In a planned 2 stent procedure , bifurcation lesion anatomy should determine the sequence of stent insertion

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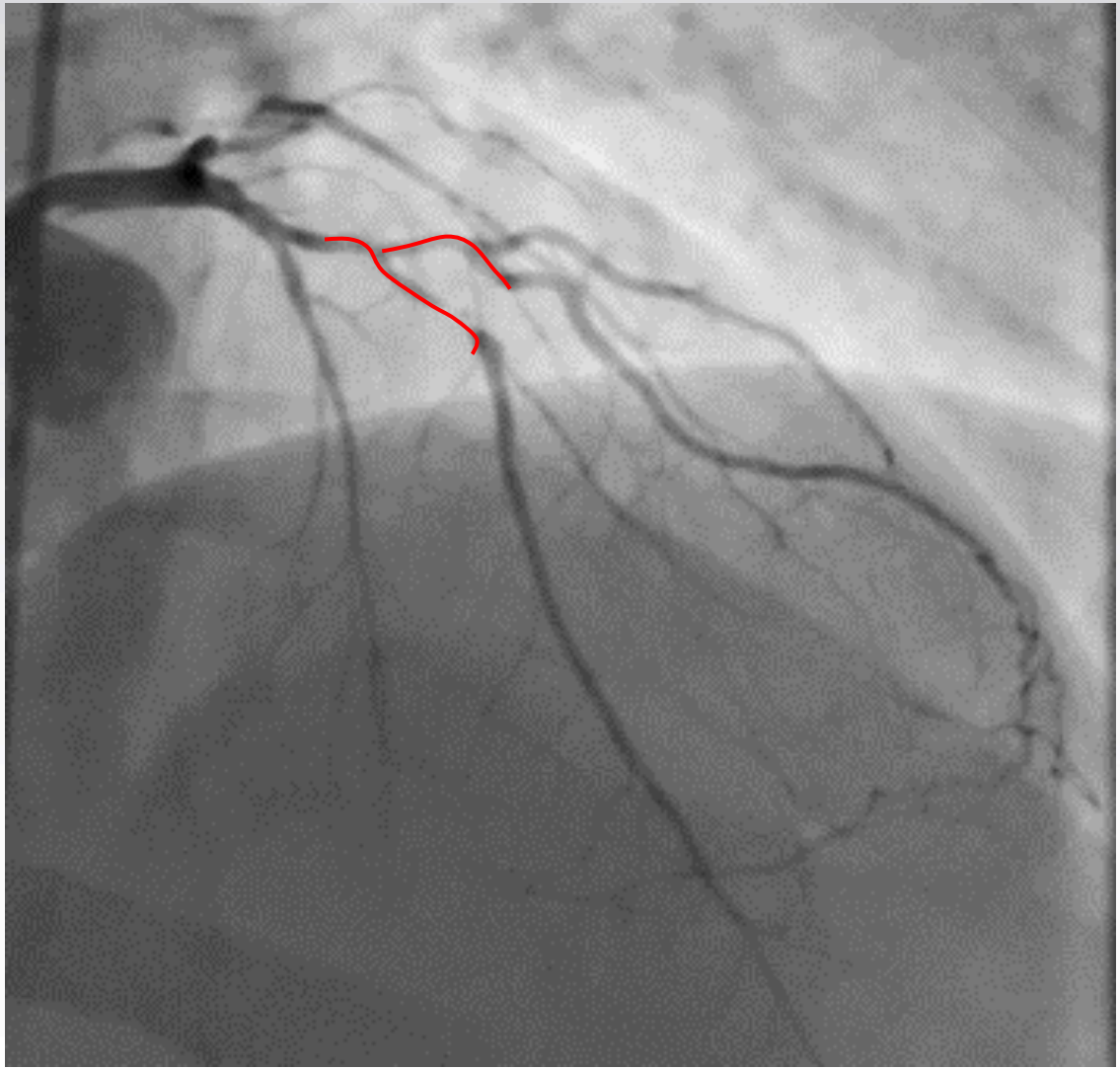
2 stent strategy in BL depends on SB :

- Size and distribution (and Clinical Rilevance)
- Lesion severity and length
- Disease extension
- Angle
- Calcification ?

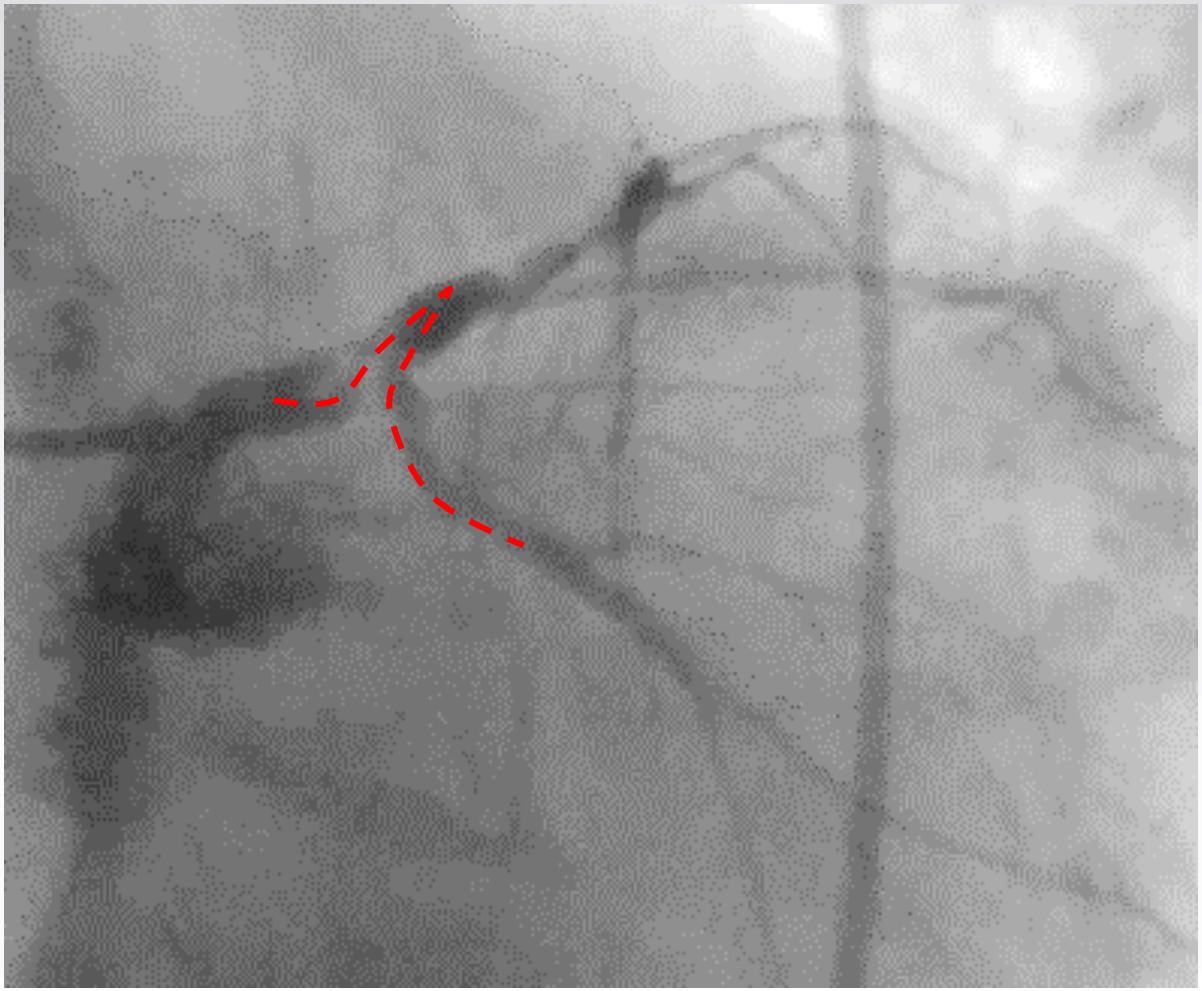
The sequence of stenting is not clearly defined ….

Operator experience in practising a particular optimized double-stenting technique is probably more relevant than the specific technique selection and stent insertion (MV o SB first).

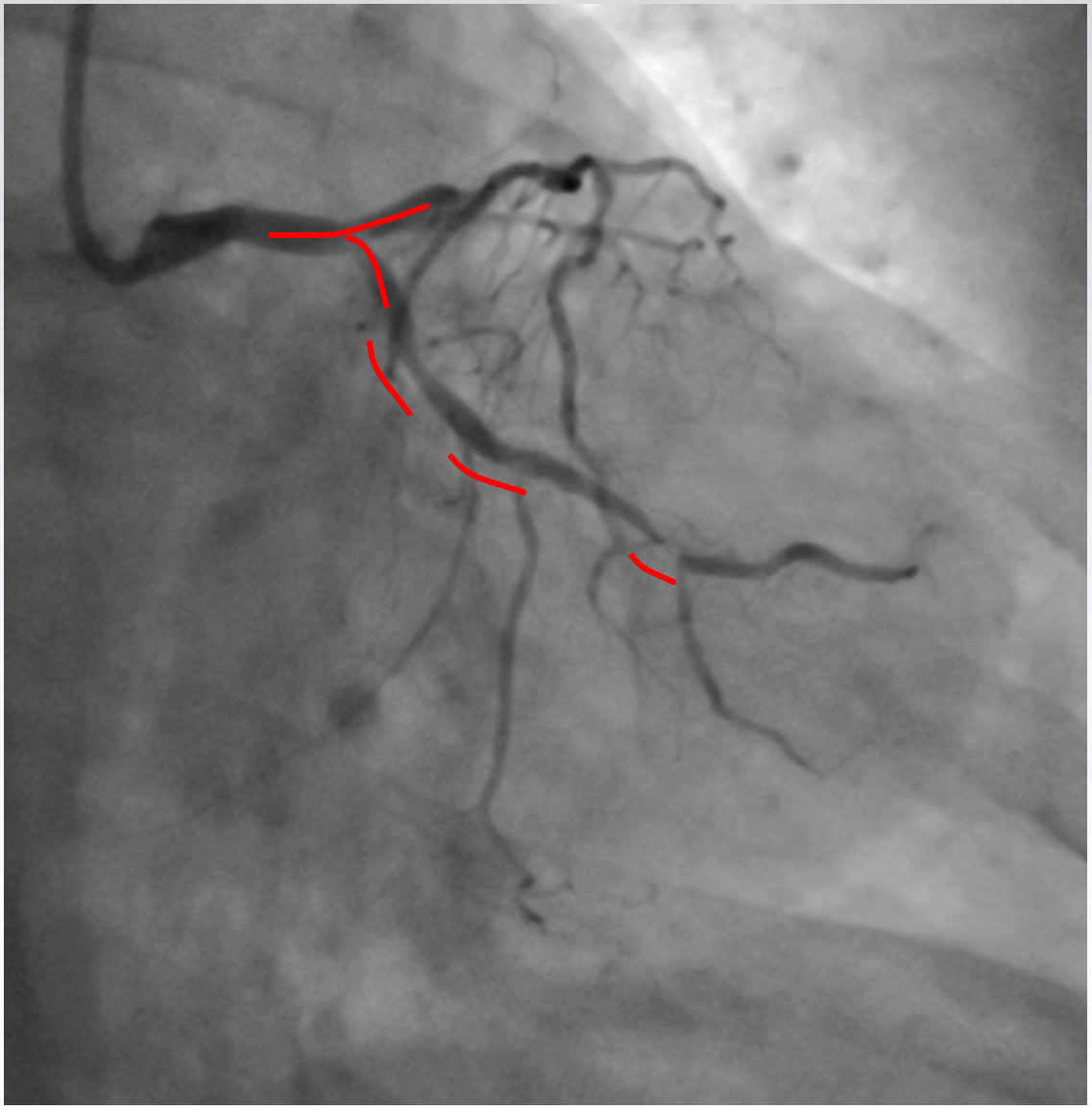
SB with complex lesion



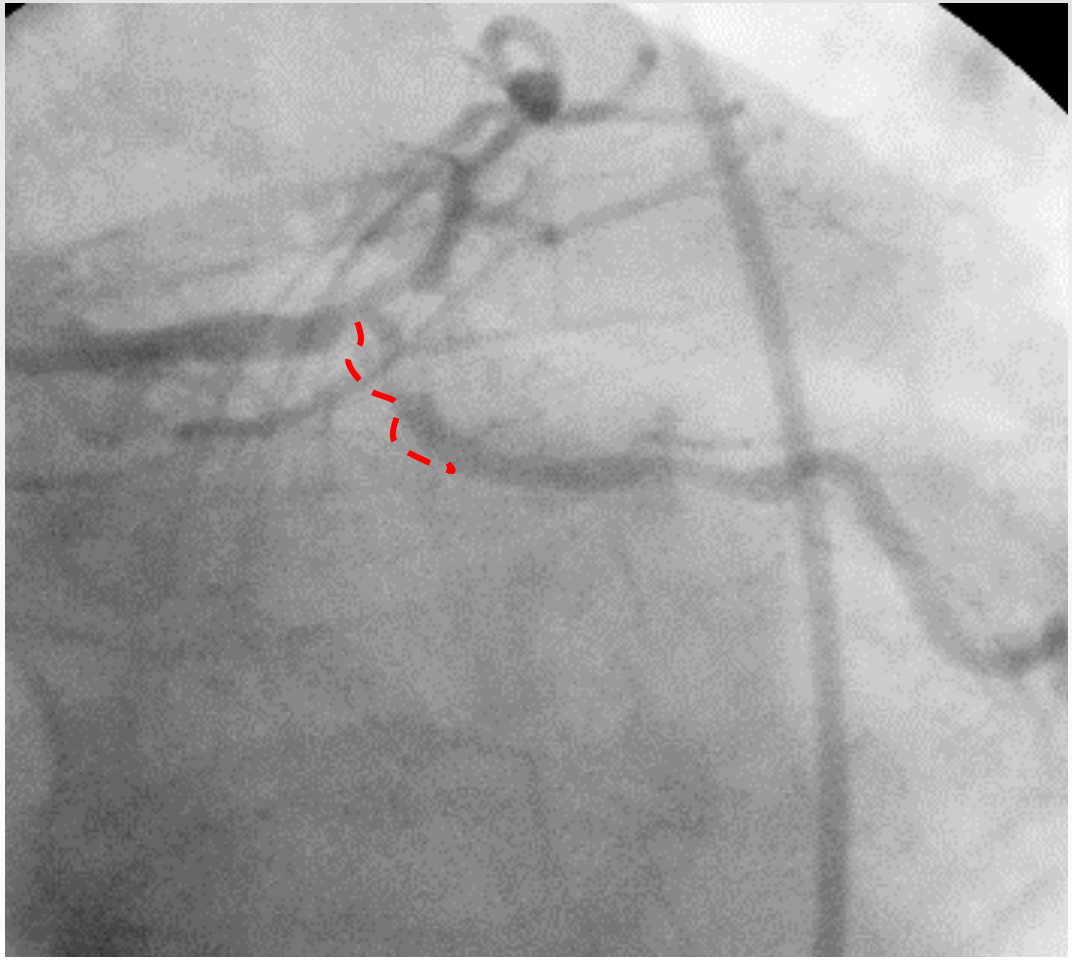
Severe calcifications and challenging access to SB



Diffuse disease on SB



SB with predictable Dissection following predilatation



CLINICAL RESEARCH
CORONARY INTERVENTIONS

EuroIntervention 2014;10:545-560

2014

Percutaneous coronary intervention for coronary bifurcation disease: consensus from the first 10 years of the European Bifurcation Club meetings

Jens Flensted Lassen[1]* MD, PhD; Niels Ramsing Holm[1], MD; Goran Stankovic[2], MD, PhD; Thierry Lefèvre[3], MD; Alaide Chieffo[4], MD; David Hildick-Smith[5], MD; Manuel Pan[6], MD; Olivier Darremont[7], MD; Remo Albiero[8], MD; Miroslaw Ferenc[9], MD; Yves Louvard[3], MD

EBC consensus:

- Operator experience may be important when choosing a two-stent technique.
- Two-stent techniques with deployment of the MV stent first are recommended.
- SB first two-stent techniques may be considered when the SB has particularly difficult access, dissections after predilatation or downstream stenoses to be stented.
- Final kissing balloon dilatation is mandatory in any two-stent technique.

2016

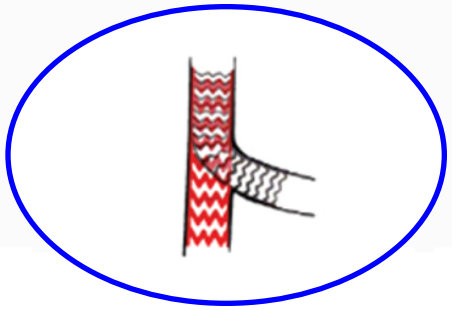
CLINICAL RESEARCH
CORONARY INTERVENTIONS

EuroIntervention 2016;12:38-46

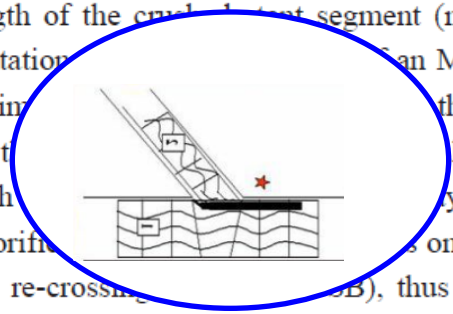
Percutaneous coronary intervention for coronary bifurcation disease: 11th consensus document from the European Bifurcation Club

Jens Flensted Lassen[1*], MD, PhD; Niels Ramsing Holm[2], MD; Adrian Banning[3], MD, PhD; Francesco Burzotta[4], MD, PhD; Thierry Lefèvre[5], MD; Alaide Chieffo[6], MD; David Hildick-Smith[7], MD; Yves Louvard[5], MD; Goran Stankovic[8], MD, PhD

Culotte is a long-lasting technique whose efficacy has been documented in trials (NORDIC I, II, IV and BBC ONE) but has been questioned for distal LM bifurcation treatment[15]. Culotte may be practised in both intentional double-stenting procedures and in provisional procedures requiring SB stenting as a bail-out. In the case of intended double stenting, the first stent is usually implanted from the distal SB into the MV followed by distal MV rewiring and stent implantation from distal to the proximal MV.



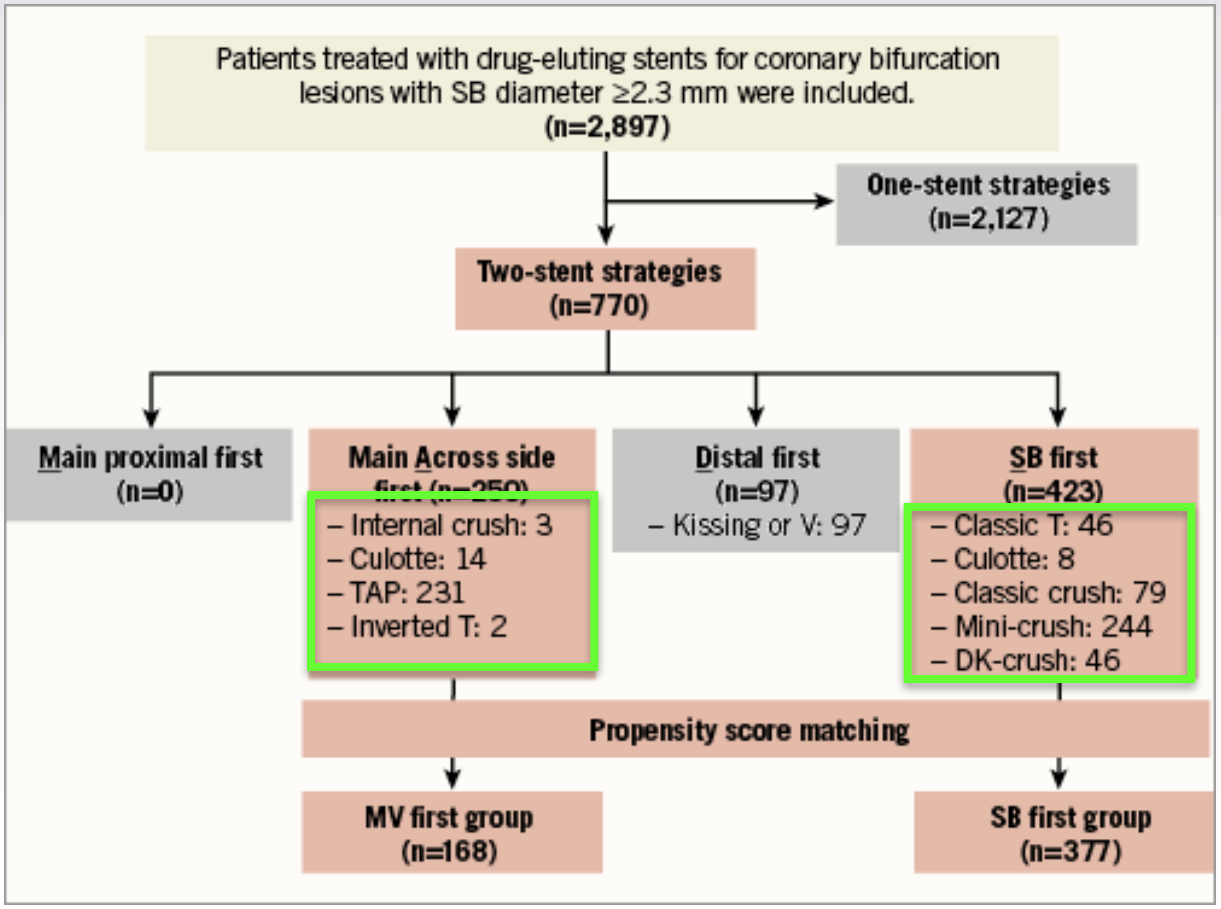
Crush has evolved over time. After its first description by Colombo, a series of improvements was reported. Its clinical performance is now recognised to be highly dependent on technical factors such as the success in ending up with a final kissing inflation. According to the results of recent Chinese trials conducted by highly experienced crush-dedicated operators, excellent clinical performance for the so-called DK crush technique was reported[16]. Expert operators agree that a "modern" way to perform crush is based on the following combination of technical refinements: 1) limiting the length of the crush stent segment (mini-crush) during stent implantation an MV balloon (instead of directly in the SB stent (step-crush), and 3) t lloon inflation after stent crush yer of stent struts from the SB orifi on the carina side (securing wire re-cross B), thus increasing the rate and success of final kissing inflation (DK crush).



EuroIntervention

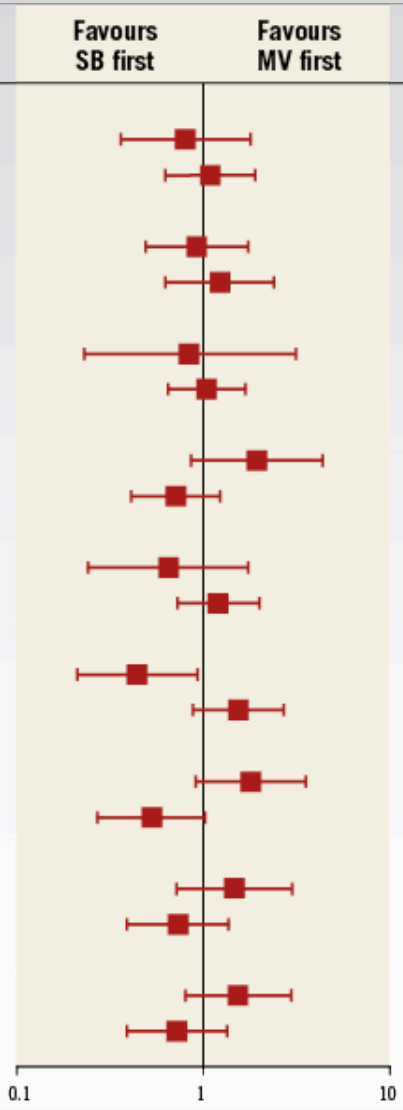
Two-stent techniques for coronary bifurcation lesions (main vessel first versus side branch first): results from the COBIS (COronary BIfurcation Stenting) II registry

TK Park et al :; EuroIntervention 2017;13:835-842 published online May 2017



Anatomical characteristics

Subgroup	Patients	TLR (%) SB first	TLR (%) MV first	Hazard ratio (95% CI)	*p*-value	*p* for interaction
MV RD						0.52
≥3.25 mm	217	12/120 (10.0)	12/97 (12.4)	0.80 (0.36-1.78)	0.59	
<3.25 mm	456	40/303 (13.2)	19/153 (12.4)	1.09 (0.63-1.88)	0.77	
SB RD						0.54
≥2.5 mm	276	20/151 (13.2)	19/125 (15.2)	0.92 (0.49-1.72)	0.79	
<2.5 mm	397	32/272 (11.8)	12/125 (9.6)	1.23 (0.63-2.38)	0.55	
SB RD>MV RD						0.78
Yes	51	5/29 (17.2)	4/22 (18.2)	0.84 (0.23-3.12)	0.79	
No	622	47/394 (11.9)	27/228 (11.8)	1.04 (0.65-1.67)	0.88	
MV DS						0.04
≥70%	257	22/156 (14.1)	8/101 (7.9)	1.94 (0.86-4.36)	0.11	
<70%	416	30/267 (11.2)	23/149 (15.4)	0.71 (0.41-1.22)	0.22	
SB DS						0.27
≥70%	200	12/150 (8.0)	6/50 (12.0)	0.65 (0.24-1.73)	0.39	
<70%	472	40/273 (14.7)	25/199 (12.6)	1.20 (0.73-1.98)	0.47	
SB DS>MV DS						0.008
Yes	252	17/189 (9.0)	12/63 (19.0)	0.44 (0.21-0.92)	0.03	
No	420	35/234 (15.0)	19/186 (10.2)	1.54 (0.88-2.68)	0.13	
MV lesion length						0.01
≥18 mm	329	36/215 (16.7)	11/114 (9.7)	1.79 (0.91-3.53)	0.09	
<18 mm	344	16/208 (7.7)	20/136 (14.7)	0.53 (0.27-1.01)	0.05	
SB lesion length						0.15
≥7.5 mm	354	33/247 (13.4)	10/107 (9.4)	1.47 (0.72-2.98)	0.29	
<7.5 mm	319	19/176 (10.8)	21/143 (14.7)	0.73 (0.39-1.36)	0.32	
Bifurcation angle						0.10
≥65°	293	27/167 (16.2)	14/126 (11.1)	1.53 (0.80-2.92)	0.20	
<65°	380	25/256 (9.8)	17/124 (13.7)	0.72 (0.39-1.33)	0.29	



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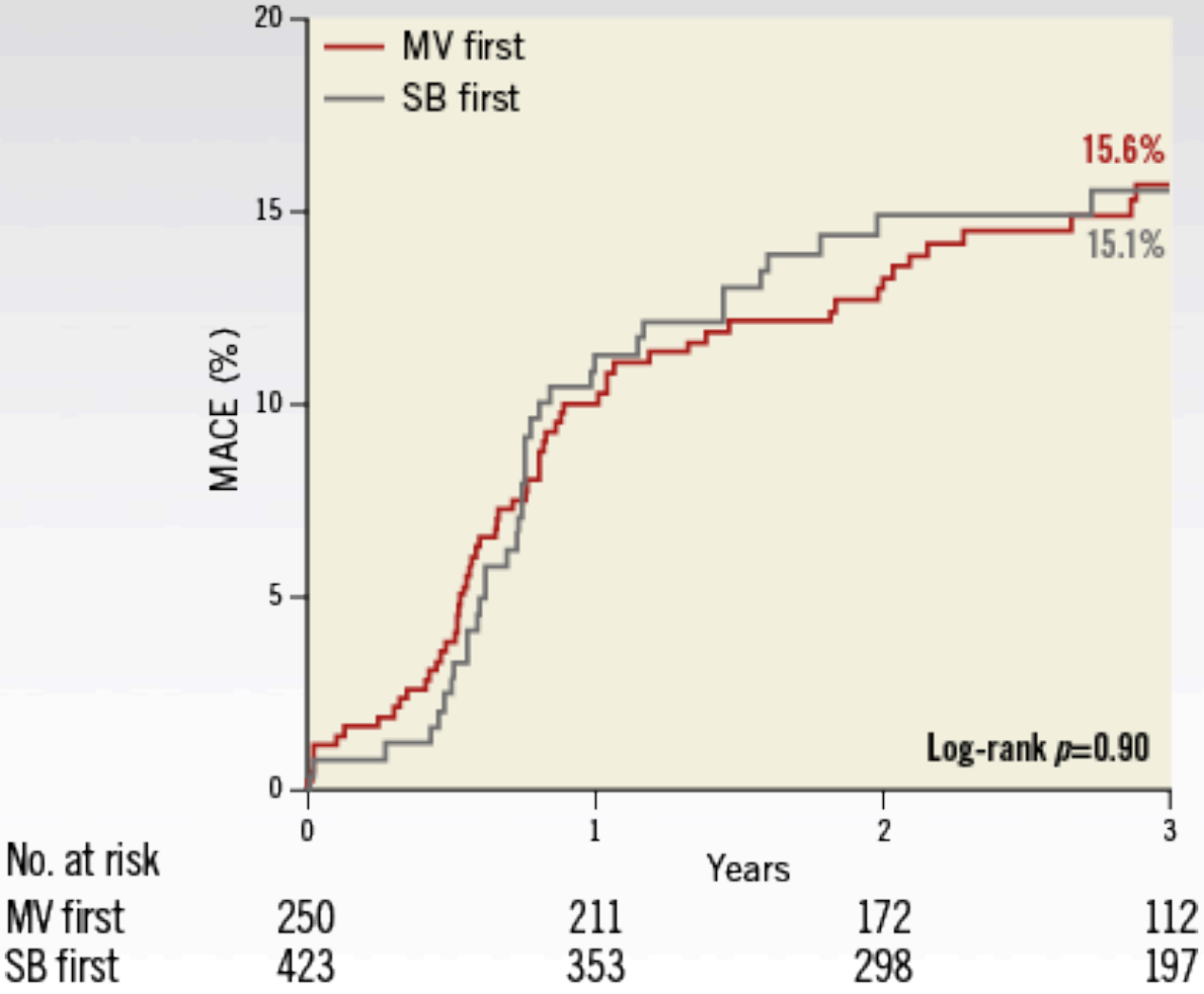

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SB occlusion during the procedure

Table 3. Procedural outcomes and in-hospital events in the total and propensity score-matched populations.

		Total population			Propensity score-matched population		
		SB first (n=423)	MV first (n=250)	*p*-value	SB first (n=377)	MV first (n=168)	*p*-value
MV occlusion during procedure[a]		13 (3.1)	10 (4.0)	0.68	12 (3.2)	8 (4.8)	0.63
SB occlusion during procedure[a]		16 (3.8)	30 (12.0)	<0.001	11 (2.9)	21 (12.5)	<0.001
Angiographic success[b]	MV	421 (99.5)	249 (99.6)	>0.99	375 (99.5)	167 (99.4)	0.86
	SB	418 (98.8)	246 (98.4)	0.73	373 (98.9)	164 (97.6)	0.31
In-hospital events[c]	Death	2 (0.5)	1 (0.4)	>0.99	2 (0.5)	1 (0.6)	0.82
	ST-elevation myocardial infarction	2 (0.5)	2 (0.8)	>0.63	2 (0.5)	2 (1.2)	0.32
	Bypass graft surgery	1 (0.2)	0 (0)	>0.99	1 (0.3)	0 (0.0)	0.51
Procedural success[d]		413 (97.6)	245 (98.0)	0.97	368 (97.6)	163 (97.0)	0.76

Values are expressed as n (%). [a] Defined as TIMI flow grade <3 during or after procedure, respectively. [b] Defined as TIMI 3 flow and <30% residual stenosis. [c] Included death, ST-elevation myocardial infarction, or emergent bypass graft surgery. [d] Defined as the achievement of angiographic success in the absence of any in-hospital complications. MV: main vessel; SB: side branch; TIMI: Thrombolysis In Myocardial Infarction

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Stent thrombosis

Table 4. Long-term clinical outcomes in the total and propensity score-matched populations.

	SB first	MV first	Hazard ratio (95% CI)	*p*-value
Total population	**n=423**	**n=250**		
MACE	64 (15.1)	39 (15.6)	0.97 (0.65-1.45)	0.90
Cardiac death	8 (1.9)	5 (2.0)	0.95 (0.31-2.91)	0.93
Myocardial infarction	11 (2.6)	6 (2.4)	1.08 (0.40-2.92)	0.88
Target lesion revascularisation	52 (12.3)	31 (12.4)	1.01 (0.65-1.57)	0.98
Main vessel	45 (10.6)	25 (10.0)	1.08 (0.66-1.77)	0.75
Side branch	38 (9.0)	21 (8.4)	1.09 (0.64-1.85)	0.76
Bifurcation	47 (11.1)	25 (10.0)	1.13 (0.70-1.84)	0.62
Stent thrombosis, definite or probable	8 (1.9)	5 (2.0)	0.93 (0.30-2.84)	0.90
Propensity score-matched population	**n=377**	**n=168**		
MACE	54 (14.3)	28 (16.7)	0.91 (0.59-1.41)	0.67
Cardiac death	5 (1.3)	5 (3.0)	0.61 (0.16-2.31)	0.47
Myocardial infarction	10 (2.7)	6 (3.6)	0.94 (0.32-2.71)	0.91
Target lesion revascularisation	45 (11.9)	20 (11.9)	0.98 (0.56-1.70)	0.93
Main vessel	38 (10.1)	19 (11.3)	0.74 (0.41-1.31)	0.30
Side branch	35 (9.3)	13 (7.7)	1.26 (0.66-2.39)	0.49
Bifurcation	40 (10.6)	17 (10.1)	1.08 (0.60-1.93)	0.80
Stent thrombosis, definite or probable	6 (1.6)	5 (3.0)	0.52 (0.14-1.92)	0.33

Values are expressed as n (%). CI: confidence interval; MACE: major adverse cardiac events; MV: main vessel; SB: side branch

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To Summerise for Discussion :

In several BL subsets stenting SB first :

- **Provides a predictable result and secure access to SB**
- **Avoides difficult re-crossing with stent through the MV stent struts (partricularly with long stents) in patients with complex or diffuse SB disease**
- **Avoids bulcky protrusion of SB stent in MV**
- **Stenting MV first cannot guarantee a good apposition of the protruding , crushed or overlapped segments in MV stent (reverse crush or minicrush, internal culotte, TAP)**