

# Unresolved Target of PCI

## Bifurcation PCI

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# Current RCTs for Bifurcation Lesions

## Evaluation of Optimal Stenting Technique

### **Trials**

### **Comparison**

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**NORDIC 1**      Provisional T vs. Systemic T stenting

**NORDIC 2**      Crush vs. Culotte

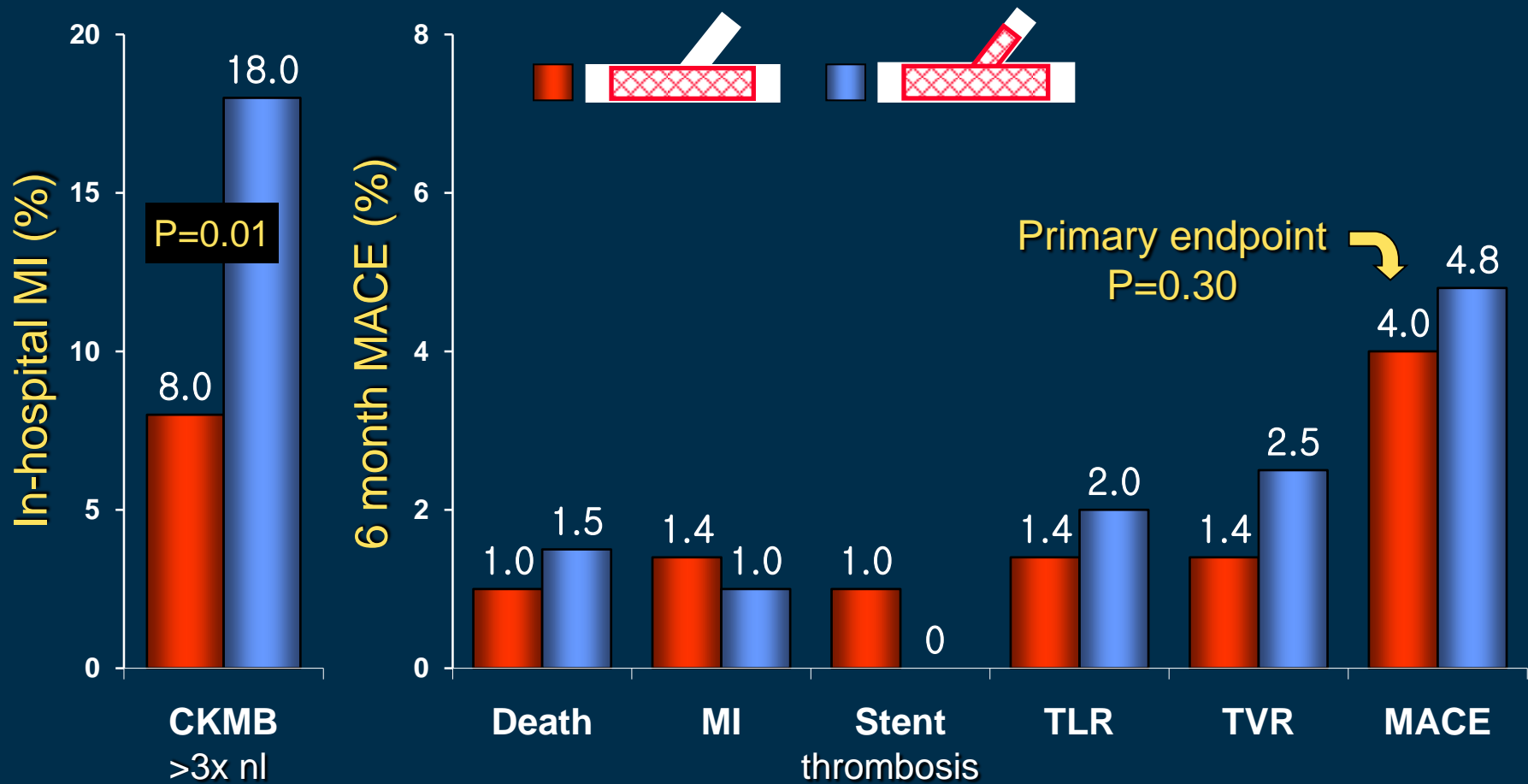
**NORDIC 3**      Kissing balloon vs. leave alone

**BBC**              Simple vs. Complex

**CACTUS**        Provisional T vs. Crush

# Nordic 1 trial (413 pts)

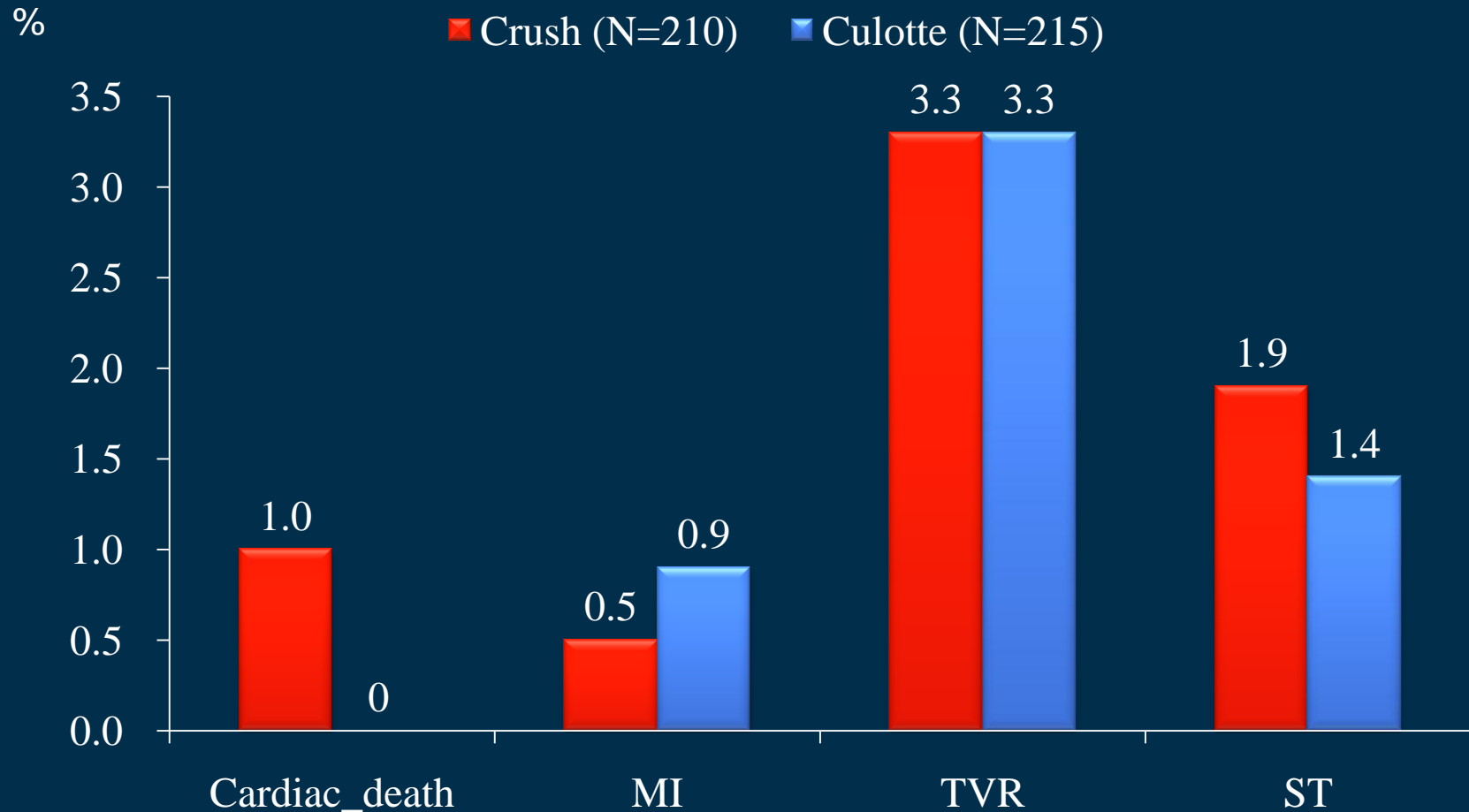
## Single vs. Two



Steigen T. et al; Circulation 2006;114:1955-61

# NORDIC II trial (425 pts)

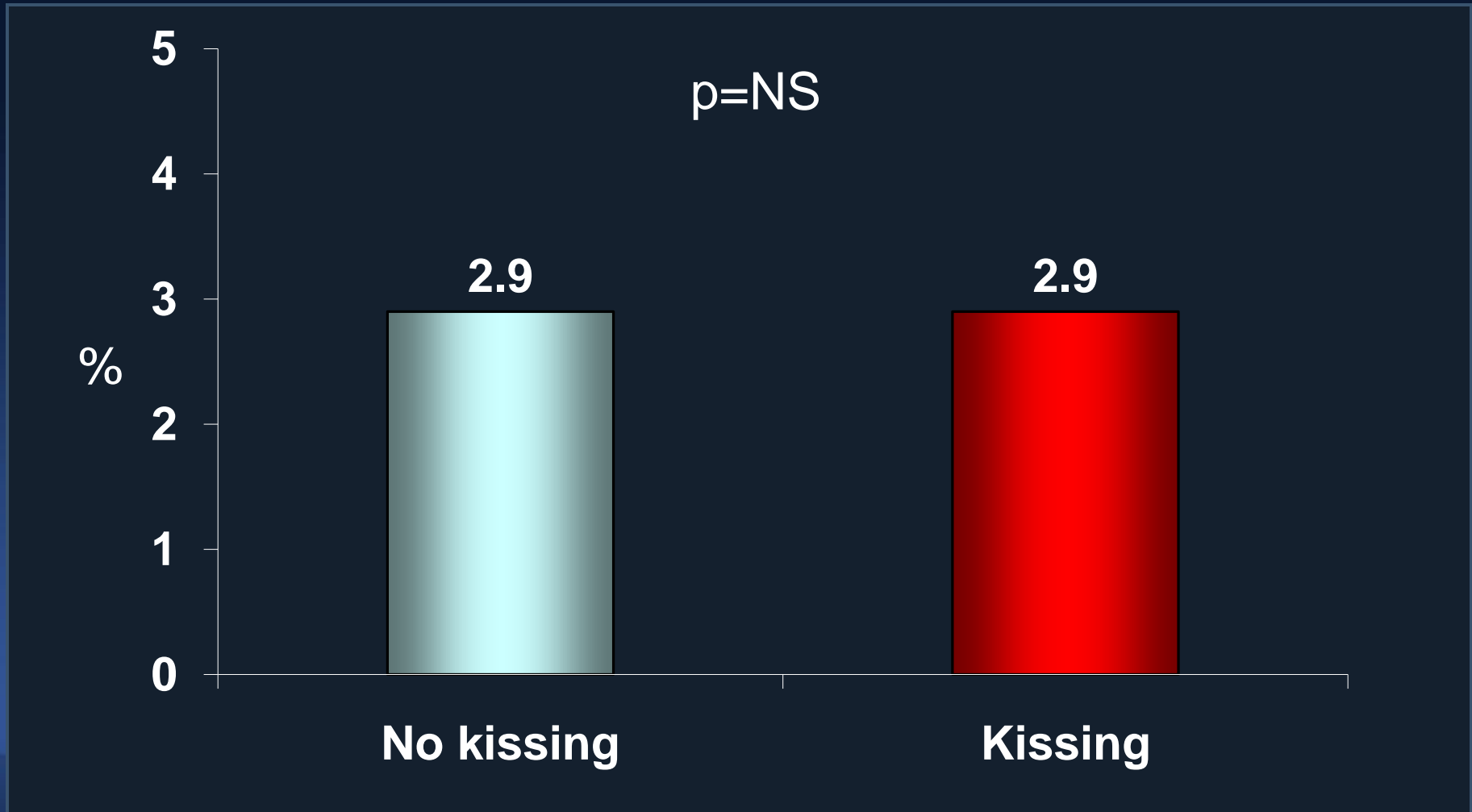
## Crush vs. Culotte



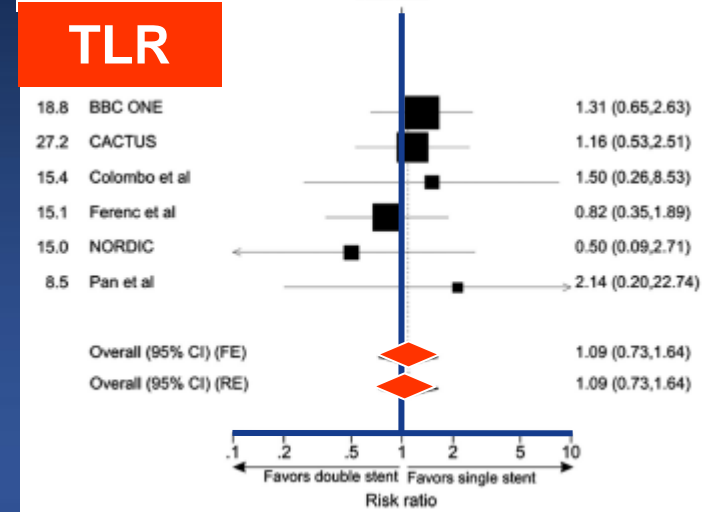
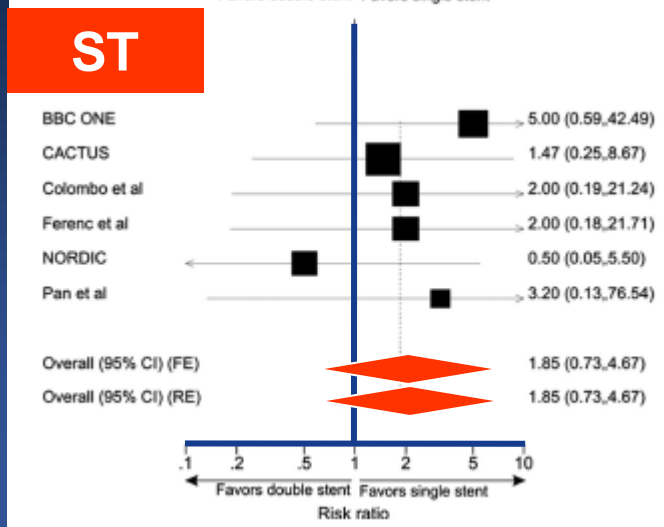
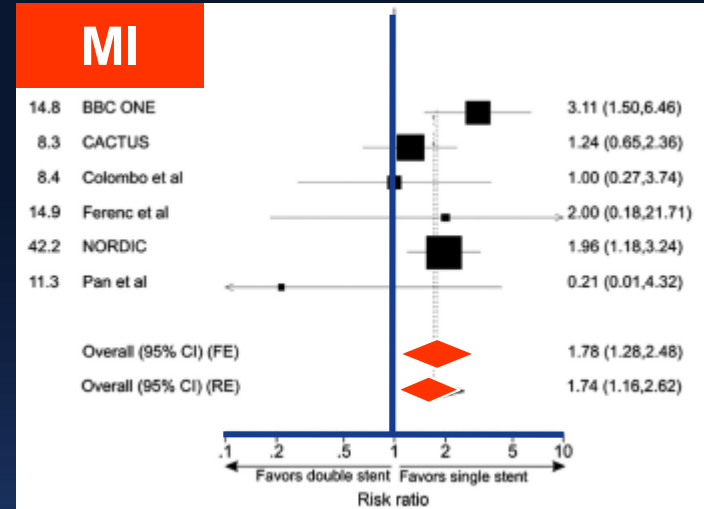
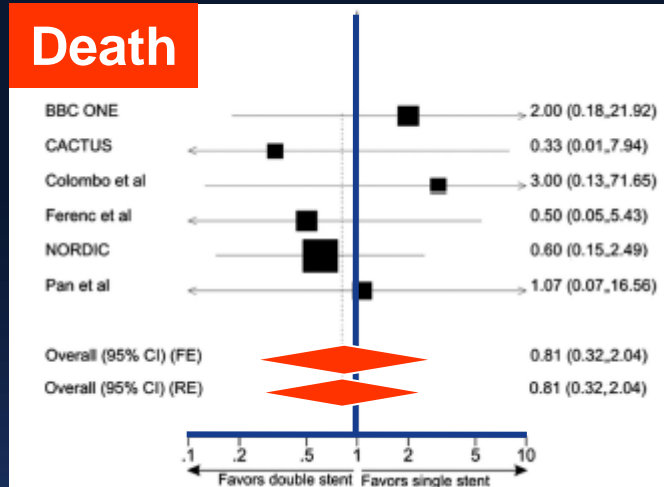
# NORDIC 3 trial (477 pts)

## Kissing vs. No kissing

6-month composite of death, MI, TLR, and ST



# Meta-analysis of 1- vs. 2-stent 9-Month Outcomes



2-stent better

1-stent better

2-stent better

1-stent better

# Technique ?

## 1-stent compared with 2-Stent

- More standardized
- Easy to perform
- Less stent
- Less contrast agent
- Less radiation
- Less procedural complication
- Switch to provisional SB treatment with simple kissing, T, Culotte, Crush..
- Comparable long-term outcomes to 2-stent

# Guideline

I IIa IIb III



**Provisional** side-branch stenting should be the initial approach in patients with bifurcation lesions when the **side branch is not large** and has only **mild or moderate focal disease** at the ostium

I IIa IIb III

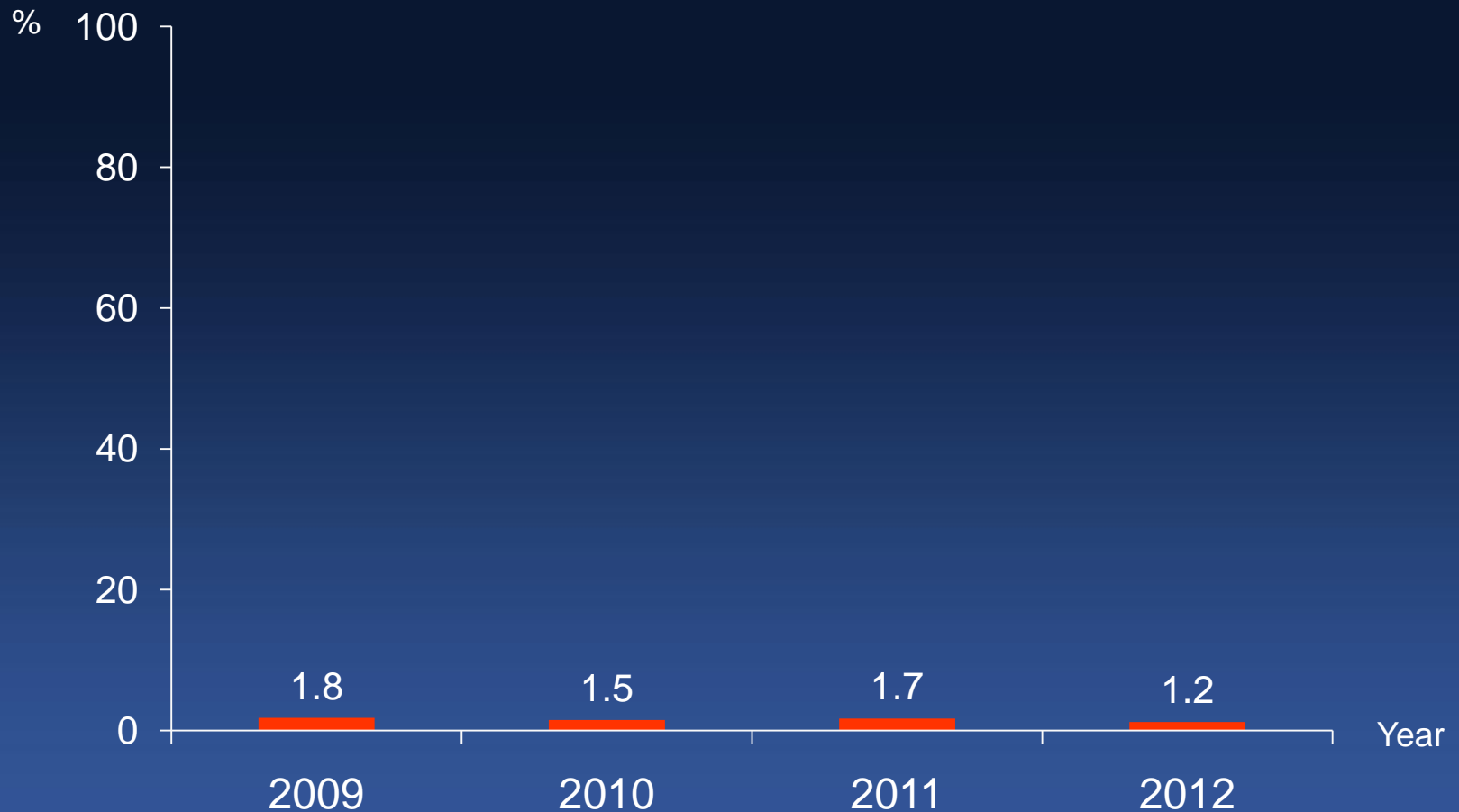


It is reasonable to use **elective double stenting** in patients with complex bifurcation morphology involving a **large side branch** where the **risk of side-branch occlusion is high** and the likelihood of successful side branch re access is low



# % of 2-stent in all PCI in AMC

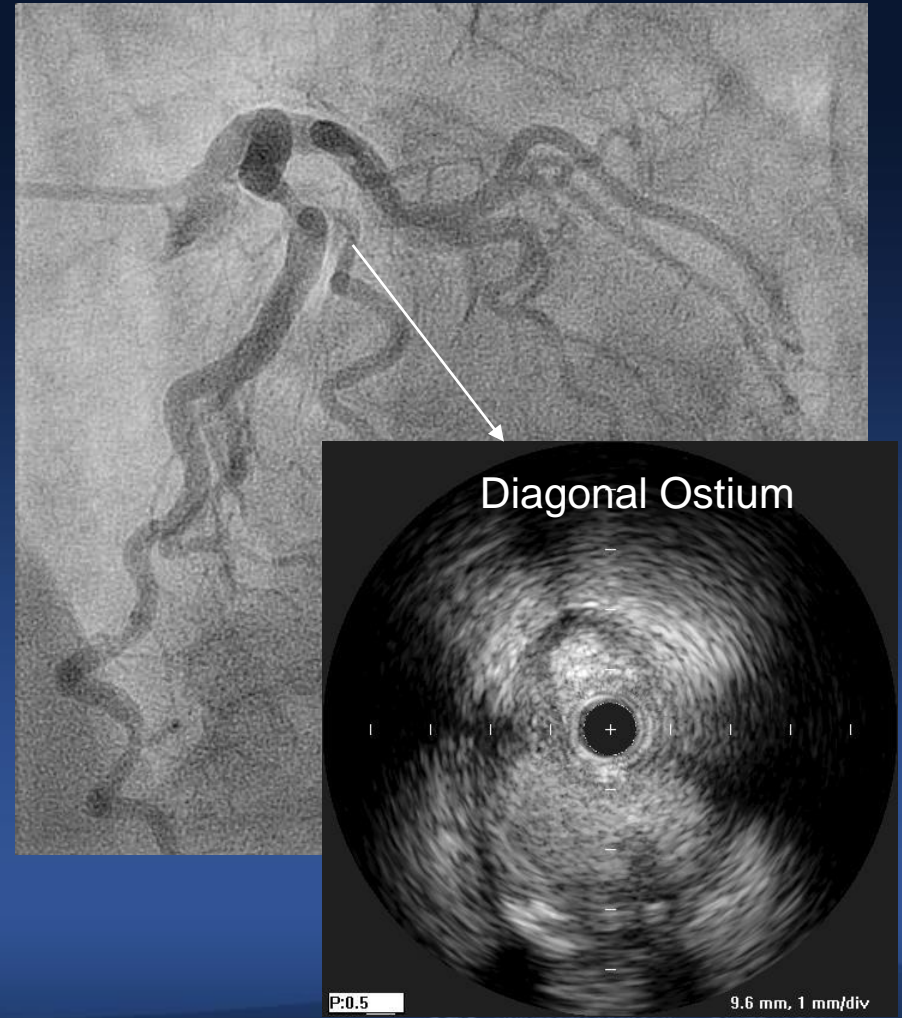
## 98% with 1-stent from all stentings



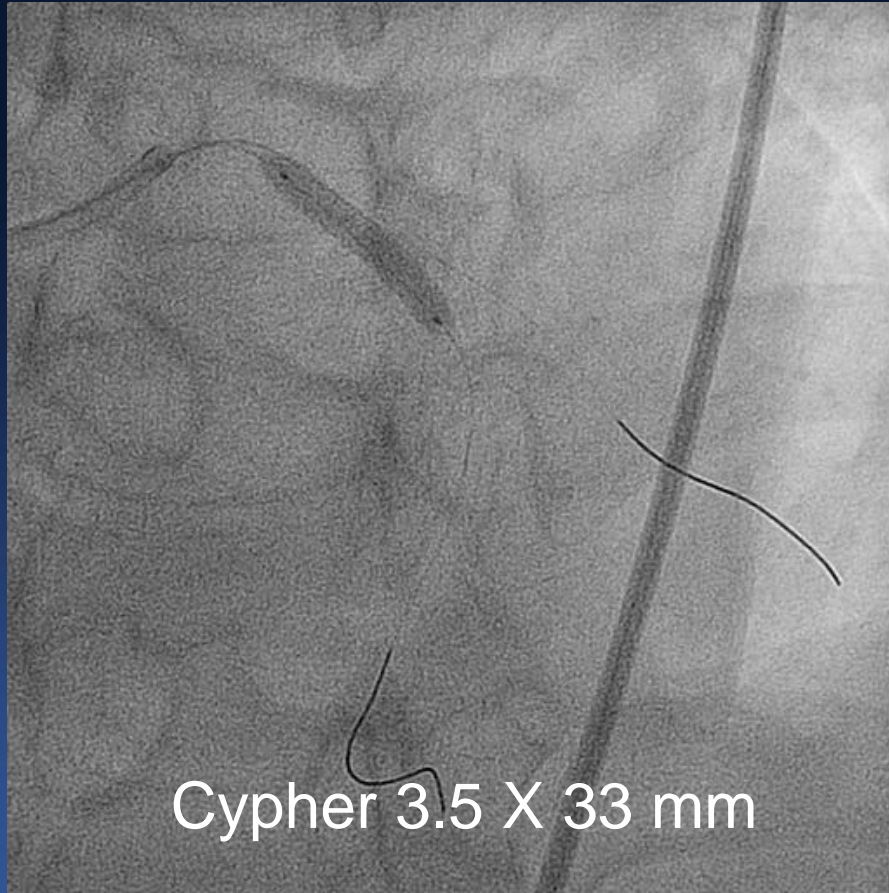
# Lessons From Trials

- No difference in the rate of death, spontaneous MI, and repeat revascularization rate
  - Superiority of simple stenting in the rate of periprocedural MI
  - Fewer stents in simple stenting
- BUT**, limited by selected inclusion, heterogeneous bifurcations, different procedures, and angiography-guidance

# Is 1-stent always good ?



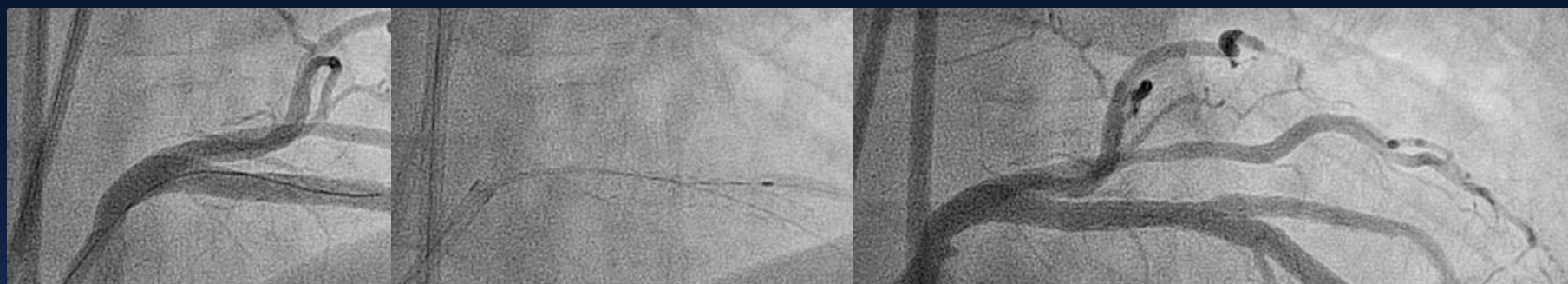
# Who (which) is guilty ?





# Rewiring with CTO wire and T stenting

Difficult rewiring because of calcified ostium



- ***The device was not responsible...***
  - My decision might be wrong.
  - Planned 2-stent might be better.
- ***The technique was not responsible...***
  - My skill (rewiring) was not good.
  - I had to pay more attention during the 1<sup>st</sup> stent placement and wire recrossing.

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I IIa IIb III

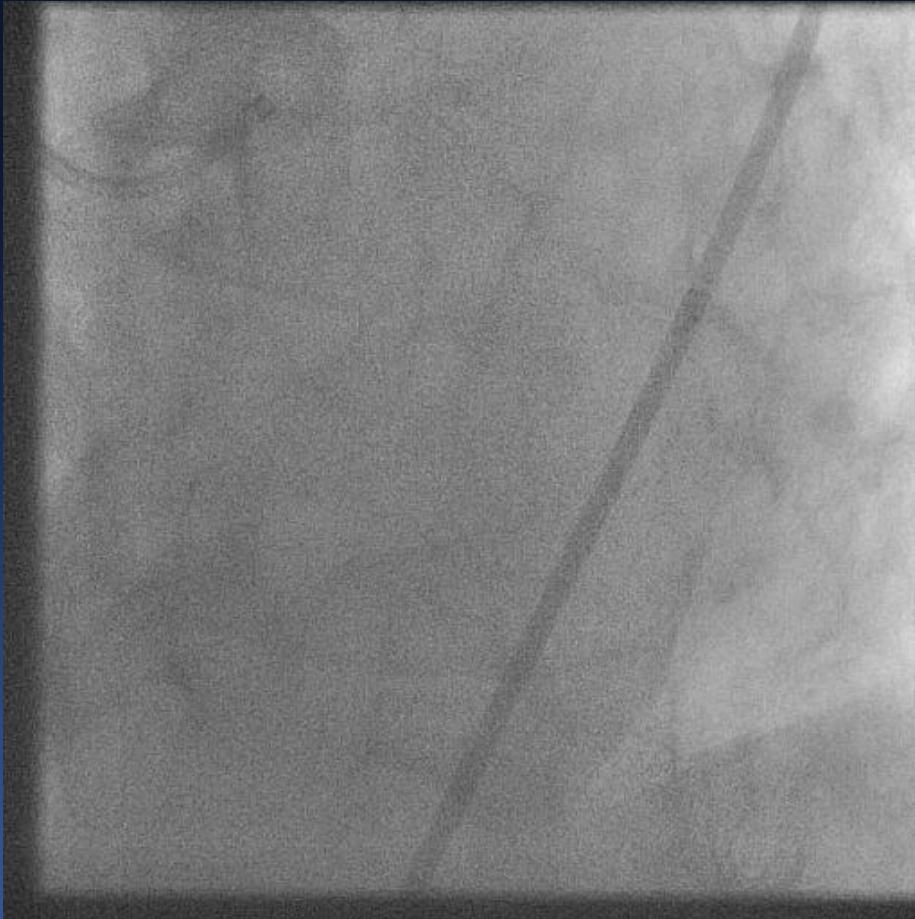


It is reasonable to use **elective double stenting** in patients with complex bifurcation morphology involving a **large side branch** where the **risk of side-branch occlusion is high** and the likelihood of successful side branch re access is low

# Best 2-stent technique ?

	<b>M</b> Main prox. first	<b>A</b> Main Across side first	<b>D</b> Distal first	<b>S</b> Side branch first	
<b>1<sup>st</sup> stent</b>	 PM stenting	 MB stenting across SB	 DM stenting	 SB ostial stenting	
<b>After balloon</b>	 Skirt	 MB stenting + SB balloon	 MB stenting + kissing	 SB minicrush	
<b>2 stents</b>	 Skirt + DM	 Skirt + SB	 Elective T stenting	 Internal crush	 Culotte
		 TAP	 V stenting	 SKS	
		 Syst. T Stenting		 Minicrush	
		 Crush			
<b>3 stents</b>	 Extended V		 Trouser legs and seat		

# What is the best technique ?

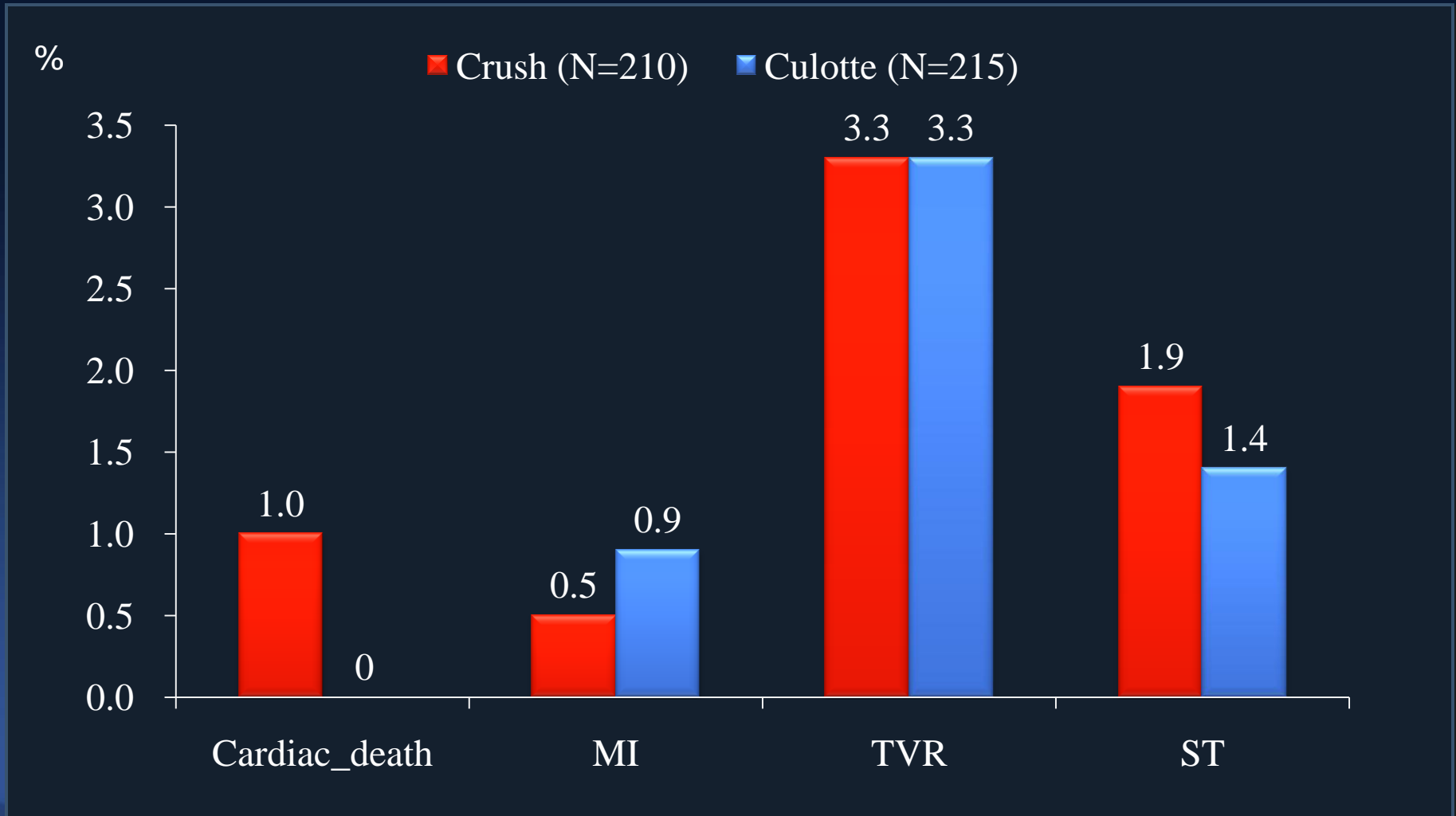


- Pt is symptomatic
- Intermediate LAD stenosis
- Not small D territories
- MEDINA 0.1.1 for 1<sup>st</sup> D
- MEDINA 1.0.1 for 2<sup>nd</sup> D
- Narrower angle in 2<sup>nd</sup> D



# NORDIC II trial (425 pts)

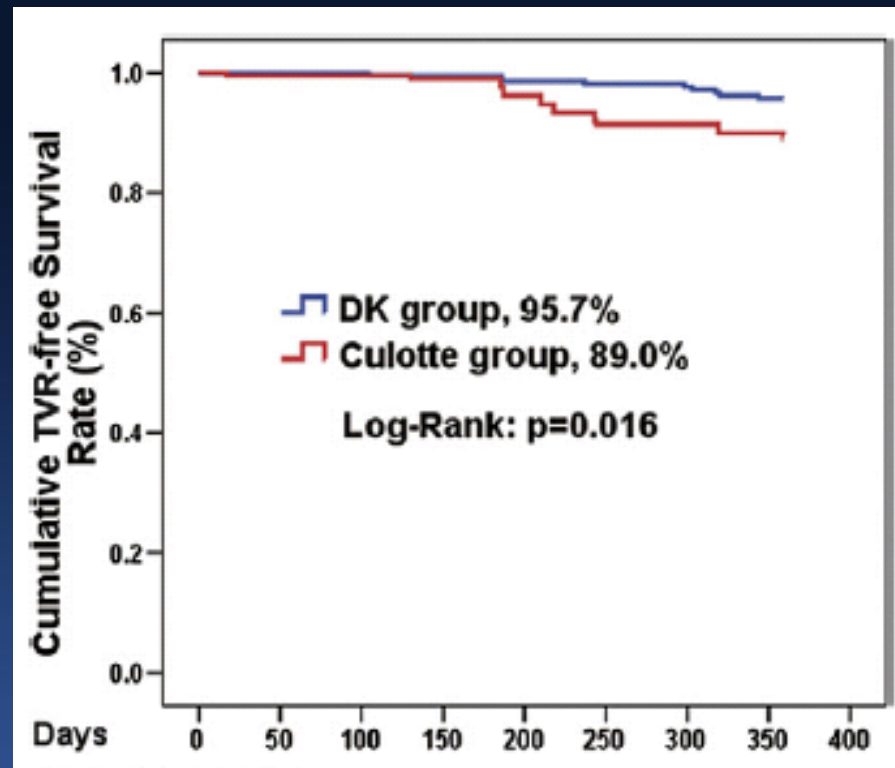
## Crush vs. Culotte



# DKCRUSH-III Study

## Culotte vs. Double Kissing Crush

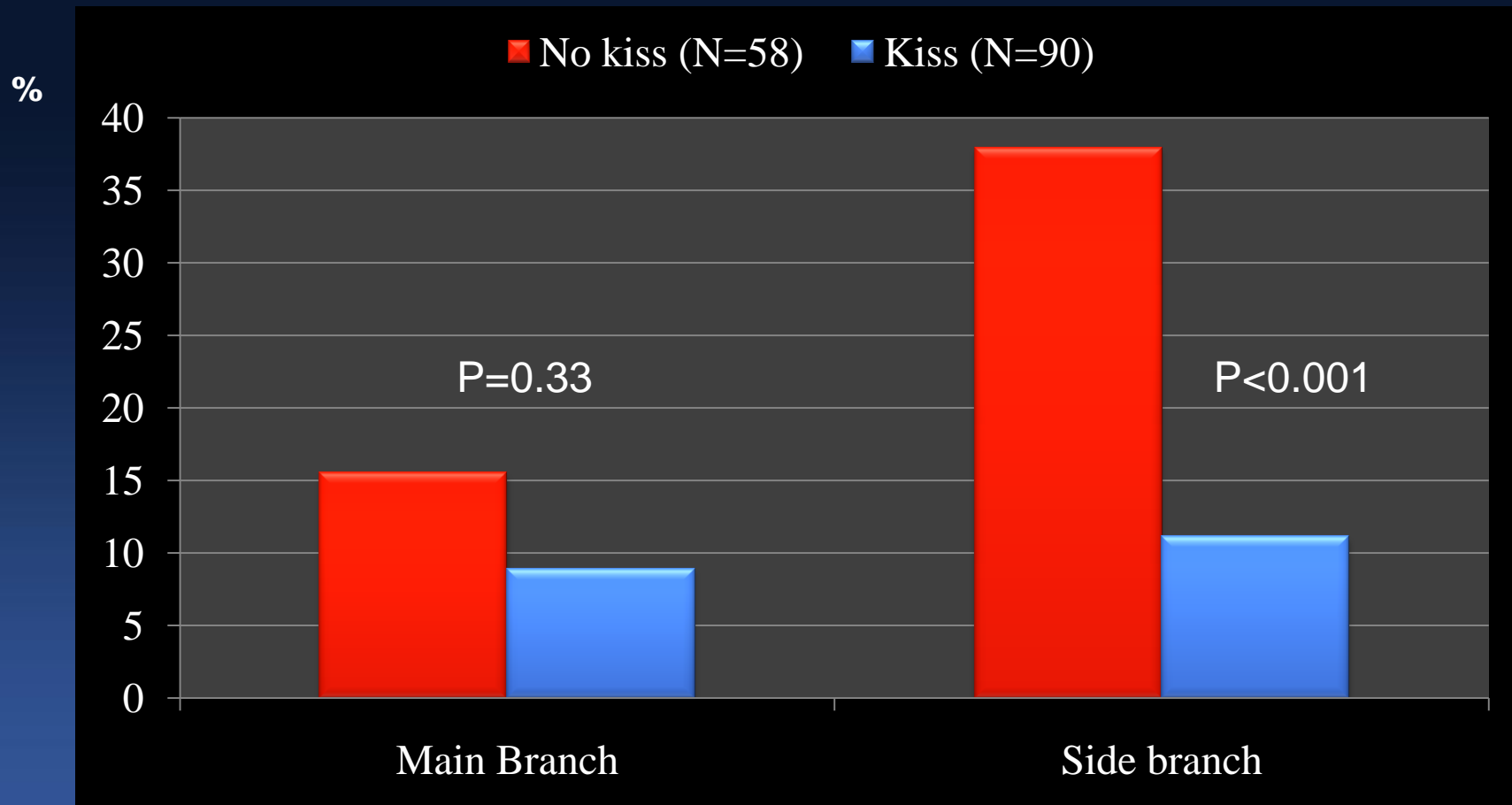
### TLR-Free Survival



The difference might be inflated due to routine angio FU ...

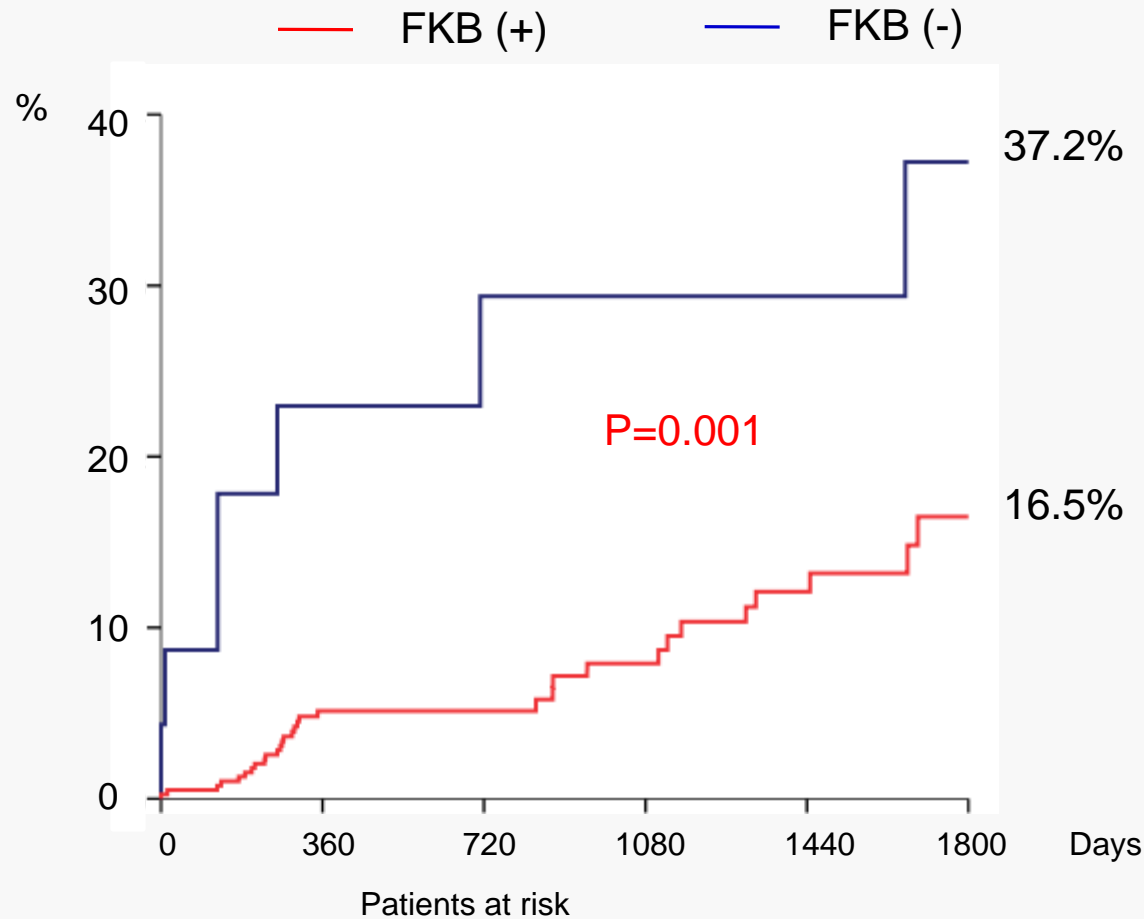
# Impact of FKD after Crush

## Restenosis Rate



Ge L et al. J Am Coll Cardiol 2005;46:613

# MACE btw FKB vs. Non-FKB



FKB (+)	415	274	155	117	85	38
FKB (-)	23	14	11	10	10	8

# Studies of Crush Stenting

***Which (who) is a major contributor of very high success rate of FKB ?***

Author	No.	Type	FKB	IVUS	MACE	ST
Ge L et al <sup>1</sup>	181	Classic	64%	< 10%	26.5% (9M)	2.8%
Colombo A et al <sup>2</sup> (CACTUS)	177	Classic	92%		15.8% (6M)	1.7%
Galassi AR et al <sup>3</sup>	199	Mini-crush	88%		20.6%(25M)	1.0%
Moussa I et al <sup>4</sup>	120	Classic	88%		13.0% (6M)	1.7%
HS David et al <sup>5</sup> (BBC)	169	Classic	72%		15.2% (9M)	-
Erglis A et al <sup>6</sup> (NORDIC2)	209	Classic	85%		4.3% (6M)	-
Chue CD et al <sup>7</sup>	100	Classic	75%		28% (3Y)	-

1. J Am Coll Cardiol 2005;46:613

3. J Am Coll Cardiol Interv 2009;2:185

5. Circulation. 2010;121:1235

7. Cath Cardiovasc Interv 2010;75:605

2. Circulation. 2009;119:71

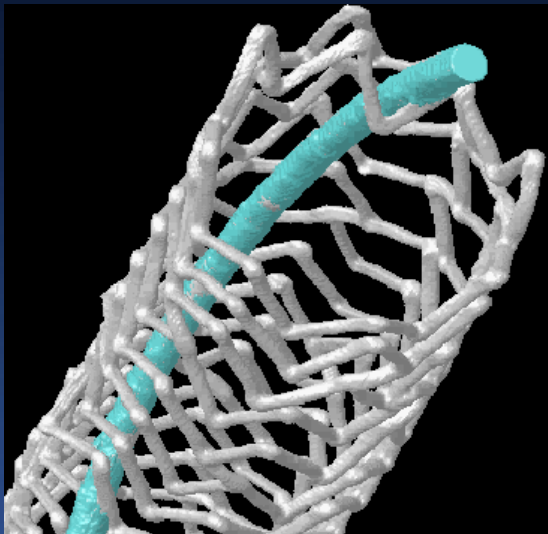
4. Am J Cardiol 2006;97:1317

6. Circ Cardiovasc Intervent. 2009;2:27

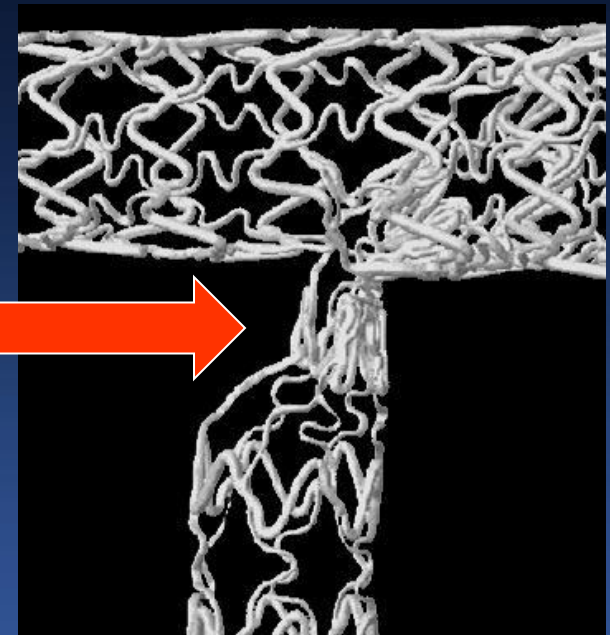
# Why does this happen ?

## *Technique, stent, wire, balloon ?*

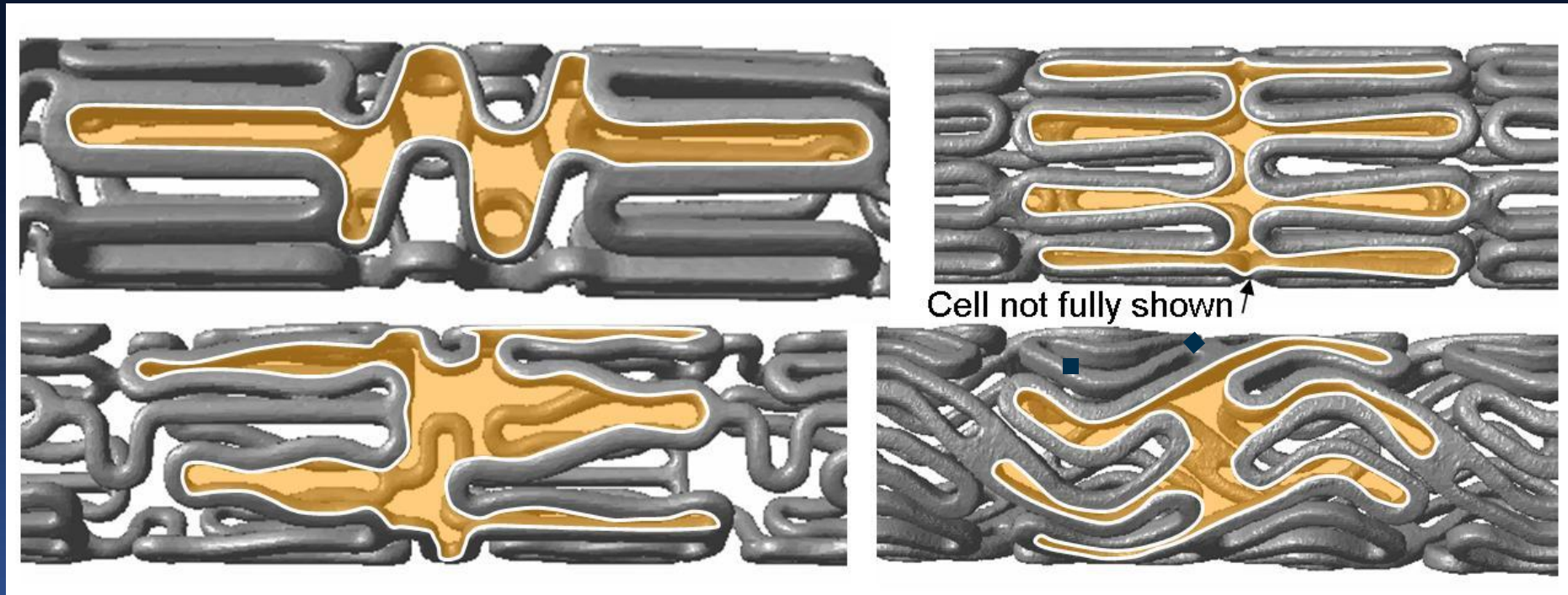
SB wire pass outside of stent



**SB  
Balloon**



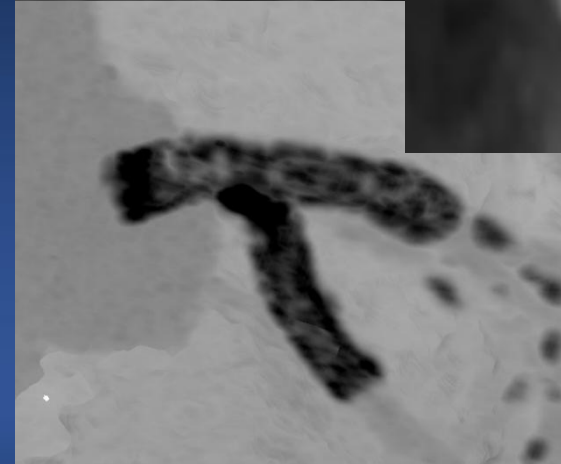
# Does a good fit lead to better a clinical outcome ?





# Device

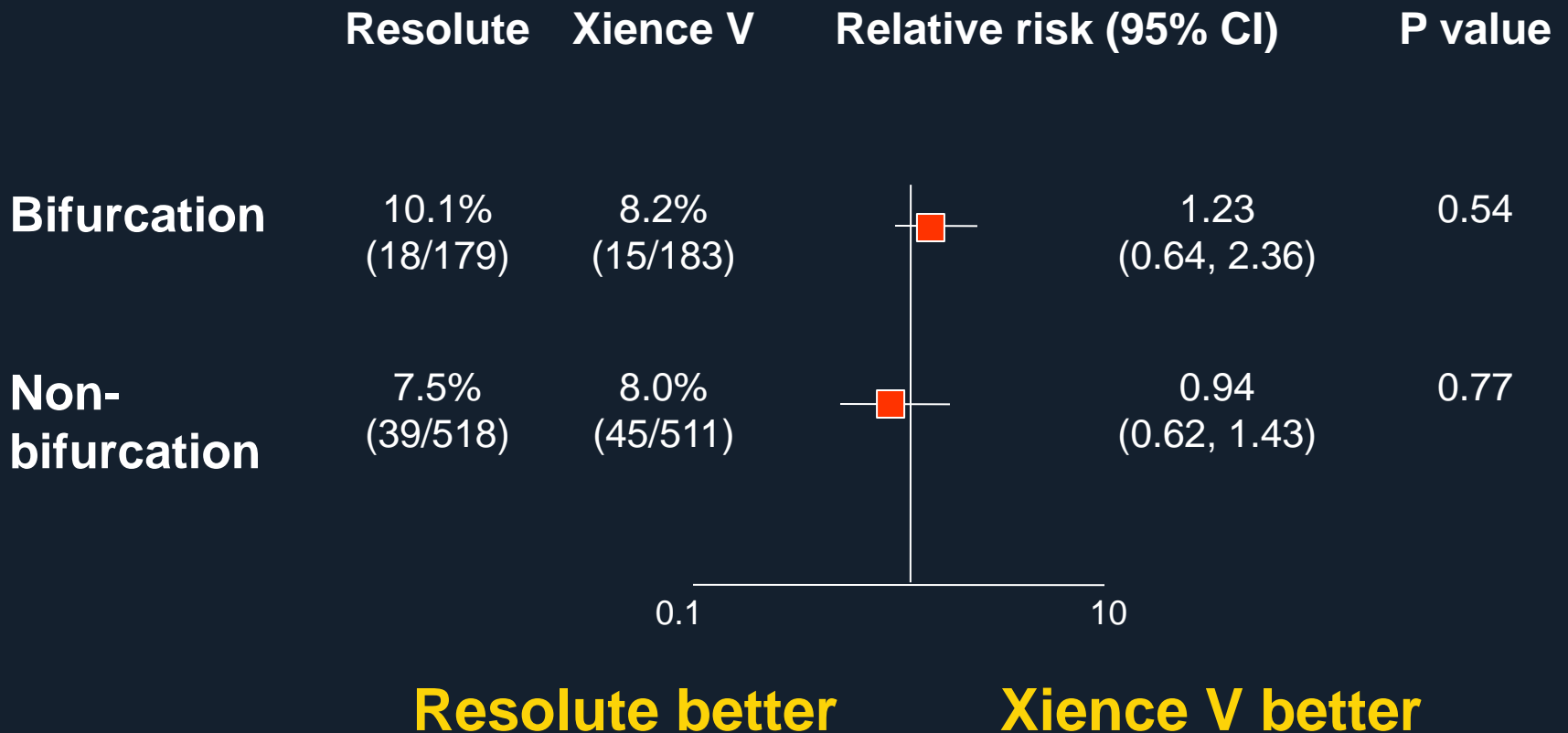
## Mechanical Property ?





# Biological Efficacy of DES

## TVF in Subgroups of TWENTE RCT

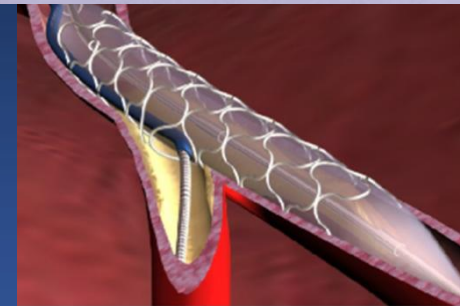
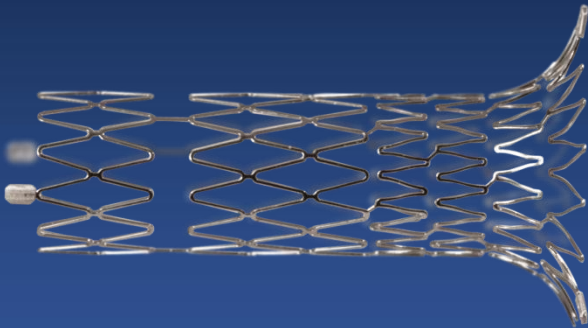
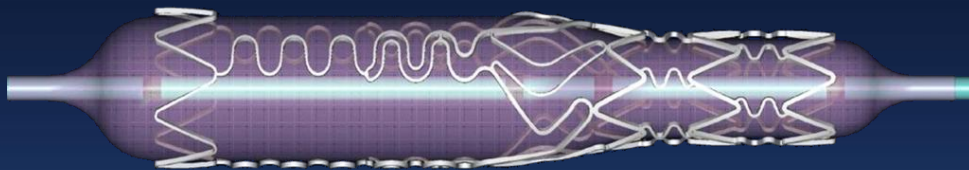


# Biological Efficacy of DES

## SEA-SIDE RCT

	Cypher (N=75)	Xience V (N=75)	P
Any events	7 (9%)	9 (12%)	0.60
Cardiac death	1 (1%)	1 (1%)	0.56
Peri-MI	1 (1%)	3 (4%)	0.31
Spont-MI	1 (1%)	3 (4%)	0.31
TVF	5 (7%)	5 (7%)	1.00
Angiographic failure	6 (8%)	5 (7%)	0.75
Associated with MACE	5 (7%)	5 (7%)	1.00
Detected but, not treated	1 (1%)	0	0.32

# Dedicated Bifurcation Stent



Does any bifurcated stent fit 'all' heterogeneous bifurcations ?

**Seoul, Korea: 25-27 April 2012**

**Left Main and Bifurcation Summit**  
**“Paradigm Shift: Bifurcation Summit”**

**My top 10 rules in non-LM**  
**Bifurcation stenting**

**Speaker – 12’**

**Antonio Colombo**

*Centro Cuore Columbus and  
S. Raffaele Scientific Institute, Milan, Italy*

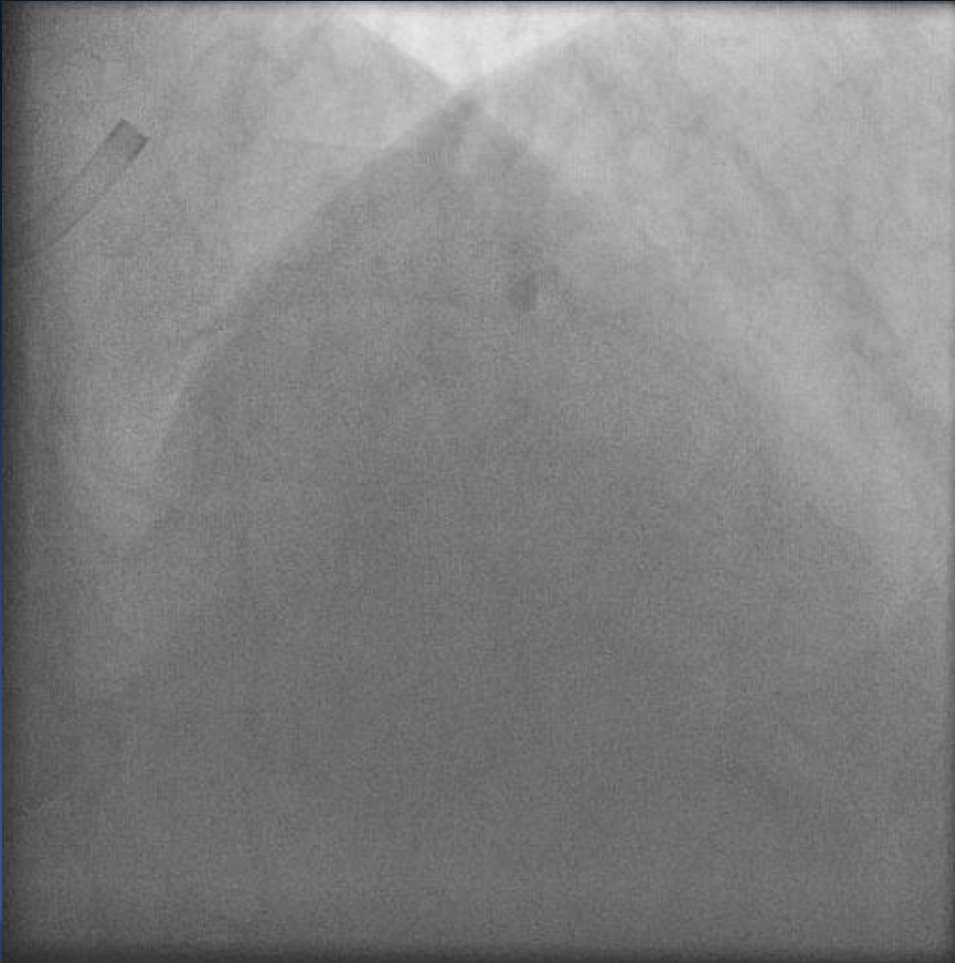
# Problems with bifurcation lesions

- ✓ **Should I wire the side branch?** YES, very little to loose (except for a guide wire) to take this decision
- ✓ **Should I implant 1 or 2 stents?** 1 stent most of the times; 2 stents if you are afraid to loose the SB, if the SB is large and diseased extending distal to the ostium and if you are confident with 2 stent technique



# My Clinical Judgment

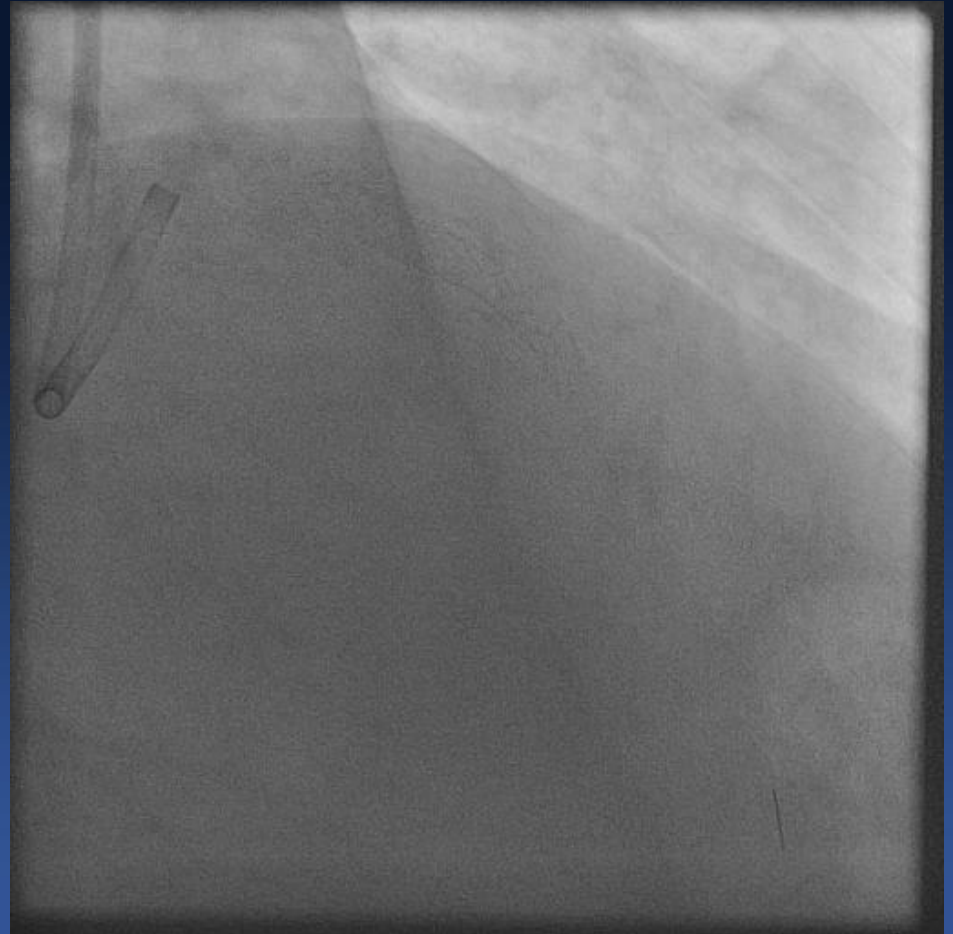
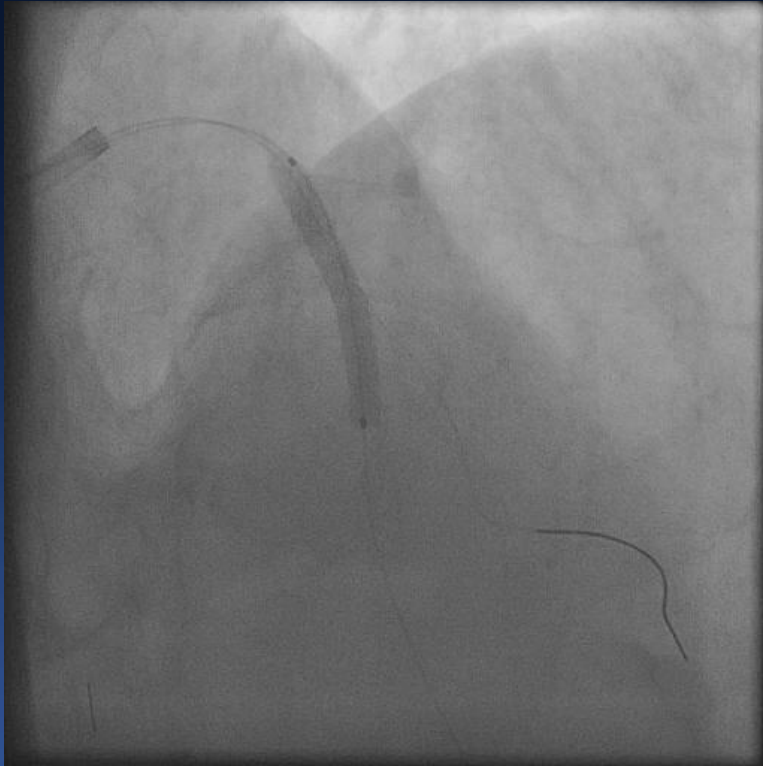
The 1st diagonal branch: does it need protection ?



***Yes, it needs a wire protection***

- Active 67 year old man
- Big territory
- Angiographic stenosis

# Stenting and Kissing balloon

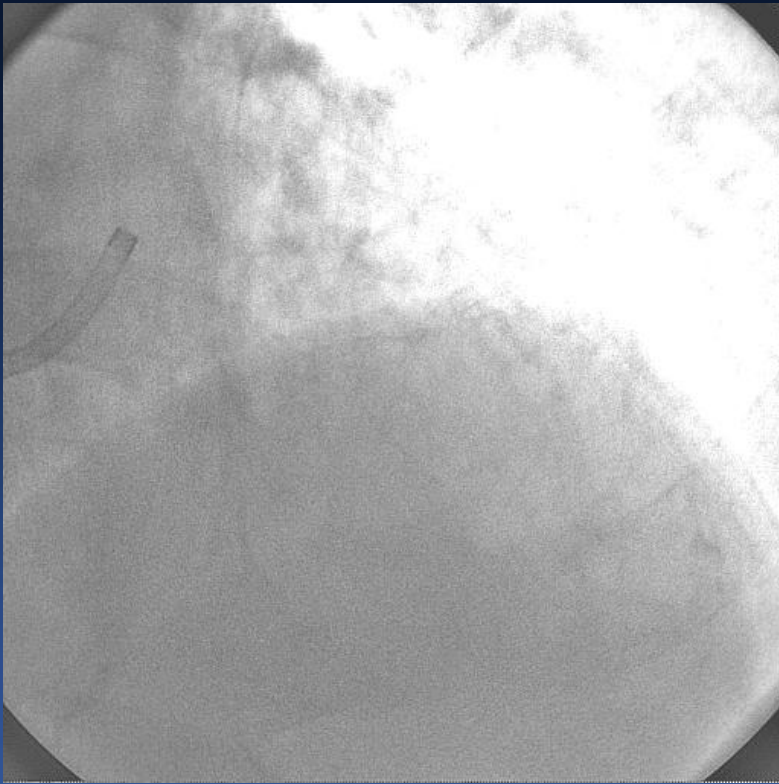


# Do you treat D2 branch? Does it need protection ?





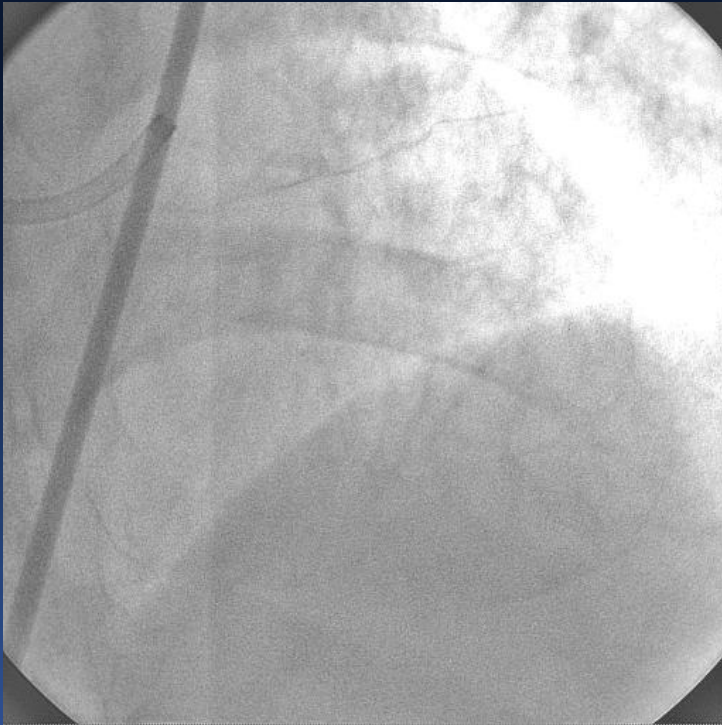
# My clinical judgment: No protection independently from the findings of CAG and IVUS



- Old age (77 year old)
- Not very active
- Stable coronary symptom
- Very long main branch (MB) lesion with multiple stents  $\geq 3$
- Tight stenosis in the downstream D2 segment requiring stenting (?)
- Not very big myocardial territory

# Follow the initial plan

## SB was not treated after MB stenting (X3)



*Clinical condition should be considered first  
to treat the **patient**, not the lesion only*

# **A key is HOW to manage with skillful hands and brain ...**

- Do evaluate well using angiography, IVUS, FFR
- Do kiss after 2-stent
- Never compromise MB result
- Never overestimate SB stenosis
- Never do cosmetic angioplasty
- Never kiss routinely after 1-stent

**Be experienced,  
whatever technique or device you use**