

Bifurcation: Lessons learned from recent trials

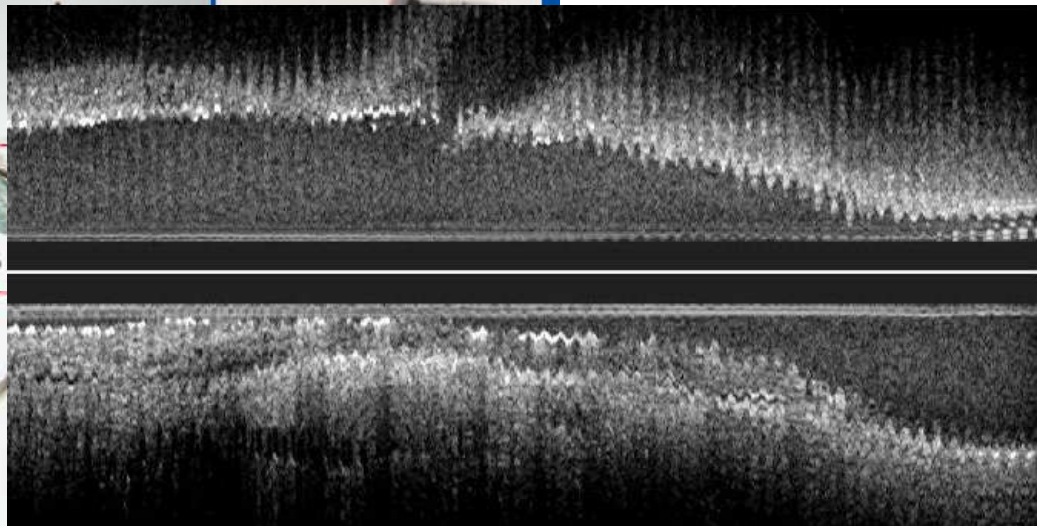
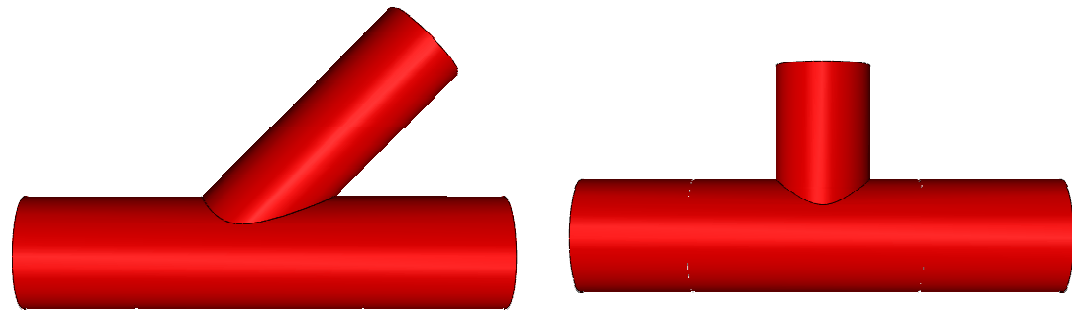
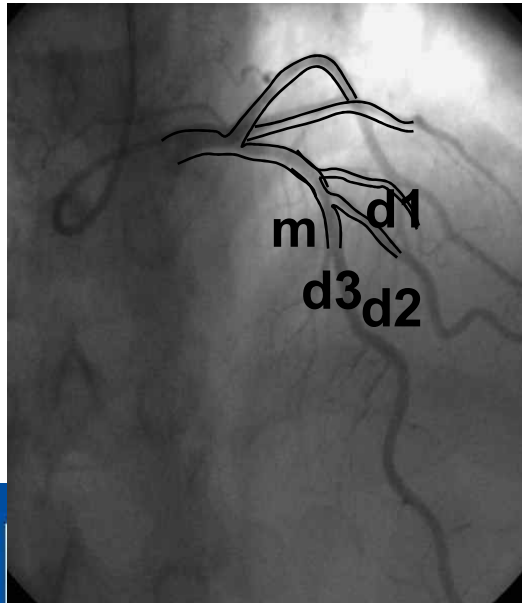
Bernard Chevalier

ICPS

Massy, France

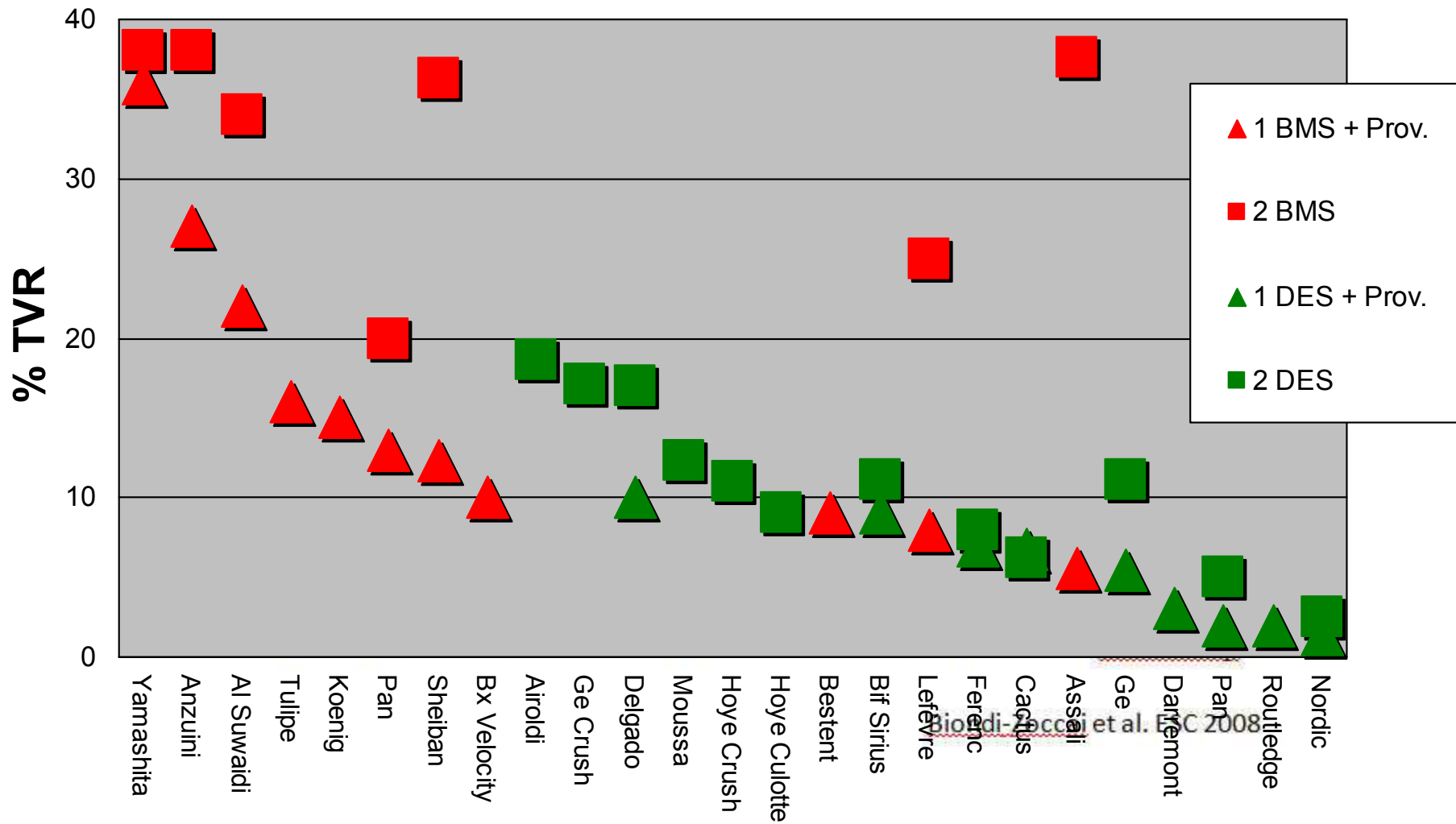
PCR

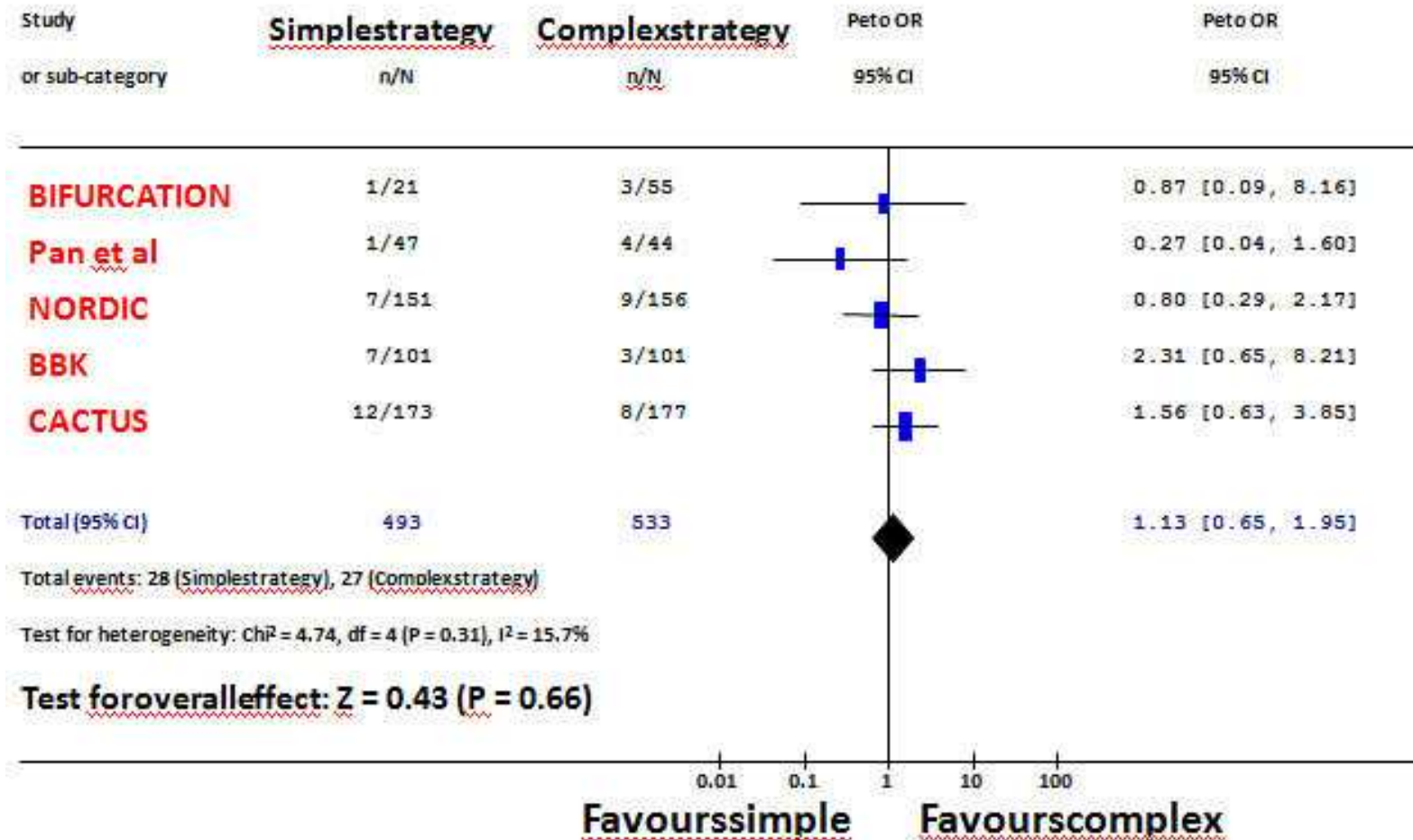
Variations in lesions

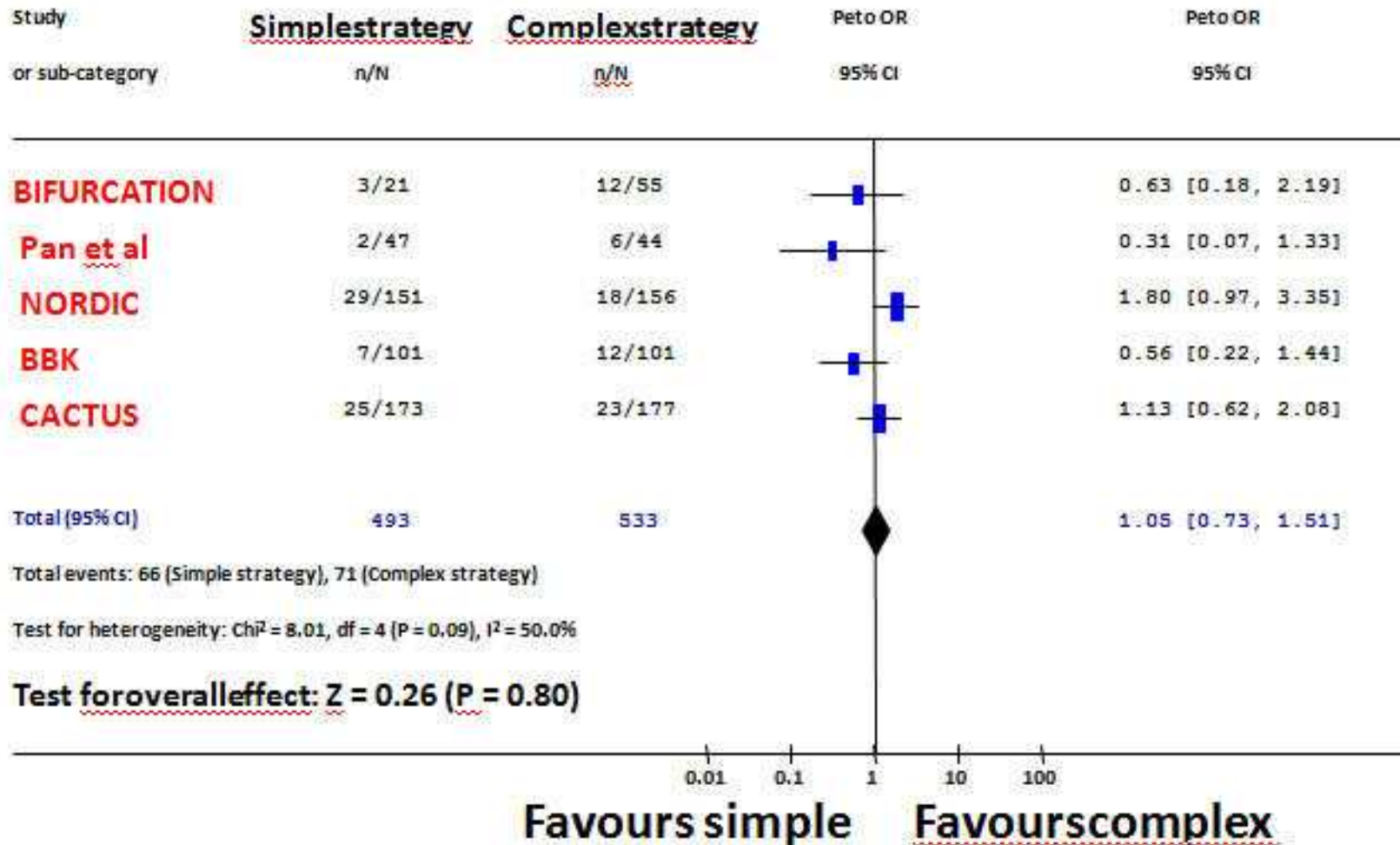


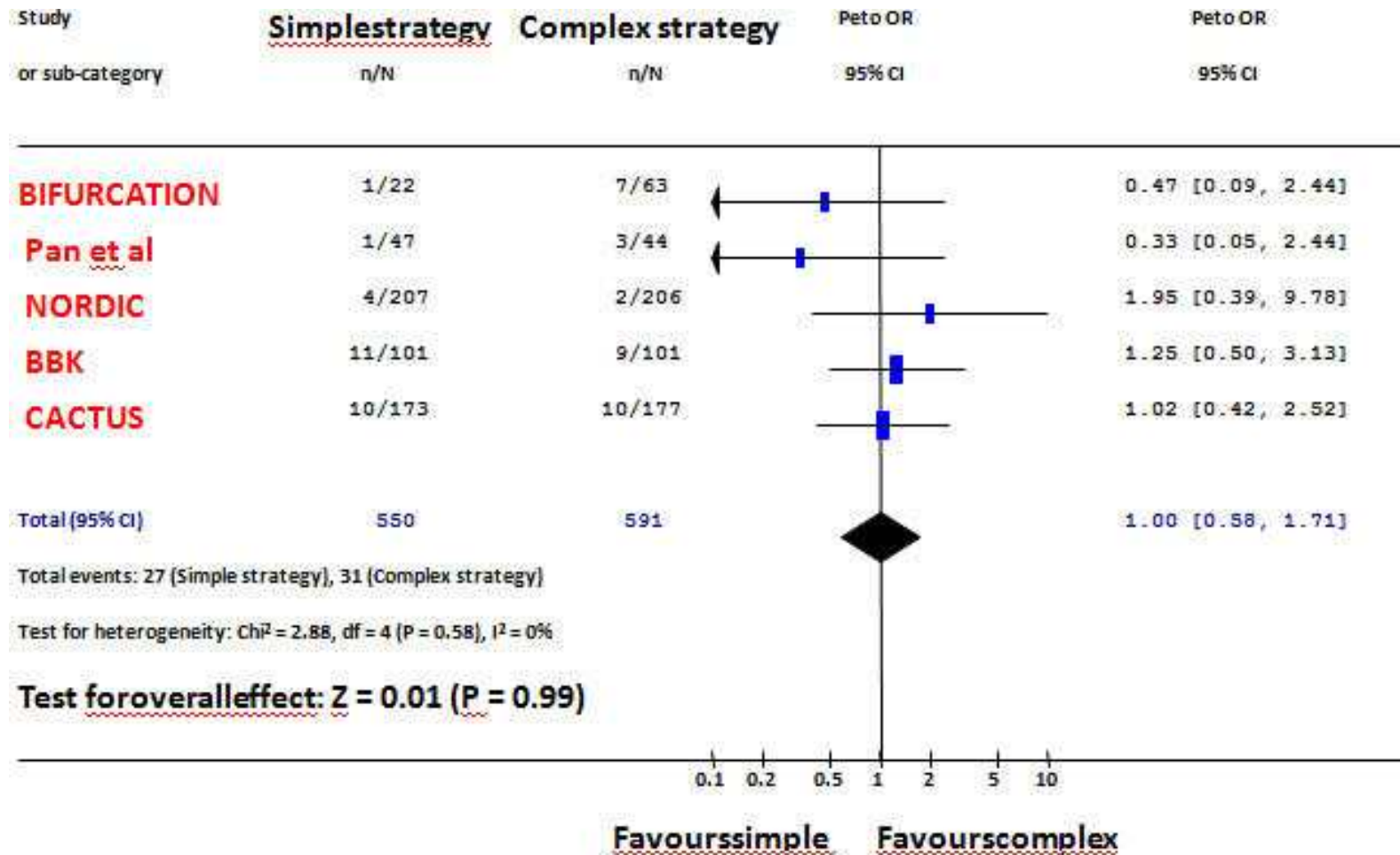
	M Main prox. first	A Main Across side first		D Distal first	S Side branch first						
1st stent	 PM stenting	 MB stenting across SB		 DM stenting	 Provisional SKS	 SB ostial stenting					
After balloon	 Skirt	 MB stenting + SB balloon	 MB stenting + kissing		 SB minicrush	 SB crush					
2 stents	 Skirt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

PCR Single vs double stenting



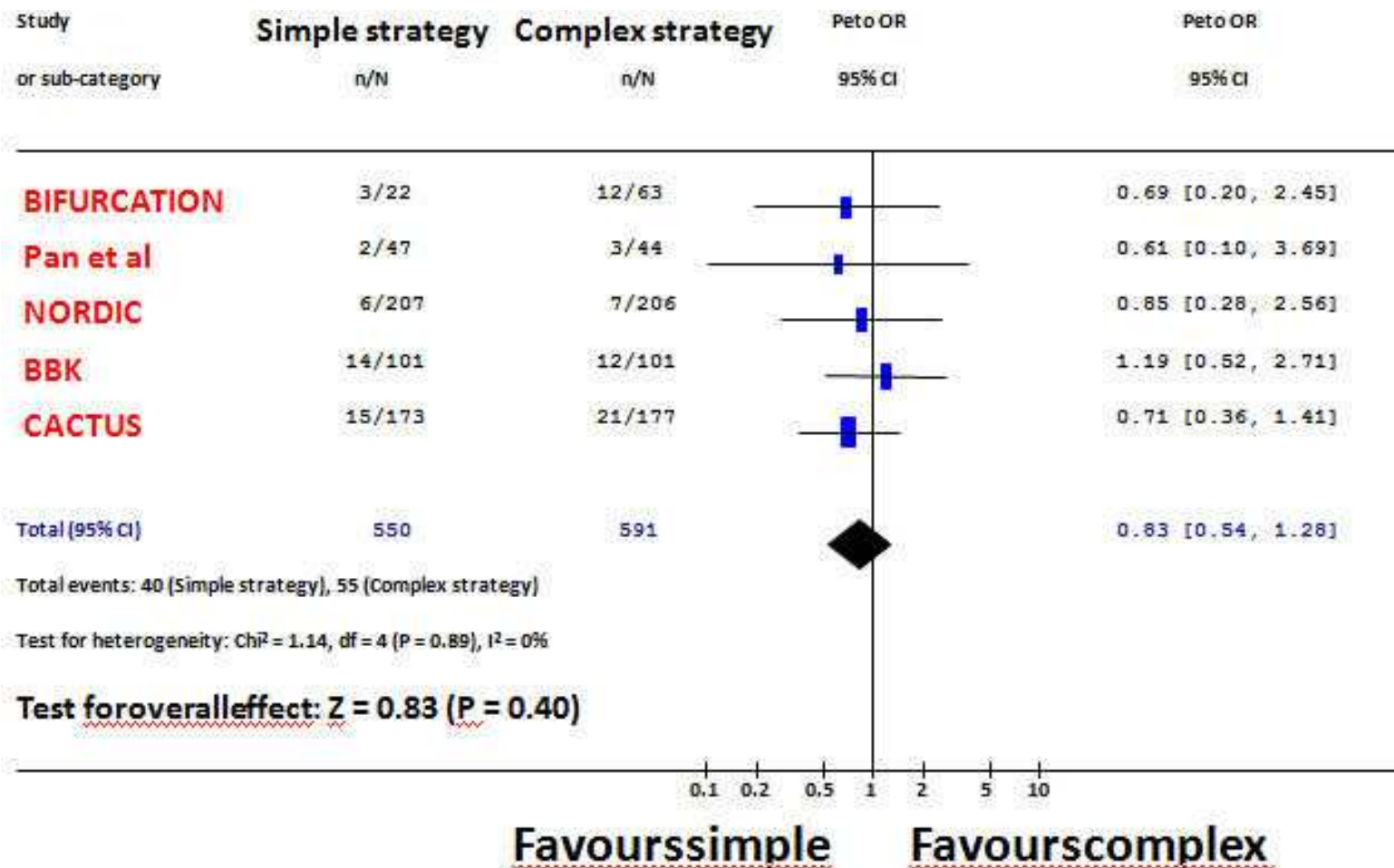


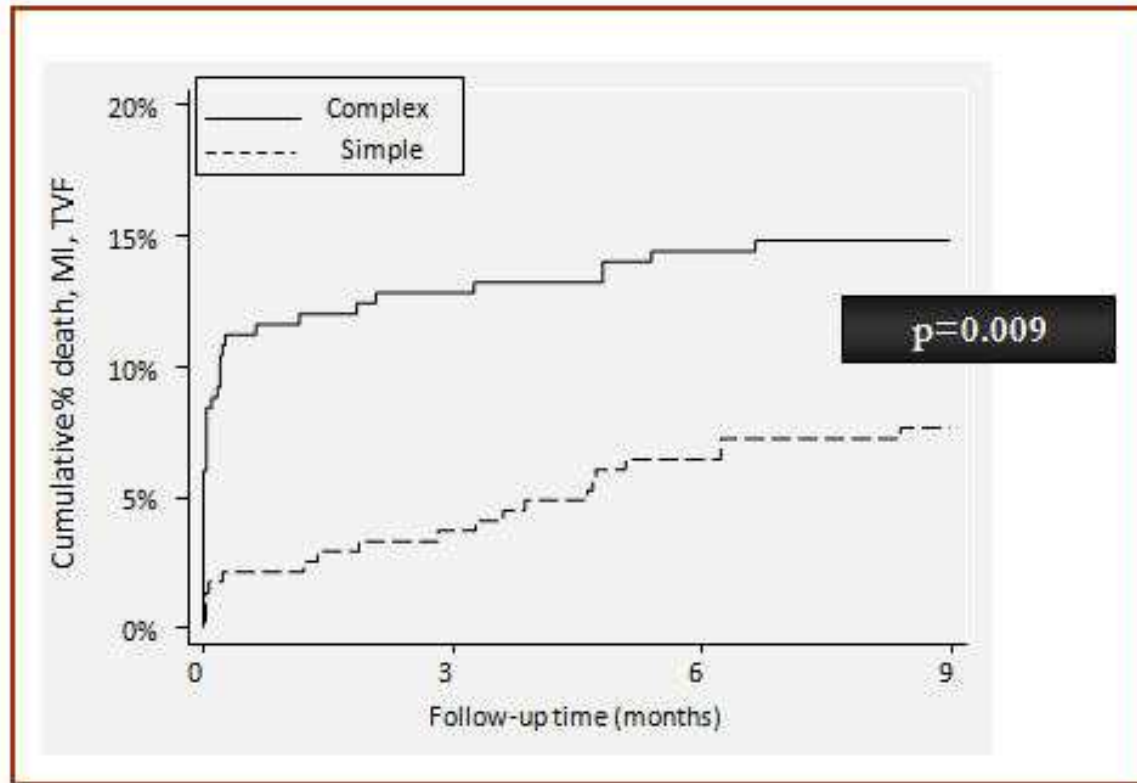




PCR

MACE

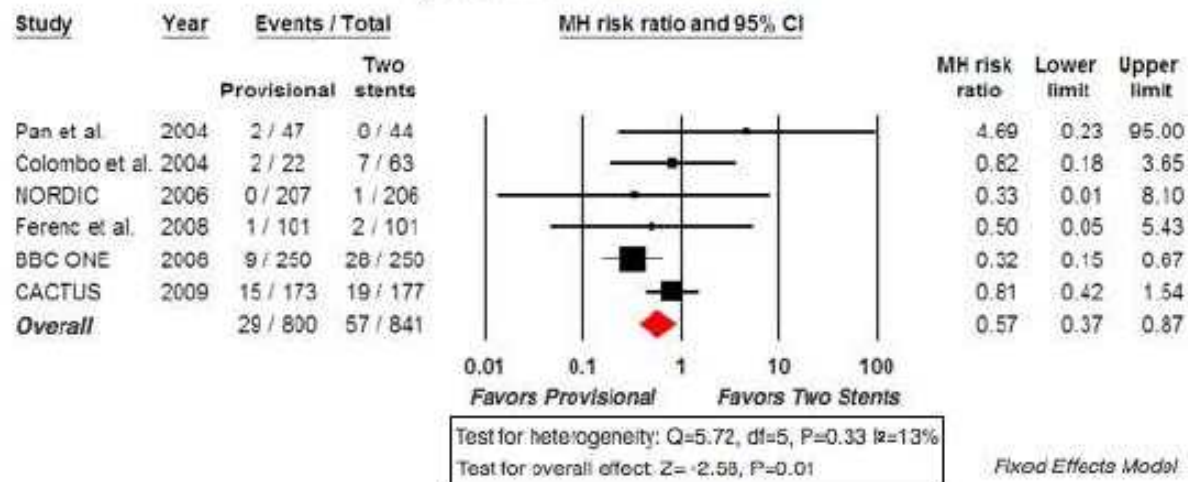




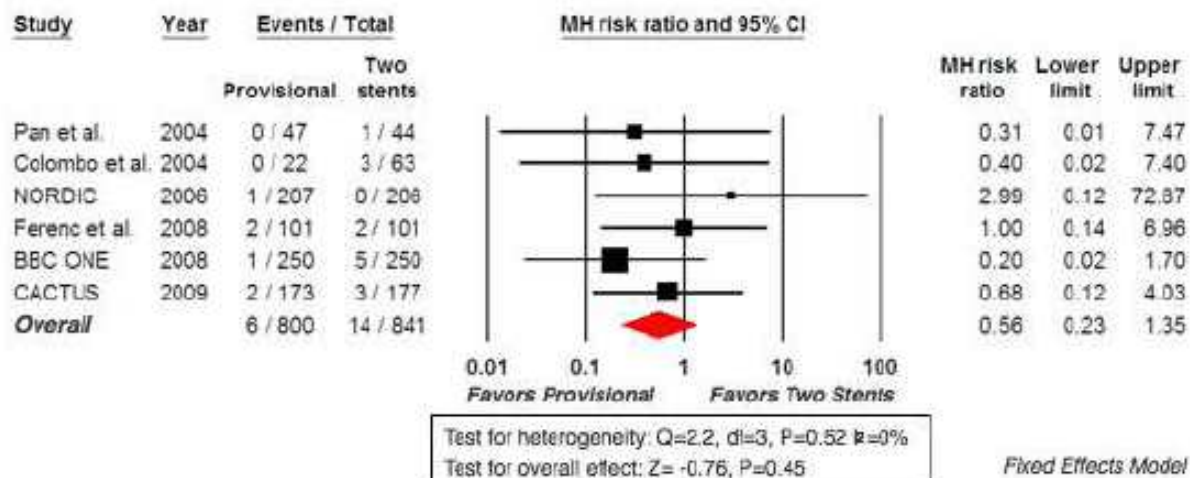
Complex	250	218	214	208
Simple	250	241	234	227

D. [Hildick-Smith](#), TCT 2008

B. Myocardial Infarction



E. Stent Thrombosis



C.

TLR

Study	Year	Events / Total		MH risk ratio and 95% CI	Statistics for each study		
		Provisional	Two stents		MH risk ratio	Lower limit	Upper limit
Pan et al.	2004	1 / 47	2 / 44		0.47	0.04	4.98
Colombo et al.	2004	1 / 22	6 / 63		0.46	0.06	3.76
NORDIC	2006	4 / 207	2 / 206		1.99	0.37	10.75
Ferenc et al.	2008	11 / 101	9 / 101		1.22	0.53	2.82
BBC ONE	2008	14 / 260	18 / 250		0.78	0.40	1.53
CACTUS	2009	11 / 173	13 / 177		0.87	0.40	1.88
Overall		42 / 800	50 / 841		0.91	0.61	1.35

Test for heterogeneity: $Q=2.2$, $df=5$, $P=0.82$ $I^2=0\%$
 Test for overall effect: $Z=-0.49$, $P=0.63$

0.01 0.1 1 10 100
 Favors Provisional Favors Two Stents

Fixed Effects Model

D.

Side Branch Restenosis

Study	Year	Events / Total		MH risk ratio and 95% CI	MH risk ratio	Lower limit	Upper limit
		Provisional	Two stents				
Pan et al.	2004	2 / 47	4 / 44		0.47	0.09	2.43
Colombo et al.	2004	3 / 21	12 / 55		0.66	0.21	2.09
NORDIC	2006	29 / 151	18 / 156		1.66	0.97	2.87
Ferenc et al.	2008	9 / 101	13 / 101		0.69	0.31	1.55
CACTUS	2009	22 / 150	20 / 152		1.11	0.64	1.96
Overall		65 / 470	67 / 508		1.09	0.79	1.51

Test for heterogeneity: $Q=5.3$, $df=4$, $P=0.26$ $I^2=25\%$
 Test for overall effect: $Z=0.53$, $P=0.60$

Fixed Effects Model

Double stenting:
Culotte/Crush/T?

Rate of main vessel and/or side branch in-stent diameter stenosis >50%

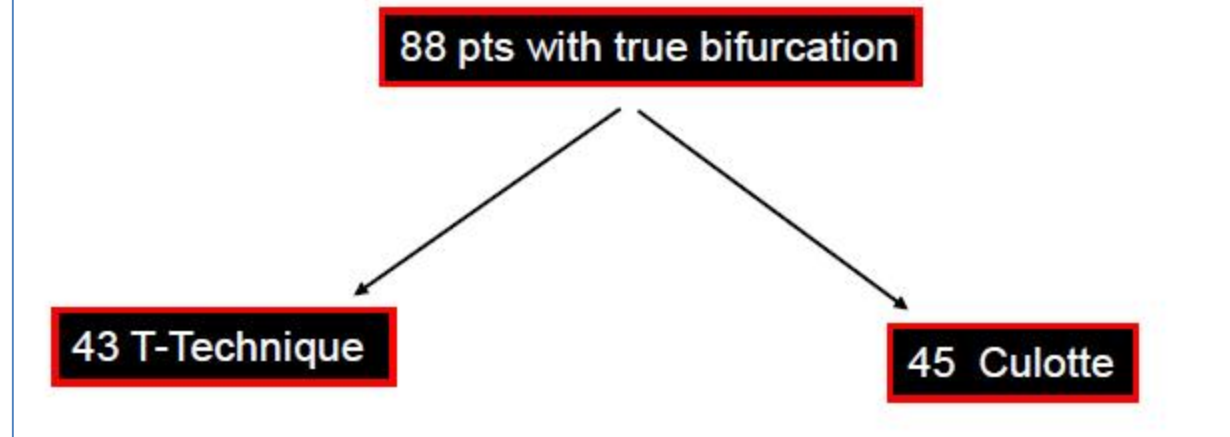
	Crush (n=20)	Culotte (n=21)	P-value
Non-cardiac death (%)	5.0	0.0	ns
Cardiac death (%)	5.0	0.0	ns
Myocardial infarc. (%)	5.0	0.0	ns
TLR (%)	20.0	0.0	0.05
Stent thrombosis (%)	0.0	0.0	ns



P. Gunnes, TCT 2007

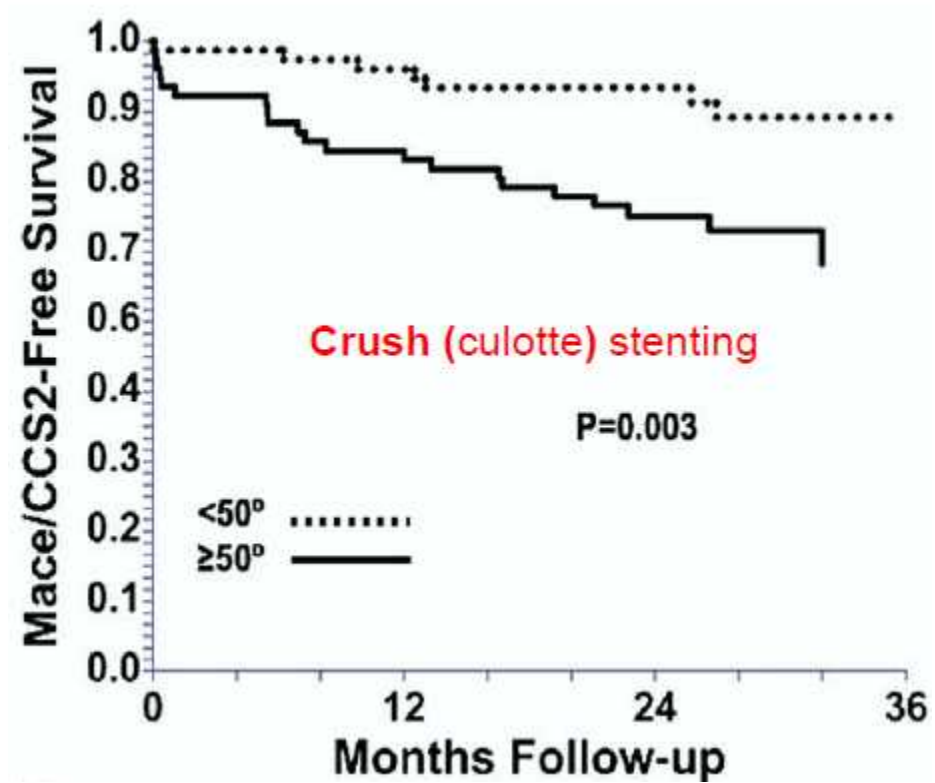
January 2005 – January 2008

LM-LAD-Cx bifurcation/trifurcation excluded from the study



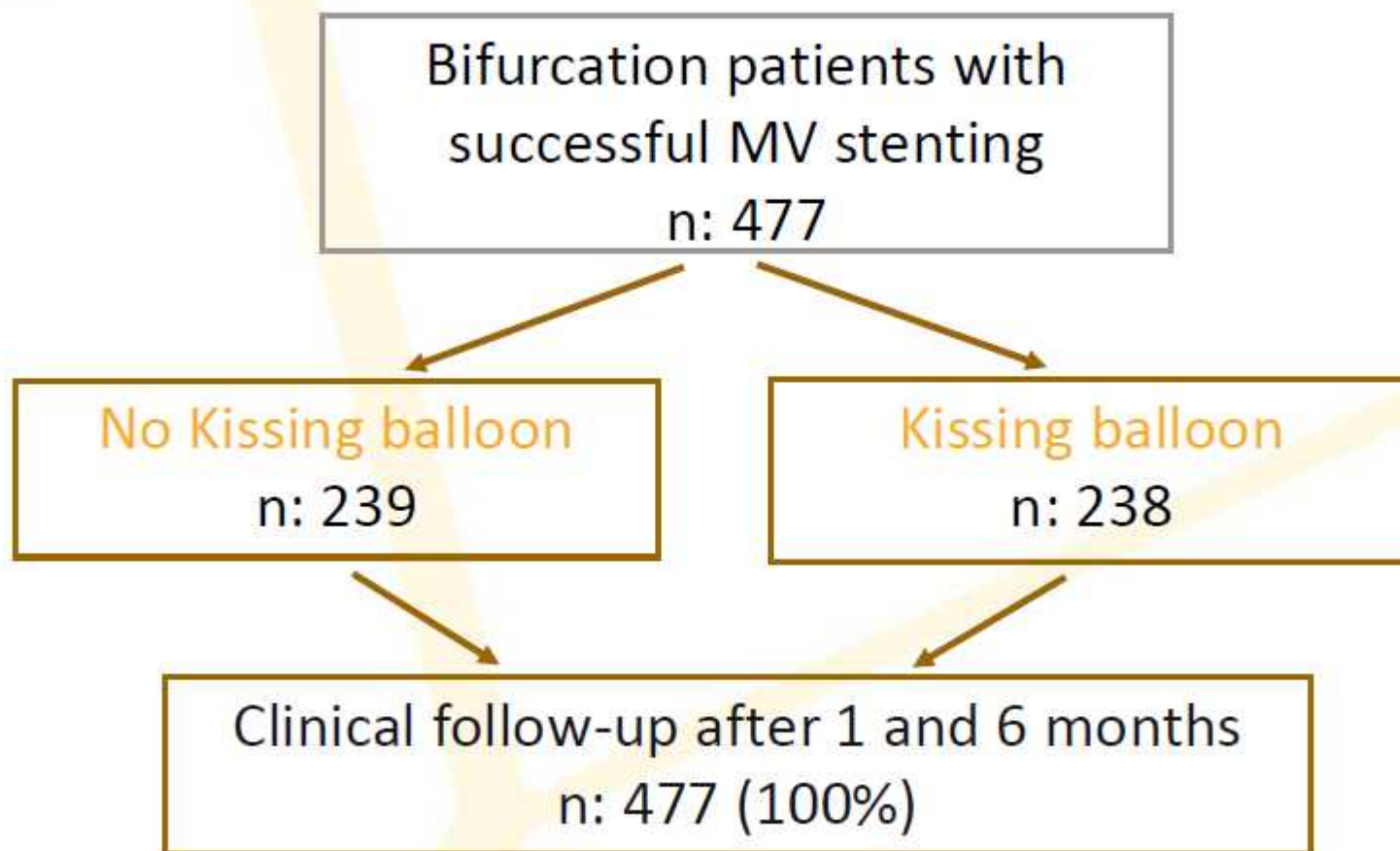
18-month MACE, n (%)			
Cardiac death	0	0	-
Non cardiac death	1 (2.2)	0	1 (1.1)
Q-wave MI	1	0	0.33
Non Q-wave MI	4 (8.8)	4 (9.3)	8 (9.1)
* TVR*	5 (11.1)	11 (25.2)	16 (18,2)
18-month TLR, n (%)			
MV	1 (2.2)	1 (2.3)	2 (2.3)
SB	3 (6.7)	9 (20.1)	12 (13.6)
Both	1 (2.2)	3 (6.9)	4 (4,5)
18-month stent thrombosis, n (%)			
Intraprocedural	0	0	-
Subacute	1 (2,2)	0	0.33
Late	0	0	-

PCR



Role of kissing ?

NORDIC III



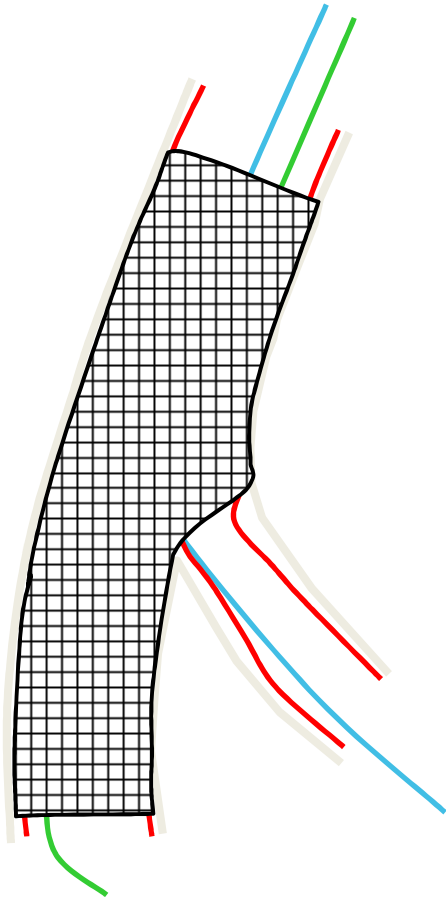
PCR

Procedure time (min)	47 \pm 22	61 \pm 28	0.0001
Fluorosc. time (min)	11 \pm 10	16 \pm 12	0.0001
Contrast (ml)	200 \pm 92	235 \pm 97	0.0001

SB stenosis after (%)	41.3 \pm 30.3	26.1 \pm 25.7	<0.000
-----------------------	-----------------	-----------------	--------

	No kissing n=239	Kissing n=238	p-value
Cardiac death (%)	0.0	0.8	ns
Non-cardiac death (%)	0.0	0.4	ns
Index lesion MI* (%)	2.2	0.0	ns
TLR (%)	2.1	1.3	ns
Stent thrombosis (%)	0.4	0.4	ns

Provisional Side Branch Stenting

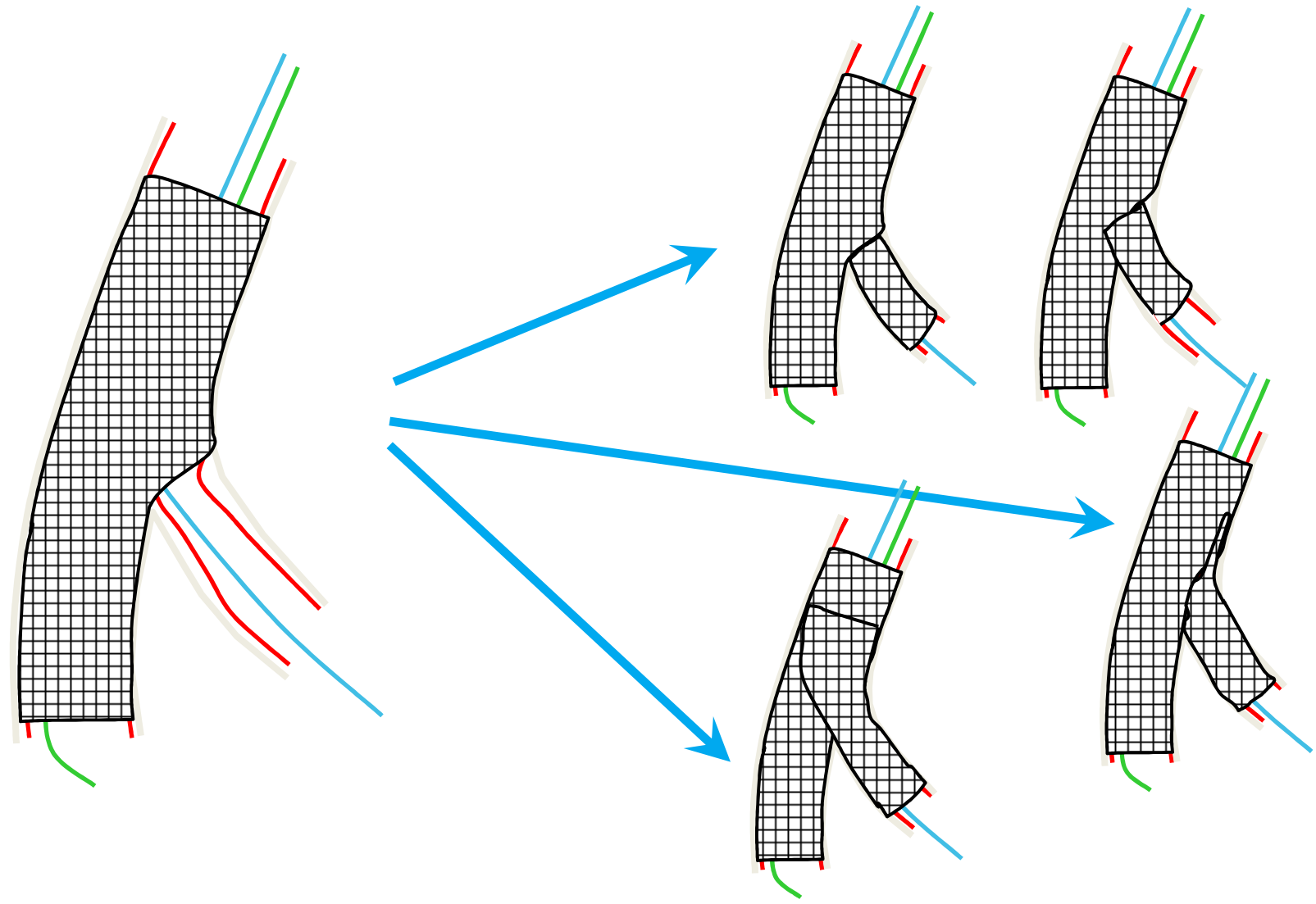


Advantages

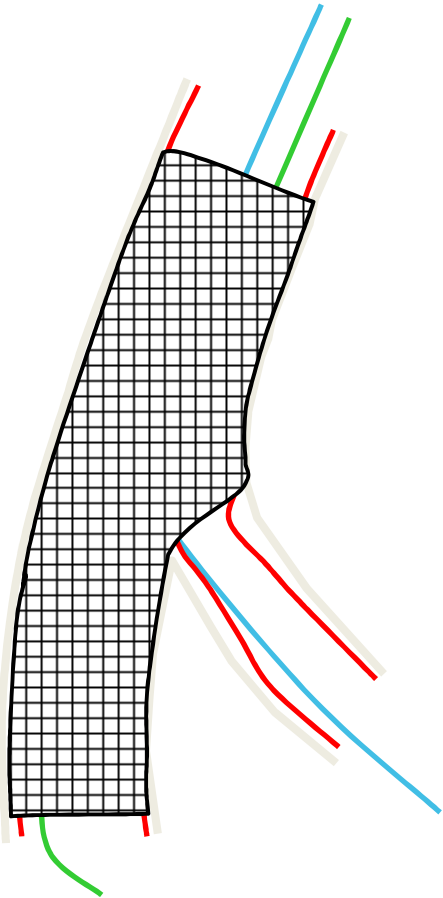
- ✓ Can be standardized
- ✓ Few tips and tricks
- ✓ One stent in > 80% of cases
- ✓ Kissing balloon easy
- ✓ Good efficacy and safety profile

PCR

Provisional Side Branch Stenting



Provisional Side Branch Stenting



Limitations ?

- ✓ Access through stent struts
- ✓ Side branch stent positioning
- ✓ Results in 1.1.1 with large SB+long lesion ?
 - ✓ **EBC II trial**

**Is there a room for
improvement?**

(How could you achieve better
results using dedicated stents?)



NOBORI 2

1 Year Clinical Outcomes

All events	Bifurcation n=191	No-Bifurcation n=809	p-value
Cardiac Death	2 (1.0%)	9 (1.1%)	1.00
MI	4 (2.1%)	11 (1.4%)	0.50
CABG	1 (0.5%)	2 (0.2%)	0.47
TL-Re-PCI	3 (1.6%)	11 (1.4%)	0.74
TV Re-PCI, non TL	2 (1.0%)	5 (0.6%)	0.62
MACE Rate	8 (4.2%)	24 (3.0%)	0.37
ST Definite/Probable	1 (0.5%)	6 (0.7%)	1.00

TLF = Target Lesion Failure (Cardiac death, MI, clinically driven TLR)

ST = Definite/Probable according to ARC

Conclusions

- Despite the huge variation in bifurcation lesions, thanks to recent trials, the treatment is now relatively standardised
 - Single stent strategy is preferred
 - Kissing could be left at operator discretion(SS)
 - Culotte is preferred to crush(Y) – T stenting
 - Unanswered questions:
 - Threshold for SB interventions(angio? FFR?...)
 - 2 stents in 1.1.1 large bifurcation (EBC II)
-