



Complex Bifurcation: A new Scoring System to Guide PCI Choices for Bifurcation Lesions

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Luvard's Conclusions :

- **Better Definition of bifurcation lesion stenosis ? Possible ? Useful?**
- **Do we need another classification than Medina's ? No**
- **Classification of treatments how to take into account the complexity of techniques ?**
- **What is missing ?**



Variables of Bifurcation Lesion and clinical outcome

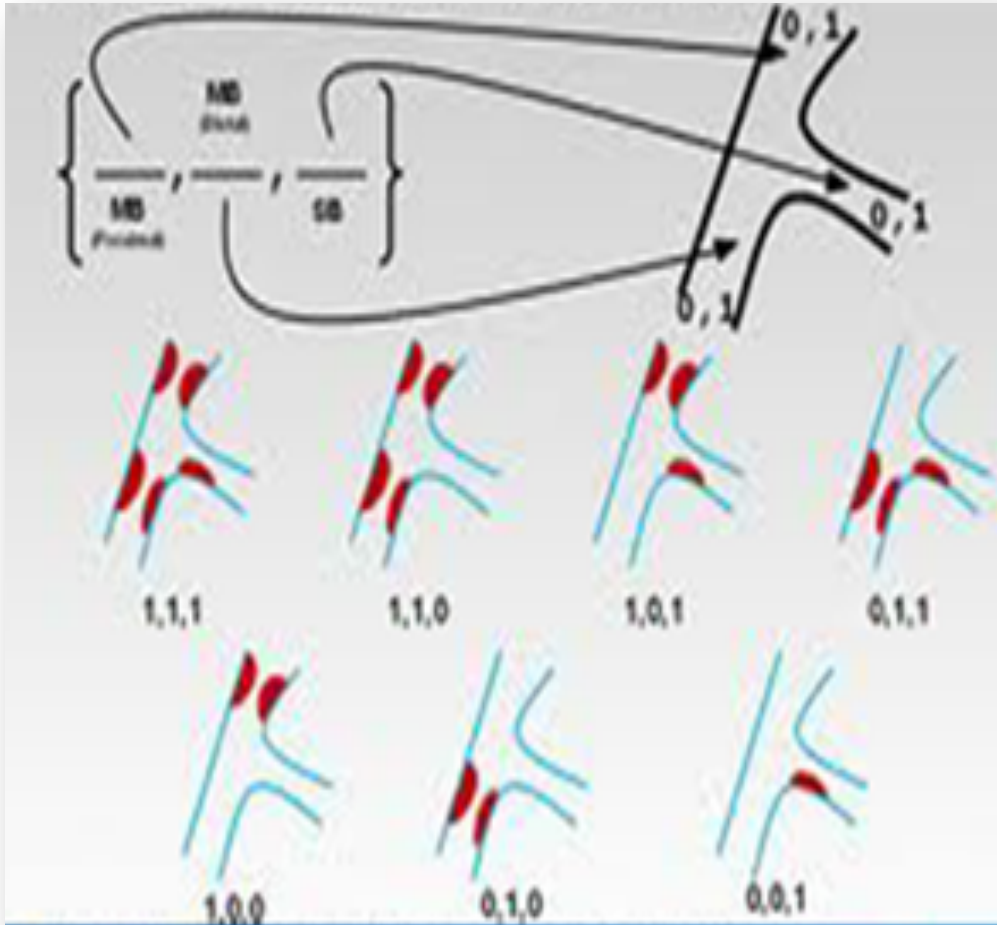
- **Lesions location (LM , non LM)**
- **Lesion Length (particularly SB)**
- **SB sizes: ≥ 2.5 mm**
- **SB Angle : any impact ?**
- **SB Size : Clinical relevance**
- **SB tortuosity , calcified, diffuse disease
(Predictors of SB closure after stenting MV)**



Variables of Bifurcation Lesion

- Which of these variable is the most important ?
- Can current classification guide for startegy selection ?
- Missing : Identification of the appropriate startegy for the appropriate lesion - as intention to treat - .

Medina Classification for Bifurcation Lesions: which information ?



- Easy Definition of Lesion Morphology and plaque distribution
- Easy Definition of MV
- No information about lesion severity , SB size and angle , calcification, tortuosity , and particularly SB lesion length

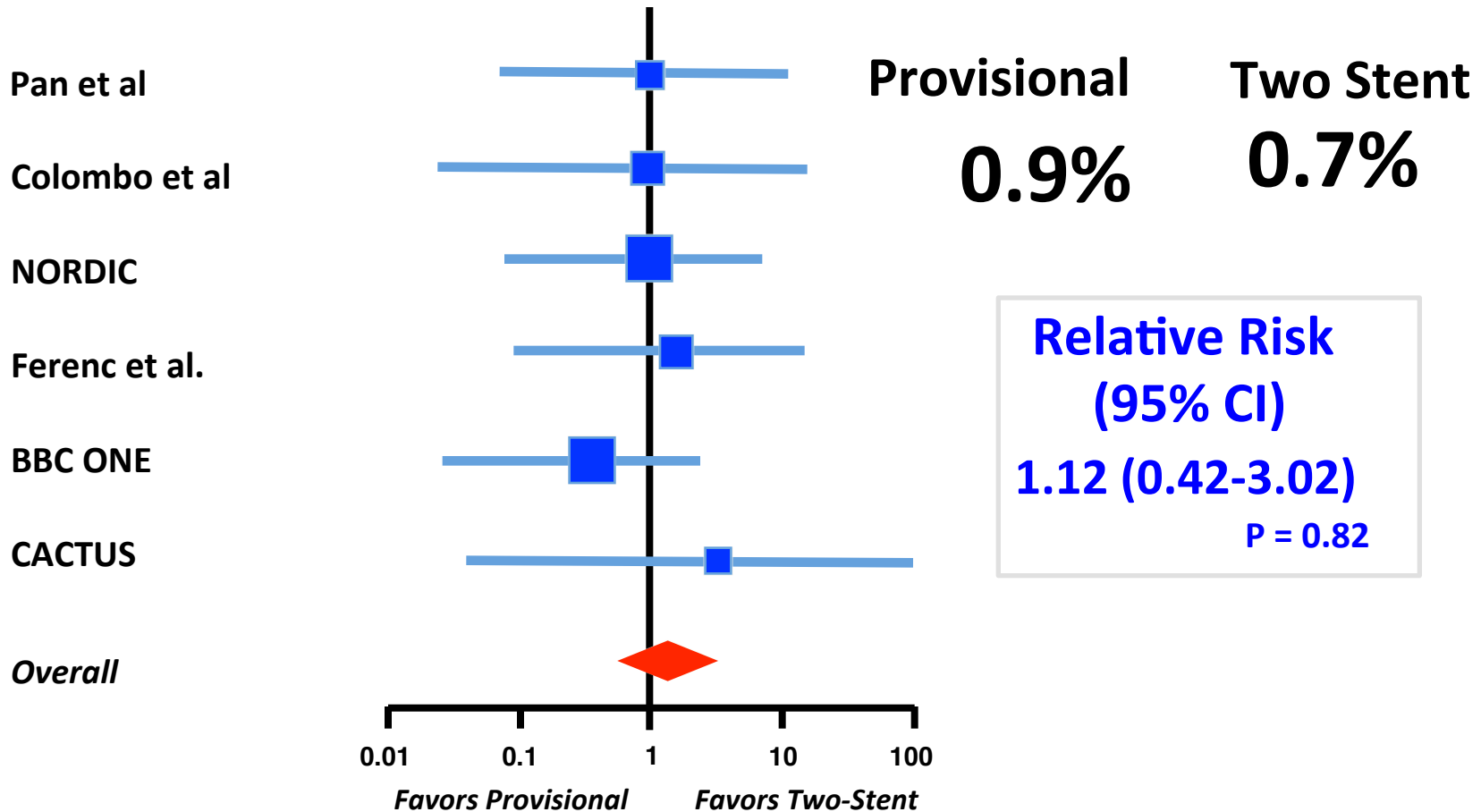


from RCTs :



Bifurcation Stenting Meta-Analysis

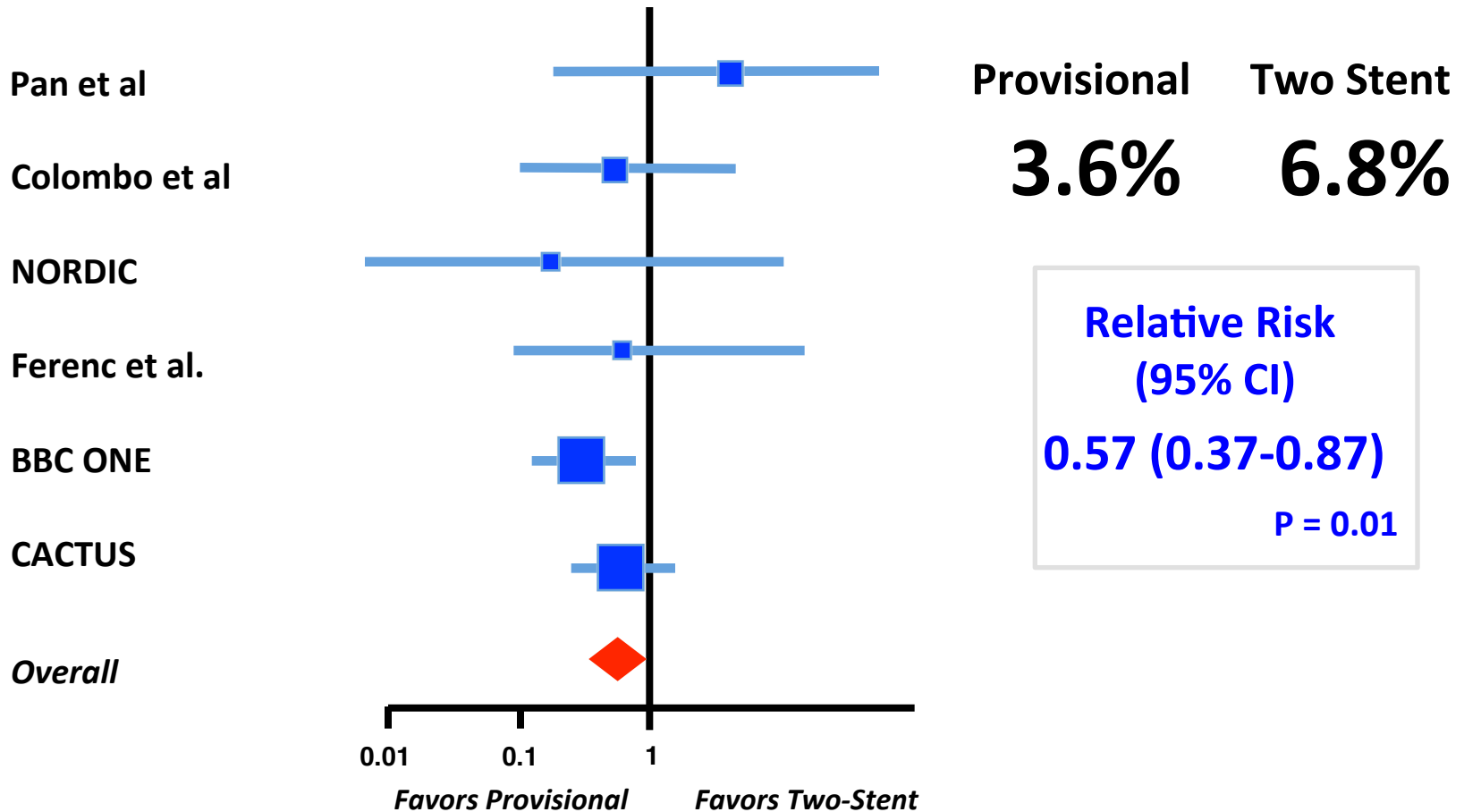
Mortality





Bifurcation Stenting Meta-Analysis

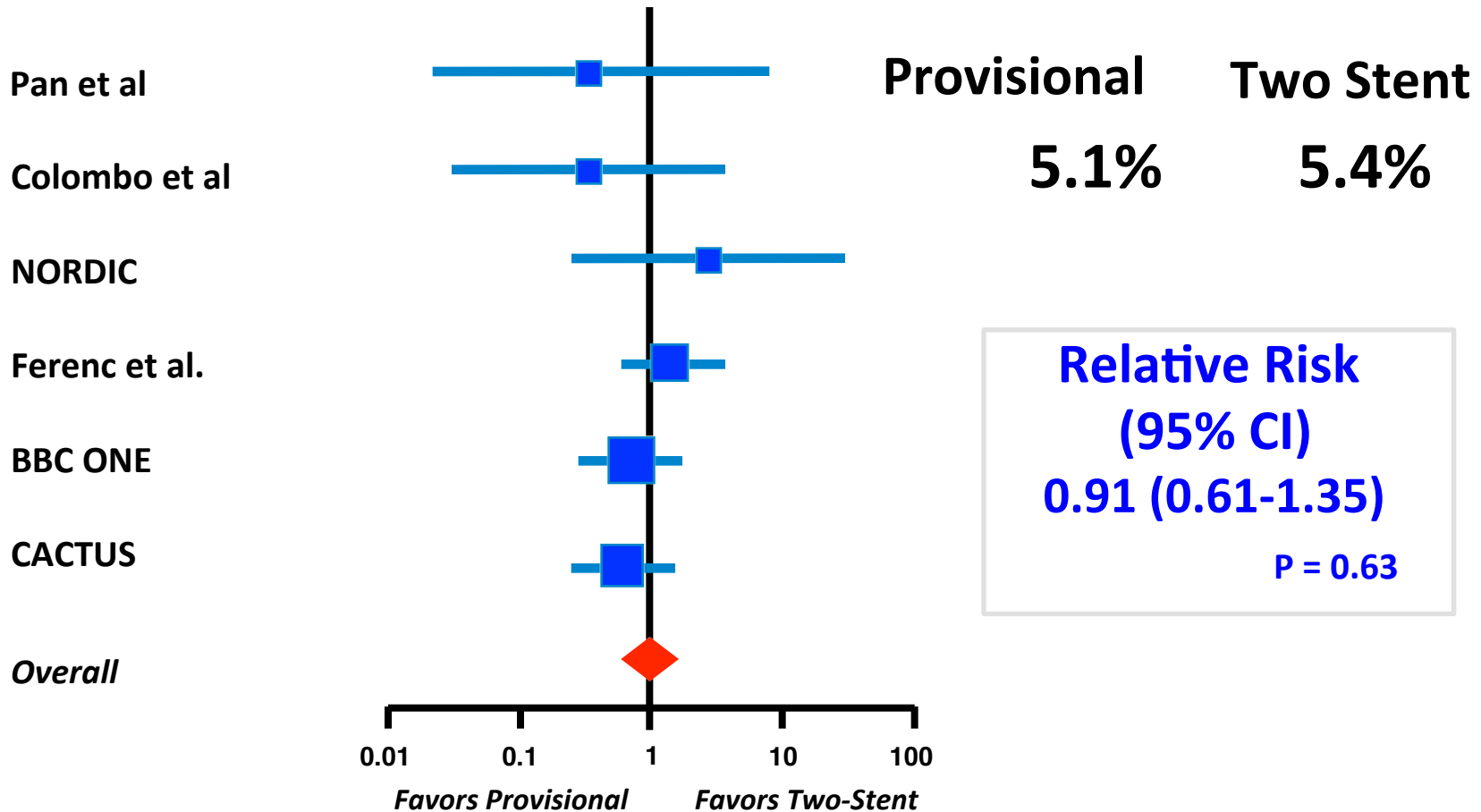
Myocardial Infarction





Bifurcation Stenting Meta-Analysis

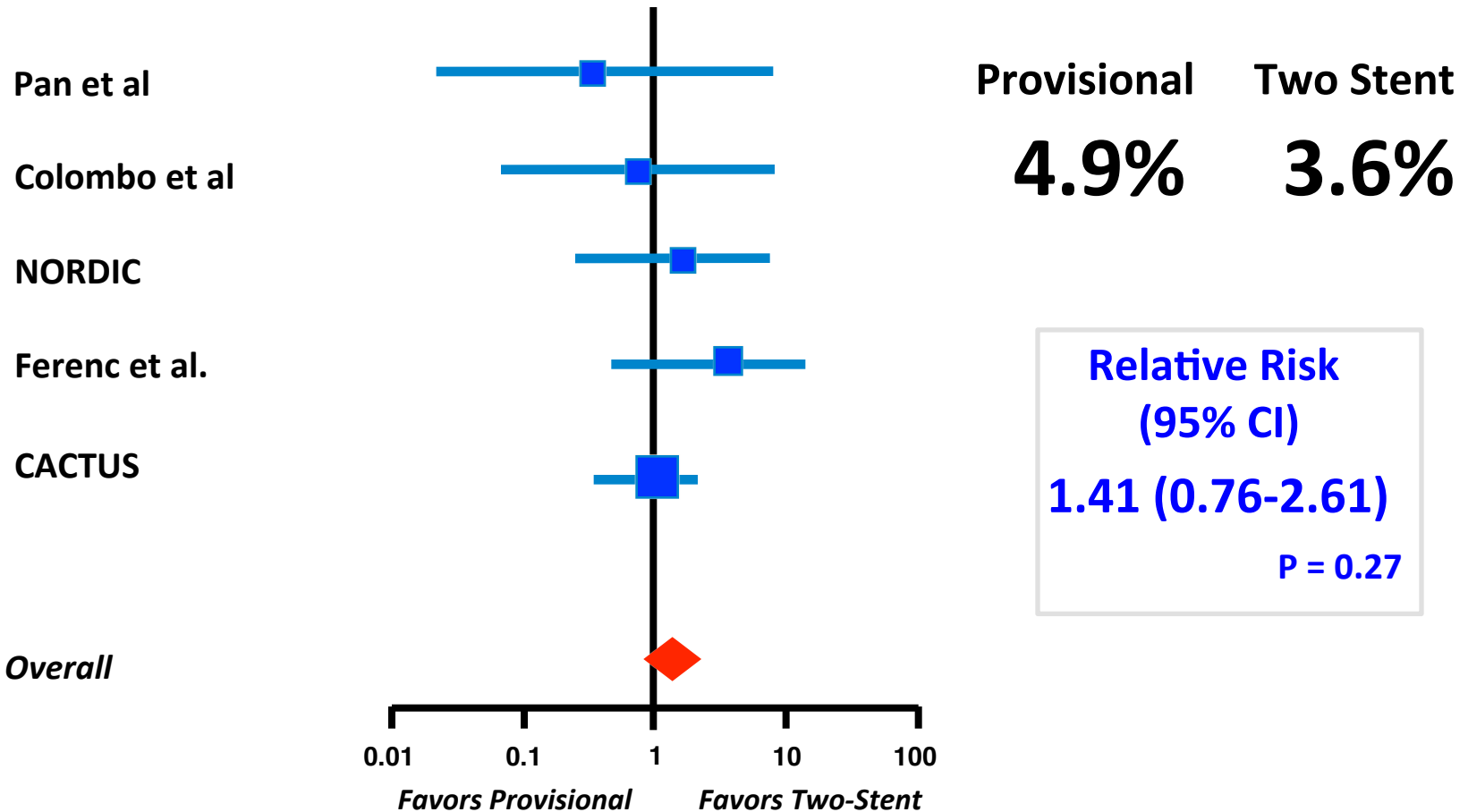
Target Lesion Revascularization





Bifurcation Stenting Meta-Analysis

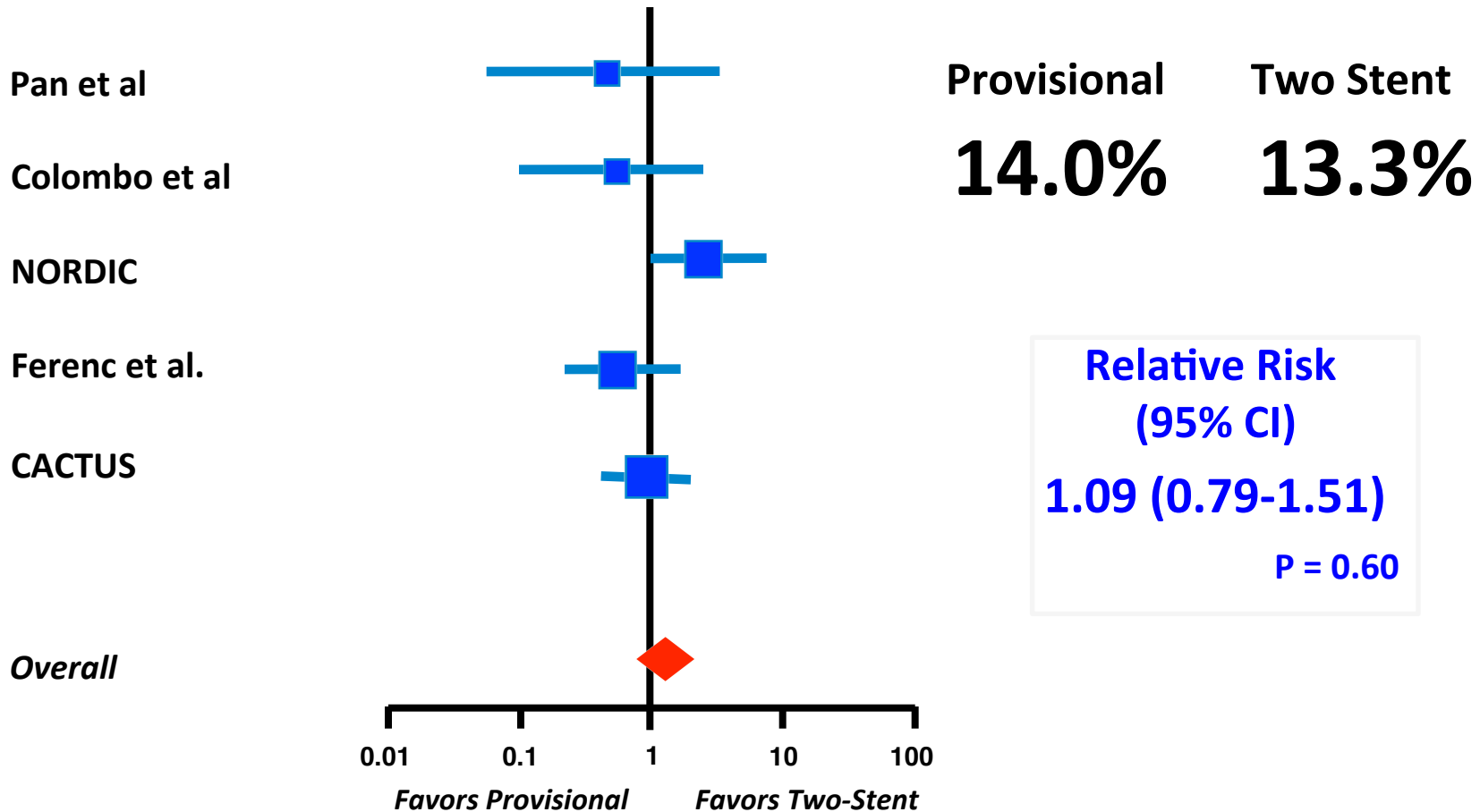
Main Branch Stenosis





Bifurcation Stenting Meta-Analysis

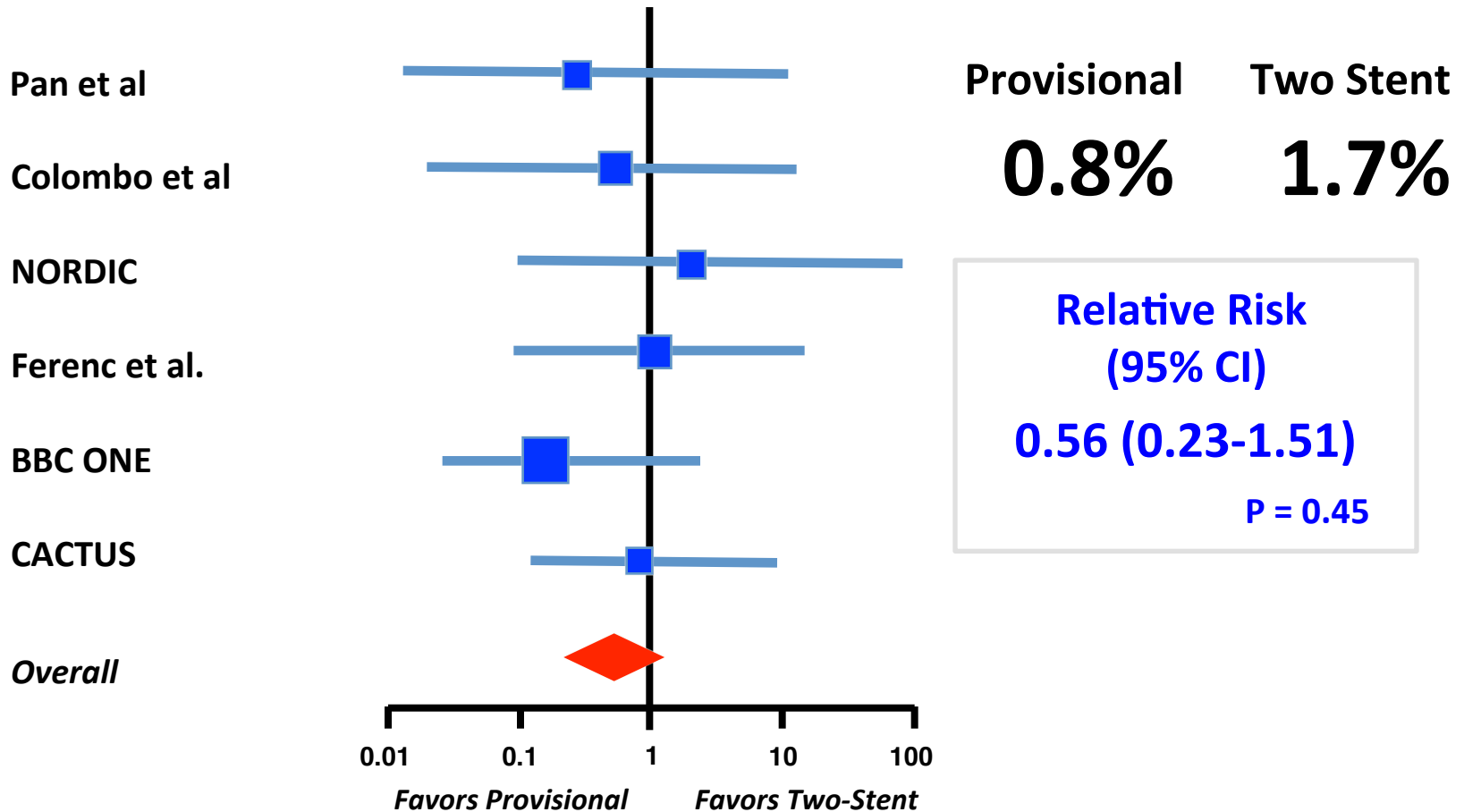
Side Branch Stenosis





Bifurcation Stenting Meta-Analysis

Stent Thrombosis





Insight analysis into RCTs

Why no differences between single or 2-stent approaches in these studies ?

All of them included patients with SB lesion length < 10 mm

(simple bifurcation lesion)



Insight analysis into RCTs

		AMI	CTO	SB-dia	SB-
		length	SB-DS		
NORDIC-I	No	No	2.0mm	5mm	
		40%			
NORDIC-II	No	No	2.5mm	6mm	
		42%			
NORDIC III	No	No	2.5mm	6mm	
		44%			
NORDIC IV	No	No	2.75mm	6mm	40%
CACTUS	No	No	2.5mm	5mm	
		62%			
BBC ONE	No	No	2.25mm	5mm	40%

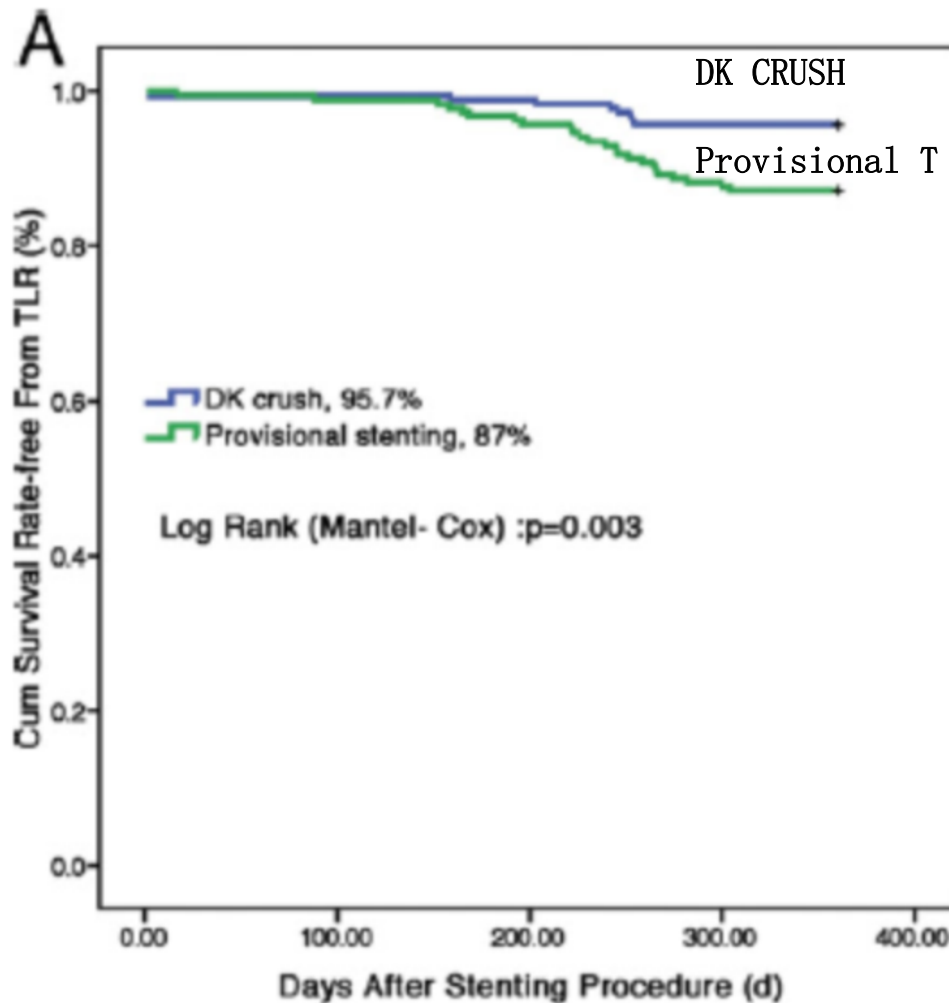


Insight analysis into RCTs

	AMI	CTO	SB-dia	SB-	
		length	SB-DS		
DKCRUSH-II	Yes	Yes	2.5mm	11mm	65%
DKCRUSH-III	Yes	Yes	>2.5mm	17mm	64%



DKCRUSH-II





DKCRUSH-III

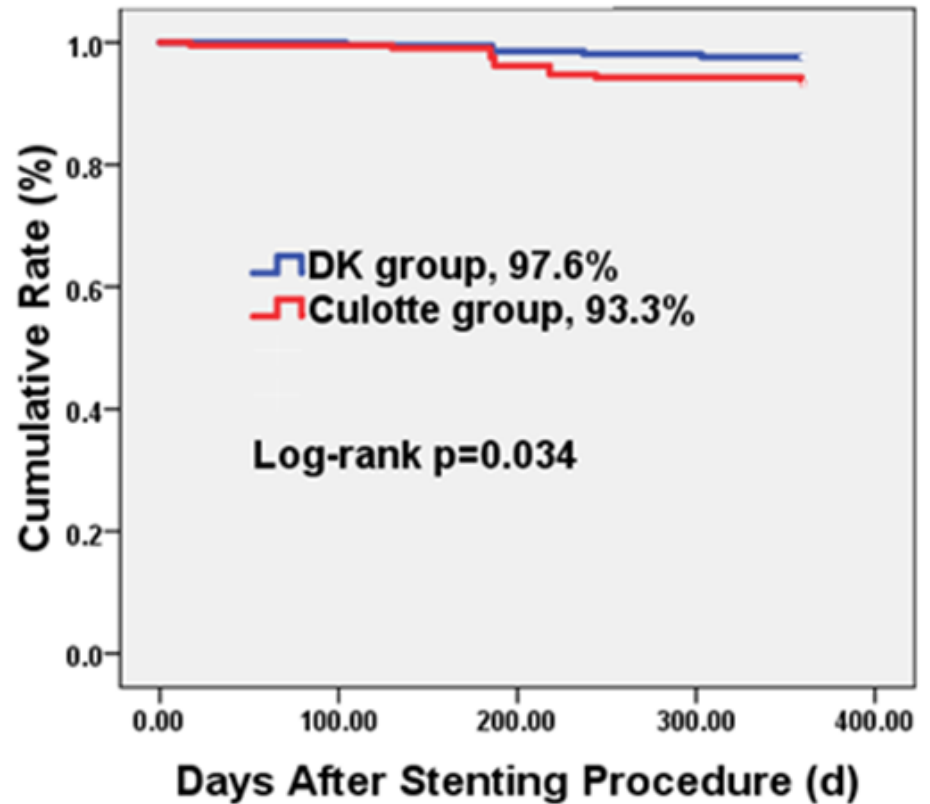
N= 419 pts with true bifurcation

210 DK Crush

Vs

209 Culotte

TLR-free survival rate

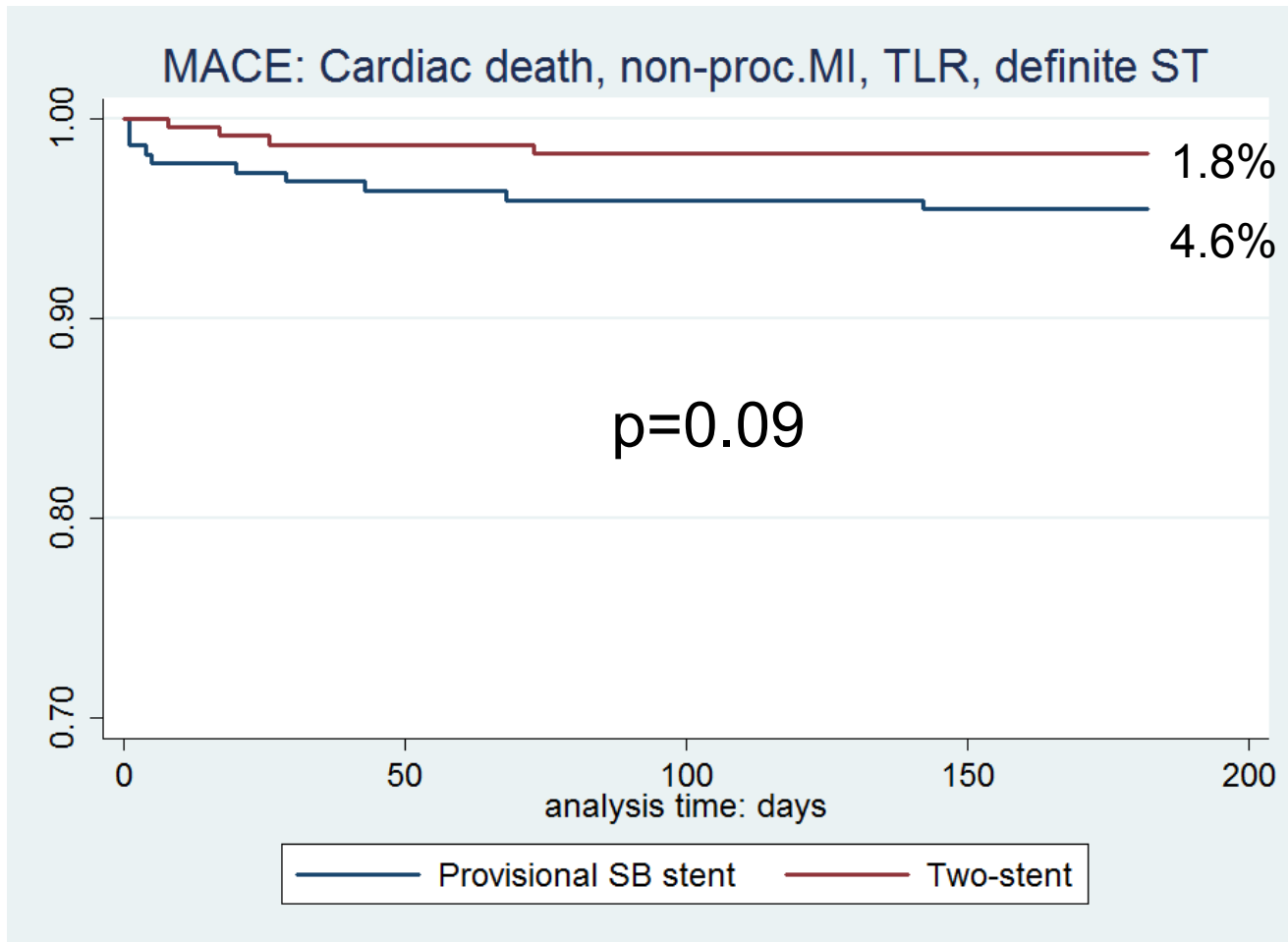


Lesion characteristics

	Provisional (n=221)	Two-stent (n=229)	p
LAD/diagonal (%)	74.1	76.7	ns
CX/obtuse marginal (%)	16.8	17.6	ns
RCA PDA/PLA (%)	6.4	4.0	ns
LM/LAD/CX (%)	2.7	1.3	ns
Ref. diameter main vessel (mm)*	3.5	3.4	0.04
Ref. diameter side branch (mm)*	2.9	2.9	ns
Lesion length SB (mm)*	7.4	8.0	<0.0001
Angulation > 60-70° (%)*	50.9	51.1	ns

*visual estimation

Eventfree survival curve at 6 months



Medina 1,1, 1 - SB > 2.5 mm



Trea

Both are Medina 1,1,1 but with different SB disease : can be treated with same approach ?

Medina 1,1,1



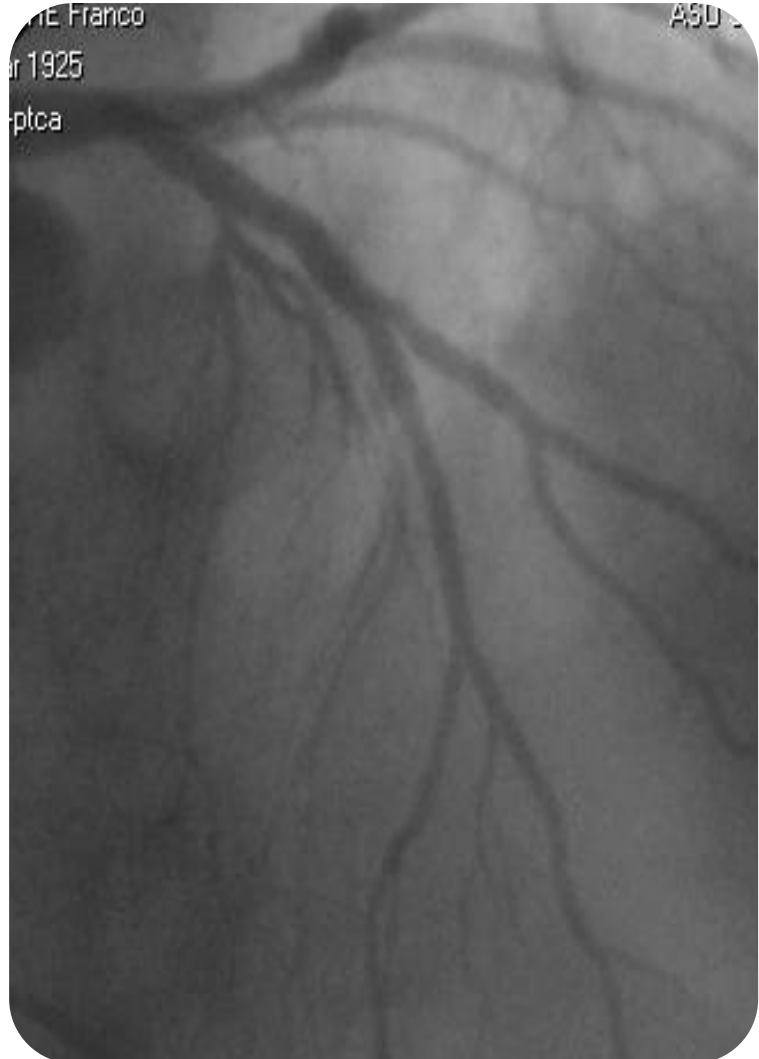
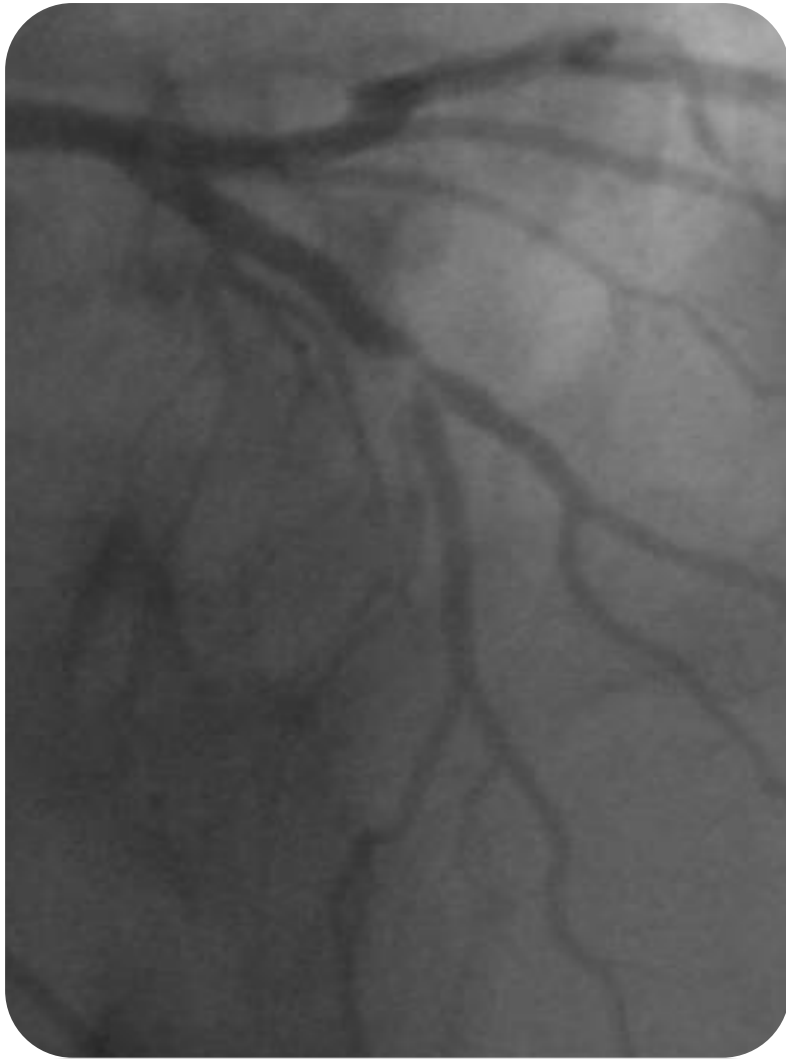
LM true bifurcation lesion



LM true bifurcation lesion



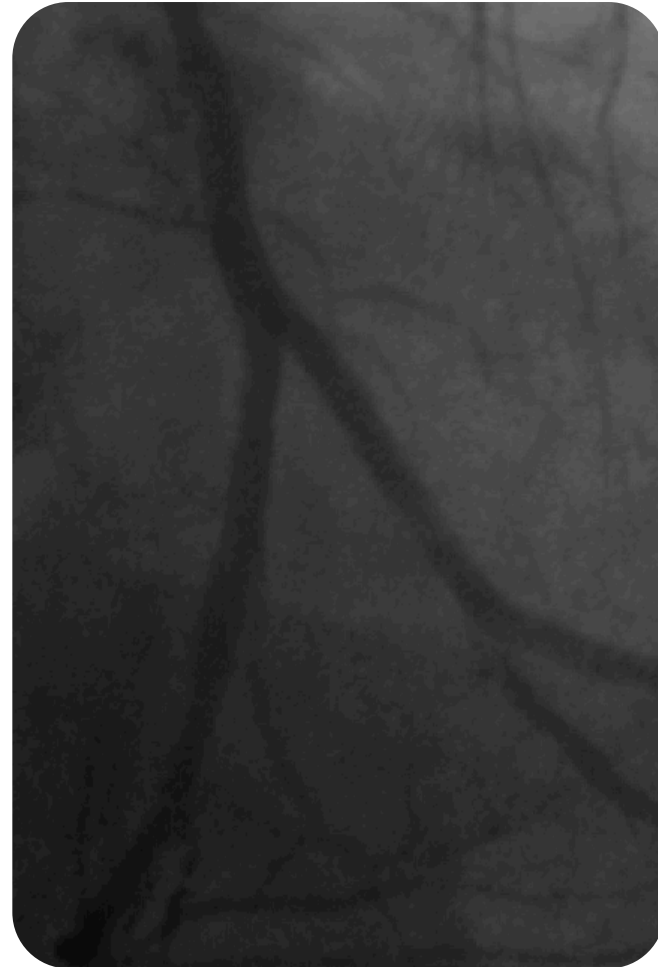
Medina 1,1,1



Provisional Stenting



Medina 1,1,1



2-stent approach is more appropriate



BL Complexity Score

Keeping the Medina system to define bifurcation lesion

Morphology :

And assigning different scores according to the BL lesion characteristics:

MV = is always the same as a fixed value (MV can provide maximum 2 point to the score)

If no significant disease = 0

If significant disease = 1

(Independently from lesion length , calcification ...)



BL Complexity Score

SB : is the main determinant for complexity :

0 = no lesion

1 = focal significant lesion (<10 mm)

4 = extended significant disease (≥ 10 mm)

Calcification = 1

C = calcification and should be added only referring to SB .



BL Complexity Score

When total score ≤ 4 BL is defined as **Simple BL**
When total score > 4 BL is defined as **Complex BL**

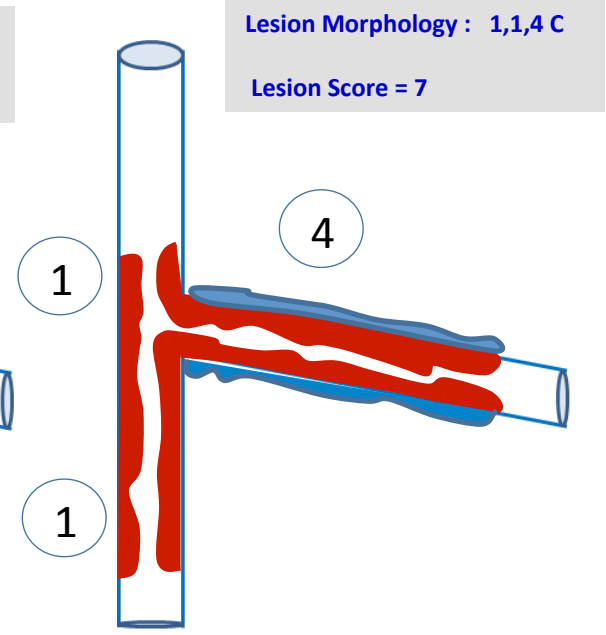
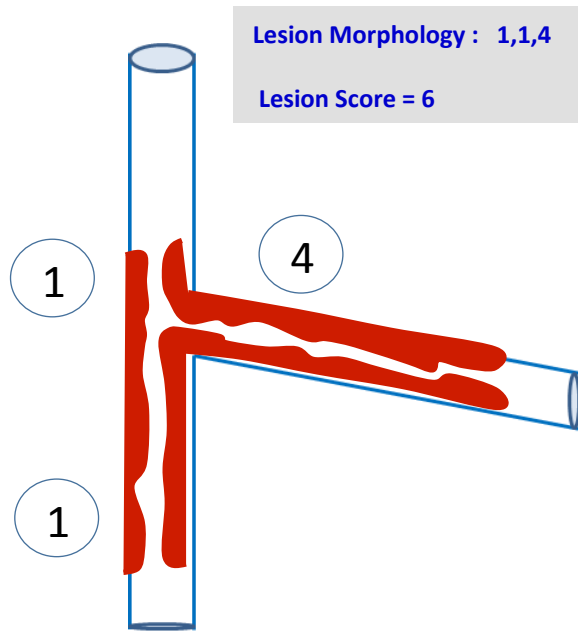
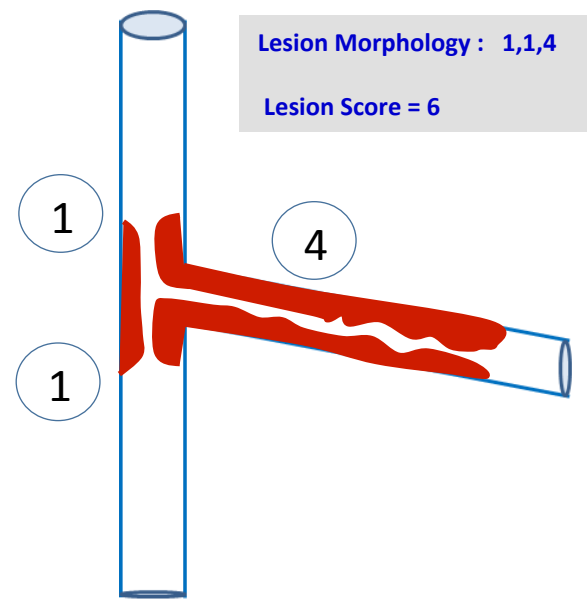
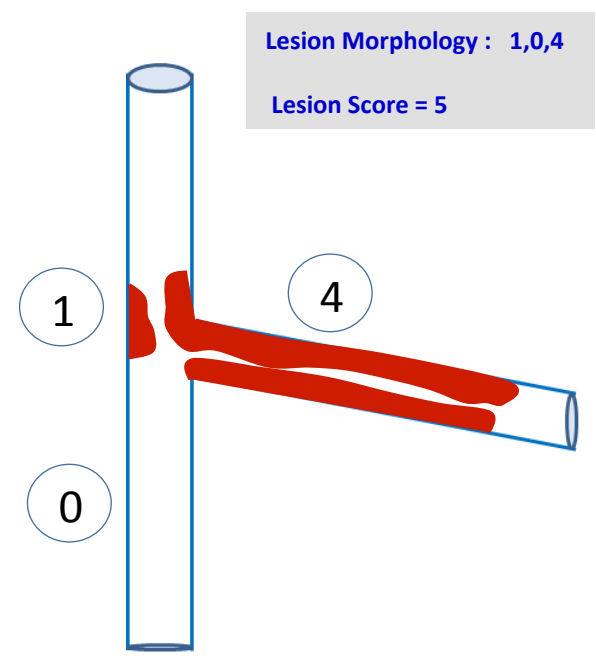
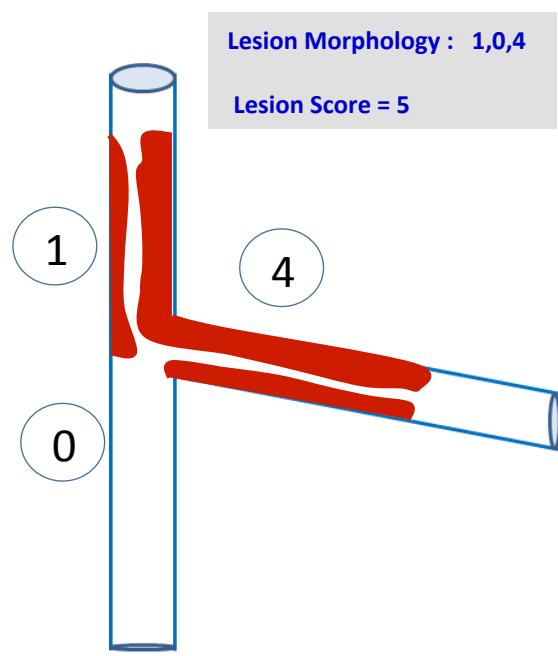
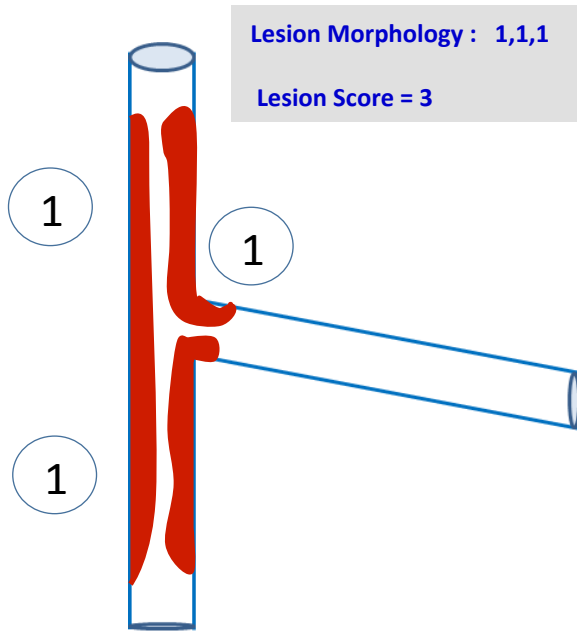
Defining Lesion Morphology :

1,1,3 C = complex bifurcation with calcified SB

Total score = 6

0,1,1 = simple bifurcation with no calcification on SB

Total Score = 2

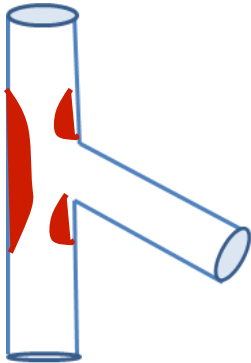




BL Complexity Score

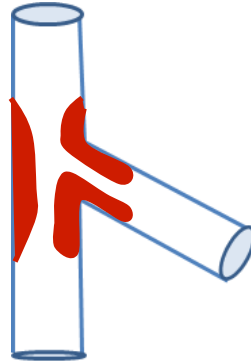
Lesion Morphology : 1,1,0

Lesion Score = 2



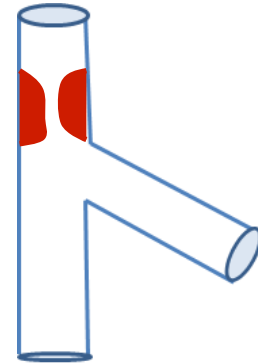
Lesion Morphology : 1,1,1

Lesion Score = 3



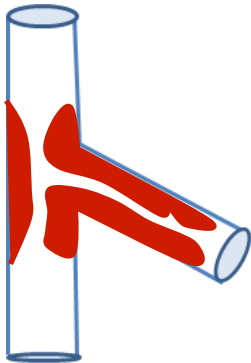
Lesion Morphology : 1,0,0

Lesion Score = 1



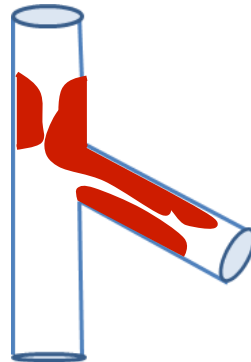
Lesion Morphology : 1,1,4

Lesion Score = 6



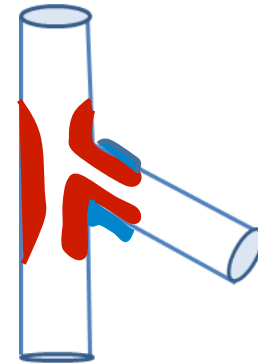
Lesion Morphology : 1,0,4

Lesion Score = 5



Lesion Morphology : 1,1,1C

Lesion Score = 4





BL Complexity Score

The BL Complexity Score was retrospectively applied in 302 consecutive patients underwent PCI for bifurcation lesion

- **248 (70%) with Complexity Score ≤ 4**
 - Provisional T Stenting in 179 pts (72%)
 - 2-stent strategy in 69 pts (28%)
- **106 (30%) with complexity Score > 4**
 - 2 stents Strategy in 88 pts (83%)
 - Provisionaal T stenting in 18 pts (17 %)

• Simple BL SB length = $5,7 \pm 2,8$ mm

• Complex BL SB length = $18 \pm 4,2$ mm

• Distal Lm Bifurcation in 68 (19%)

(Patients in whom were shifted from provisional stenting to 2 stents were excluded)

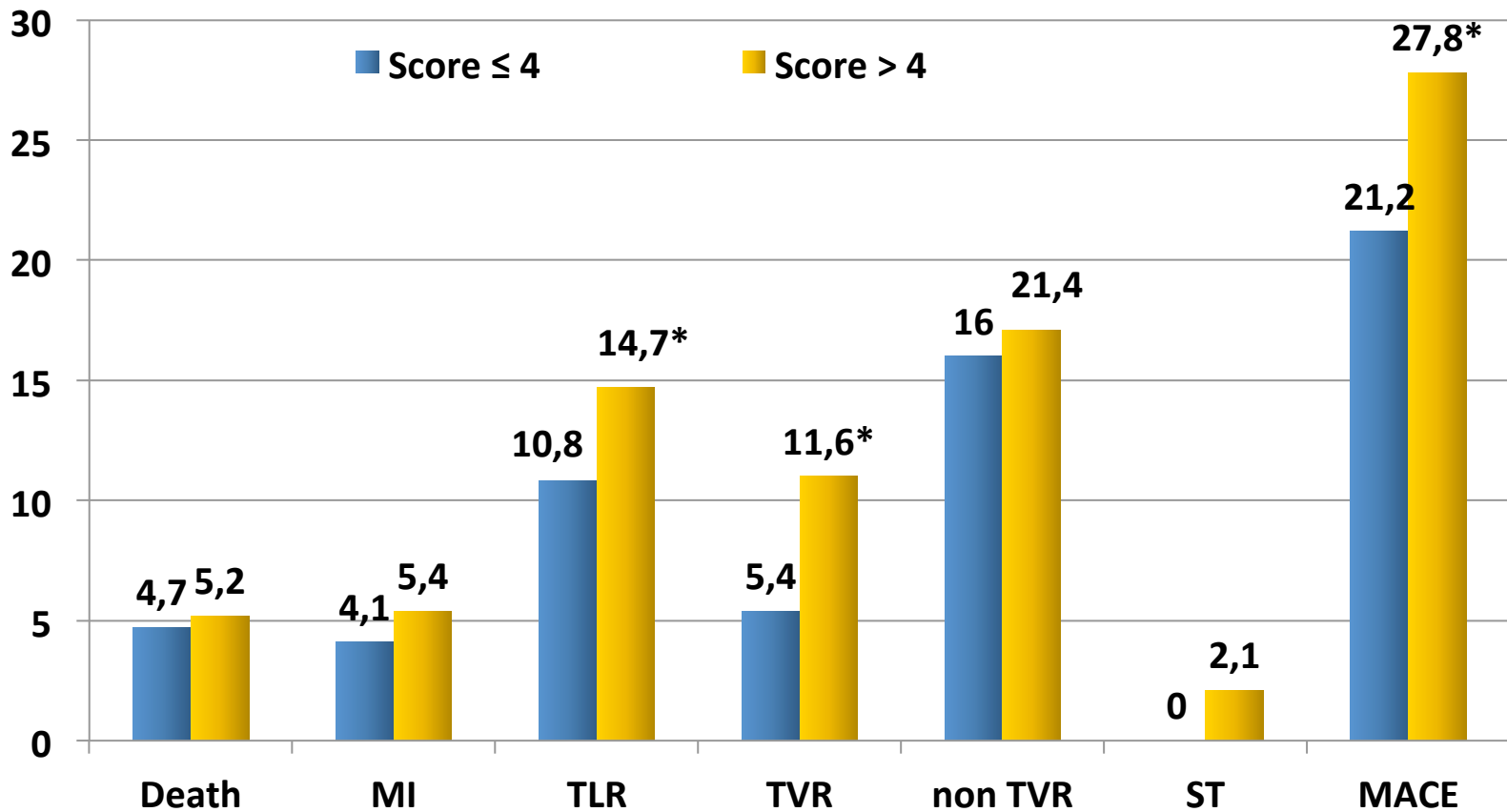
• Follow up: from 2,5 to 3,7 years (mean = 3 yrs)



Baseline features according to Score

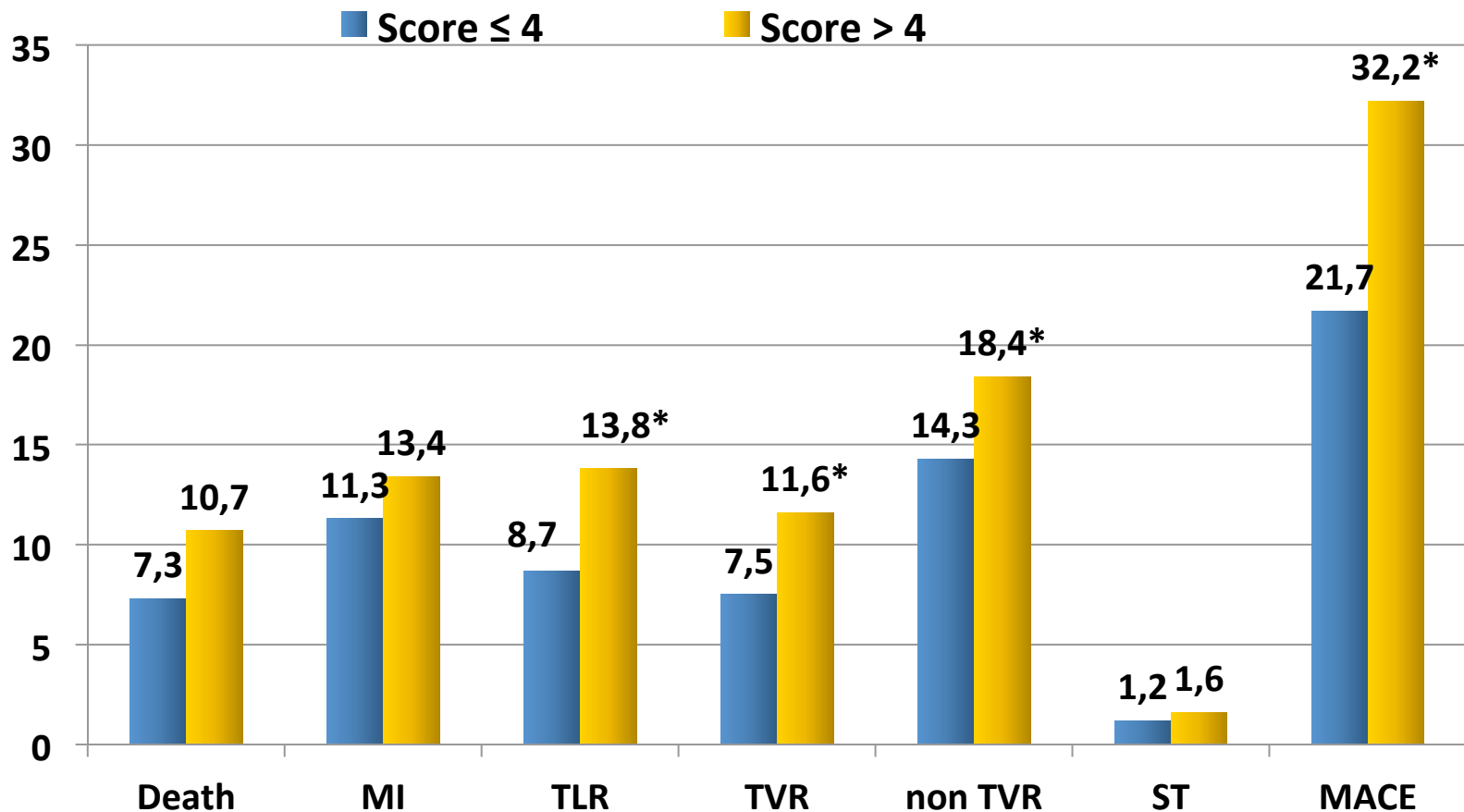
	Score \leq 4 (248;70%)	Score > 4 (106;30%)	P
Age (years)	67.4 \pm 5.6	69.4 \pm 3.4	0.45
Female gender	92 (37.4)	36 (33.9)	0.54
Hypertension	197 (79.4)	87 (82.4)	0.45
Hyperlipidemia	179 (72.3)	66 (62.5)	0.21
Diabetes mellitus	69 (28.1)	32 (30.1)	0.42
Previous myocardial infarction	86 (34.5)	42 (39.4)	0.67
Smoking habit	94 (37.3)	36 (34.7)	0.41
Acute coronary syndrome			0.12
- Unstable angina	92 (37.3)	35 (33.3)	
- NSTEMI	32 (12.8)	15 (13.9)	
- STEMI	52 (21.1)	15 (13.9)	

3-year Follow Up according to Score in all patients



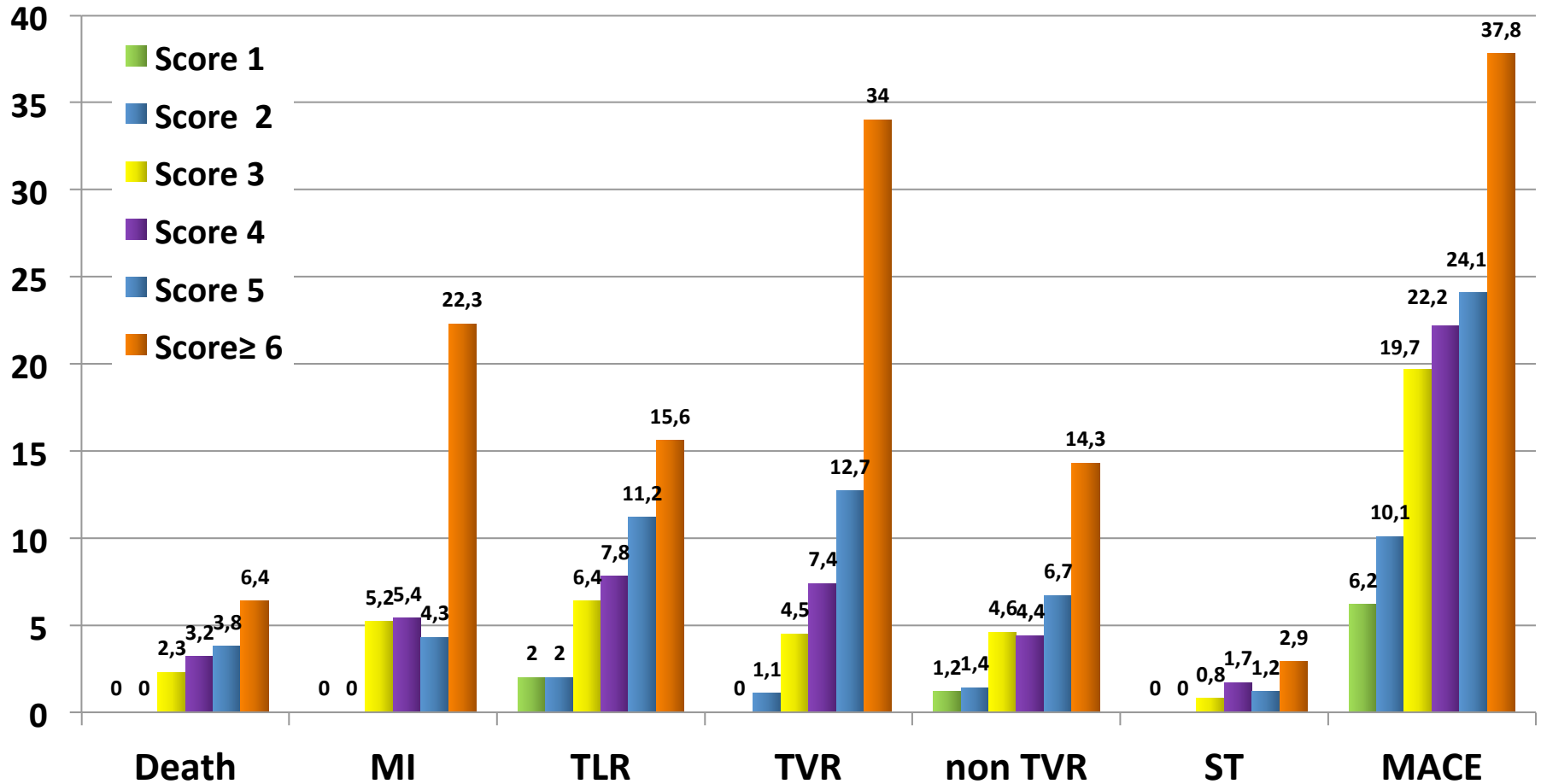


3-year Follow Up according to Score in patients with Distal Left Main Bifurcation



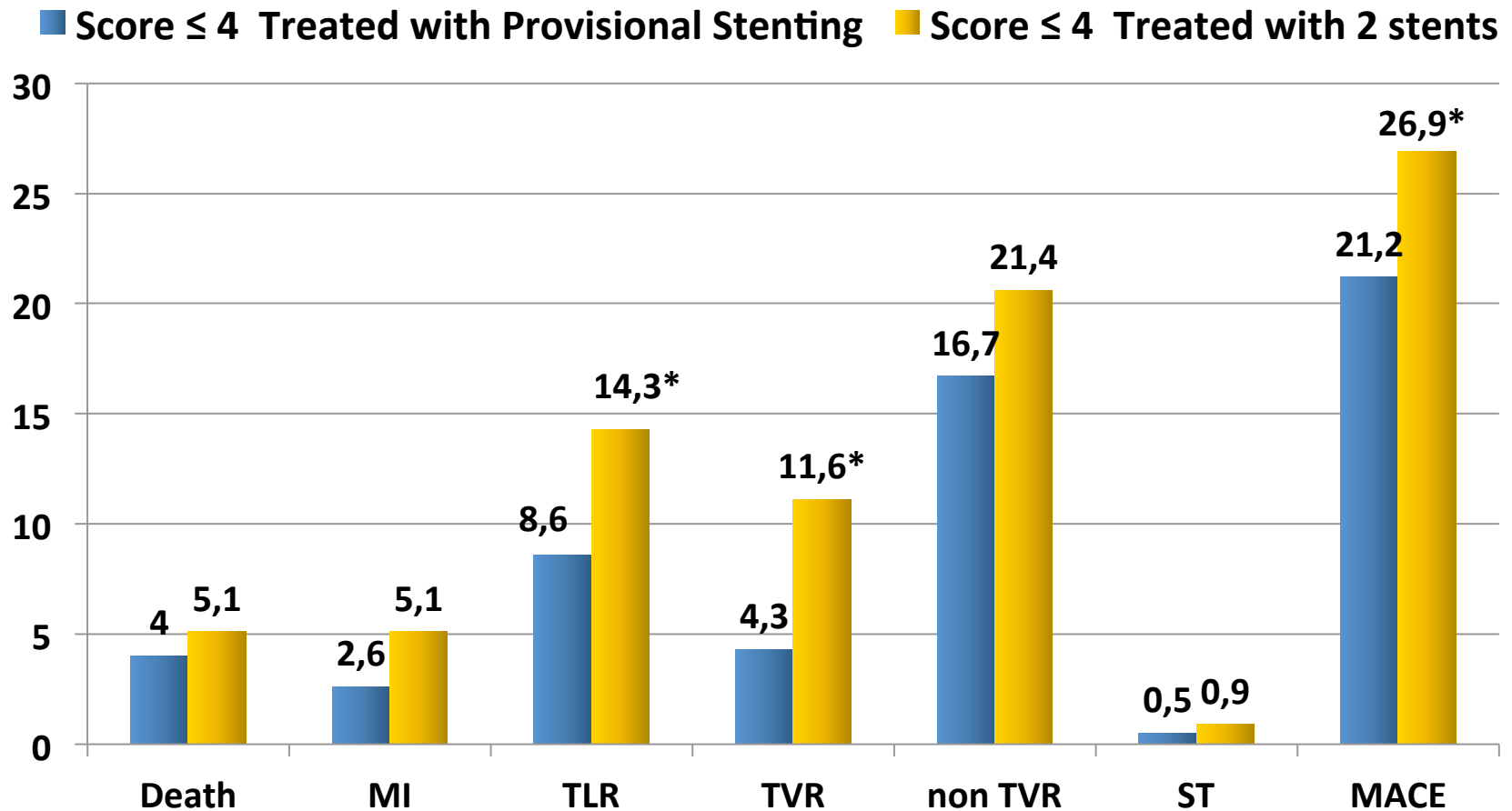


3-Year Follow Up according to Score in all Patients





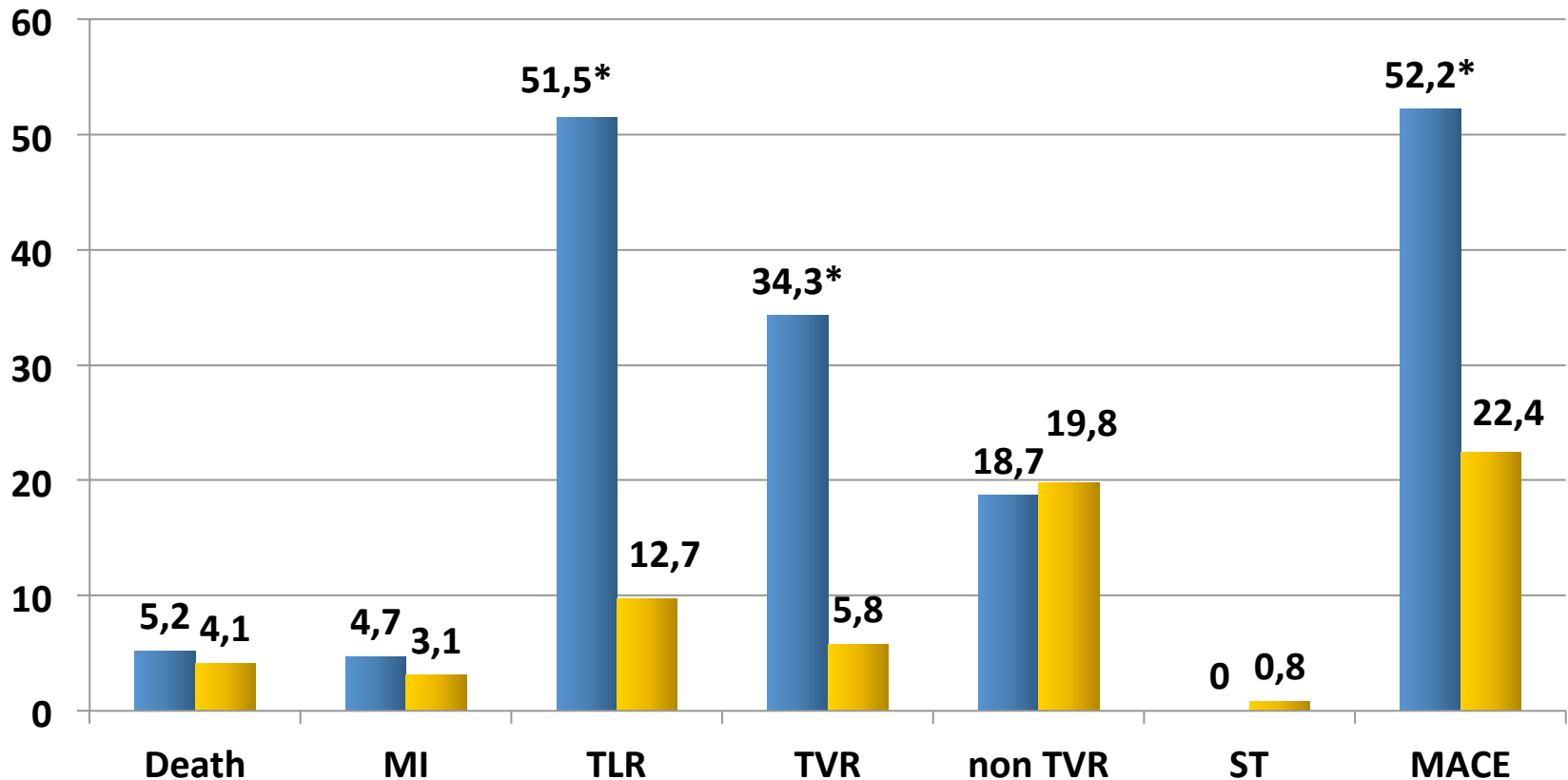
Clinical Events in patient with Simple Bifurcation Lesions (Score \leq 4) according to treatment strategy





Clinical Events in patient with Complex Bifurcation Lesion (Score > 4) according to Treatment Strategy

■ Score > 4 Treated with Provisional Stenting ■ Score > 4 Treated with 2 stents





Final Remarks

- **Medina classification for bifurcation lesions is a useful tool for the definition of bifurcation lesion morphology but can not be used for an appropriate treatment strategy selection**
- **Clinical outcome can be significantly different using different approach in the same type of bifurcation lesion (according to the present classification)**
- **BL Complexity Score seems to be able to define Simple and Complex bifurcation lesions and consequently to identify the appropriate treatment strategy :**
 - **2 stent strategy as intention to treat in Complex BL**
 - **Provisional stenting as intention to treat in Simple BL**
- **Further clinical evaluation is warranted to verify if this BL Complexity Score , associaated to Medina Classification, in daily clinical practice can guide for easy and quick selection of the more appropriate BL treatment .**