Partnership Sessions with International Societies:
Interesting PCI Cases from Malaysia

TCTAP 2013
23rd April 2013
1930-1945

PCI in small vessels:

The different modalities of currently available therapies

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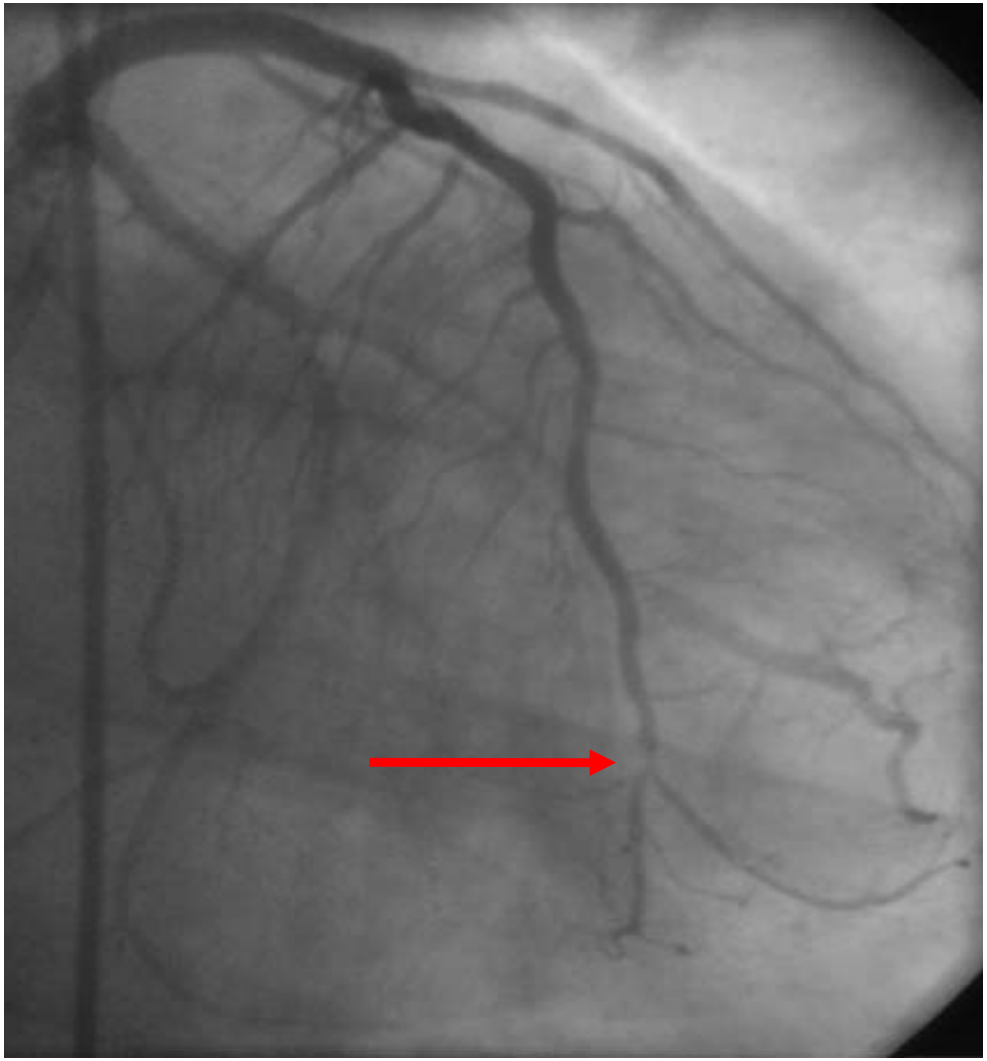
No disclosures

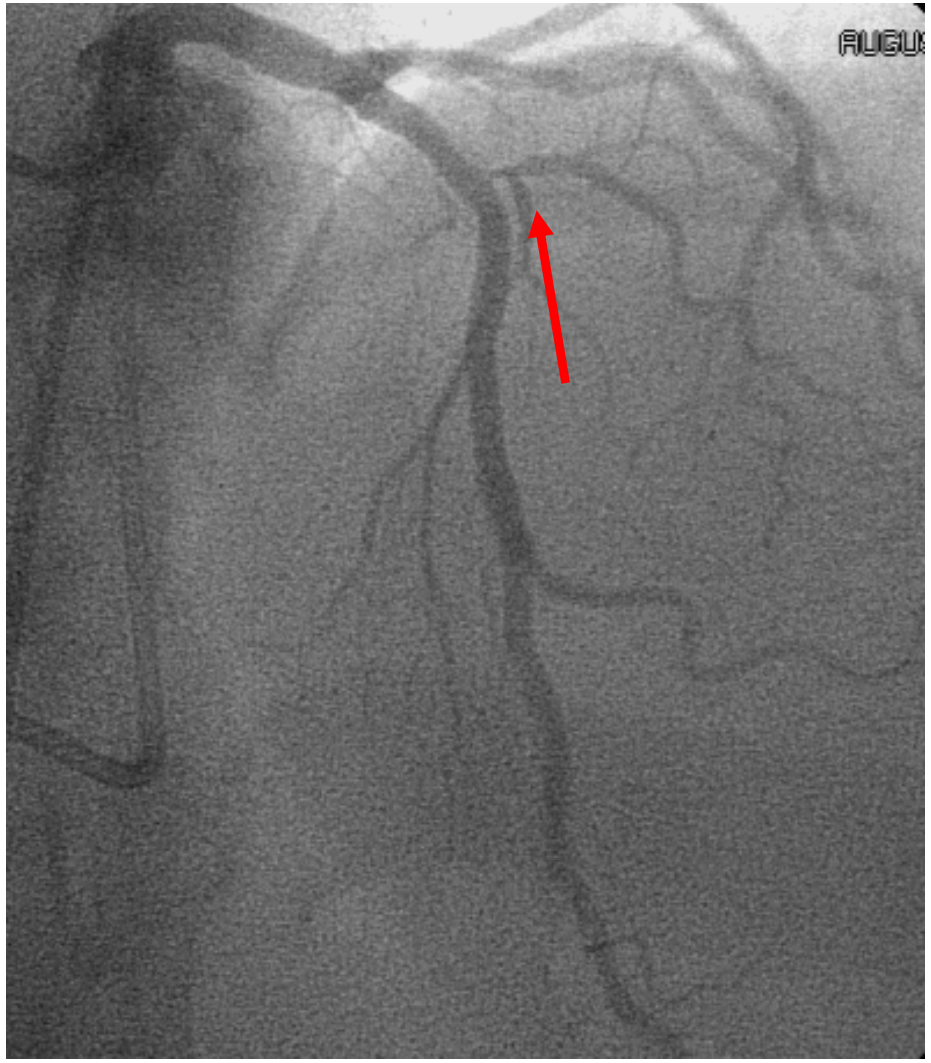
Small vessels

- A vessel that can be treated with a balloon or stent with a diameter ≤2.75 mm
- Seen usually in diabetics and female patients

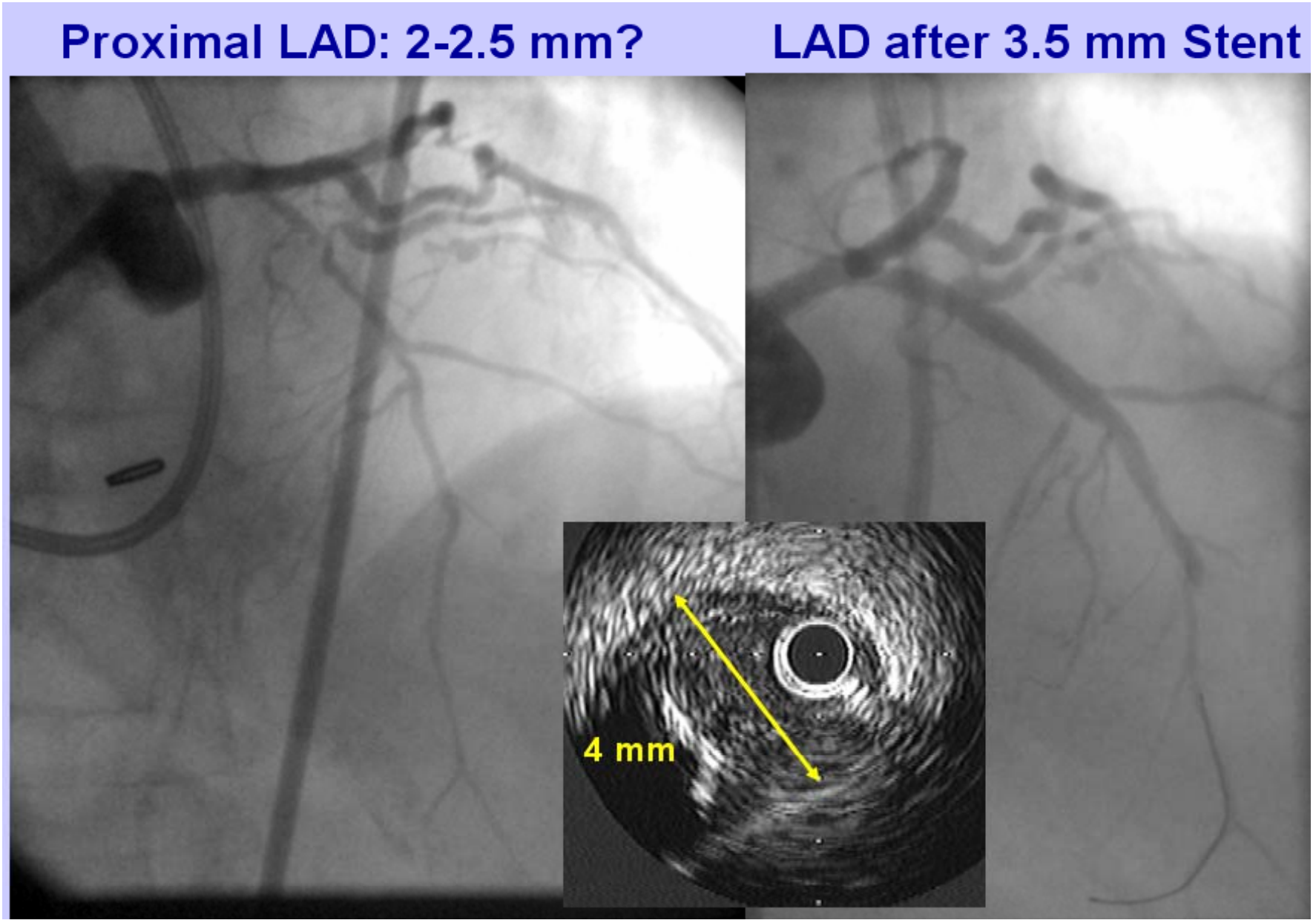
True Small Vessel:

A vessel that perfuses small amount of myocardium.

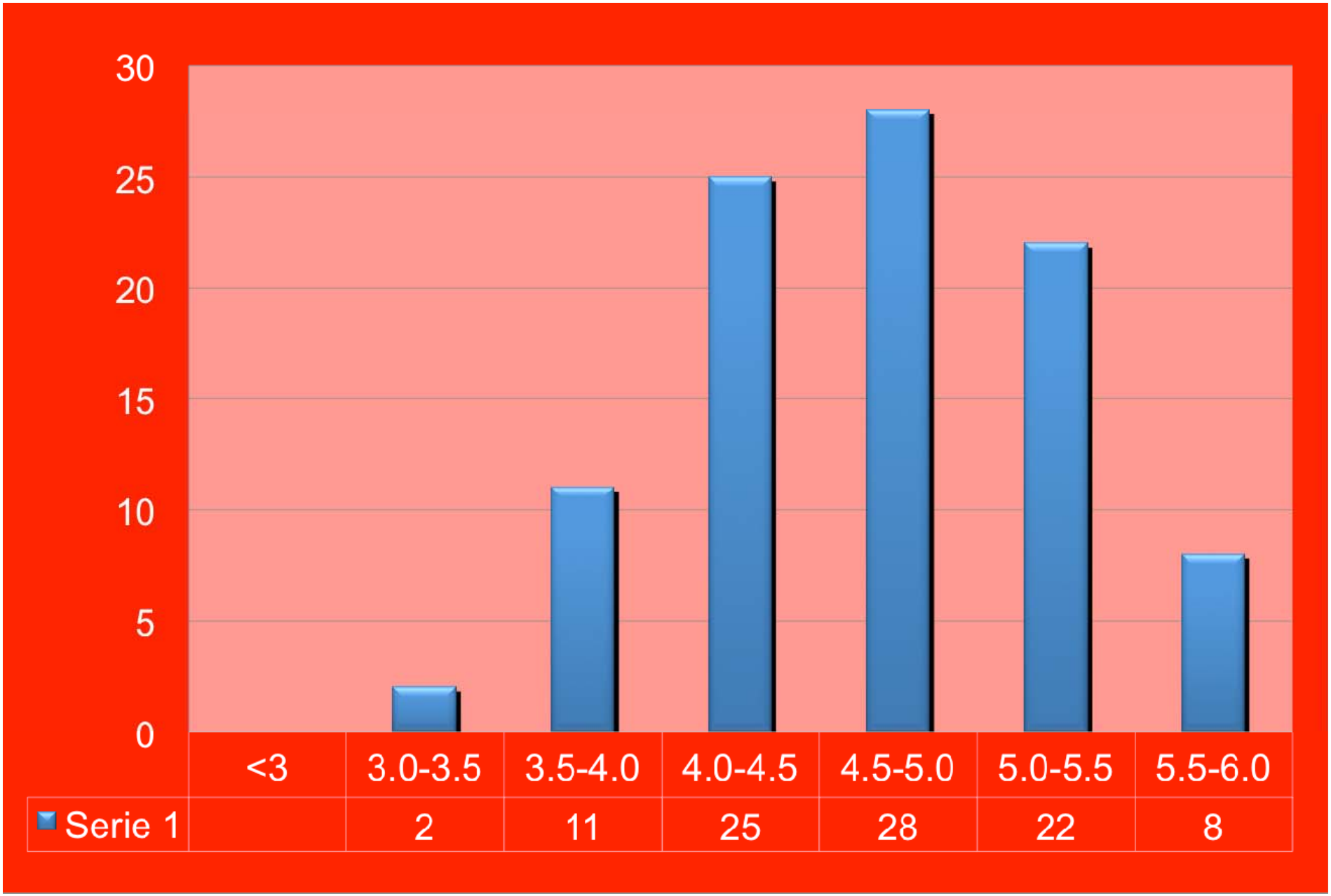




False Small Vessel



LAD size by IVUS



WHC IVUS Core Lab.: Laborgne, Cheneau et al. 2002

Multiple factors compound risk of adverse events in small vessel diffuse disease

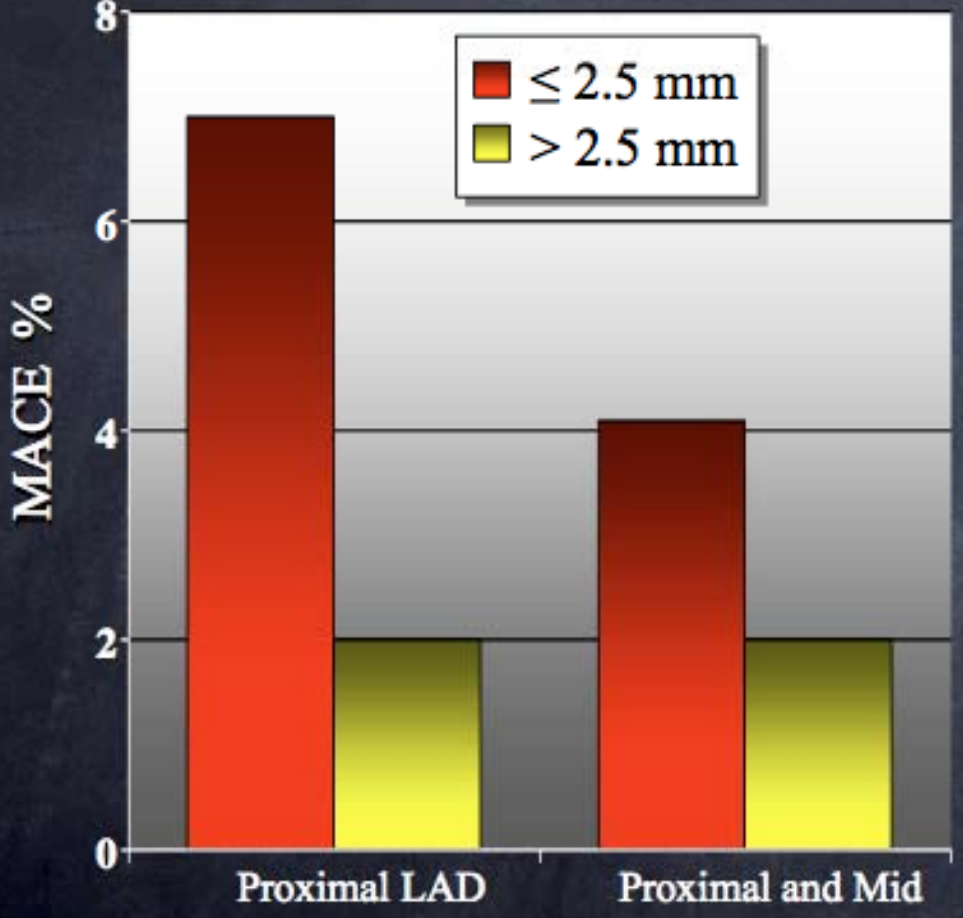
Small vessels
Long lesions

Complex anatomy

Calcified lesions
LMS
Vessel tortuousity
Multiple lesions
Bifurcations
CTO
In-stent restenosis

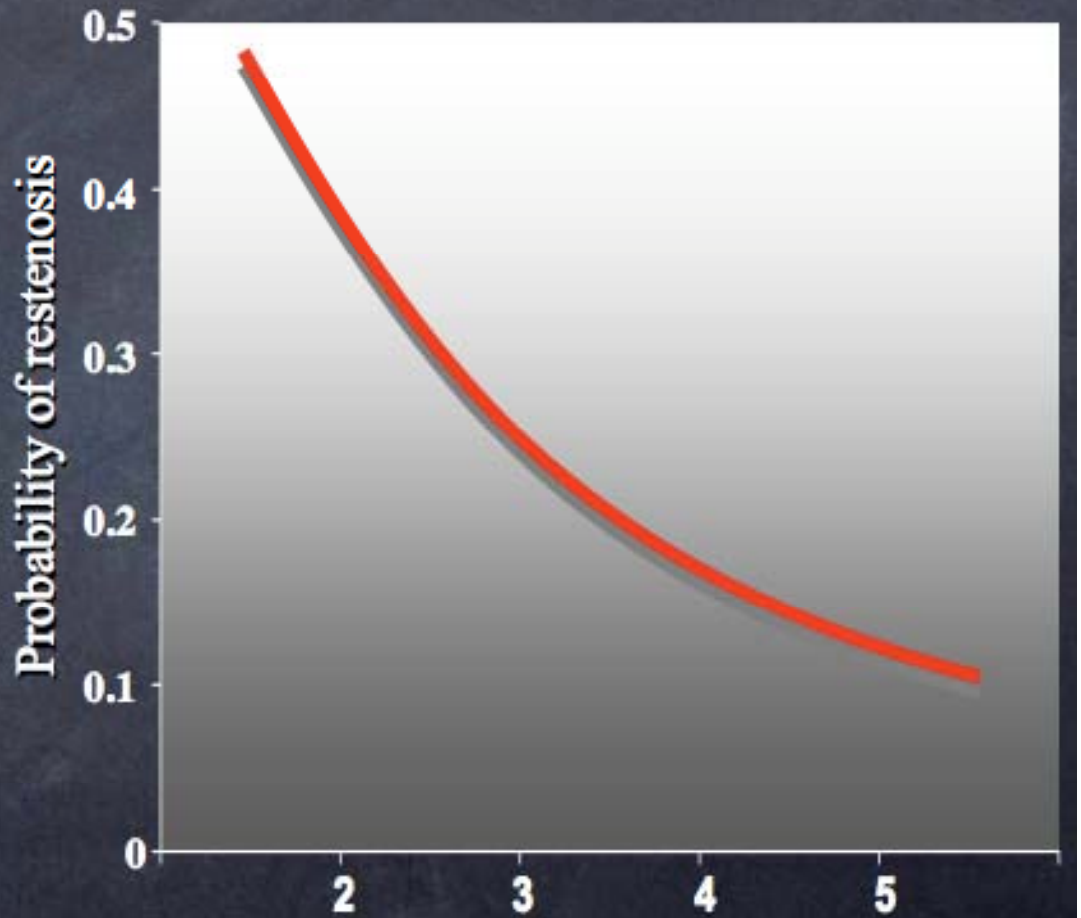
Reduced success rate
Increase complication rate
Increase restenosis rate/MACE

Percutaneous revascularization in small coronary arteries



Death, MI, emergency CABG

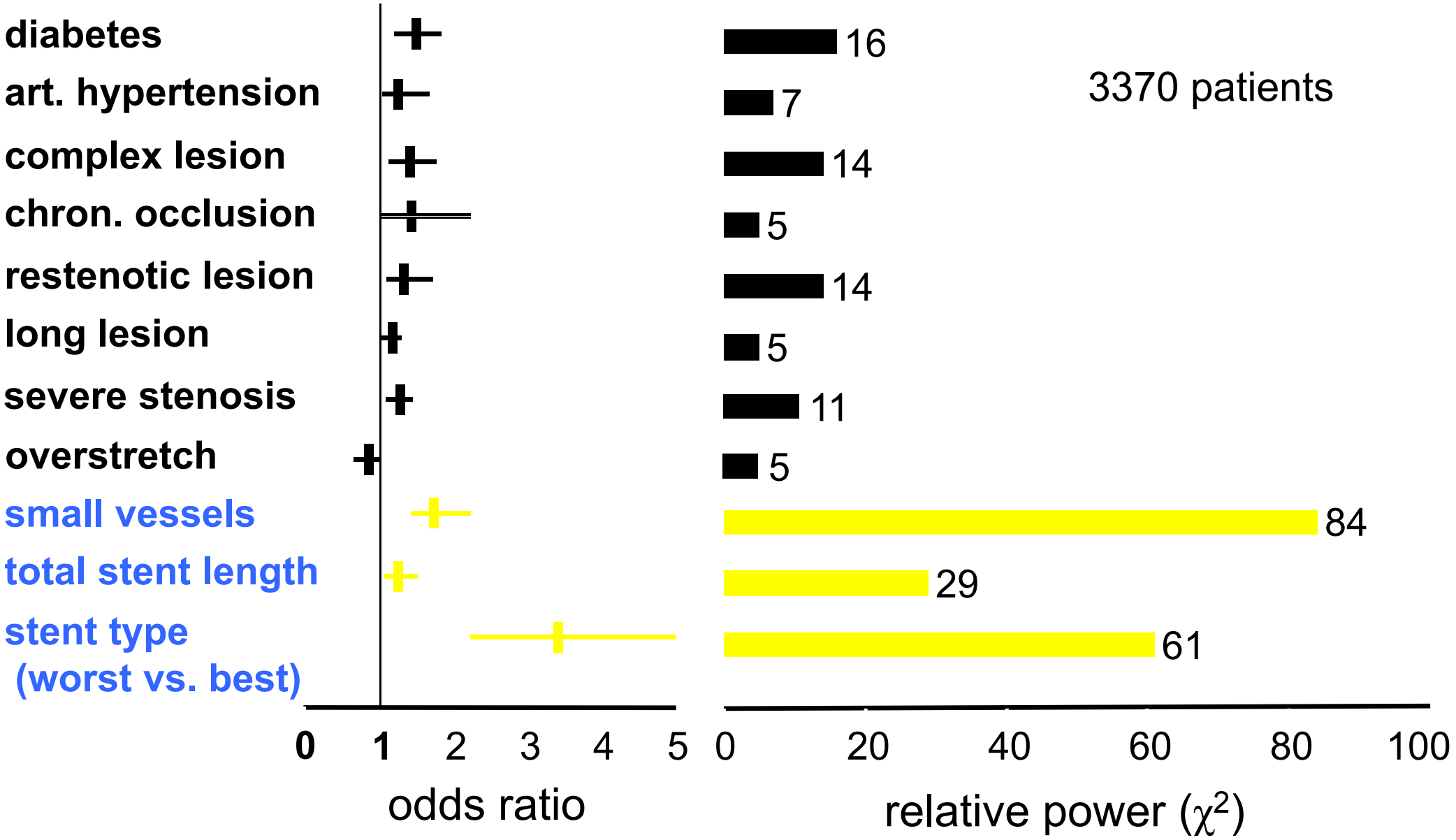
Schunkert et al, Jacc 1999; 34:40-8



Vessel size (mm)

Elezi et al, Circulation 1998; 98:1875-80

Independent Risk Factors for Restenosis



Kastrati et al., *Am J Cardiol* 2000

PCI in Small Vessel

Malaysian Data

- NCVD-PCI 2007-2009
- SV defined as lesion with one or more stents ≤ 2.75 mm in diameter

W.A. Wan Ahmad, K.H. Sim. (Eds). Annual Report of the NCVD-PCI Registry, Year 2007-2009. Kuala Lumpur, Malaysia: National Cardiovascular Disease Database, 2011.

PCI in Small Vessel

Malaysian Data

	Small vessel	Large vessel
Age		
N	6942	6570
Mean (SD)	57.4 (9.9)	57.0 (10.5)
Median (IQR)	57.1 (13)	56.9 (15)
Min, Max	23.4, 90.6	22.0, 95.0

	Small vessel	Large vessel
Procedure, N	**6944**	**6577**
Extent of coronary disease, %		
Single vessel disease	40.1	55.6
Multiple vessel disease	59.1	43.3
LMS	0.8	0.8
Graft	1.0	1.5

PCI in Small Vessel: Malaysian Data

	Small vessel	Large vessel
Procedure, N	**6944**	**9668**
Co-morbidity, %		
Current smoker	17.0	21.1
Dyslipidaemia	76.6	71.7
Hypertension	75.5	70.3
Diabetes	51.9	41.1
Family history of premature CVD	19.7	18.5
MI history	41.9	42.9
Documented CAD	57.6	54.0
New onset of angina	22.6	24.8
History of heart failure	4.3	3.7
Cerebrovascular Disease	1.5	1.2
Peripheral vascular Disease	1.0	0.8
Chronic renal failure	7.3	6.1

PCI in Small Vessel: Malaysian Data

	Small vessel	Large vessel
Lesion, N	**8188**	**9668**
Lesion location, %		
RCA	19.9	35.5
PDA	1.2	0.2
PLV	1.2	0.4
LM	1.4	2.9
LCx	17.8	12.1
OM	5.5	1.5
LAD	50.0	45.0
D	2.1	0.4
LIMA	0.2	0.1
RIMA	0	0
SVG	0.8	1.7
RAD	0	0

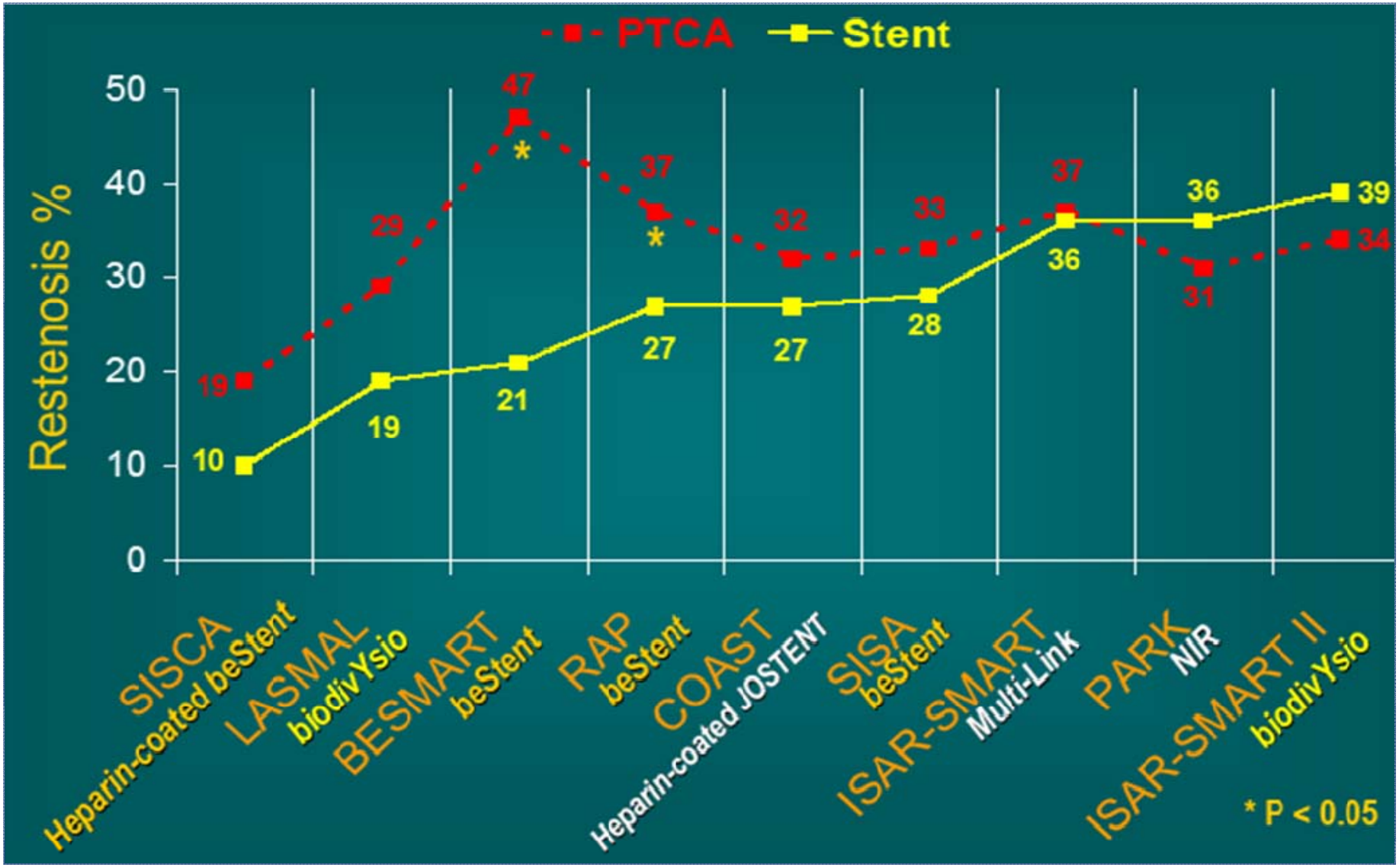
PCI in Small Vessel: Malaysian Data

	Small vessel	Large vessel
Lesion, N	**8188**	**9668**
Lesion type, %		
A	9.6	13.7
B1	23.3	30.6
B2	24.8	23.0
C	41.6	32.0
Missing	0.7	0.7
	Small vessel	**Large vessel**
Lesion, N	**8188**	**9668**
Acute closure, %	0.4	0.3
Dissection, %	5.4	3.2
Perforation, %	0.1	0.3
	Small vessel	**Large vessel**
Lesion results, %		
Successful	99.3	99.4

PCI in Small Vessel: Malaysian Data

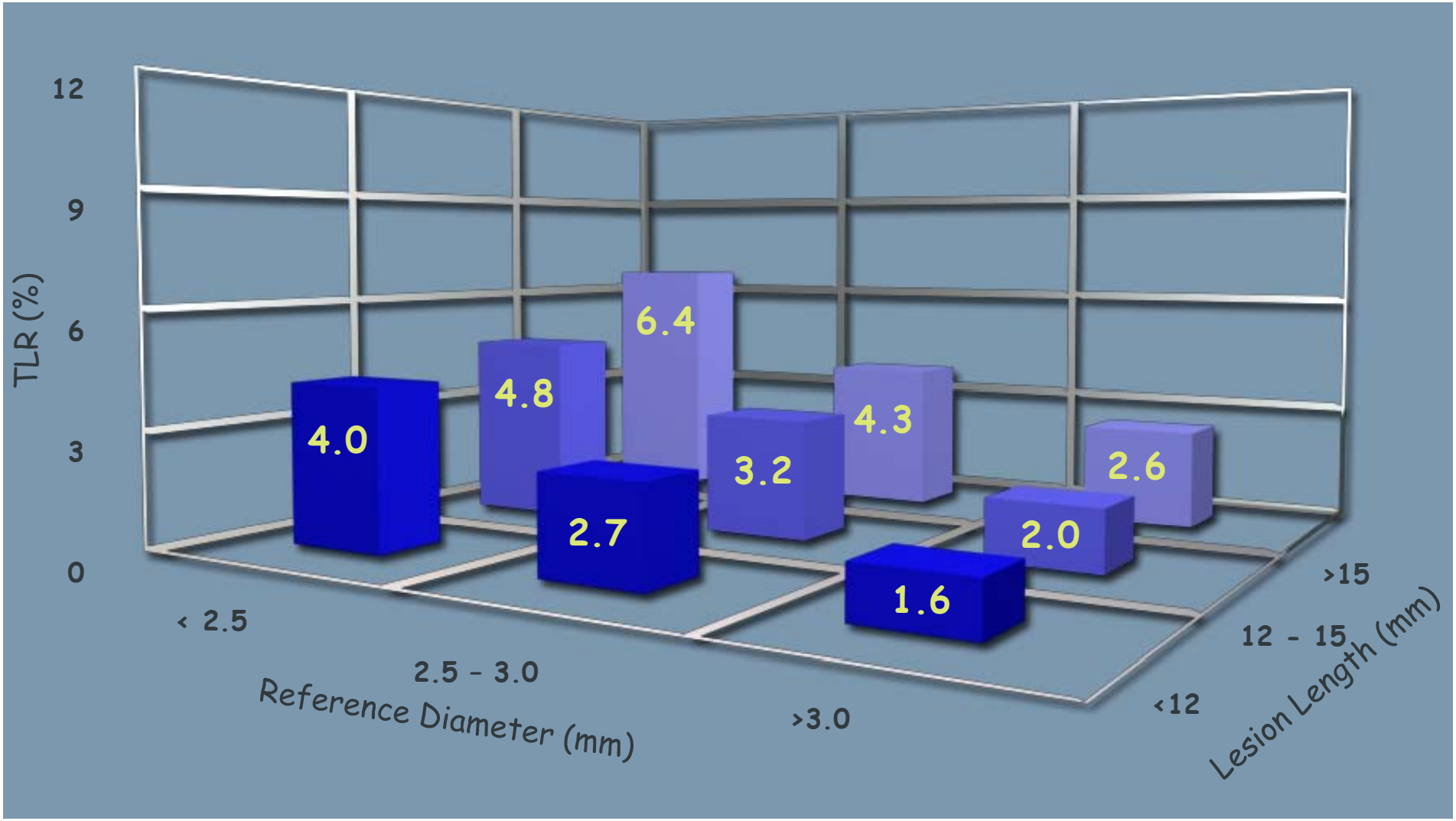
	Small vessel	Large vessel
Procedure, N	**6944**	**6577**
Complication after procedure, %		
Periprocedural	0.4	0.3
Emergency PCI	0.3	0.2
Bail-out CABG	0.0	0.0
Cardiogenic shock	0.5	0.4
Arrhythmia	0.5	0.5
TIA/Stroke	0.1	0.0
Tamponade	0.0	0.0
Contrast reaction	0.0	0.1
Heart failure	0.1	0.1
New renal impairment	0.2	0.1

Restenosis Rates in RCTs of BMS vs PTCA in Small Vessels



Multivariable Predictors of TLR

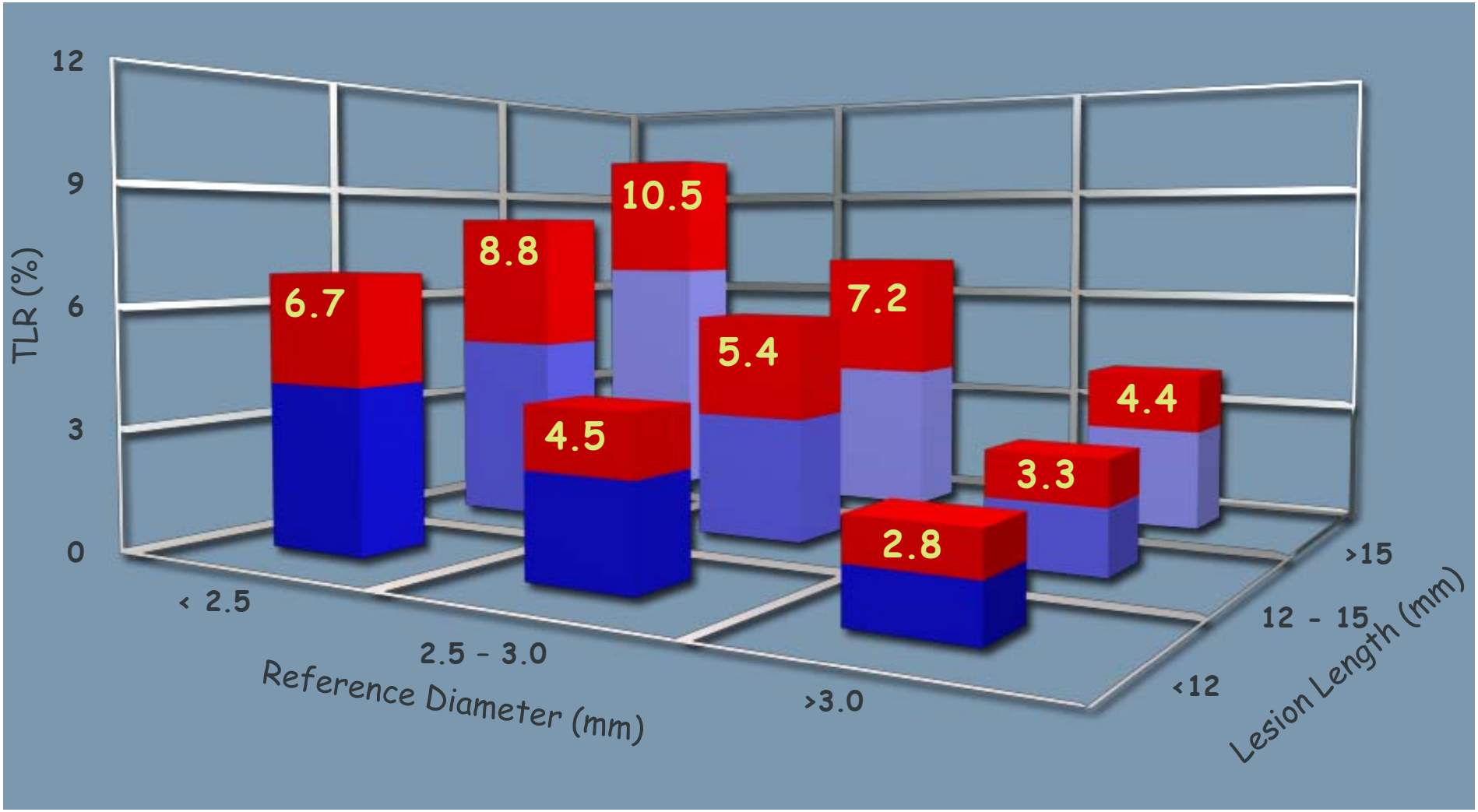
Non-diabetic



Integrated Cypher Data

Multivariable Predictors of TLR

Diabetic



Integrated Cypher Data

Insights from DIABETES TRIAL – Efficacy of SES Implantation in Diabetic Patients with Very Small Vessels (≤ 2.25 mm)

- 85 Patients (100 lesions) from the DIABETES Trial

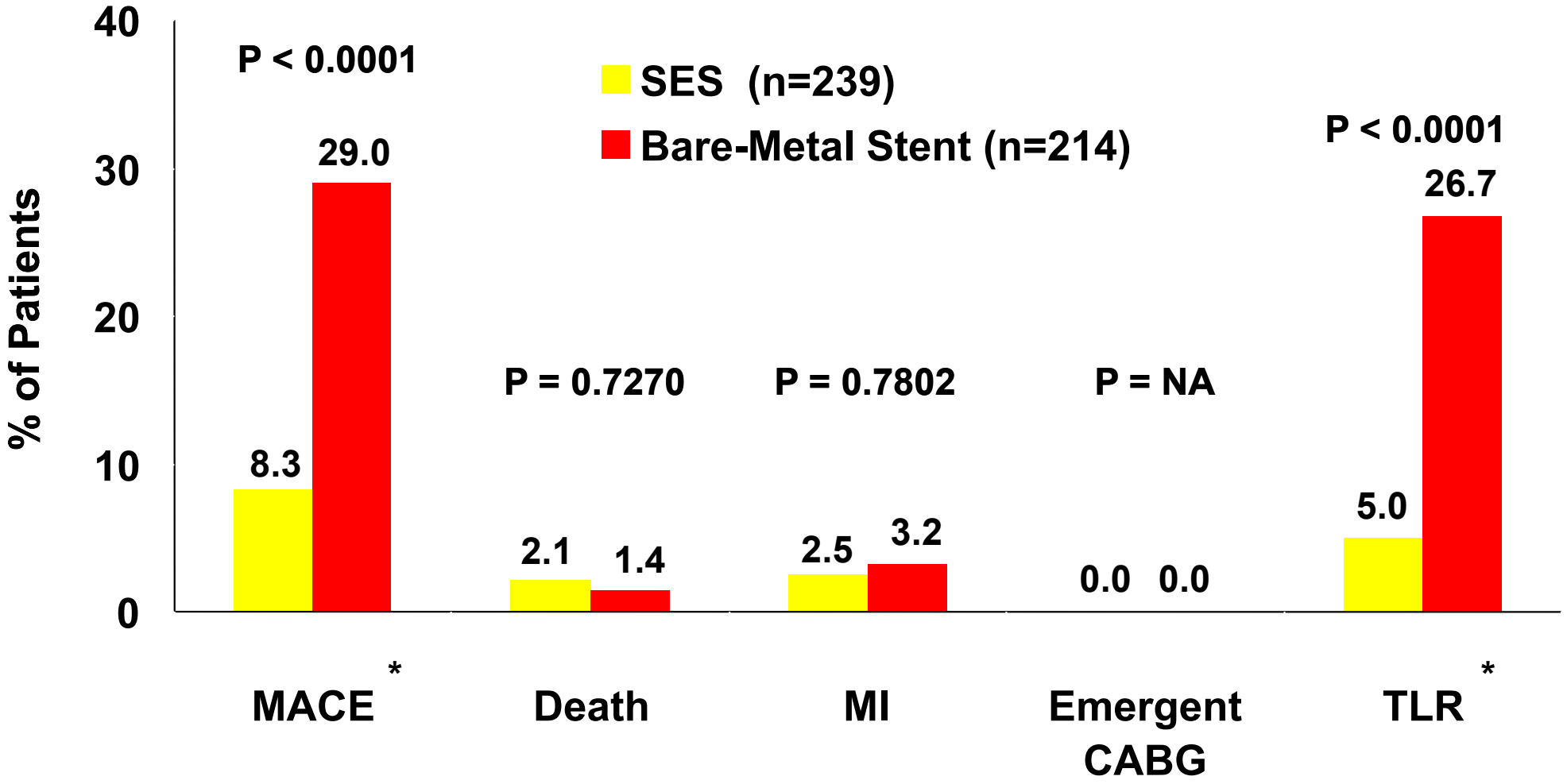
	Sirolimus Stent	Bare Metal Stent	*P* Value
No. of lesions with 9-month follow-up	44	46	
In-segment late lumen loss (mm)	-0.03 ± 0.3	0.44 ± 0.5	<0.001
In-segment Restenosis (%)	9.1	39.1	0.001

Conclusion: SES are effective in reducing the incidence of restenosis in diabetic patients with very small vessels, without increasing the risk of stent thrombosis.

Jimenez-Quevedo P, et al. *Rev Esp Cardiol*. Oct 2006;59:1000–1007.

1-Year Clinical Outcomes: Small Vessel Subgroup

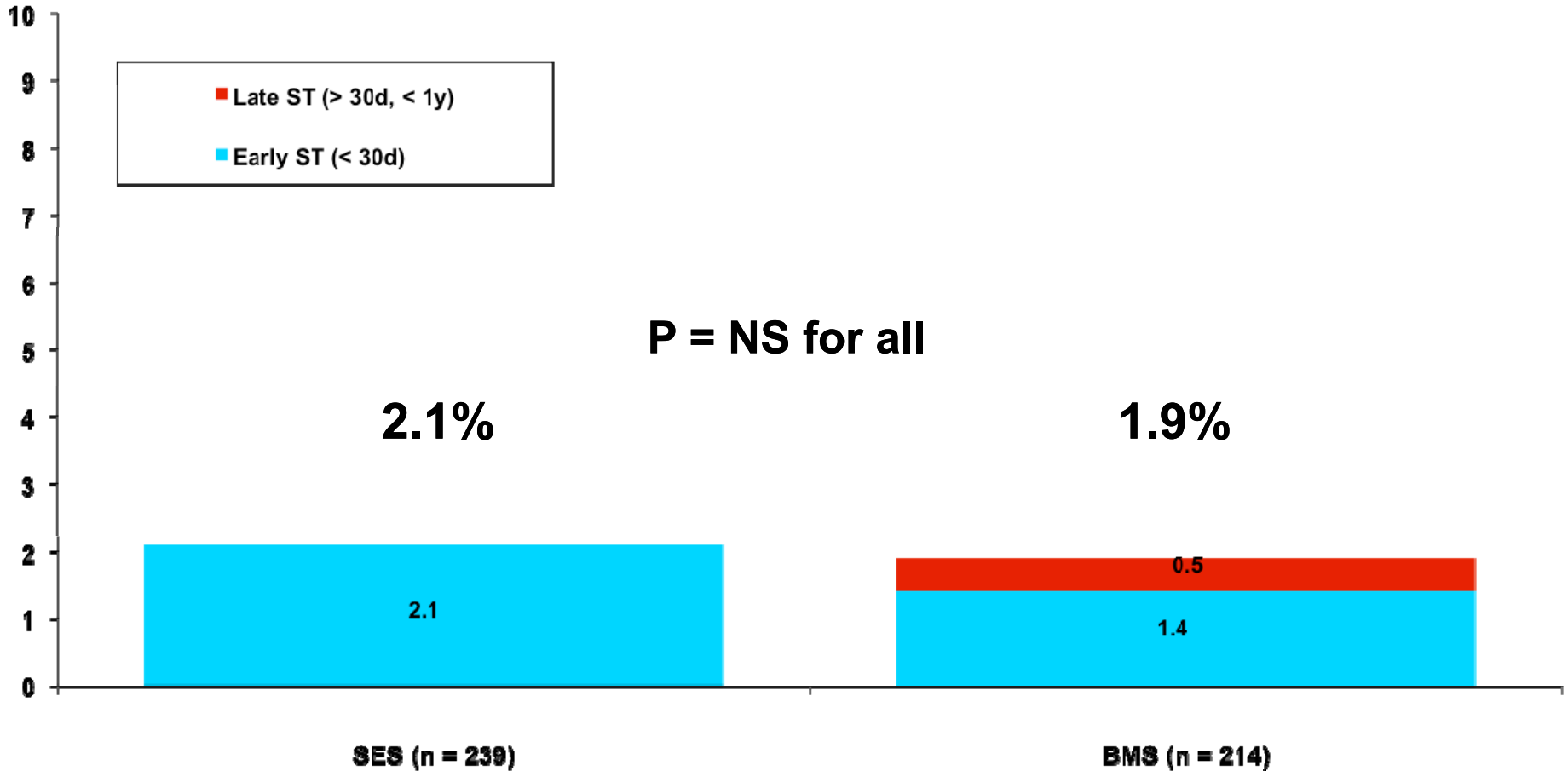
RAVEL, SIRIUS, E-SIRIUS, C-SIRIUS, DECODE and TYPHOON



* P < 0.001

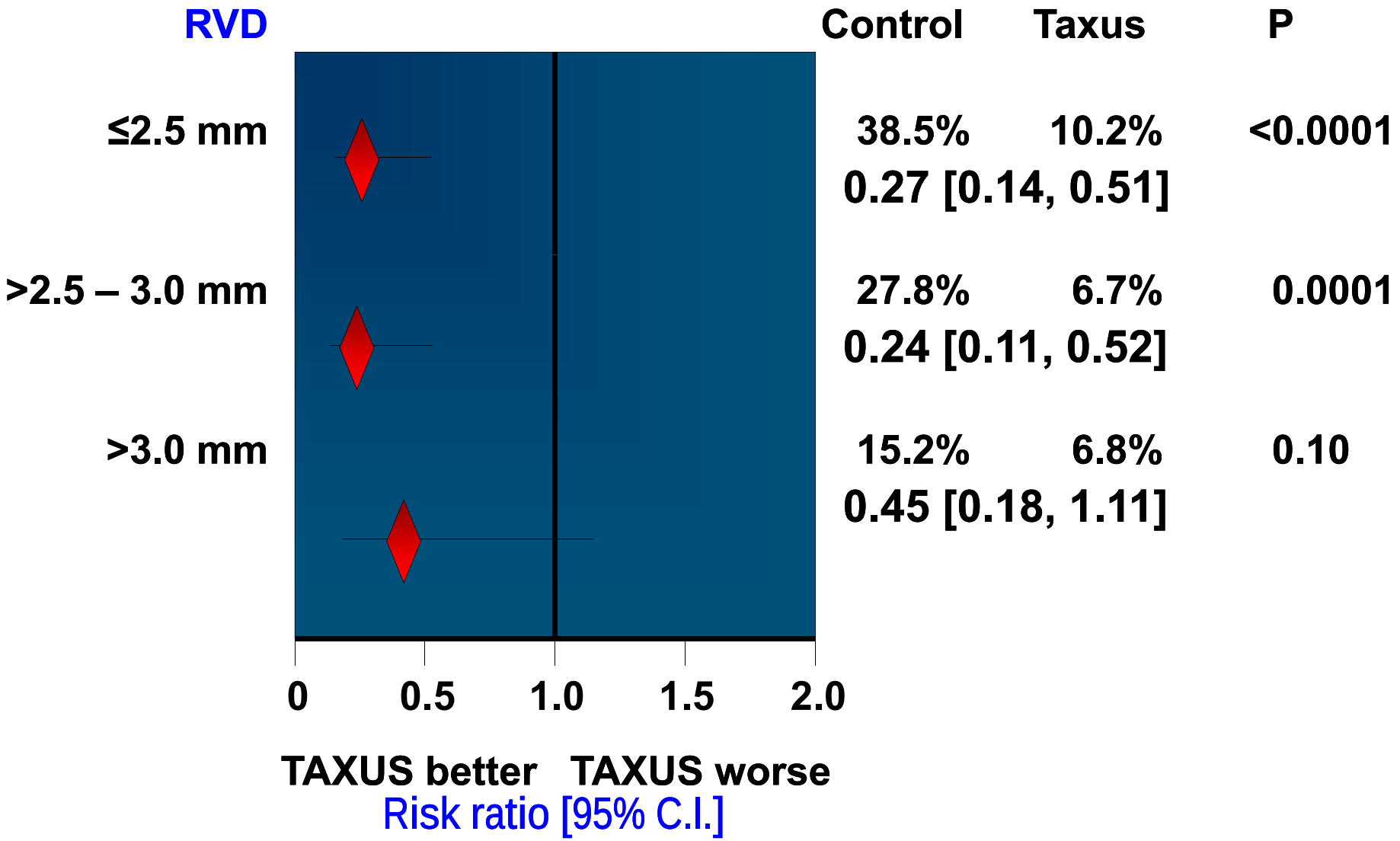
Stent Thrombosis (Protocol Definition) Through 1-Year

RAVEL, SIRIUS, E-SIRIUS, C-SIRIUS, DECODE and TYPHOON



TAXUS IV: Impact of Vessel Size

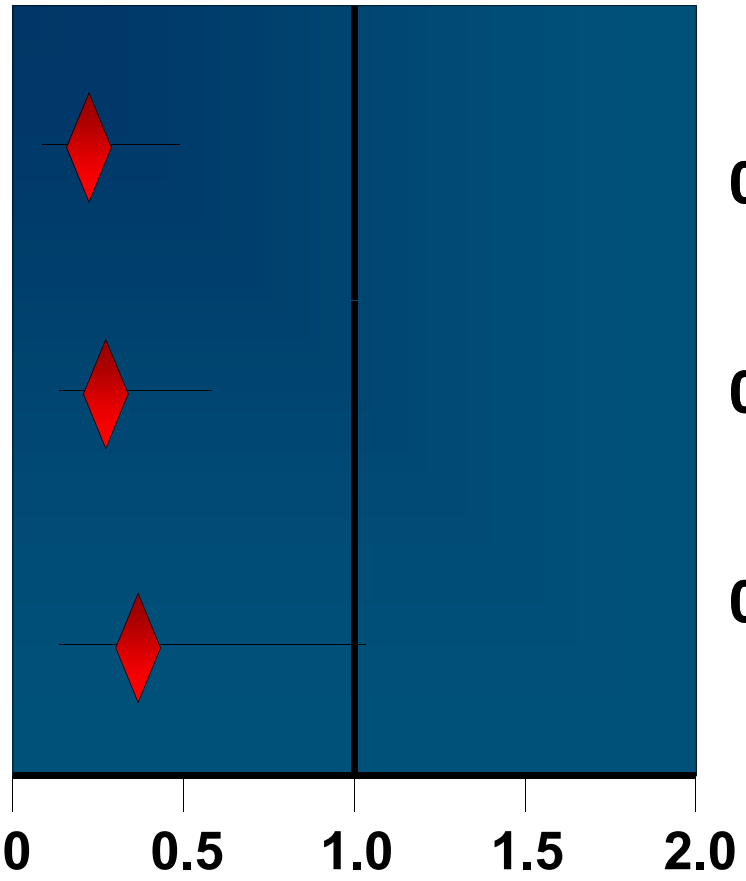
Restenosis (analysis segment)



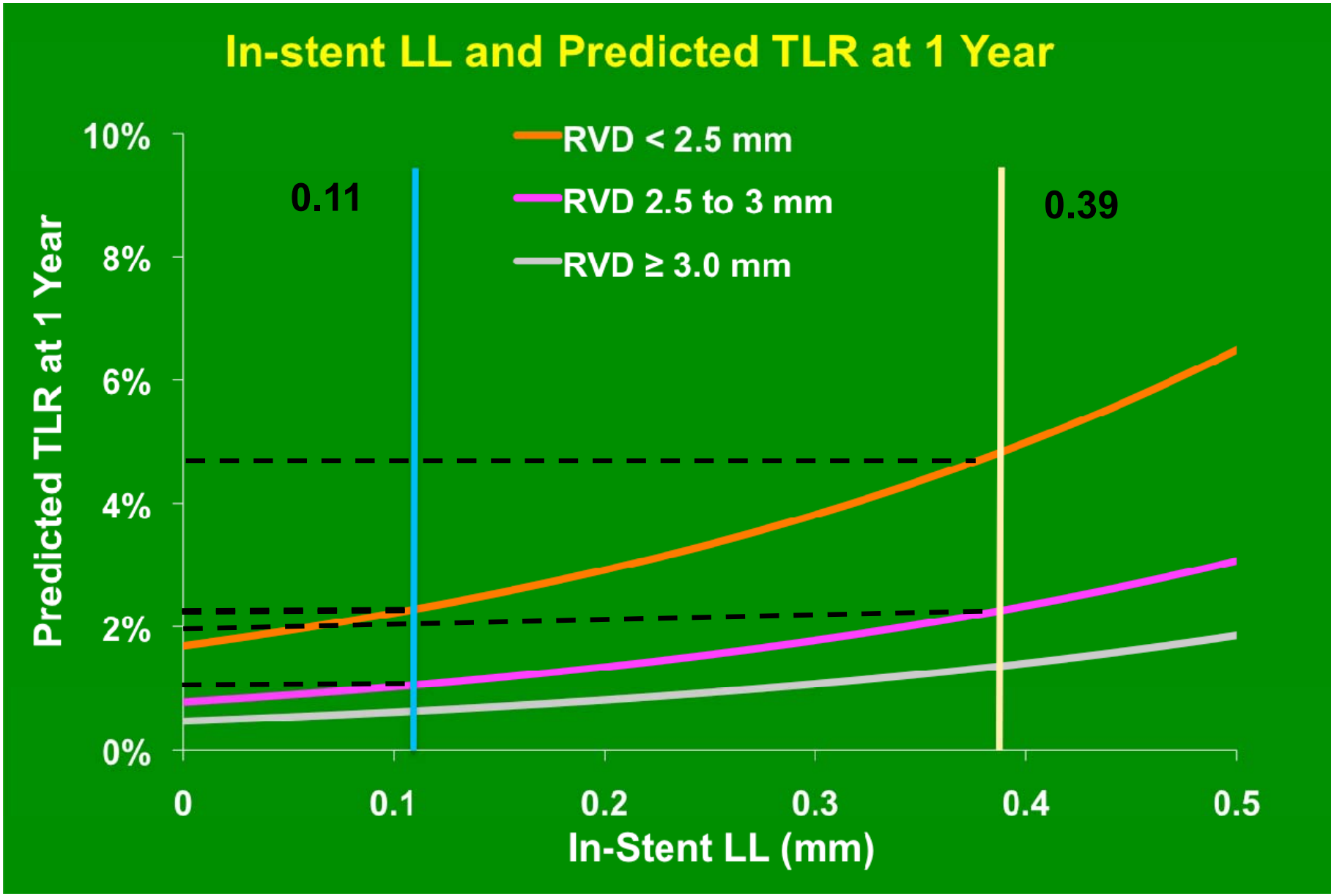
TAXUS IV: Impact of Vessel Size

TLR (9-month)

RVD	Control	Taxus	P
≤2.5 mm	15.4%	3.4%	<0.0001
	0.22 [0.10, 0.49]		
>2.5 – 3.0 mm	11.2%	3.1%	0.0004
	0.28 [0.13, 0.60]		
>3.0 mm	6.7%	2.5%	0.057
	0.38 [0.14, 1.05]		

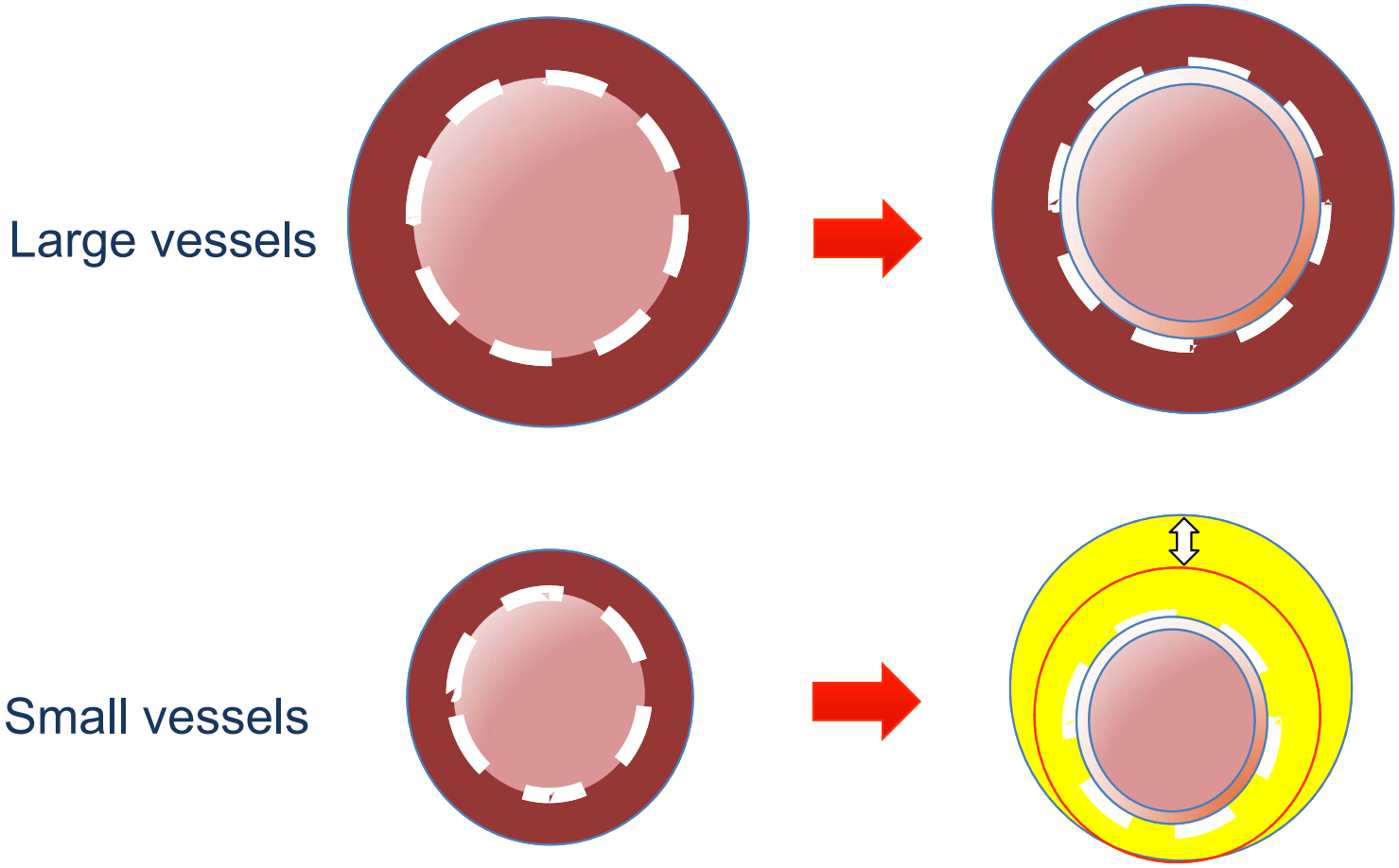


Relationship of TVR to late loss post stenting

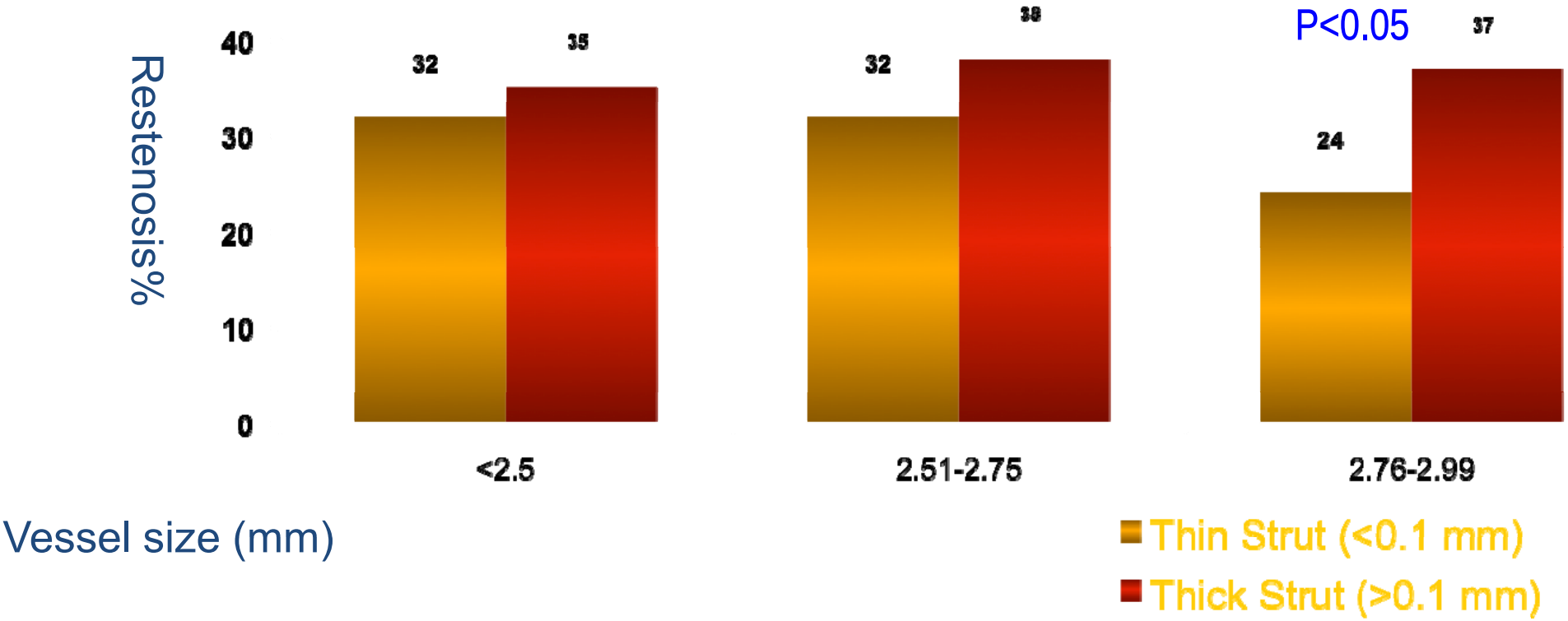


Mauri L, Orav JE, Kuntz RE. Circulation 2005; 111: 3435-3442

Vascular Response to Injury



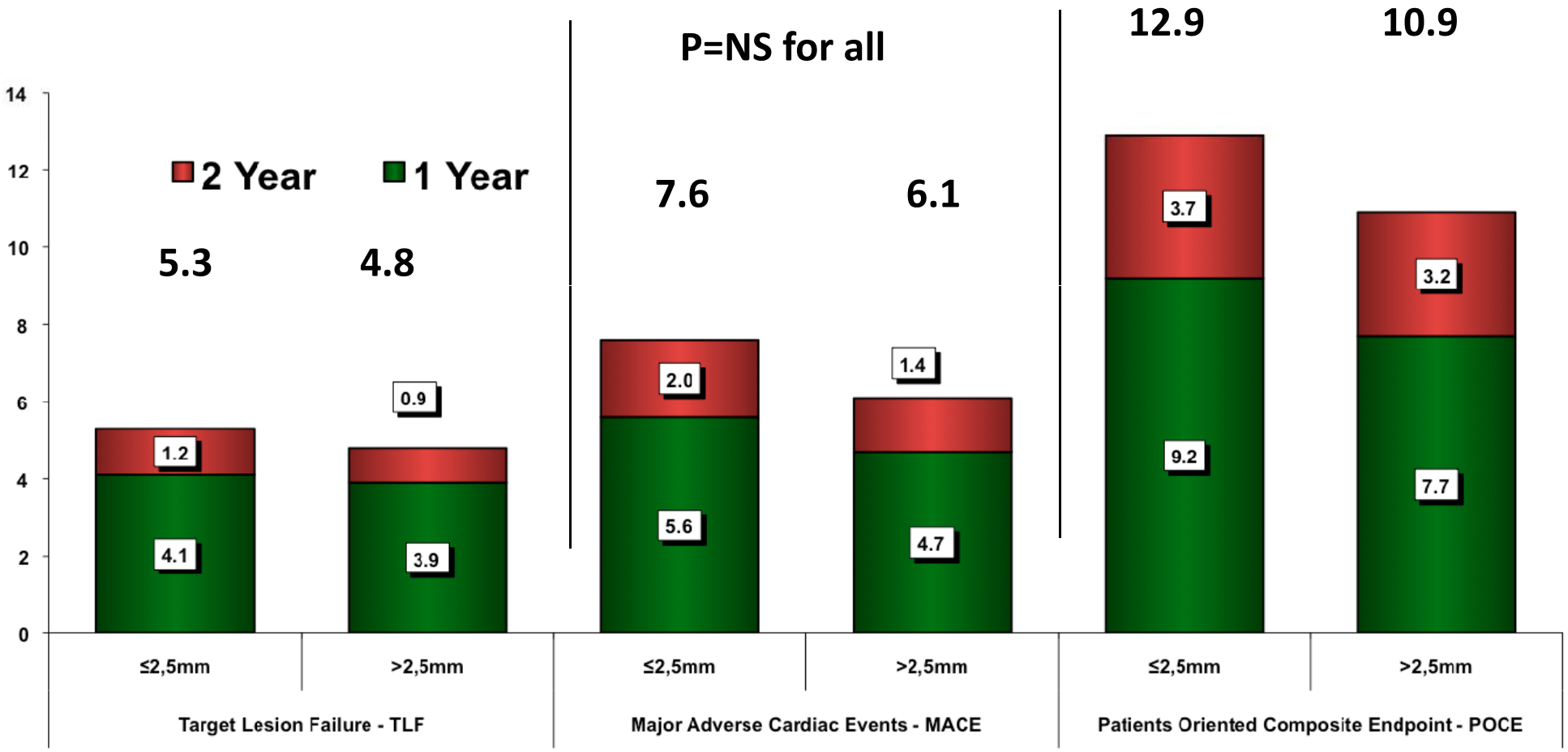
Is strut thickness important in small vessels



Brigouri C, Colombo A. JACC 2002;40:403-9.

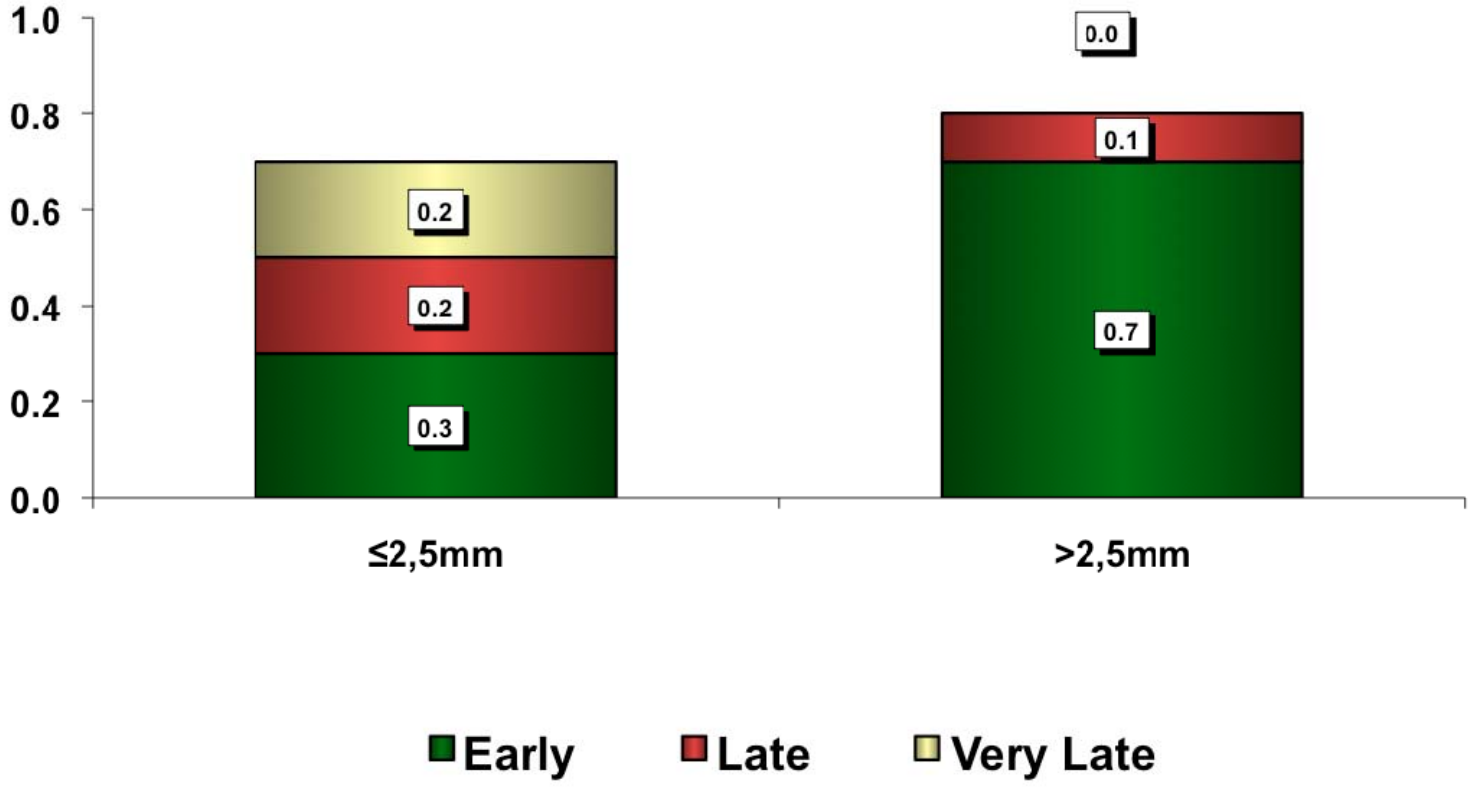
NOBORI VSV
2 year Composite Endpoints

VSV: RVD ≤2.5mm



NOBORI VSV
Stent Thrombosis at 2 Years

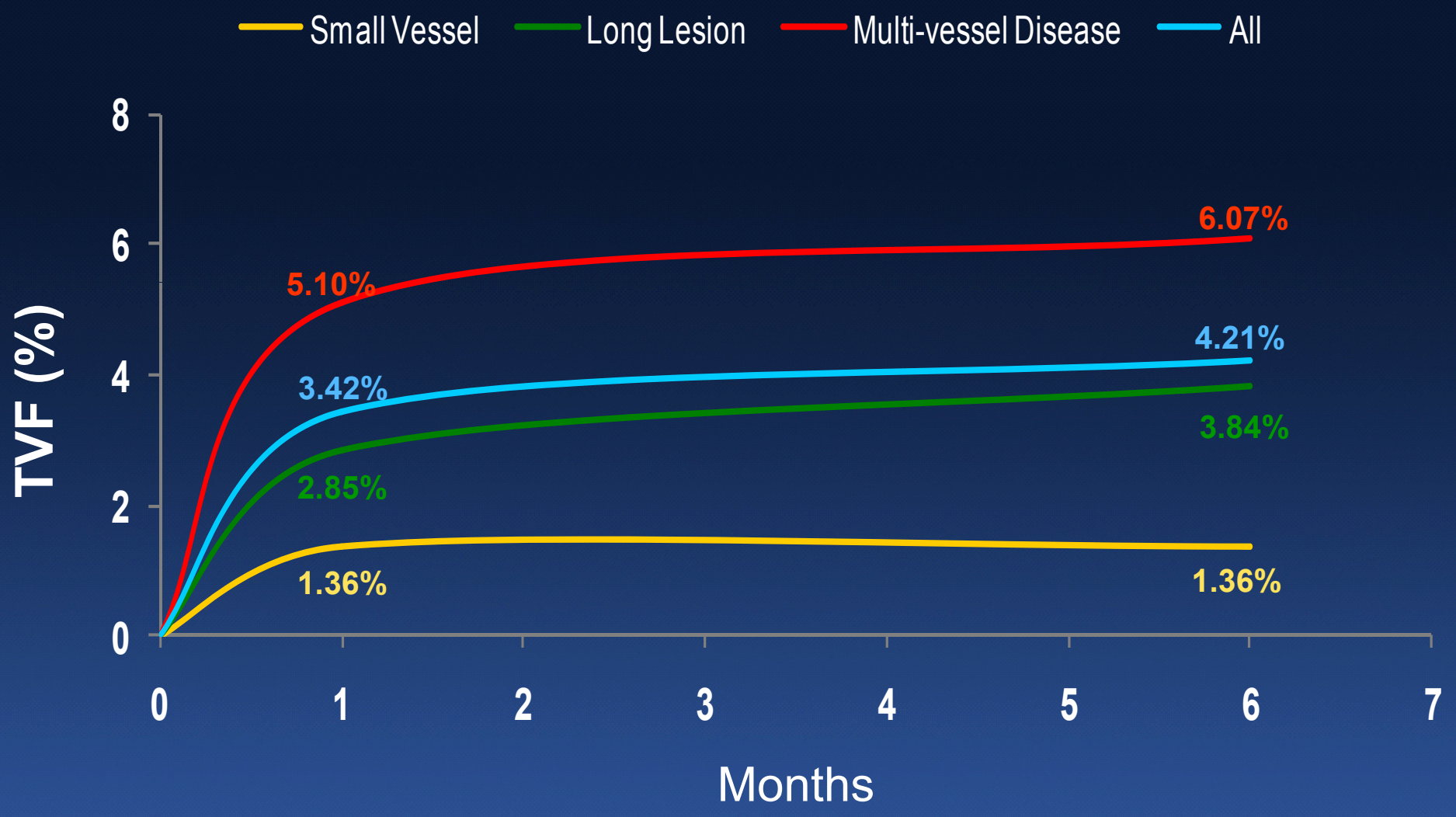
0.7	0.8	Total ST (%)



Definite/probable ST according to ARC

SEEDS

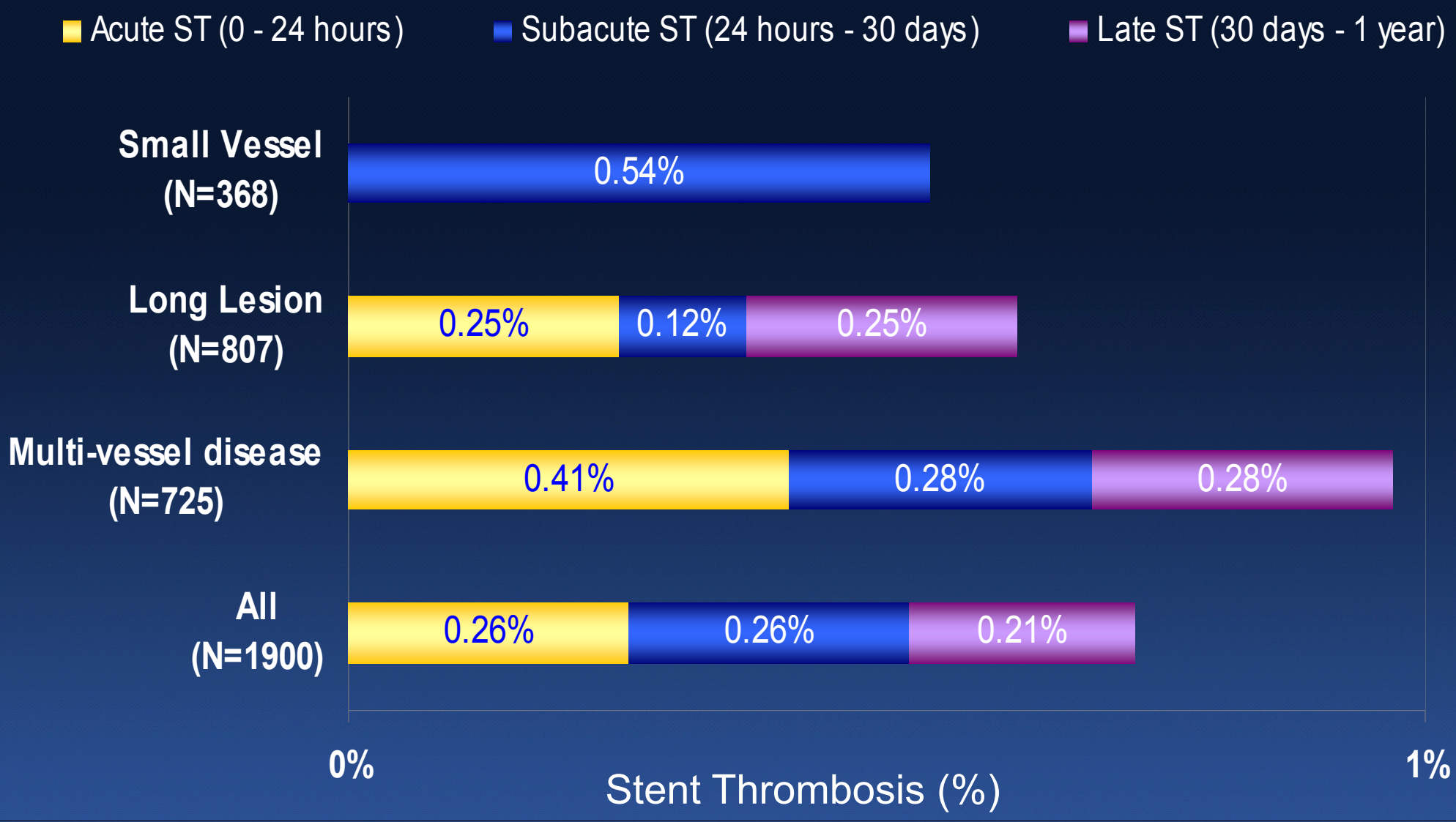
6-Month ID-TVF *(ID-TVF = cardiac death, MI, or ID-TVR)*



A Prospective, Multicenter Registry to Evaluate Safety and Effectiveness of Everolimus Drug-Eluting Stent for Treatment of Coronary Revascularization in Chinese Patients with either Long Lesion, Small Lesion, or Multivessel Diseases

SEEDS

Stent Thrombosis (ARC def/prob) through 6 months



A Prospective, Multicenter Registry to Evaluate Safety and Effectiveness of Everolimus Drug-Eluting Stent for Treatment of Coronary Revascularization in Chinese Patients with either Long Lesion, Small Lesion, or Multivessel Diseases

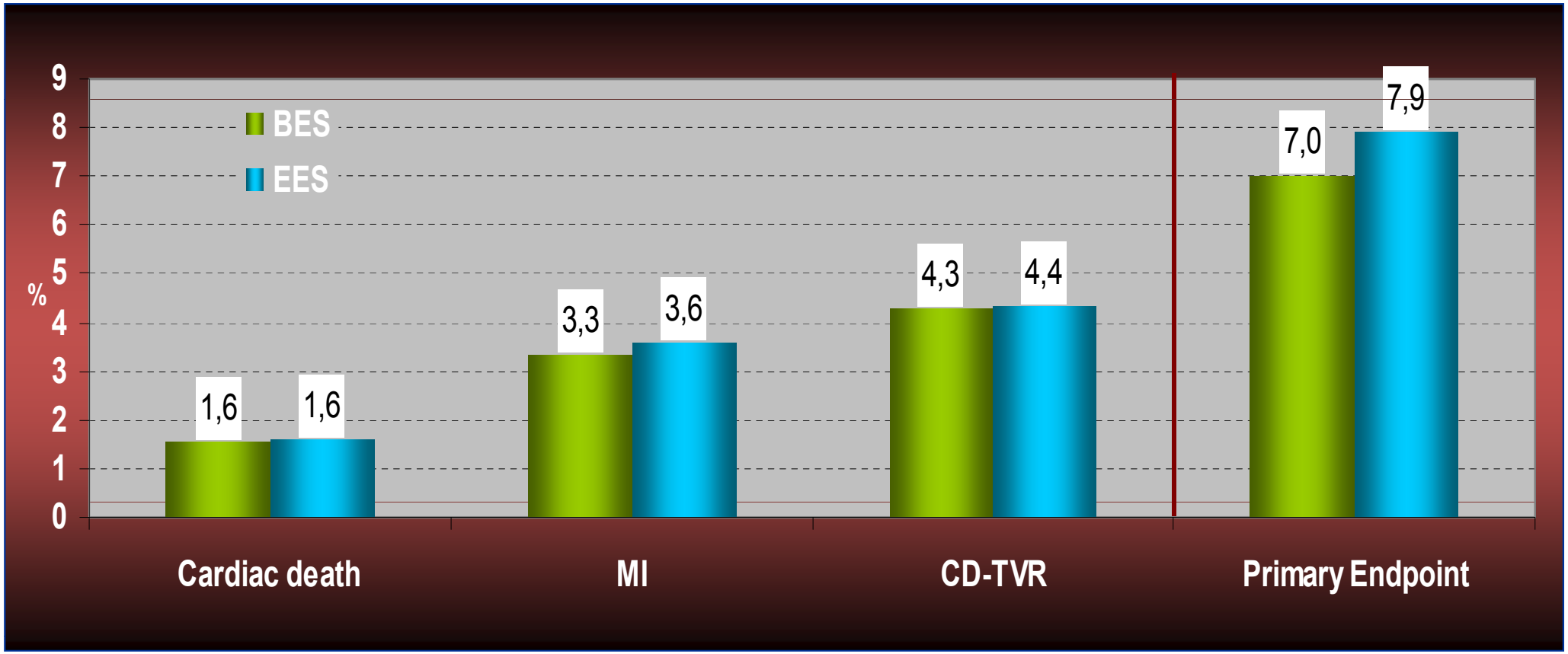
COMPARE II trial
Small Vessels Subgroup

Primary Endpoint

(<2.75 mm)

Cardiac Death, MI, Clinically Indicated TVR

P = NS



Sjoerd Hofma et al, TCT2012

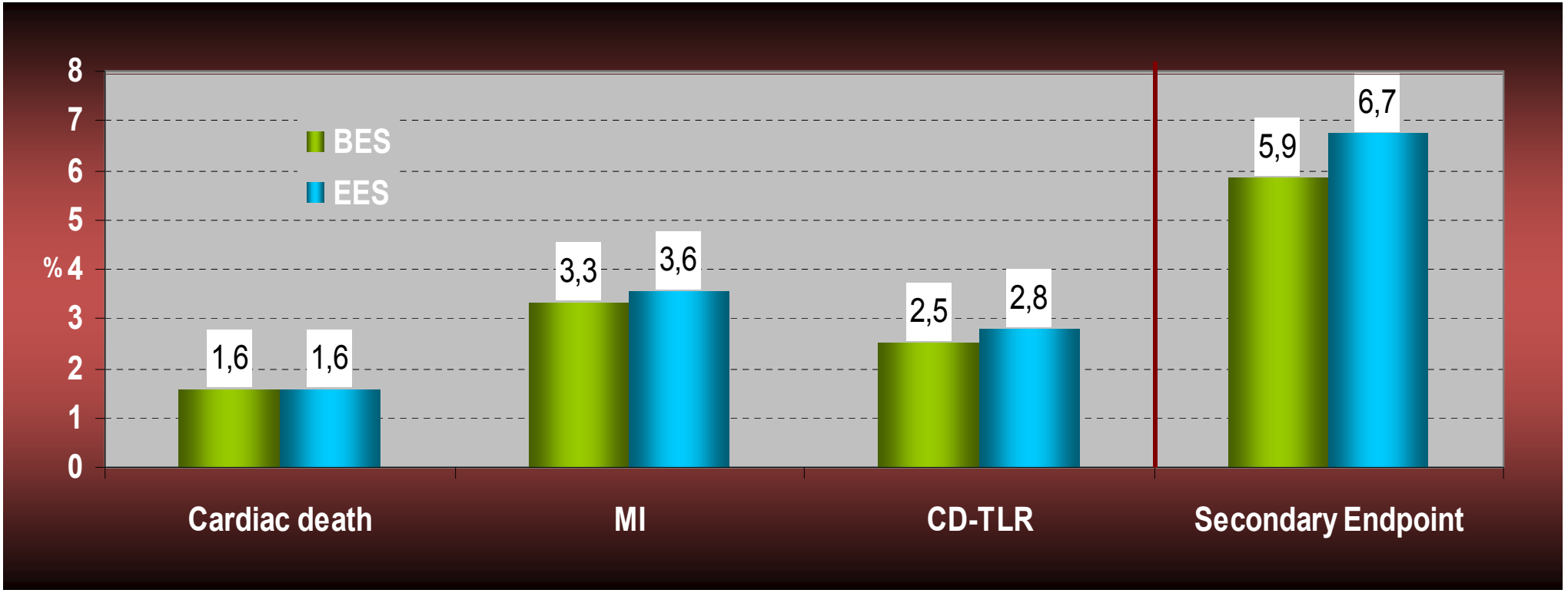
COMPARE II trial
Small Vessels Subgroup

Secondary Endpoint

(<2.75 mm)

Cardiac Death, MI, Clinically Indicated TLR

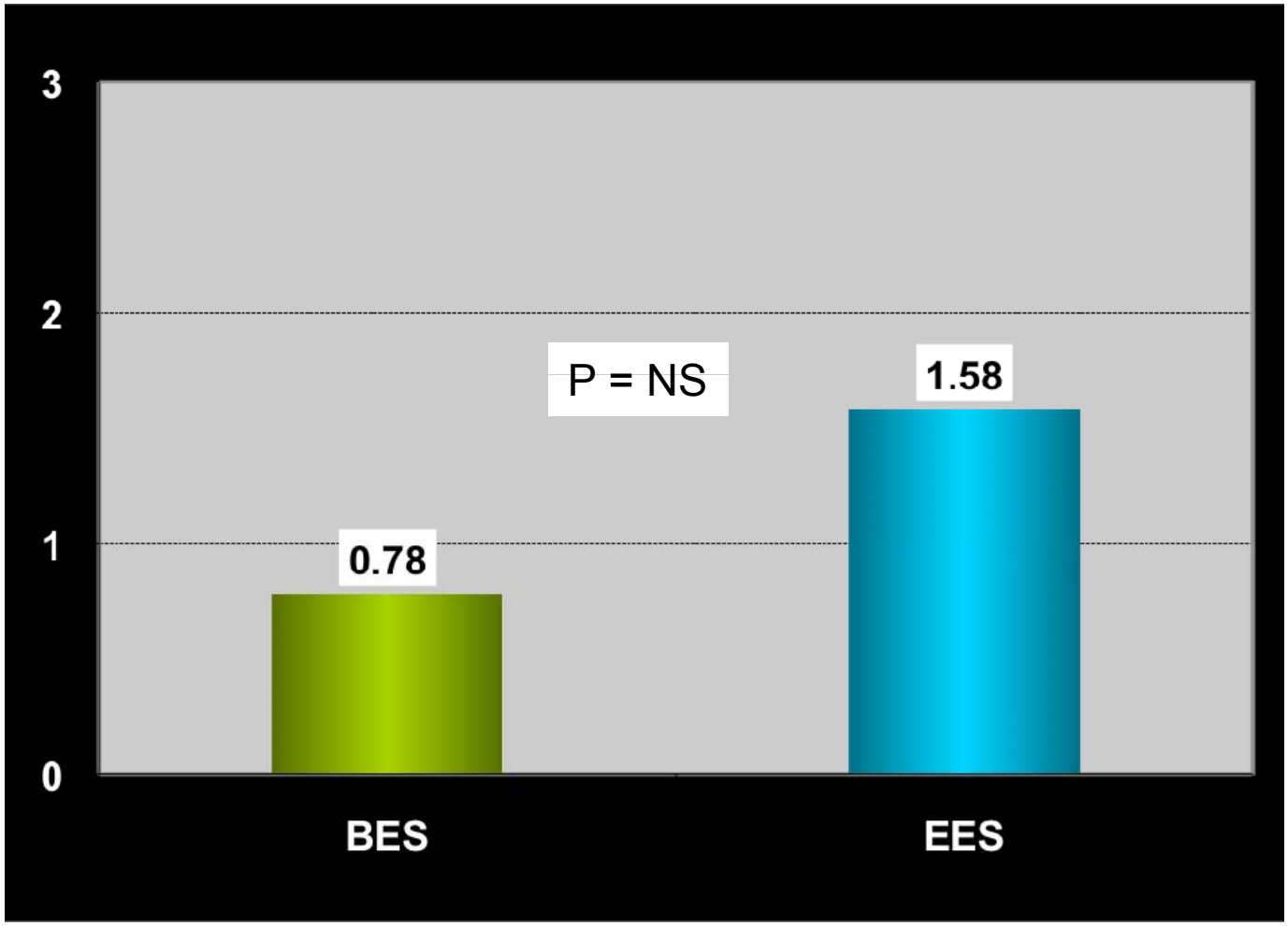
P = NS



Sjoerd Hofma et al, TCT2012

COMPARE II trial
Small Vessels Subgroup

Stent Thrombosis (ARC)

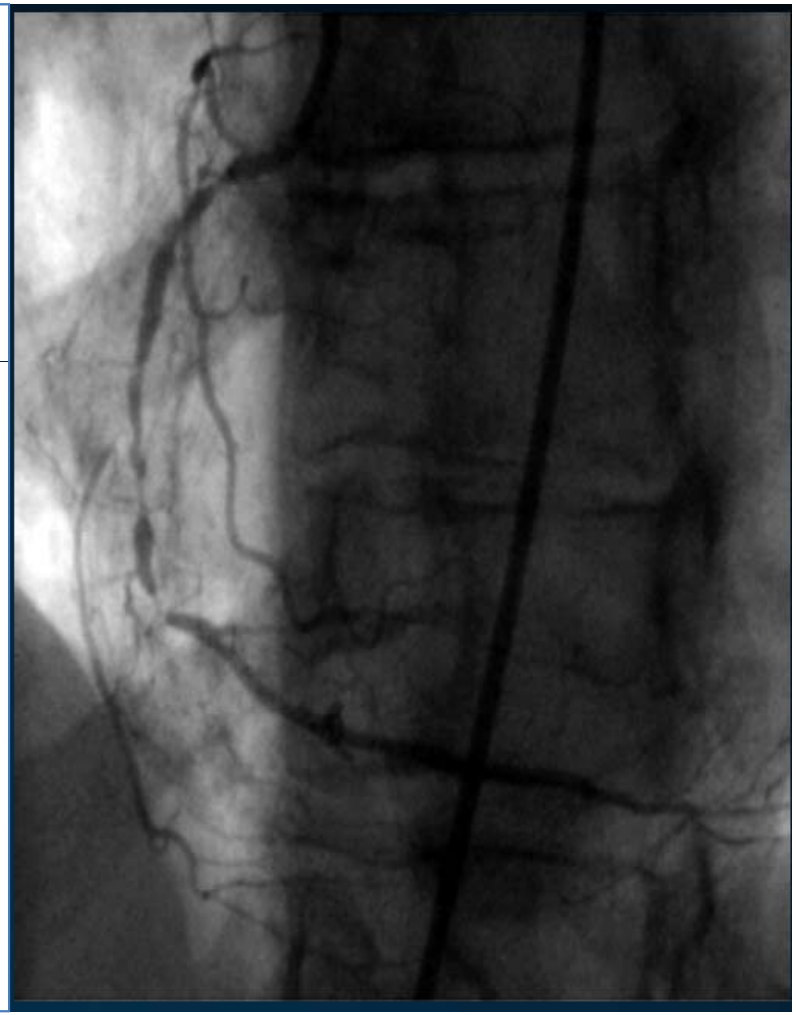


Definite/Probable ST, ARC

Sjoerd Hofma et al, TCT2012

Calcified small vessels

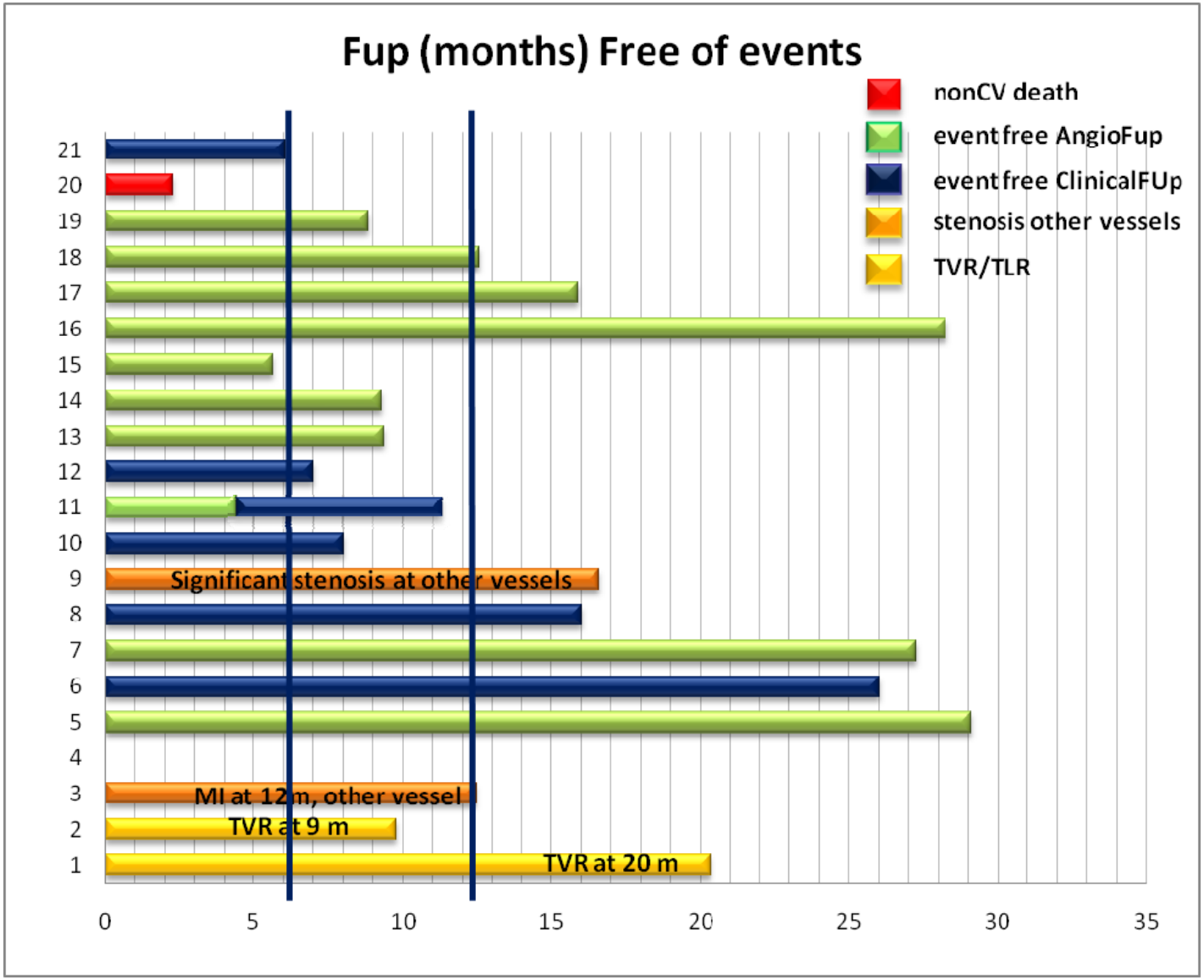
- Especially challenging, failed deliverability in 2-5% of cases
- Often diffuse, narrow, calcified and small caliber
- Difficult to deliver the stent
- Debulking an option
- DEB post-Rotablation if unable to DES



Reaching Further in the Treatment of Calcified Small Vessel Disease Is Rota-DEB an Option?

Follow up:

- Freedom from major cardiac adverse events was 95% at 6M and 90% at 12M.



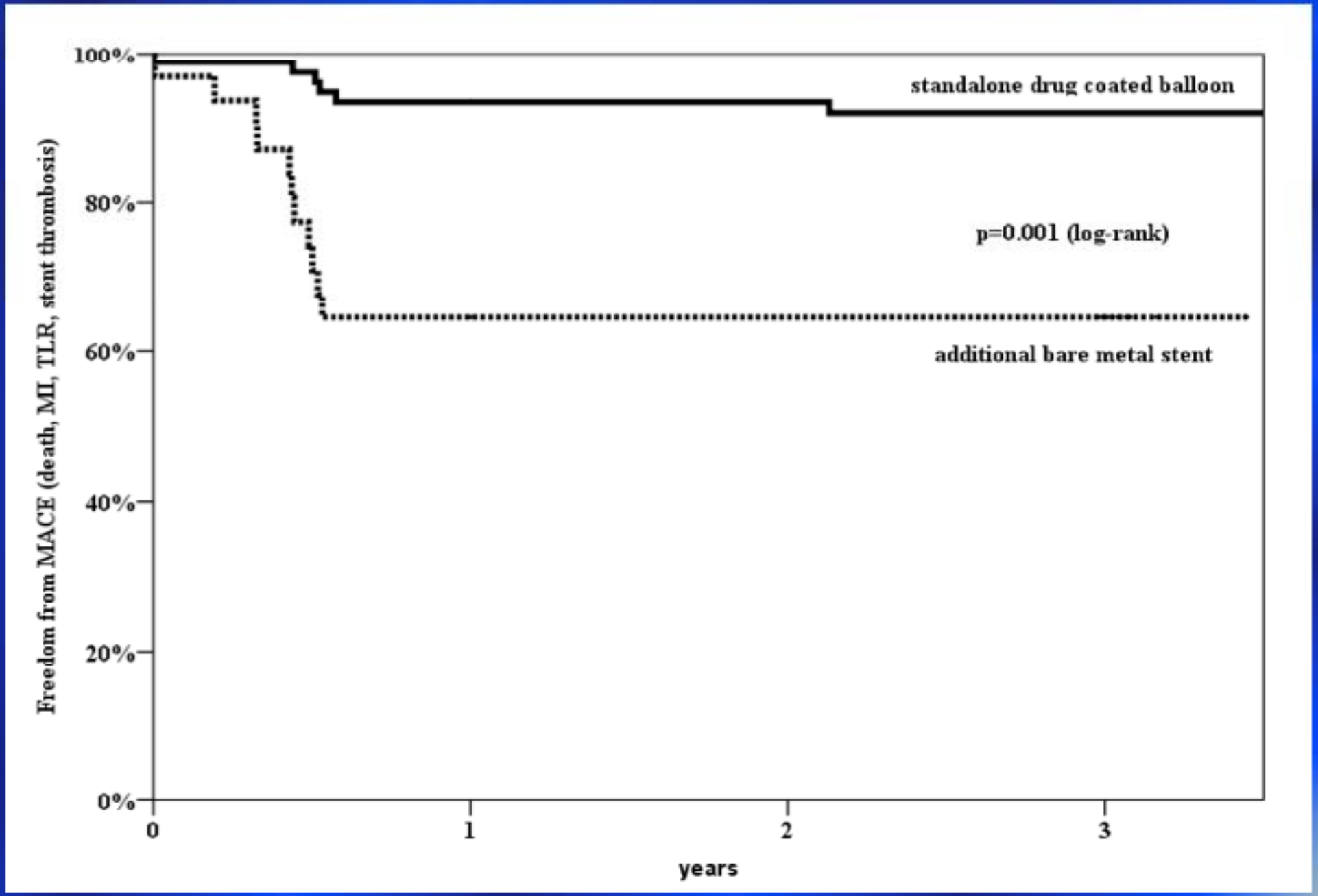
Paula Mota et al. TCT 2012

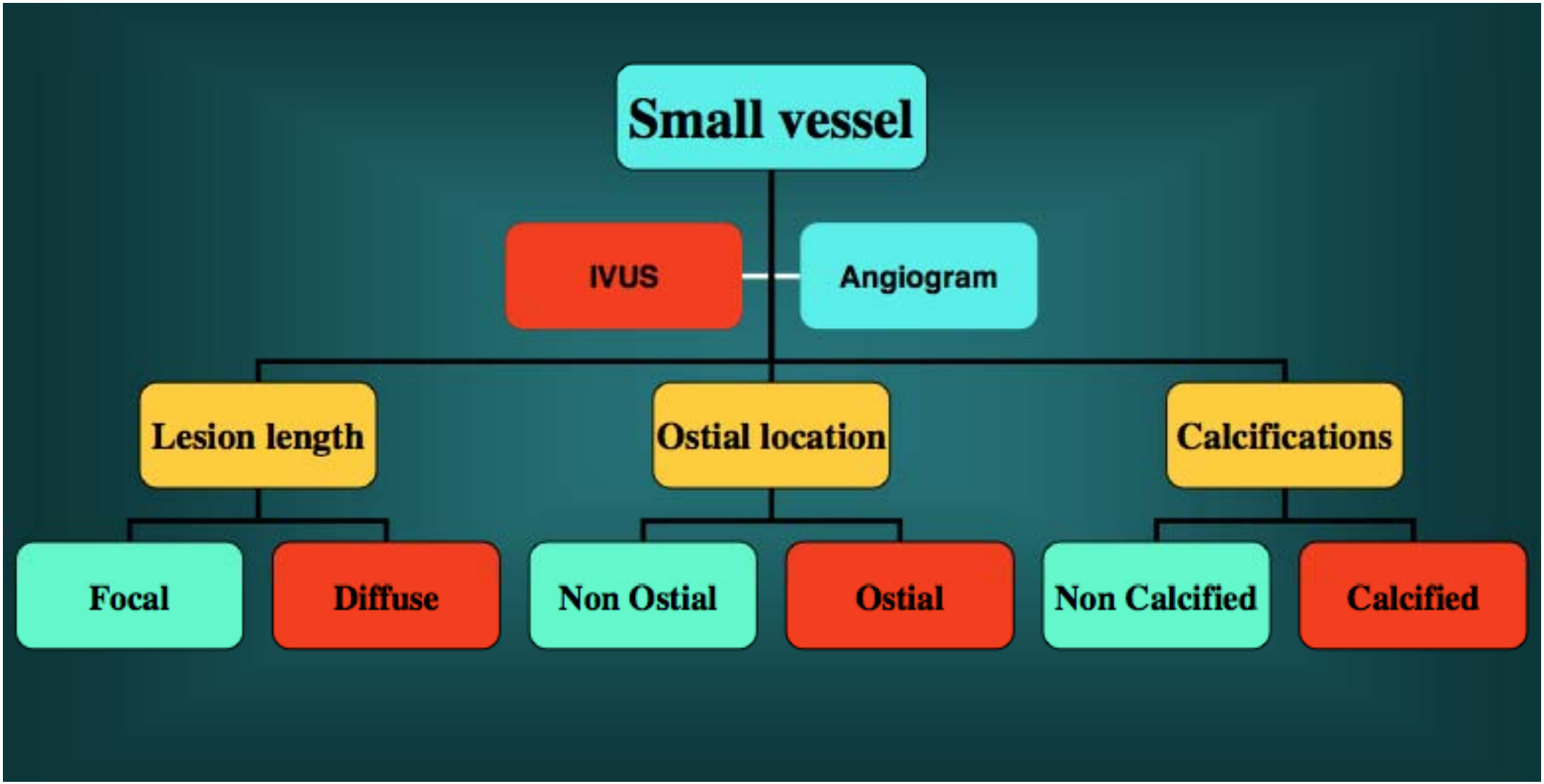
PEPCAD I SVD

Treatment of Small Vessel Coronary Artery Disease by the Sequent® Please Paclitaxel coated balloon

	Coated Balloon	Coated Balloon + BMS
Ø in-segment LLL (6 Months)	0.16 ±0.38 mm	0.62 ±0.73 mm
binary restenosis rate in-segment (6 Months)	4 / 82 (5.5%)	13 / 32 (44.8%)
MI	1 / 82 (1.3%)	1 / 32 (3.1%)
TLR	4 / 82 (4.9%)	9 / 32 (28.1%)
MACE	6.1 %	37.5 %

3-year Freedom From MACE
(Death, Myocardial Infarction, TLR, Stent Thrombosis)




Small vessel
IVUS
Angiogram
Lesion length
Ostial location
Calcifications
Focal
Diffuse
Non Ostial
Ostial
Non Calcified
Calcified

Small stents:

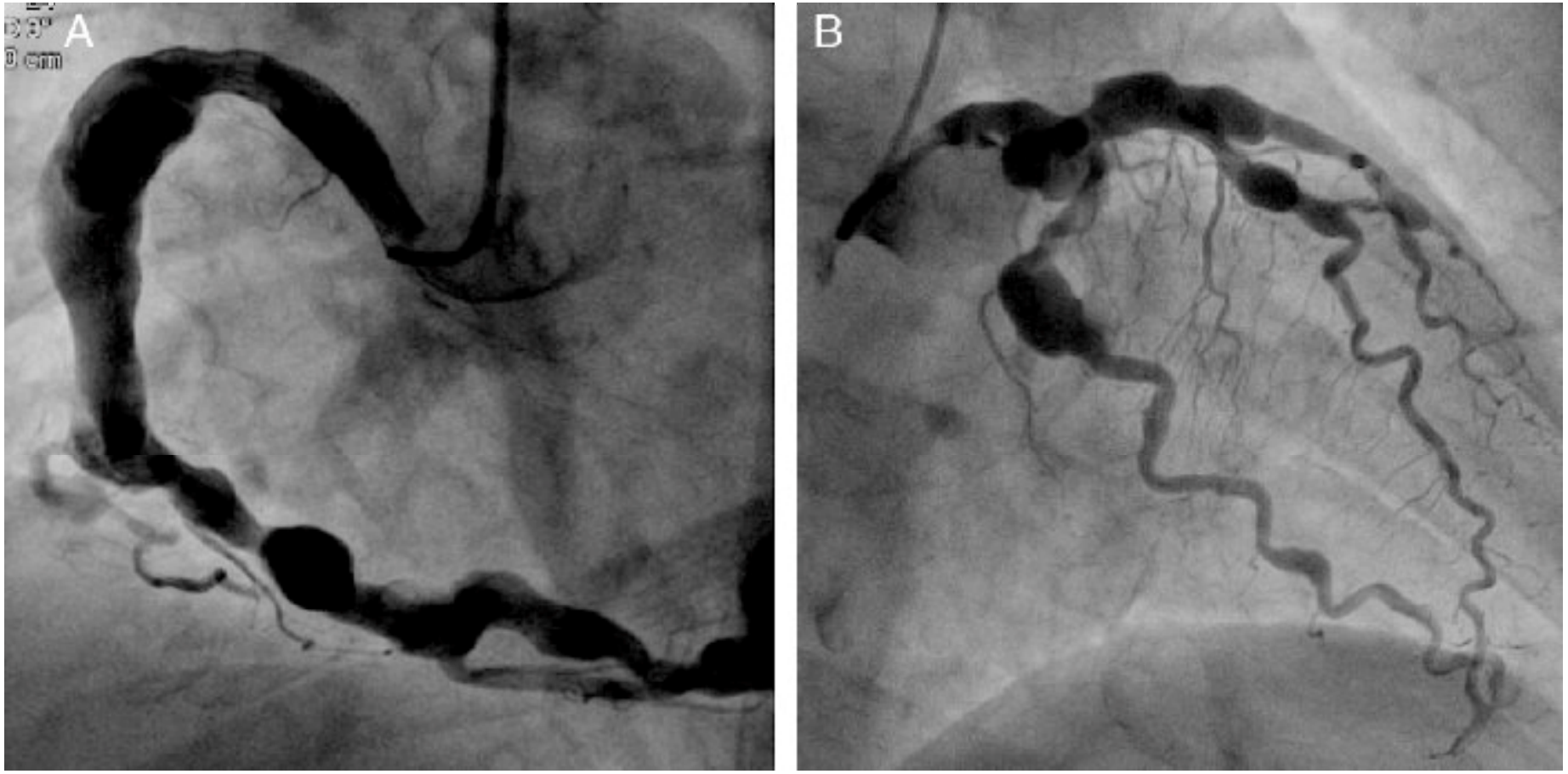
important characteristics

- More deliverable, more conformable
- Improved balloon re-wrap and less withdrawal resistance

Newer generation stents

Conclusion

- SV PCI still a challenging subset of intervention
  especially in diabetics
- IVUS indicated to determine if truly SV or just diffuse disease esp prox and mid-LAD and prox-RCA lesions
- Small vessels must be prepared well prior to stenting and followed by adequate post-stenting ballooning dilation paying attention to risk of vessel perforation and dissection esp if only DEB is considered
- Procedural risk and long term risk
- Operator technique and experience


A
B