

How to treat Bifurcations

Nicolaus Reifart

Professor of Medicine Frankfurt University

Chief Cardiology Main Taunus Hospitals

Bad Soden, Germany

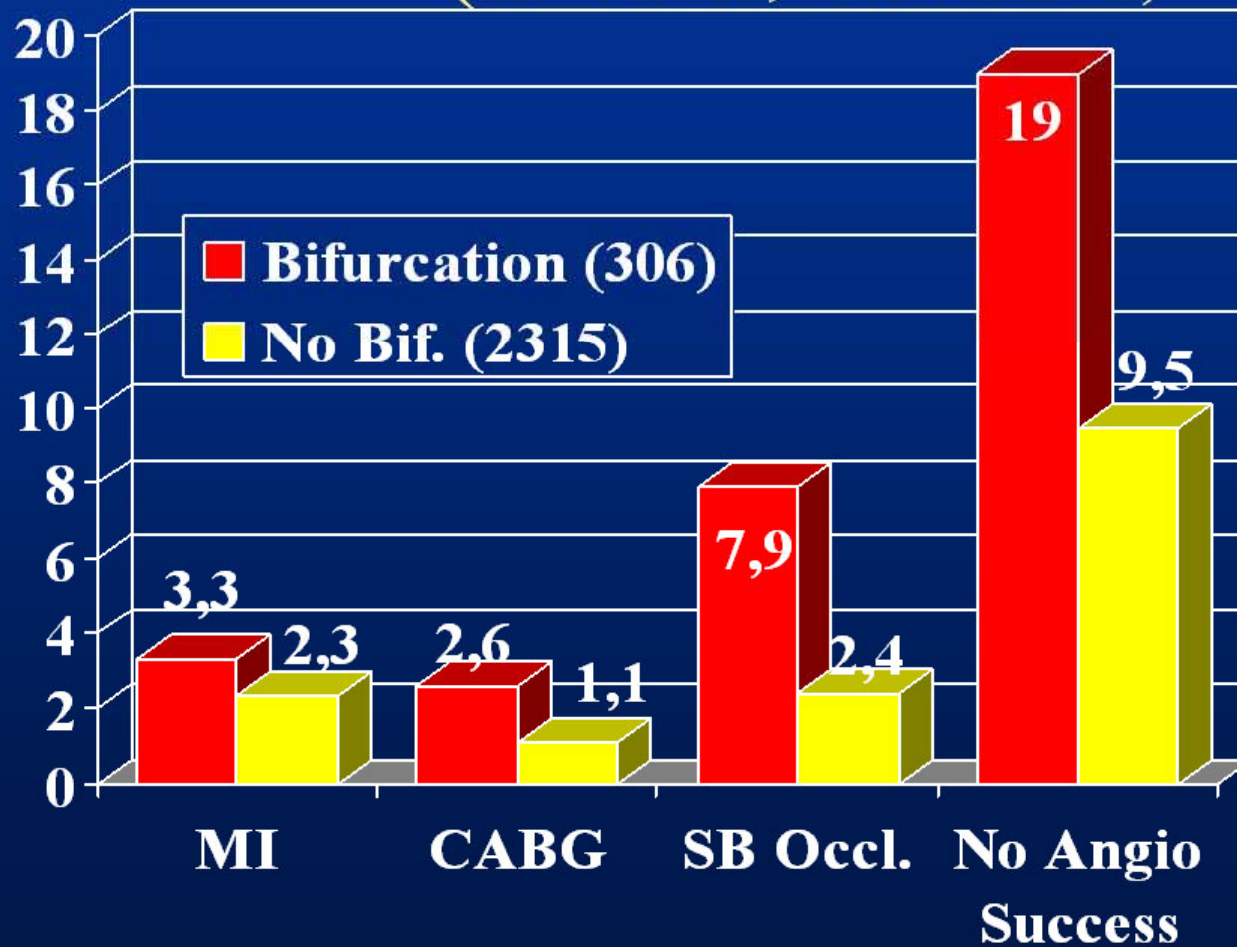
Seoul 2006

How to treat Bifurcations

- Why are bifurcations different?
- Bifurcations - Definitions
- Treatment Strategies
- Results of various Strategies
- Our Preference

Bifurcations NHLBI

(n= 2321; 7/97-2/98)



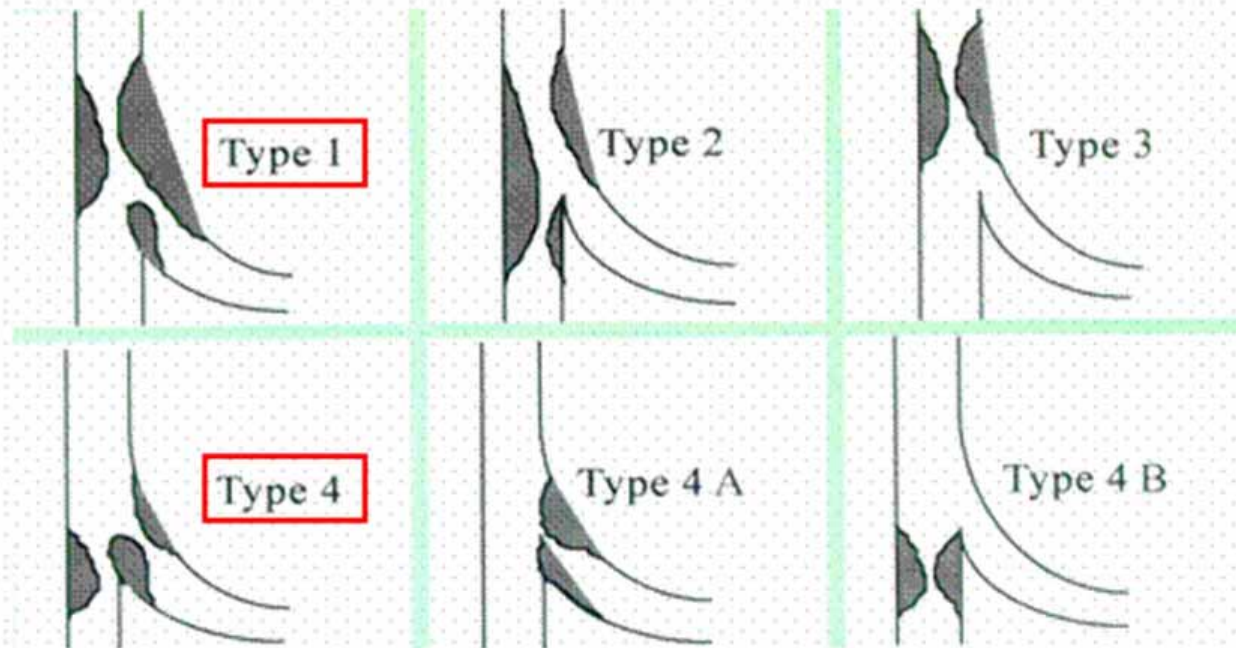
More
Complications

Less Success

More
Restenosis

Definition and Classification with 8 Subdefinitions

1. According to plaque location



2. According to angulation



Bifurcation-Lesion: Definition

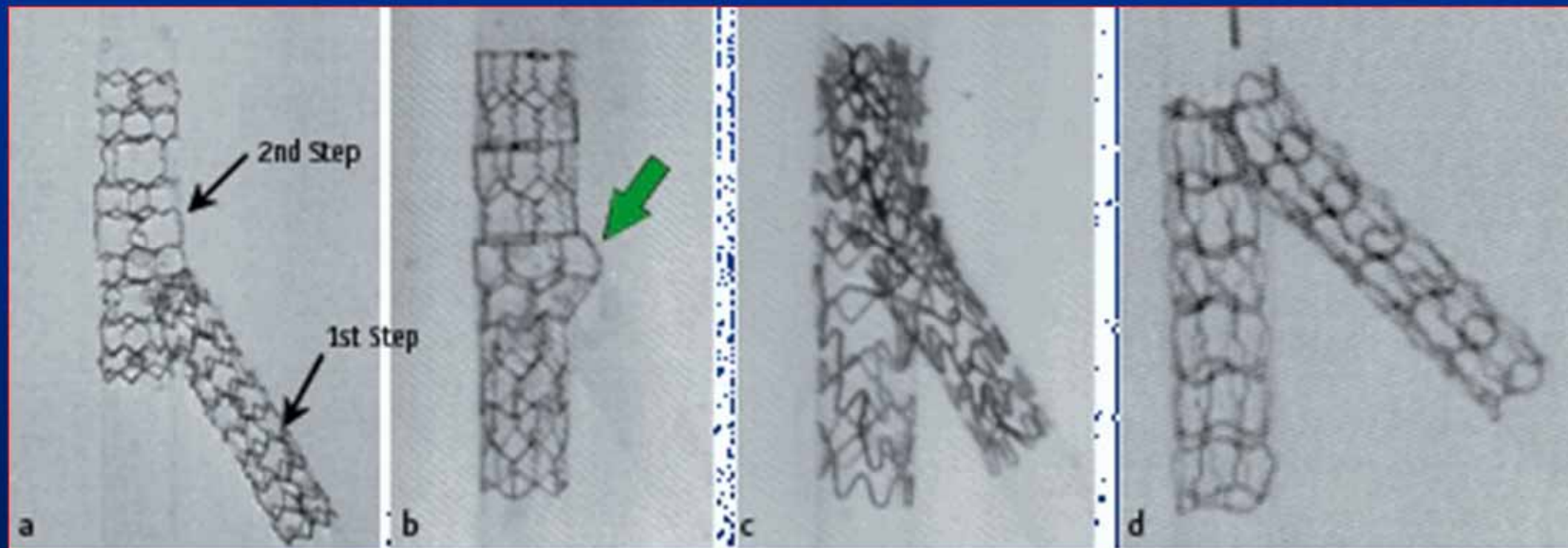
Stenosis within 5 mm of
a Sidebranch ≥ 1.5 mm*

*worth to be kept open

Further practical Classification

- The SB dictates the strategy
- Small Sidebranches < 2.5 mm (SSB) should not occlude but are clinically not relevant
- Ergo: **1.MB/SSB 2. MB/SB**
3. MB/MB

Bifurcation Lesions: 10 different Treatment-strategies + various dedicated stents (*will not discuss*)



T

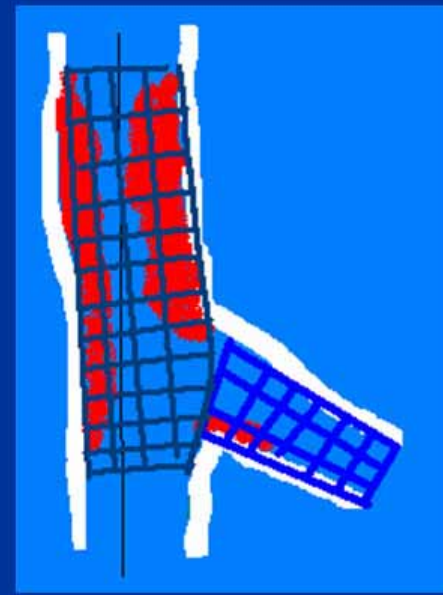
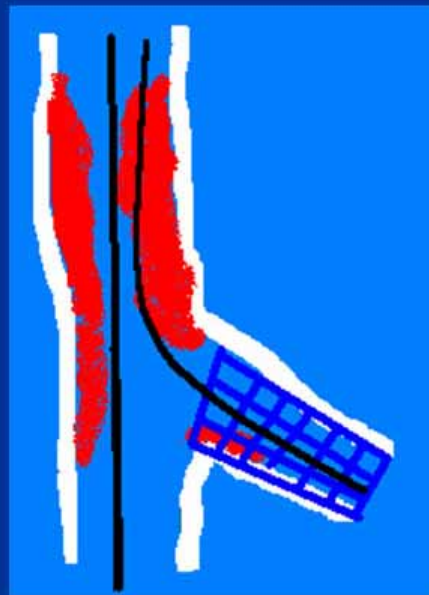
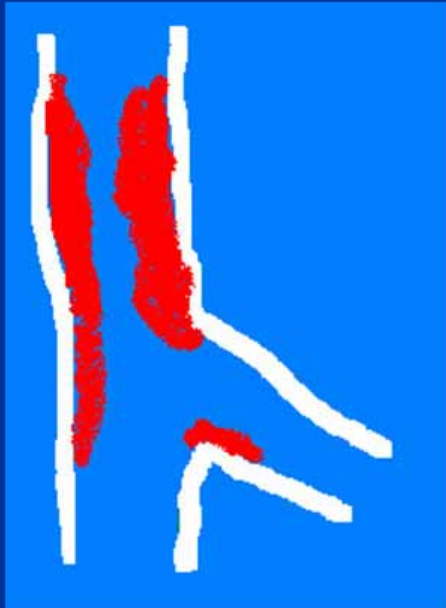
Provisional T

Coulotte

V

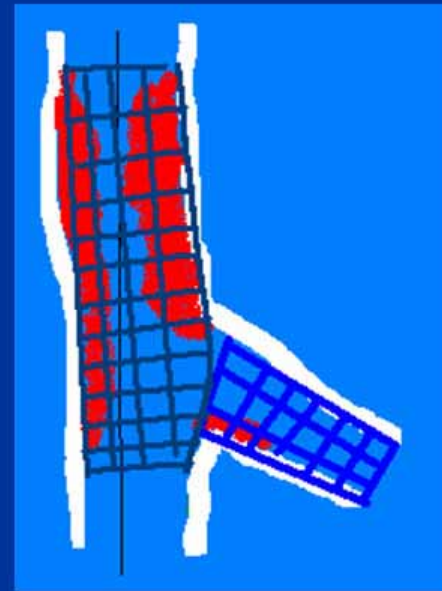
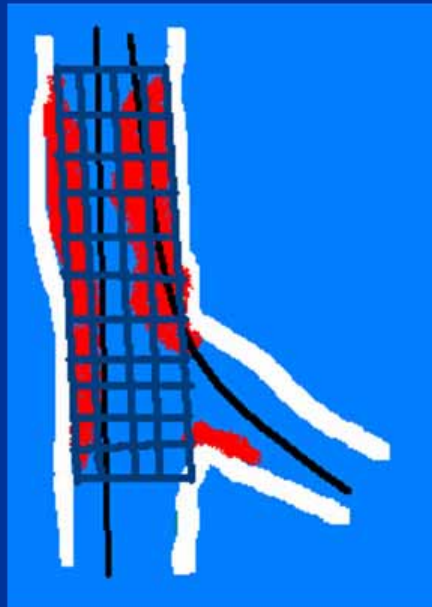
T Type A

- 2 Stents in a T-shape, **SB** first



T Type B

- 2 Stents T-shaped, MB first



Crushing:

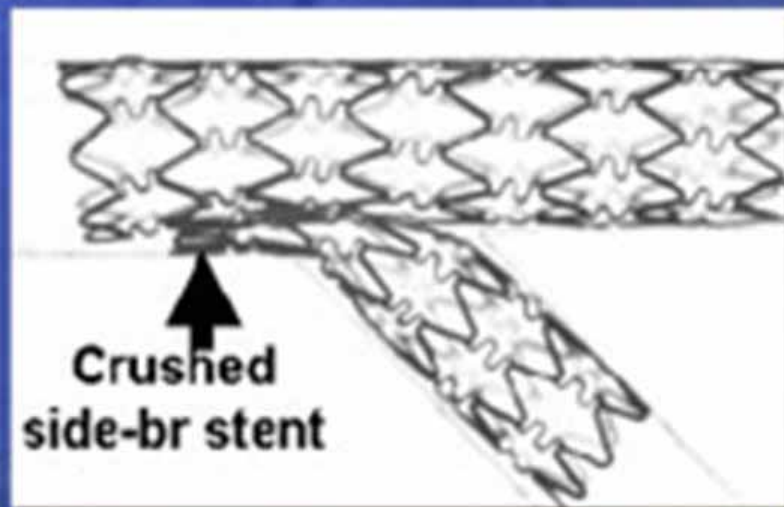
The Rambo-technique to treat bifurcations with DES



Stent-crush: What looks ugly mostly is ugly

The Crush

- 1) Place undeployed stent in main branch and side-branch
- 2) Deploy side-branch
- 3) Deploy main-branch stent crushing side-branch stent



Adapted from Orniston J, ACC 2004



The 4 Crush-techniques

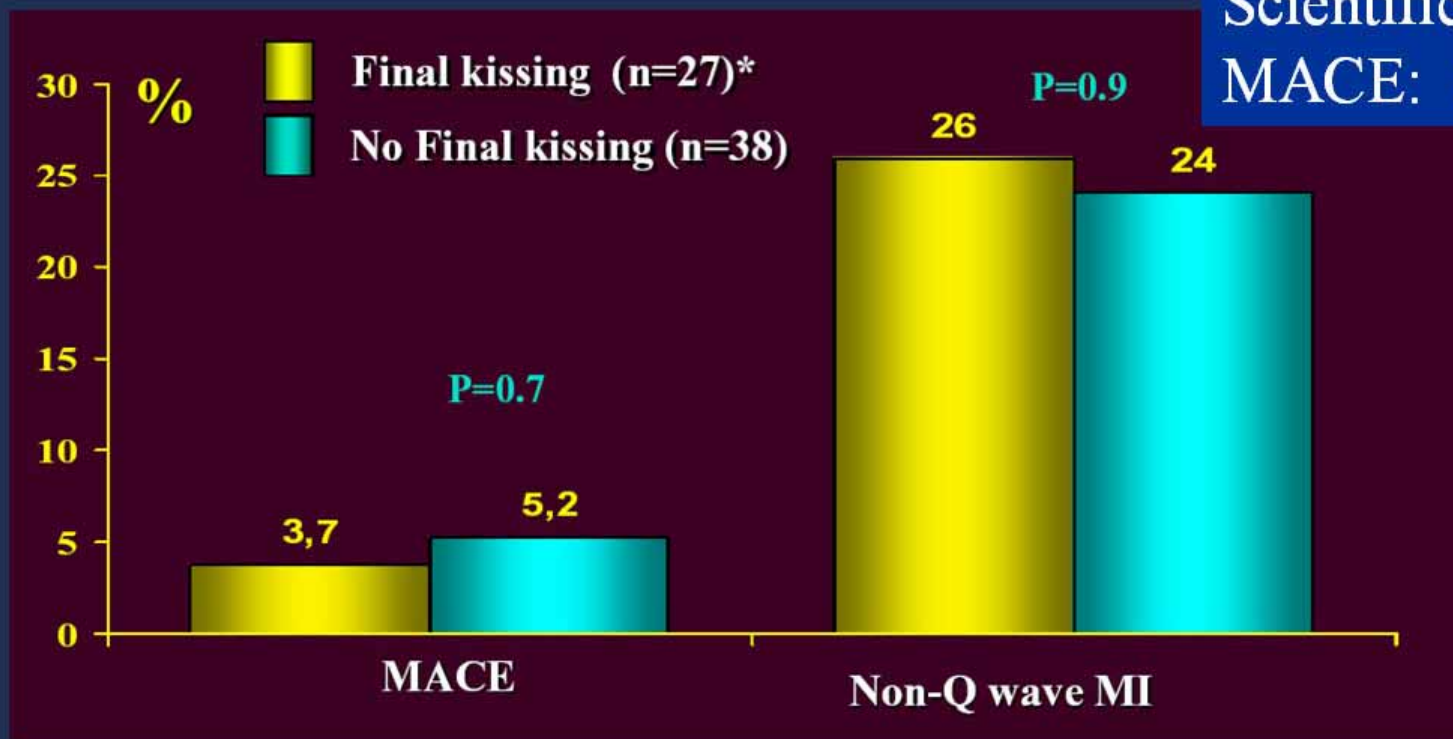
- Standard Crush: MB crushes SB 7F
- Reverse Crush: MB first, SB crushed against MB 6F
- Inverted Crush: SB stent more proximal, crushes MB 7F
- Standard Step Crush: MB crushes SB stepwise 6F
- Inverted Step Crush: SB crushes MB stepwise 6F

Forget it all !!!
Simpler is better!

DES for Bifurcation Lesions Milan Experience



In-hospital Clinical Outcome
with “Crushing Technique” with Cypher
(65 patients) in EMO, Columbus



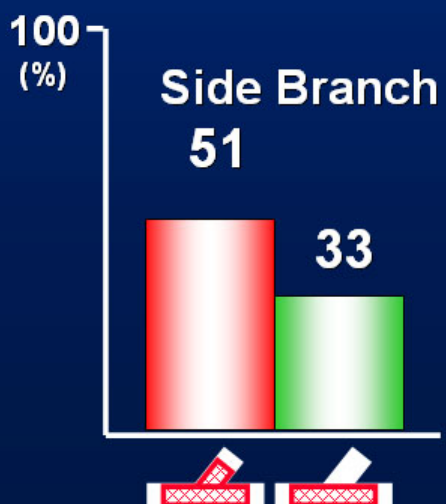
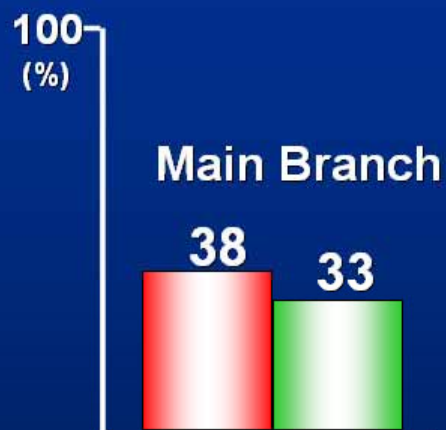
*3 trifurcation lesions

Non-Q wave MI: CKMB > 3 x upper nl
MACE: death, Q-wave MI, reintervention

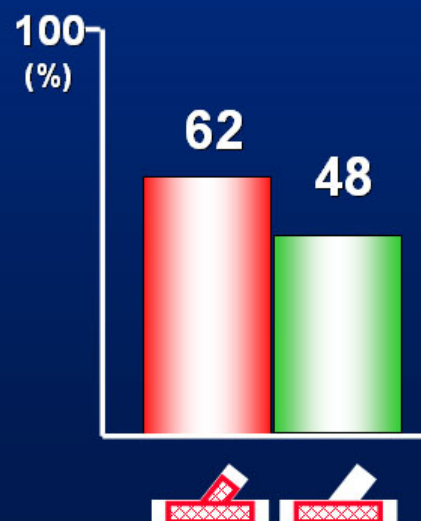
Bifurcation lesions: two stents (BMS) versus one stent - immediate and follow-up results

Yamashita et al. JACC 2000; 35: 929-36

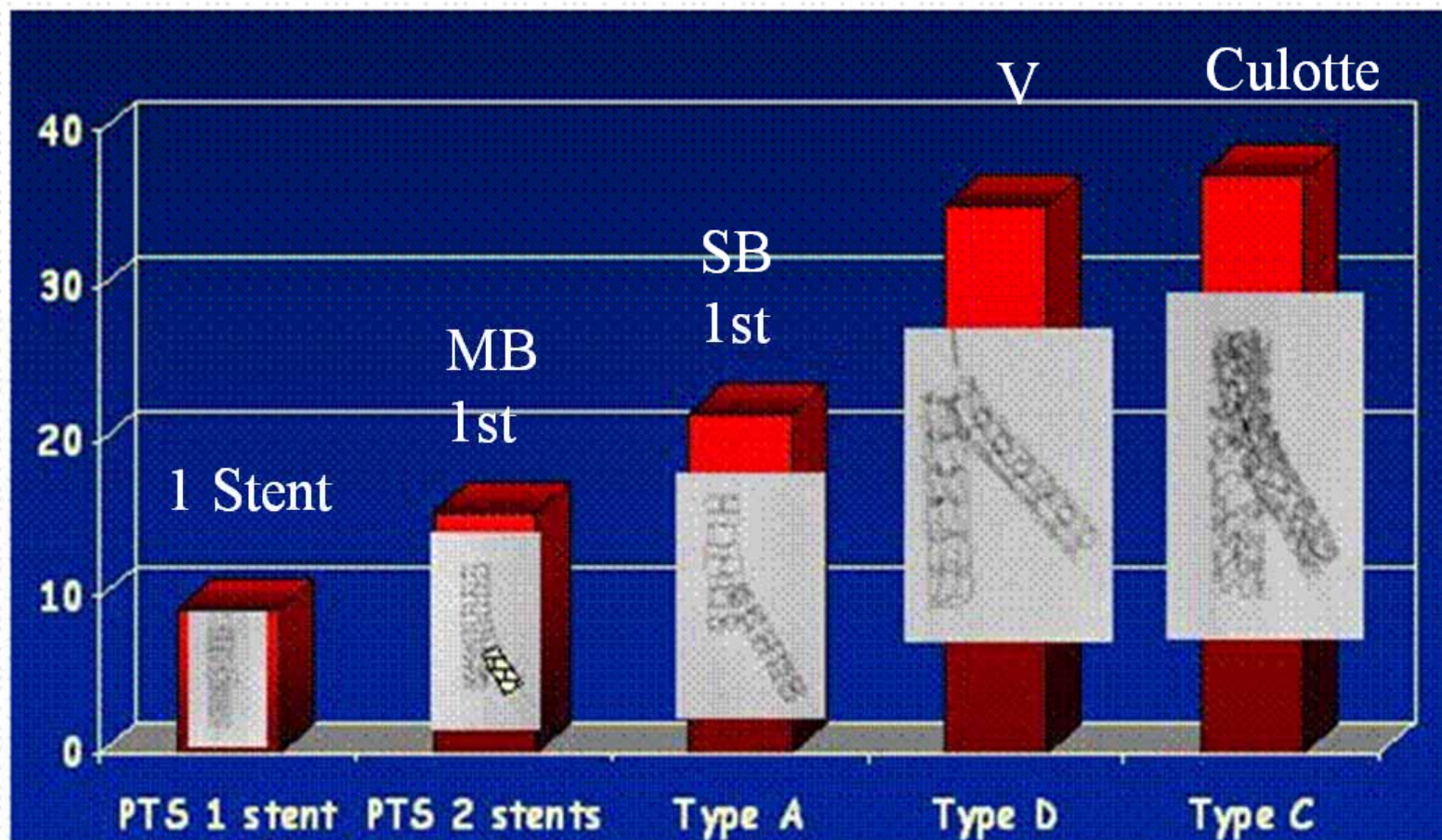
Restenosis rates



Global restenosis rate



TVR and Treatment Type

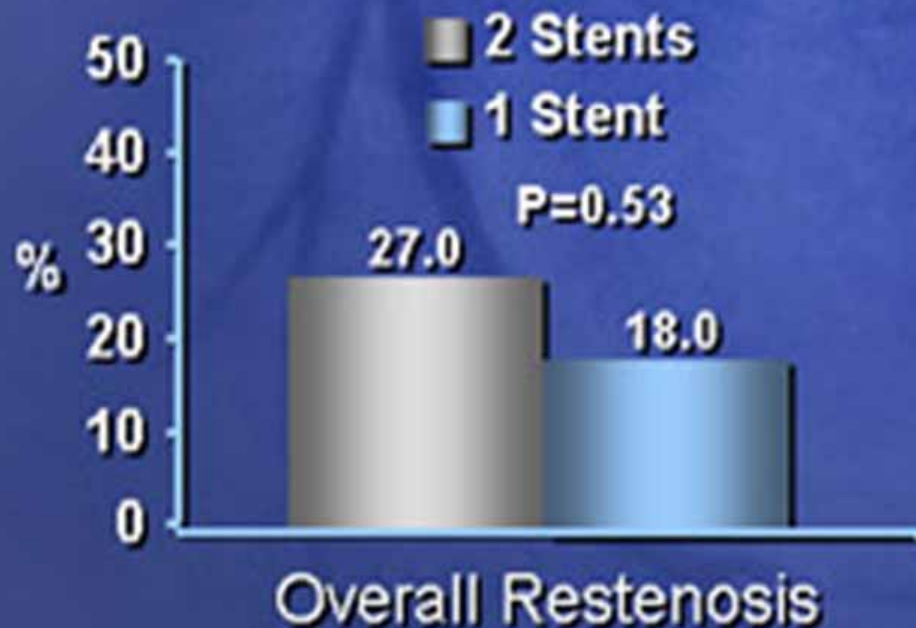


Sengotuel, Lefèvre, Louvard et al ACC 2004

CYPHER Stent in Bifurcation Lesions

randomised 1 versus 2 stents - N=85

- 3 cases of stent thrombosis and 1 sudden death, all in stent/stent cases – 3.5% SAT



- 6.1% restenosis rate of the main branch and
- 14 cases of SB restenosis

Columbo A. *Circulation*.2004;109:1244-1249



Main Vessel and Side Branch Stenting versus Optional Side Branch Stenting Using Sirolimus-Eluting Stents in Bifurcation Lesions

Terje K. Steigen, Pål Gunnes, Rune Wiseth,
Kjell Nikus, Saila Vikman, Jan Ravkilde, Andrejs
Erglis, Indulis Kumsars, Matti Niemelä, Stefan
James, Jan S. Jensen, Jens Aarøe, Antti
Ylitalo, Steffen Helqvist, Kari Kervinen, Iwar
Sjögren, Oliver Meyerderks, Jan Mannsverk,
Jens F. Lassen, Leif Thuesen

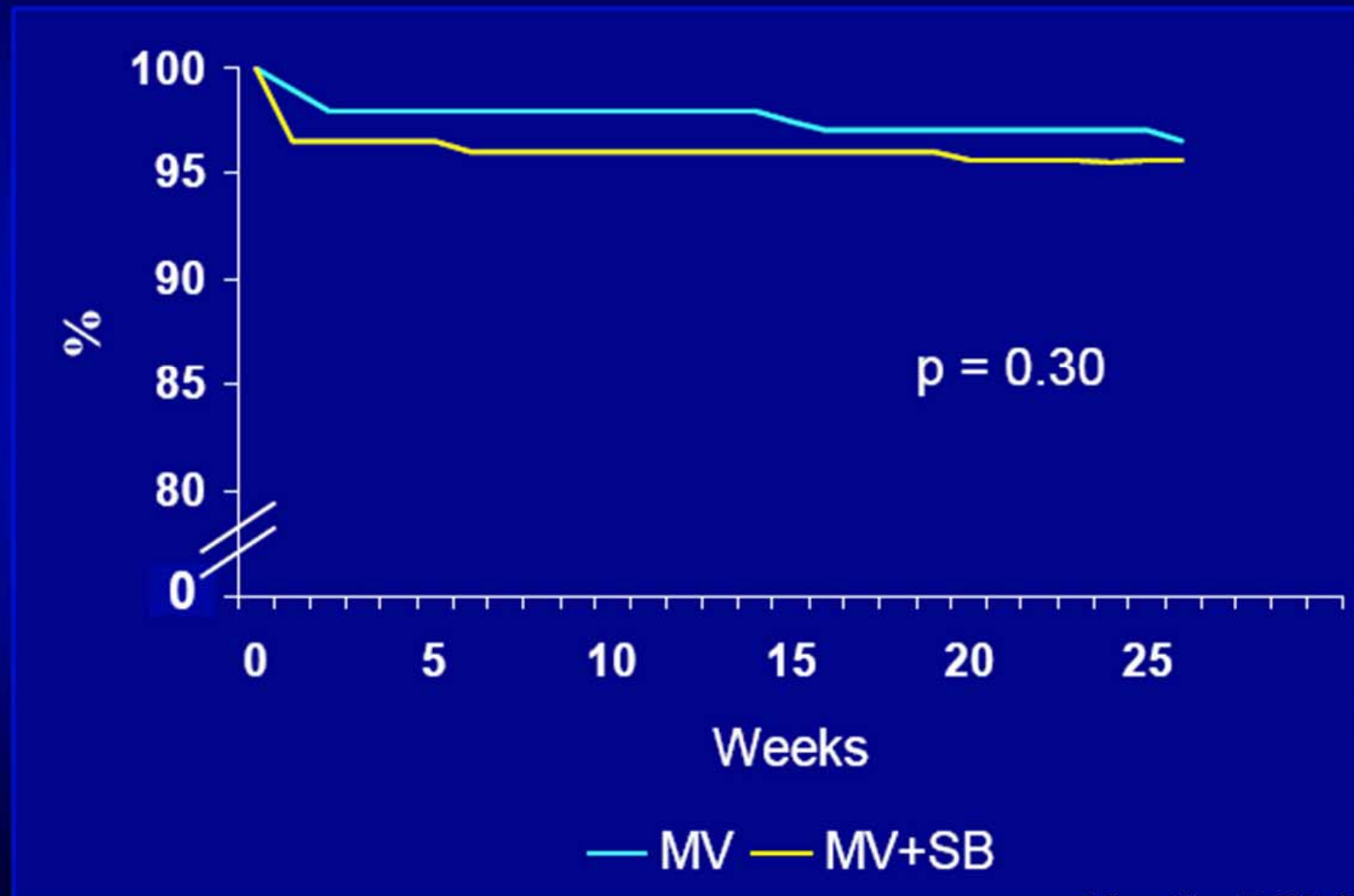
For the Nordic PCI Study Group

Procedural data II

	MV (n=207)	MV+SB (n=206)	P-value
MV stented (%)	100	98.5	ns
SB stented (%)	4.3	95.1	<0.001
Kissing balloon (%)	32	74	<0.001
Tx successful (%)	97	95	ns
(Residual stenosis <30% of MV + TIMI flow III in SB)			

Event free survival

MACE (cardiac death, MI, TVR, stent thrombosis)



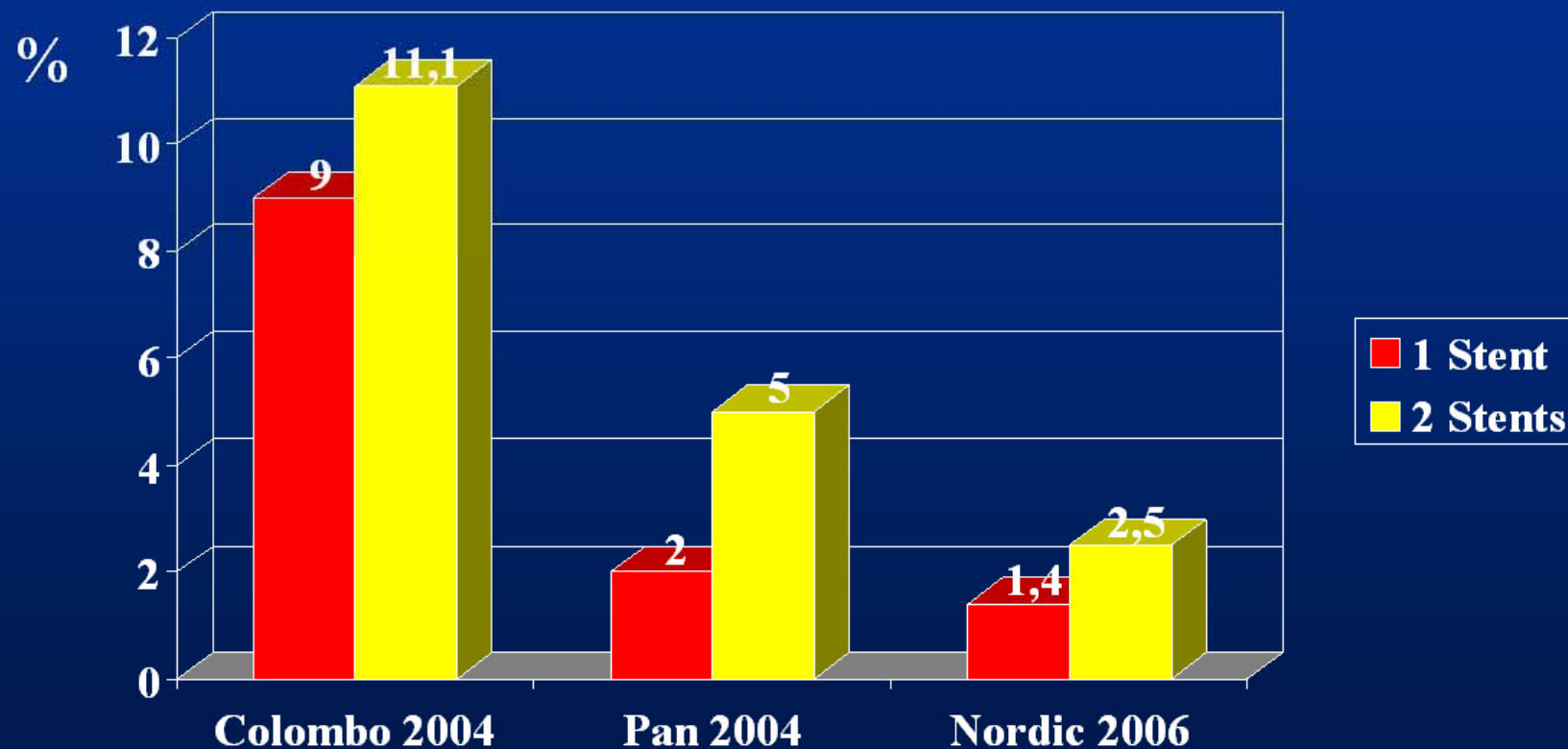
Nordic PCI Study

Procedure related biomarker elevation (279 patients)

	MV (n=153)	MV+SB (n=126)	P-value
>3 elevation (%)	8	18	0.011
>5 elevation (%)	4	13	0.008
>10 elevation (%)	3	5	ns

Conclusion: 1 Stent in > 95% better strategy (less cpl and money)

Randomised DES-Bifurcation trials: TVR Simple vs complex



.... and more serious complications...

How ~~to~~ we treat Bifurcations

SSSR

- **Simple Definition, Simple Strategy**
- **Safety** oriented (avoid infarction)
- **Straight forward** (uniform operational sequence)
- **Rapid** (consequence of simple, uniform strategy)

How ~~to~~ we treat Bifurcations

Specific Bifurcation Philosophy:

- Branches are larger than they appear
- Dont ever close branches > 1.5 mm
- Dont aim for optimal result of branches < 2.5 mm
- 1 Stent is almost allways better than 2

How ~~to~~ we treat Bifurcations

- Always 2 wires (unless branch < 1.5 mm)
- Predilatation with 2 balloons if SB stenosed (0.5 mm smaller than RVD)
- 1 DES SB wire jailed
- If SB $> 70\%$ stenosis: rewiring and always 2 balloons – SB-Stent only with threatening occlusion
- If MB/MB $> 50\%$ after balloon: V-Stent or T-stent