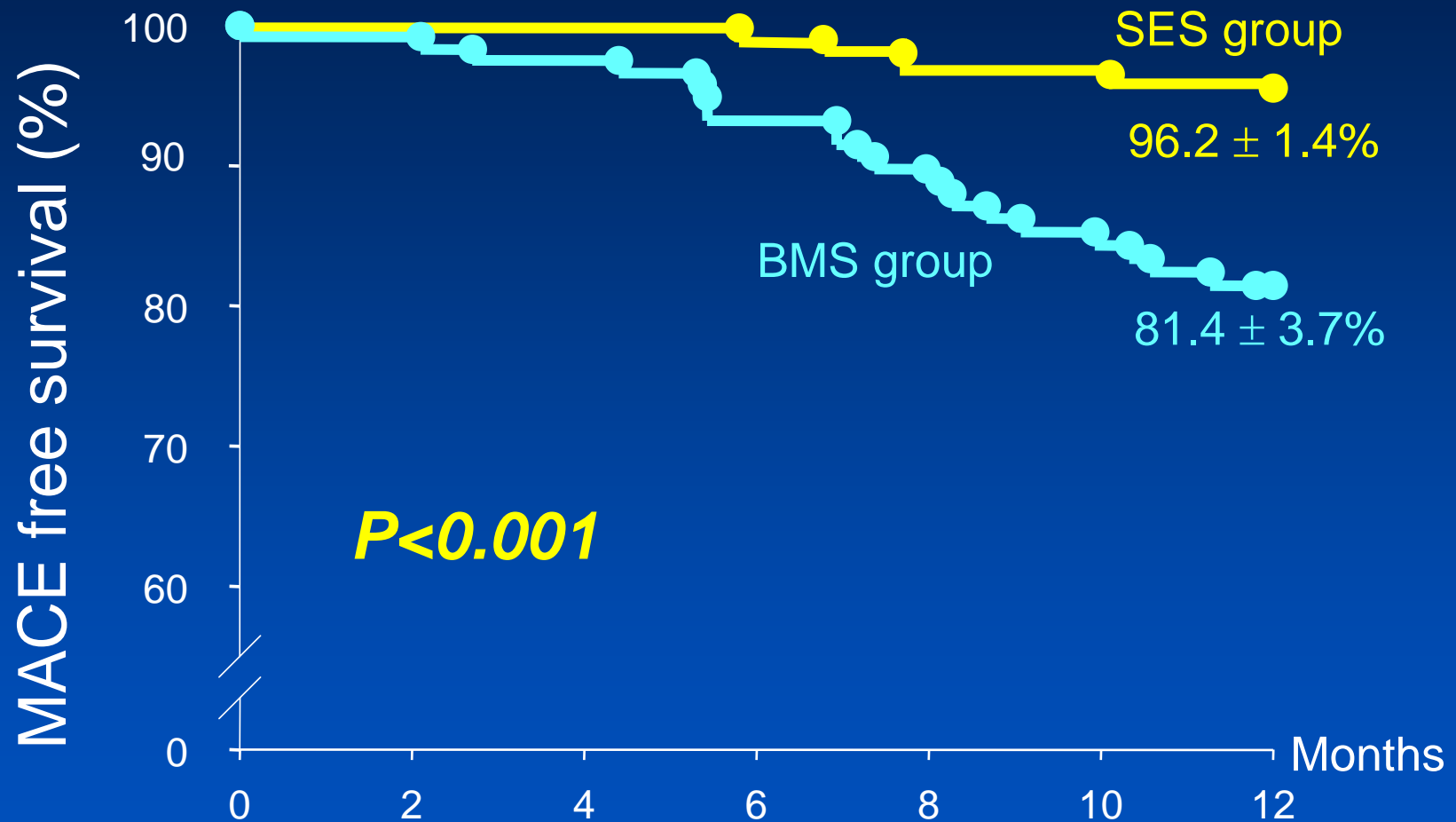
	BMS N=121	SES N=126
Death	0	0
Q MI	0	0
Non-QMI	0	0
SAT	0	0
TLR *	24 (19.8%)	4 (3.1%)
CABG	13	2
PCI	11	0

* $p < 0.001$

Park SJ et al, J Am Coll Cardiol 2005;45:351



MACE free Survival at 1 year



Park SJ et al, J Am Coll Cardiol 2005;45:351



PCI for LMCA disease...

- Simple technique,
- Acceptable overall restenosis and TLR rate (7.9% and 3.1%)

PCI may be more effective alternative to bypass surgery if we could do appropriate treatment with DES

Restenosis and TLR rate (11.0% and 1.7%) in AMC data were acceptable