

***Update of Left Main
Bifurcation PCI
- From COBIS registry***

Soo-Joong Kim M.D., PhD.

Department of Cardiology, Internal Medicine,

Kyung Hee University Hospital

Superiority of DES to BMS in ULMCA disease

- 44 studies (n=10,342)
- Co-primary end points: mortality, MI, TVR/TLR, & MACE(mortality, MI, TVR/TLR)

Comparison of DES vs BMS in 9 studies

	Time	Contributing Studies First Author (Ref. #)	DES (n)	BMS (n)	OR (95% CI)	p Value
Mortality	6-12 months	Erglis et al. (70)	53	50	0.94 (0.06-15.48)	0.97
	2 yrs	Han et al. (72) Palmerini et al. (33) Schrale et al. (77)	1,344	496	0.42 (0.28-0.62)	<0.01
	3 yrs	Kim et al. (74) Tamburino et al. (78) Tamburino et al. (79)	1,809	736	0.70 (0.53-0.92)	0.01
MI	6-12 months	Erglis et al. (70)	53	50	0.64 (0.19-2.17)	0.47
	2 yrs	Han et al. (72)	178	109	0.16 (0.01-3.53)	0.13
	3 yrs	Tamburino et al. (78)	611	238	0.49 (0.26-0.92)	0.03
TVR/TLR	6-12 months	Erglis et al. (70)	53	50	0.10 (0.01-0.84)	0.01
	2 yrs	No studies	—	—	—	—
	3 yrs	Kim et al. (74) Tamburino et al. (78) Tamburino et al. (79)	1,809	736	0.46 (0.30-0.69)	<0.01
MACE	6-12 months	Chieffo et al. (69) Erglis et al. (70)	138	114	0.34 (0.15-0.78)	0.01
	2 yrs	Gao et al. (71) Han et al. (72)	398	333	0.31 (0.15-0.66)	<0.01
	3 yrs	Kim et al. (74) Tamburino et al. (79)	1,198	498	0.78 (0.57-1.07)	0.12

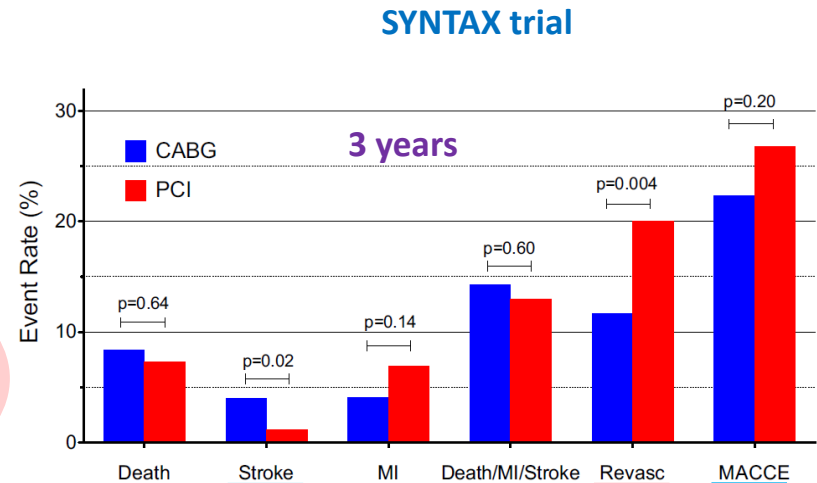
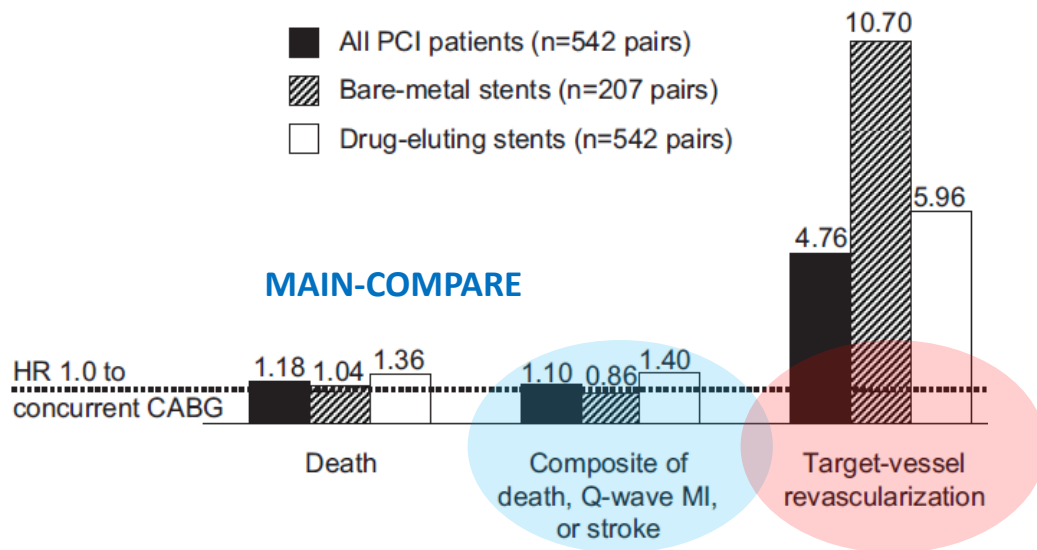
	Stent Type	6-12 Months	2 Years	3 Years
Mortality	DES	5.94% (4.73%-7.44%) n = 2,691	7.89% (6.07%-10.20%) n = 4,430	8.80% (6.20%-12.34%) n = 2,912
	BMS	7.24% (3.51%-14.33%) n = 763	14.14% (8.96%-21.62%) n = 1,266	12.71% (6.94%-22.15%) n = 959
MI	DES	6.26% (4.71%-8.27%) n = 2,356	3.90% (1.98%-7.55%) n = 2,182	4.04% (2.33%-6.91%) n = 2,516
	BMS	9.97% (6.09%-15.90%) n = 157	3.06% (1.18%-7.69%) n = 607	3.43% (1.87%-6.21%) n = 752
TVR/TLR	DES	7.83% (5.95%-10.24%) n = 2,257	10.20% (8.55%-12.13%) n = 4,772	8.03% (5.62%-11.37%) n = 2,912
	BMS	16.95% (12.92%-21.92%) n = 985	16.15% (13.93%-18.66%) n = 1,241	16.40% (12.23%-21.64%) n = 959
MACE	DES	15.87% (12.93%-19.32%) n = 2,593	18.99% (14.92%-23.86%) n = 2,623	21.43% (14.85%-29.91%) n = 1,652
	BMS	39.31% (31.68%-47.50%) n = 554	32.69% (17.72%-52.26%) n = 441	31.60% (23.15%-41.47%) n = 399

PCI vs CABG in LM disease

Comparable !!

	Chieffo et al ⁵³		Lee et al ⁵⁴		Palmerini et al ⁵⁵		Sanmartin et al ⁵⁶	
No. of patient	107	142	50	123	157	154	96	245
Group	DES	CABG	DES	CABG	DES/BMS	CABG	DES	CABG
Age (mean, years)	64	68	72	70	73	69	66	66
Diabetes, %	19	23	36	31	26	25	19	32
Ejection fraction, %	52	52	51	52	52	55
High surgical risk score, %*	32	29	64	46	64	61	27	25
Bifurcation involvement, %	81	...	60	...	80	83	62	...
Early outcomes, %	In-hospital		1 month		1 month		In-hospital	
Death	0	2	2	5	3	5	2	6
Myocardial infarction	9	26	2	2	5	2	0	1
Target-vessel revascularization†	0	2	0	1	1	1	0	1
Mid-term outcomes, %	12 months		12 months		14 months		12 months	
Death	3	6	4	15	14	12	5	8
Myocardial infarction	1	1	8	5	0	1
Target-vessel revascularization†	20	4	13	5	26	3	5	1

Clinical Outcomes at 12 Months (%)	Surgery	Stenting	P
Death	4.4	4.2	0.88
Stroke	2.7	0.3	0.009
Myocardial infarction	4.1	4.3	0.97
Revascularization	6.7	12.0	0.02
Death, stroke, and myocardial infarction	9.1	7.0	0.29
Symptomatic graft occlusion or stent thrombosis	3.7	2.7	0.49
MACCE			
Overall LMCA disease (n=705)	13.6	15.8	0.44
Isolated LMCA disease (n=91)	8.5	7.1	1.00
LMCA plus 1-vessel disease (n=138)	13.2	7.5	0.27
LMCA plus 2-vessel disease (n=218)	14.4	19.8	0.29
LMCA plus 3-vessel disease (n=258)	15.4	19.3	0.42



PCI vs CABG in LM disease

Comparable !!

Trial Name	n	Follow-up	Primary Endpoint	Event Rate		p Value	Major Secondary Endpoint	Event Rate		p Value
				PCI	CABG			PCI	CABG	
LE MANS	105	1 yr	Change in LVEF	3.3 ± 6.7%	0.5 ± 0.8%	0.047	Death, MI, TVR, CVA, ST	30.7%	24.5%	NS
Boudriot et al. (6)	201	1 yr	Death, MI, TVR	19%	13.9%	0.19*	Death, MI	5.0%	7.9%	0.01*
PRECOMBAT	600	1 yr	Death, MI, TVR, CVA	8.7%	6.7%	0.01*	Death, MI, CVA	3.3%	4.0%	0.83
SYNTAX	705	3 yrs	Death, MI, TVR, CVA	26.8%	22.3%	0.20	Death, MI, CVA	13.0%	14.3%	0.60
EXCEL	2,634	3 yrs	Death, MI, CVA	NA	NA	Noninferiority and superiority	Death, MI, TVR	NA	NA	NA
MILESTONE	1,000	1 yr	Death	NA	NA	Noninferiority	Death, MI, CVA, TVR	NA	NA	NA

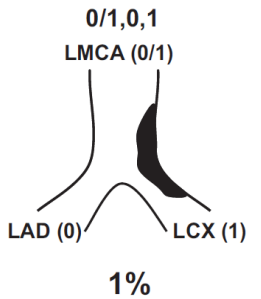
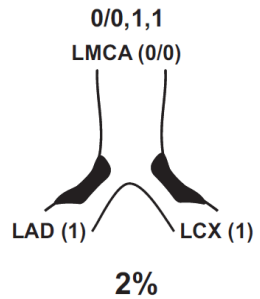
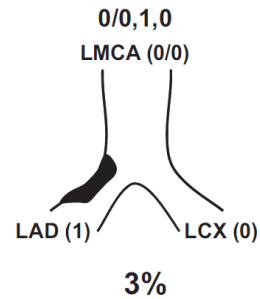
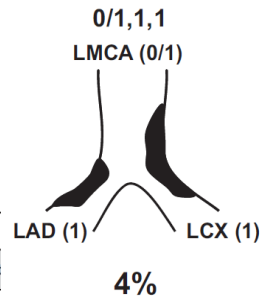
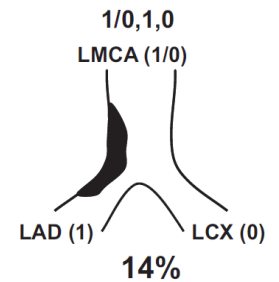
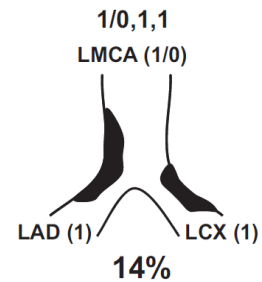
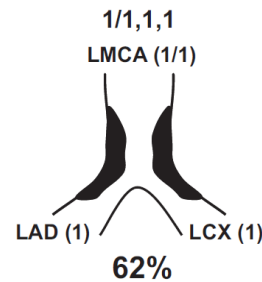
Recommendations according to extent of CAD	CABG		PCI	
	Class ^a	Level ^b	Class ^a	Level ^b
Left main disease with a SYNTAX score ≤ 22.	I	B	I	B
Left main disease with a SYNTAX score 23–32.	I	B	IIa	B
Left main disease with a SYNTAX score >32.	I	B	III	B

Unprotected left main coronary artery

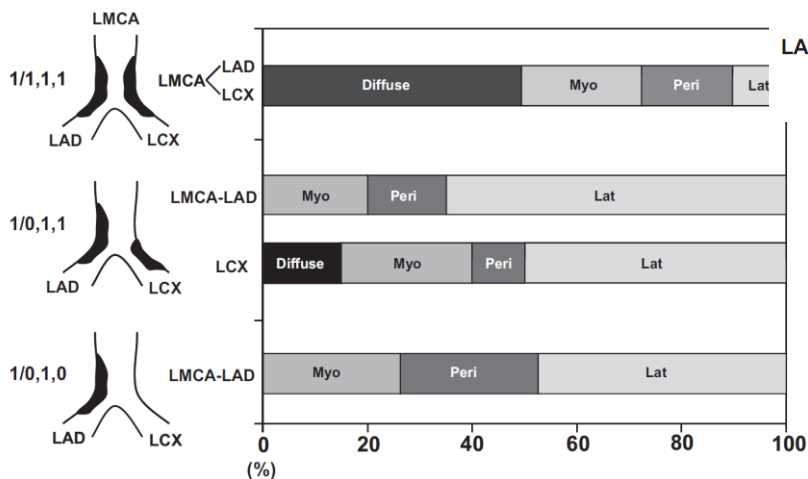
- Ostial vs mid shaft vs **distal bifurcation**
- Characteristics of LM segment
 - **Anatomically easy accessibility**
 - **Relatively large caliber**
 - **Short length**
 - **Diffuse nature of the disease**
- Up to 80% of LM disease
 - **Bifurcation**
 - **multivessel**

Diffuse nature of LM disease

- Review of 140 angiogram of distal LMCA & ostial LAD & LCX lesions with preintervention IVUS of both LAD & LCX



Plaque circumferential distribution

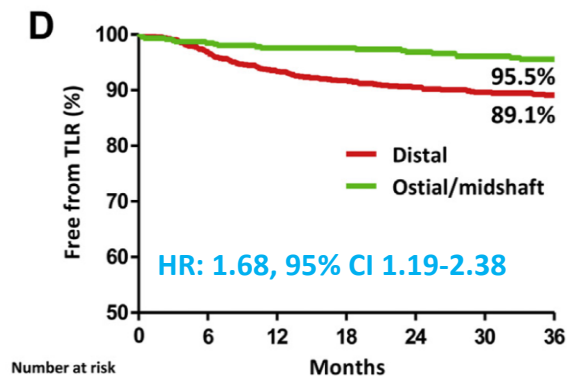
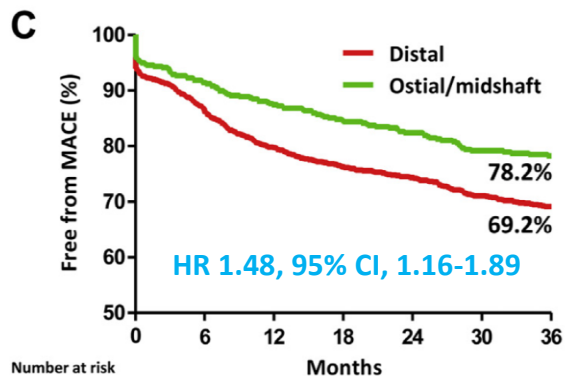
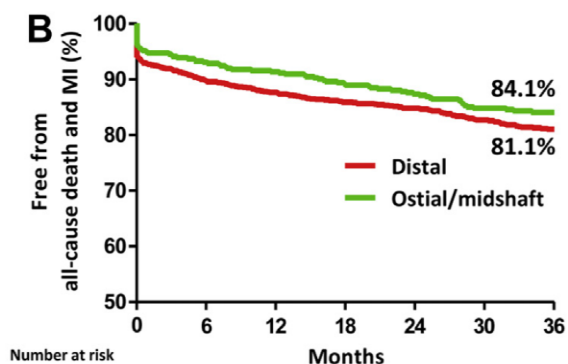
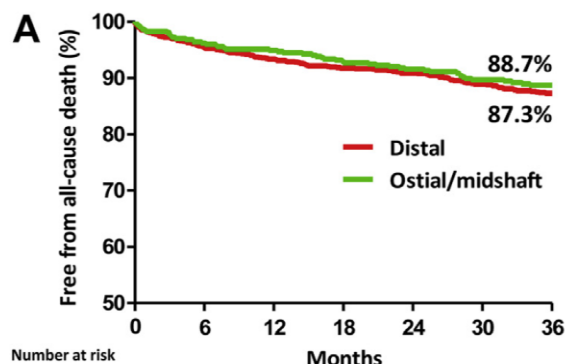


IVUS classification for LMCA bifurcation plaque distribution

Ostial/mid shaft vs distal bifurcation in LM disease

DELTA registry

- 1,612 pts (482 treated for ostial/mid-shaft lesions vs 1,130 for distal bifurcation lesions)
- Median follow-up period of 1,250 (987 - 1,564) days



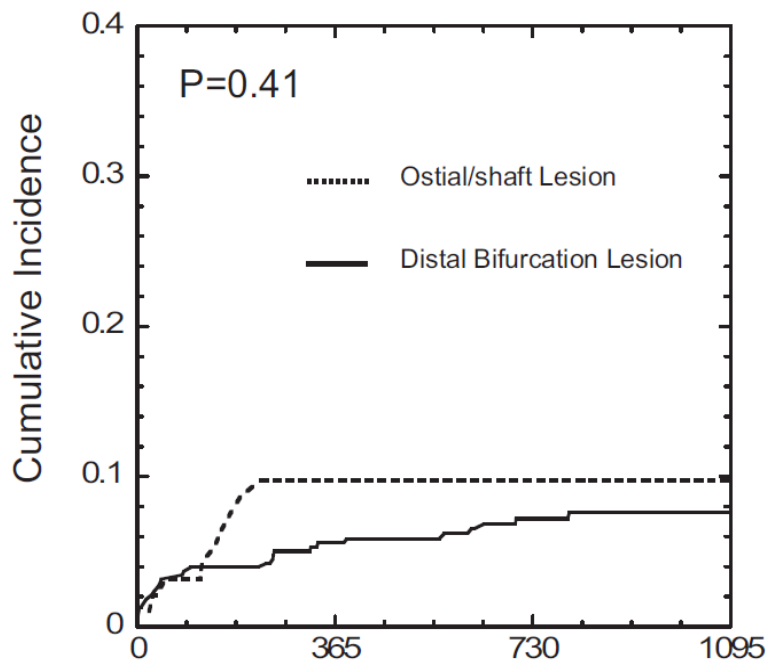
	Ostial/Mid-Shaft ULMCA PCI (n = 482)	Distal ULMCA PCI (n = 1,130)	p Value
Multivessel disease	338 (70.1)	962 (85.1)	<0.001
RCA disease	164 (34.0)	431 (38.1)	0.124
SYNTAX score*	26.1 ± 12.3	29.7 ± 14.3	<0.001
True bifurcation	0	624 (55.2)	
Pre-dilation	177 (36.7)	536 (47.4)	<0.001
Post-dilation	207 (42.9)	533 (47.1)	0.119
Atherectomy	3 (0.6)	21 (1.9)	0.112
Rotablator	5 (1.0)	20 (1.8)	0.276
Cutting balloon	69 (14.3)	81 (7.3)	<0.001
JABP	15 (3.1)	102 (9.0)	<0.001
IVUS	161 (33.4)	381 (33.7)	0.622
DES type			0.100
SES	281 (58.3)	599 (53.0)	
PES	199 (41.3)	515 (45.6)	
ZES/EES	2 (0.4)	16 (1.4)	
Stent diameter, mm	3.51 ± 0.36	3.33 ± 0.36	<0.001
Total stent length, mm	15.9 ± 13.5	24.8 ± 18.8	<0.001
Number of stents per lesion	1.09 ± 0.34	1.41 ± 0.61	<0.001
2-stent strategy	0	460 (40.7)	
Stenting technique			
Crush		196 (17.3)	
Mini-crush		53 (4.7)	
Culotte		35 (3.1)	
T-stenting		115 (10.2)	
V-stenting		61 (5.5)	
Post-dilation	207 (42.9)	533 (47.1)	0.123
Maximum balloon diameter, mm	3.88 ± 0.58	3.59 ± 0.54	<0.001
Maximum pressure, atm	16.7 ± 3.6	15.8 ± 4.2	0.002
Final kissing balloon inflation	0	677 (59.9)	

Ostial/mid shaft vs distal bifurcation in LM disease

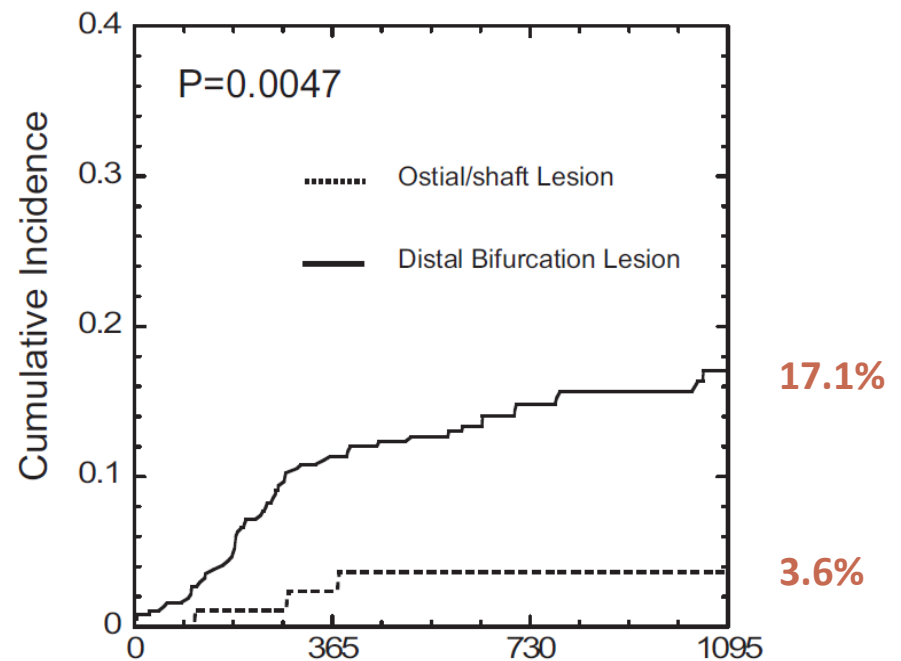
j-Cypher Registry

- Prospective registry of consecutive pts treated w/ SES (N=12,824 / ULMCA stenting – n=582)

A Cardiac Mortality



B Target Lesion Revascularization

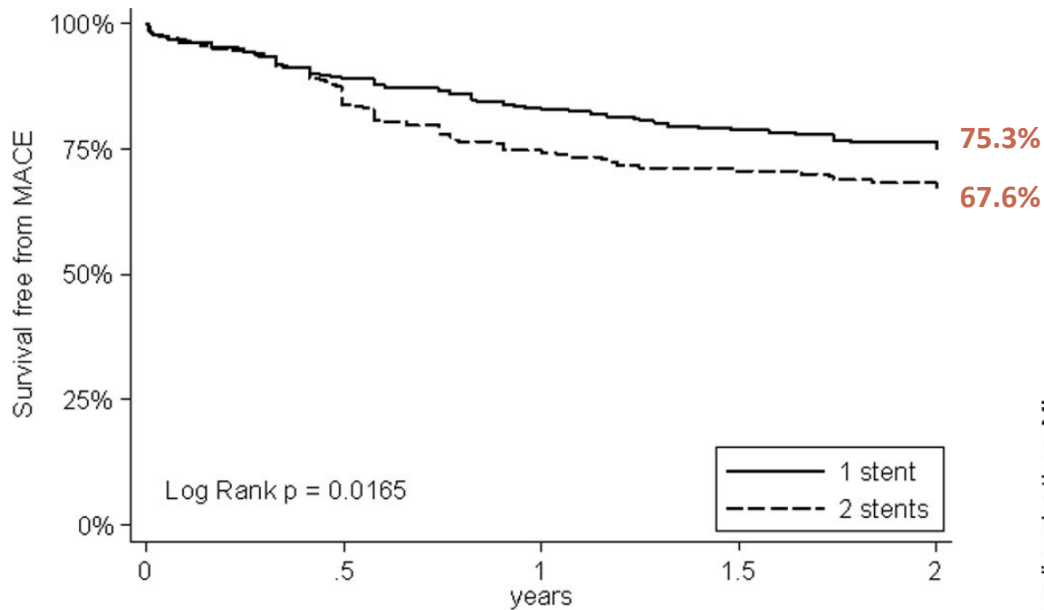


Provisional vs 2-stent strategy in distal LM disease

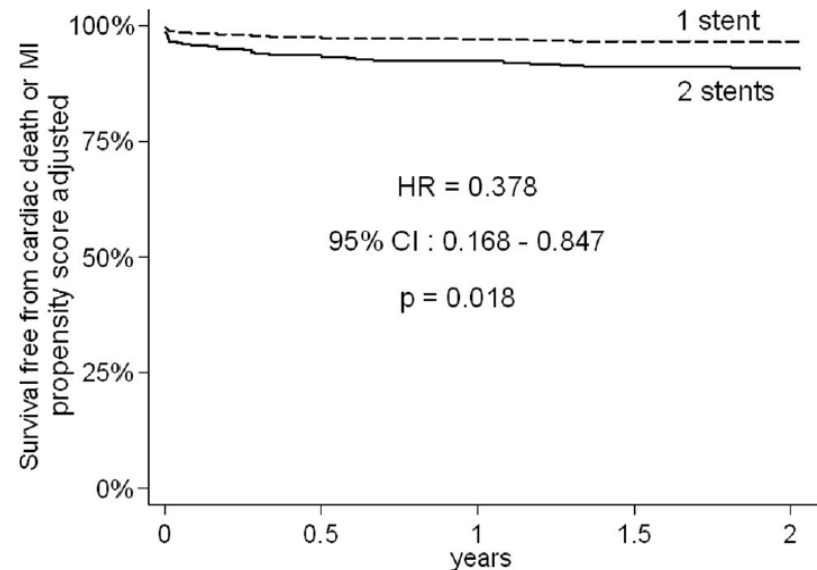
Study name	Year	Patients, N		FU (mo)	Adjusted hazard ratio (95% confidence interval)*				
		Provisional approach	Double stenting		MACE	Death or MI	Death	MI	TVR
Palmerini ³	2008	456	317	24	0.48 (0.33-0.69) <i>p</i> =0.001	0.38 (0.17-0.85) <i>p</i> =0.018	–	–	–
Toyofuku ⁶	2009	261	119	36	–	–	0.61 (0.34-1.08) <i>p</i> =0.09	–	0.32 (0.18-1.21) <i>p</i> <0.01
Kim ⁴	2011	234	158	36	0.89 (0.22-0.67) <i>p</i> <0.001	–	0.77 (0.28-2.13) <i>p</i> =0.62	0.38 (0.19-0.78) <i>p</i> =0.008	0.16 (0.05-0.57) <i>p</i> =0.005
Song ⁵	2014	509	344	36	0.42 (0.28-0.63) <i>p</i> <0.001	0.48 (0.25-0.93) <i>p</i> =0.03	0.30 (0.11-0.81) <i>p</i> =0.02	0.41 (0.18-0.95) <i>p</i> =0.04	0.47 (0.32-0.69) <i>p</i> <0.01

Provisional vs 2-stent strategy in distal LM disease

- **Observational study including 773 distal ULMCS pts treated with DES**
- **1- stent (n=456) vs 2- stents (n=317)**
- **Primary end point : MACEs (mortality, MI, TLR) during 2 years**



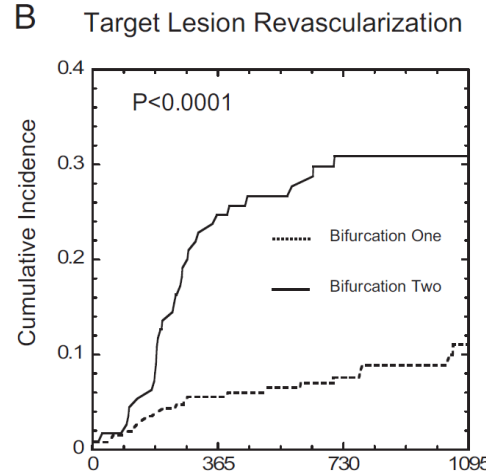
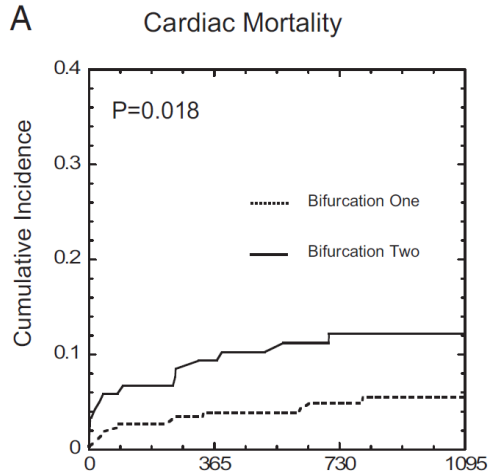
Adjusted HR, 0.48 (95% CI, 0.33-0.69)



Provisional vs 2-stent strategy in distal LM disease

j-Cypher Registry

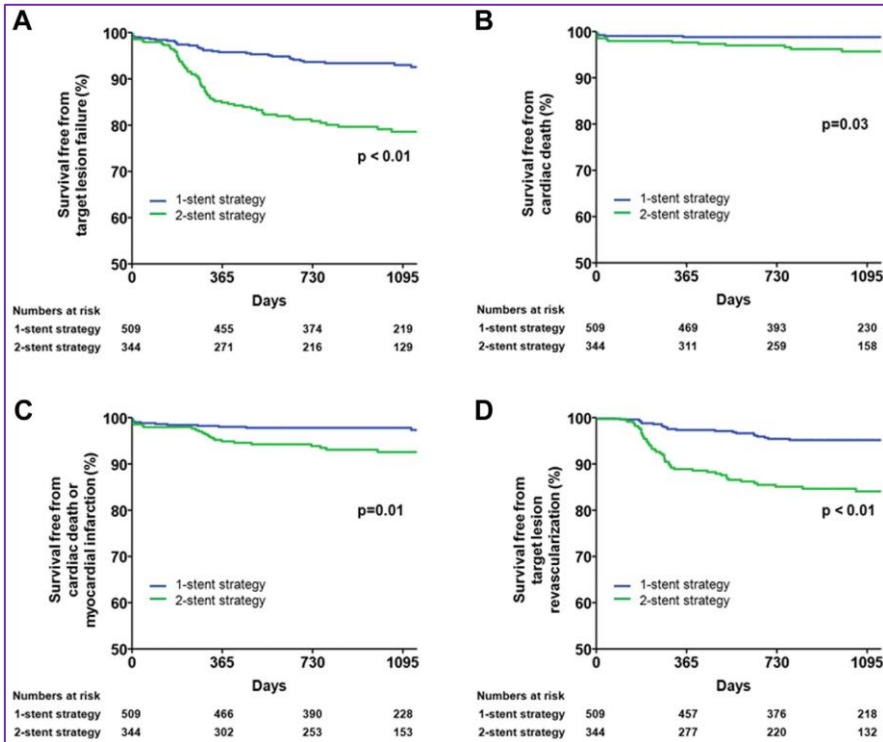
- Prospective registry of consecutive pts treated w/ SES (N=12,824 / ULMCA stenting – n=582)



	Events, Incidence (%)		P
	One-Stent Bifurcation (n=261)	Two-Stent Bifurcation (n=119)	
Total death	30 (13.4)	21 (18.8)	0.12
Cardiac deaths	13 (5.5)	14 (12.2)	0.018
Sudden deaths	2 (0.8)	3 (2.7)	0.15
Myocardial infarction	8 (4.5)	5 (4.7)	0.58
Stroke	10 (4.7)	3 (3.0)	0.53
Definite/probable ST	3 (1.5)	7 (6.3)	0.0076
Definite ST	3 (1.5)	5 (4.7)	0.054
Definite ST (ULMCA)	1 (0.4)	3 (2.8)	0.050
TLR	22 (11.1)	33 (30.9)	<0.0001
CABG	2 (0.9)	3 (0.3)	0.15
Any revascularization	77 (35.5)	47 (44.0)	0.017

Provisional vs 2-stent strategy in distal LM disease

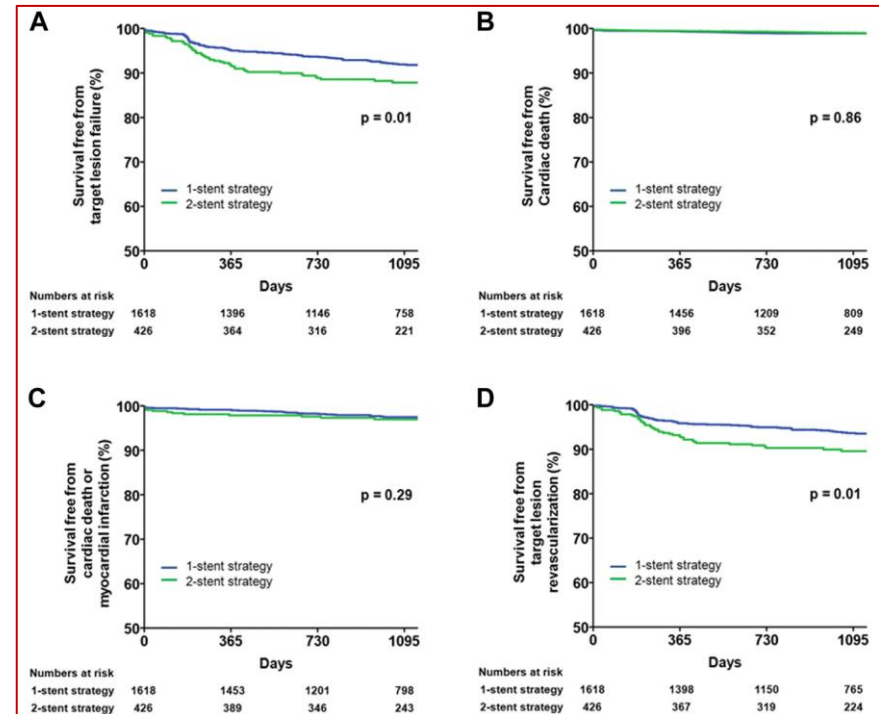
- COBIS II Registry



- LM bifurcation lesion

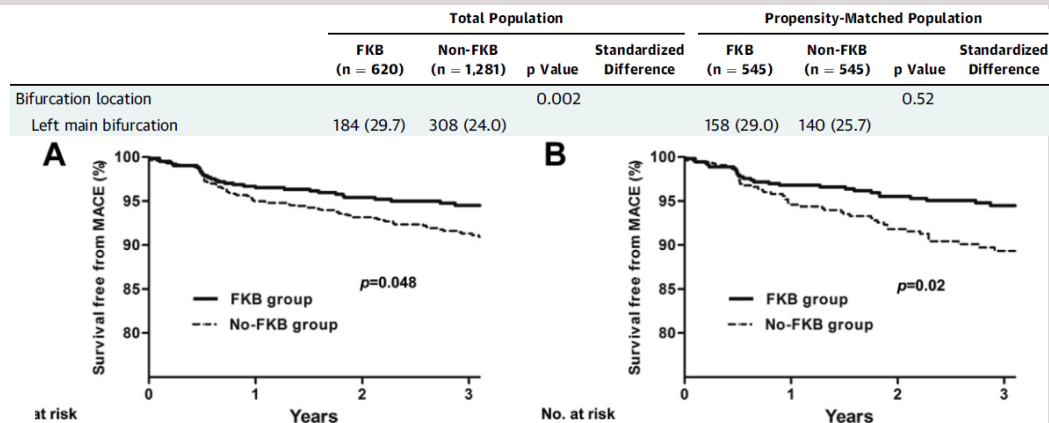
	Non-LM Bifurcation (n = 2,044)		LM Bifurcation (n = 853)		Interaction p Value
	HR (95% CI)	p Value	HR (95% CI)	p Value	
Target lesion failure	1.39 (0.99-1.94)	0.06	2.38 (1.60-3.55)	<0.01	<0.01
Cardiac death	1.24 (0.72-2.14)	0.44	2.43 (1.05-5.59)	0.04	0.12
Spontaneous myocardial infarction	1.40 (0.64-3.09)	0.40	3.32 (1.23-8.98)	0.02	0.25
Cardiac death or myocardial infarction	1.12 (0.58-2.19)	0.73	2.09 (1.08-4.04)	0.03	0.06
Definite or probable stent thrombosis	1.95 (0.64-5.98)	0.24	4.58 (1.43-14.7)	0.01	0.12
Target lesion revascularization	1.48 (1.02-2.13)	0.04	2.44 (1.50-3.96)	<0.01	0.04
Target vessel revascularization	1.26 (0.92-1.74)	0.15	2.12 (1.45-3.08)	<0.01	<0.01

- Non-LM bifurcation lesion



Systematic kissing balloon inflation in 1-stent Tx

- COBIS II



	FKB (N=103)	No-FKB (N=277)	P value
Death	5 (5.6%)	12 (4.4%)	0.79
Cardiac	2 (2.3%)	10 (3.7%)	0.43
Non-cardiac	1 (1.1%)	0	0.09
Unknown	2 (2.3%)	2 (0.8%)	0.28
Myocardial Infarction	0	2 (0.8%)	0.40
Death or Myocardial Infarction	5 (5.6%)	13 (4.8%)	0.91
Repeat Revascularization			
Any	9 (10.0%)	18 (7.1%)	0.37
Target Vessel Revascularization	9 (10.0%)	16 (6.3%)	0.24
Target Lesion Revascularization			
Left main-TLR*	6 (6.7%)	10 (3.9%)	0.29
MACE†	11 (12.1%)	21 (7.9%)	0.29

Selection of LM bifurcation Tx strategy

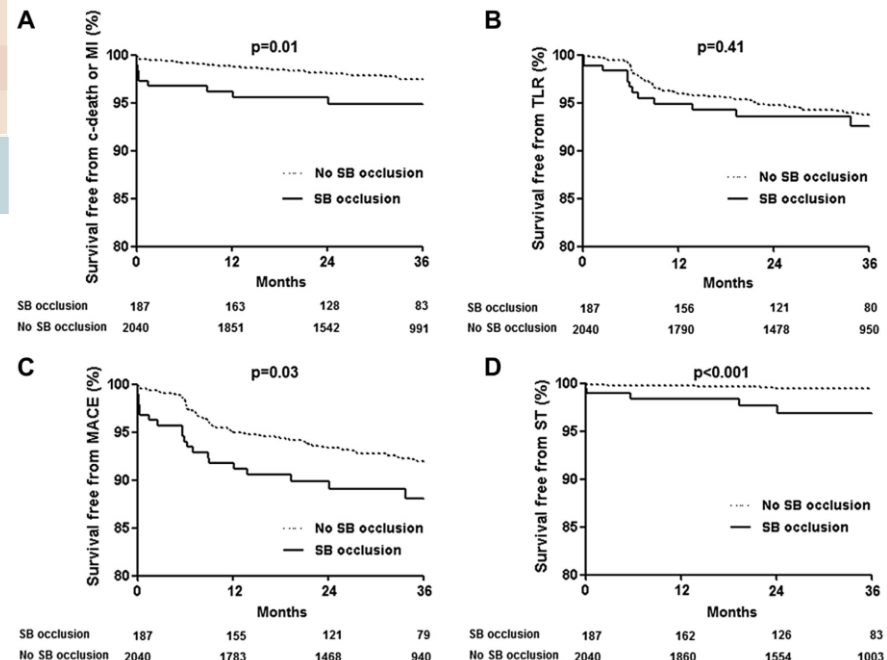
- COBIS II

• IVUS

- 2227 consecutive pts undergoing PCI w/ DES for bifurcation lesions with SB > 2.3 mm
- Pts w/ 1-stent technique or MV stenting first strategy selected
- SB occlusion after MV stenting : TIMI flow grade <3

Variable	Odds Ratio (95% CI) (range)	p Value
Pre-procedural %DS of the SB \geq 50%	2.34 (1.59–3.43)	<0.001
Pre-procedural %DS of the proximal MV \geq 50%	2.34 (1.57–3.50)	0.03
SB lesion length	1.03 (1.003–1.06)	<0.001
Acute coronary syndrome	1.53 (1.06–2.19)	0.02
Left main lesions (vs. non-left main lesions)	0.34 (0.16–0.72)	0.005

Independent Predictors of SB Occlusion



Plaque distribution and SB jailing

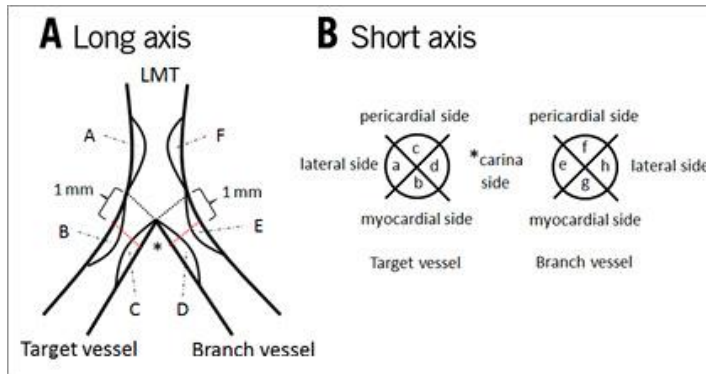
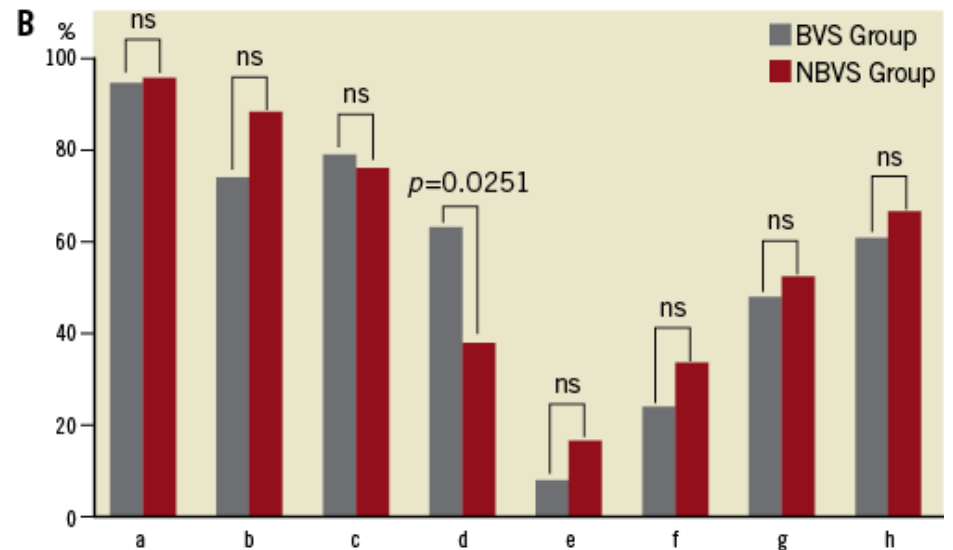
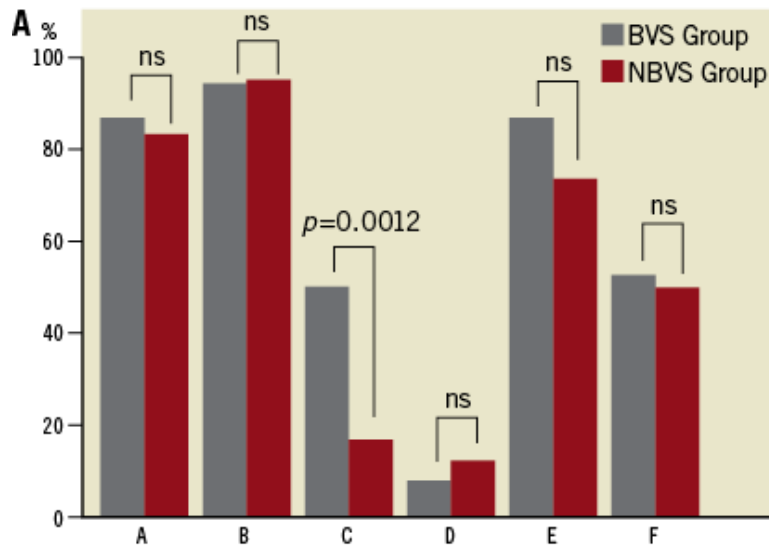


Table 3. Multivariate analysis: predictors of the branch vessel compromise.

	Odds ratio	95% CI	p-value
∠ LMT-TV	0.96	-0.0932-0.0049	0.0926
∠ LMT-BV	1.02	-0.0277-0.0708	0.4158
∠ TV-BV	1.03	-0.0132-0.0083	0.1760
TV / LMT ratio	27.0	-4.530-11.432	0.8298
BV / LMT ratio	0.34	-9.8225-7.7501	0.4099
BV / TV ratio	0.95	-6.3048-5.7184	0.8039
"C" in the long axis	5.15	1.585-18.80	0.0086
"d" in the short axis	3.83	1.246-13.00	0.0231

CI: confidence interval; CT: computed tomography; LMT: left main trunk; TV: target vessel; BV: branch vessel



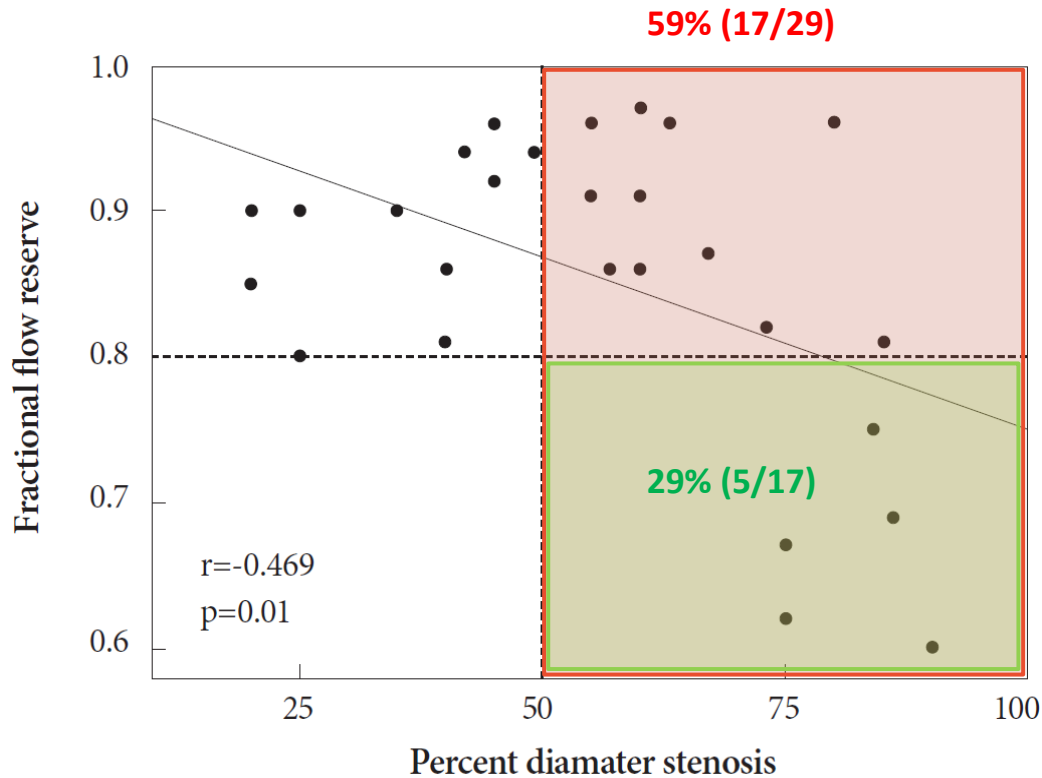
Provisional vs 2-stent strategy in distal LM disease

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Toyofuku ⁶	2009	261	119	36	–	–	0.61 (0.34-1.08) <i>p</i> =0.09	–	0.32 (0.18-1.21) <i>p</i> <0.01
Kim ⁴	2011	234	158	36	0.89 (0.22-0.67) <i>p</i> <0.001	–	0.77 (0.28-2.13) <i>p</i> =0.62	0.38 (0.19-0.78) <i>p</i> =0.008	0.16 (0.05-0.57) <i>p</i> =0.005
Song ⁵	2014	509	344	36	0.42 (0.28-0.63) <i>p</i> <0.001	0.48 (0.25-0.93) <i>p</i> =0.03	0.30 (0.11-0.81) <i>p</i> =0.02	0.41 (0.18-0.95) <i>p</i> =0.04	0.47 (0.32-0.69) <i>p</i> <0.01

Strategy	Anatomical features
Favour provisional approach	<ul style="list-style-type: none"> – Insignificant stenosis at the ostial LCX with Medina classification 1,1,0 or 1,0,0 – Small LCX <2.5 mm in diameter – Diminutive LCX, right dominant coronary system – Wide angle between LAD and LCX – No concomitant disease or only focal disease in LCX
Favour two-stent technique	<ul style="list-style-type: none"> – Significant stenosis at the ostial LCX with Medina classification 1,1,1 or 1,0,1 or 0,1,1 – Large LCX ≥2.5 mm in diameter – Diseased left dominant coronary system – Narrow angle between LAD and LCX – Concomitant diffuse disease in LCX

FFR vs CAG in LCXos

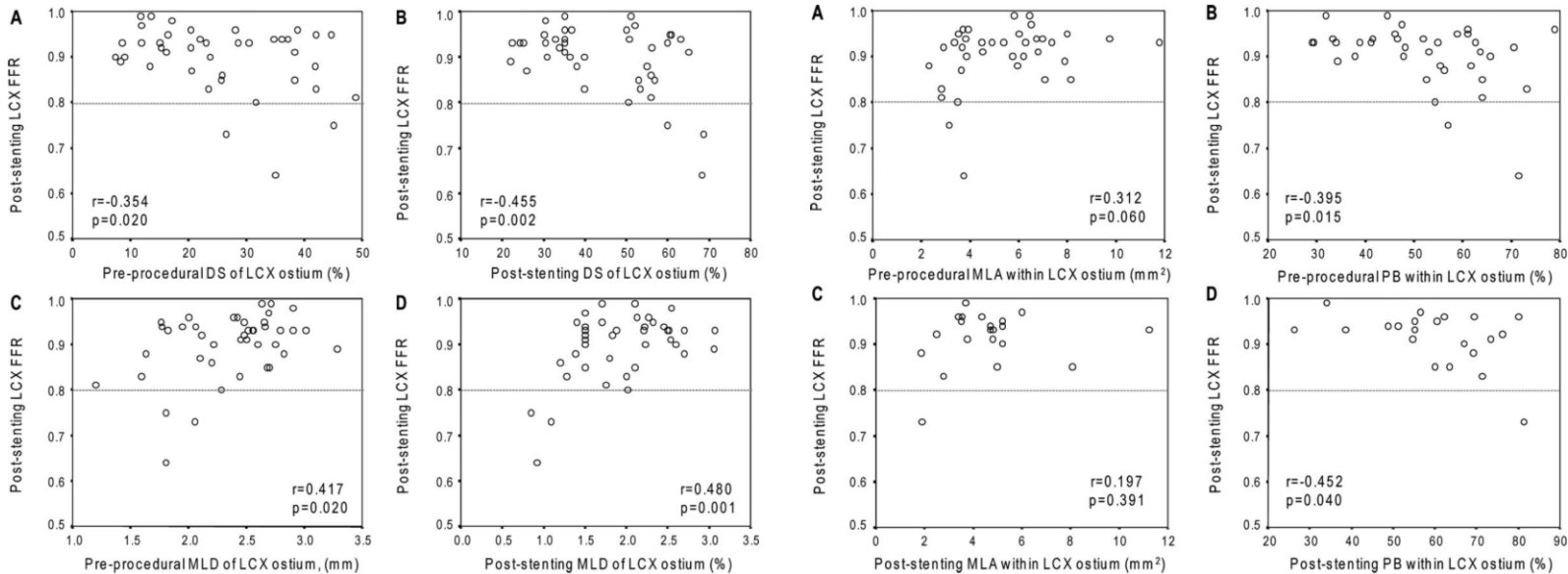
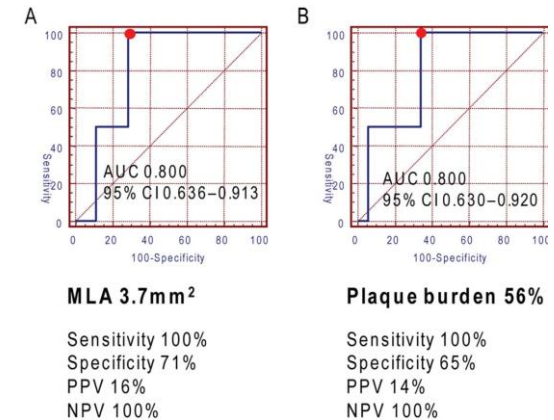
- 29 pts w/ distal LM or ostial LAD lesions treated by LM-to-LAD crossover stenting
- FFR measured at the jailed LCX after successful stenting
- Additional intervention performed in lesions with FFR <0.8.



FFR vs CAG / IVUS in LCXos

- 43 pts treated by single-stent cross-over technique for LMCA bifurcation lesions w/ LCX ostial DS of < 50%
- FFR after MB stenting & SB IVUS (pre- and post-)
- After MB stenting
 - DS >50% at the LCX ostium in 42%
 - FFR <0.80 in only 7%

Neither angiographic DS nor IVUS-MLA could accurately predict functional LCX compromise with an FFR of <0.80 !!

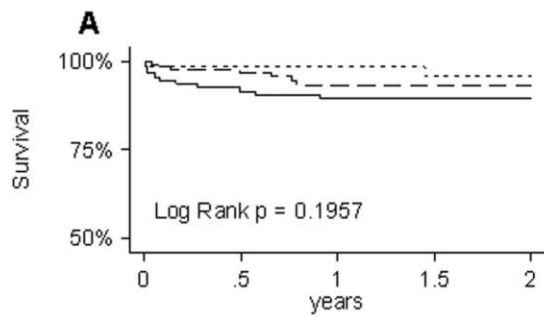


Elective 2-stent techniques

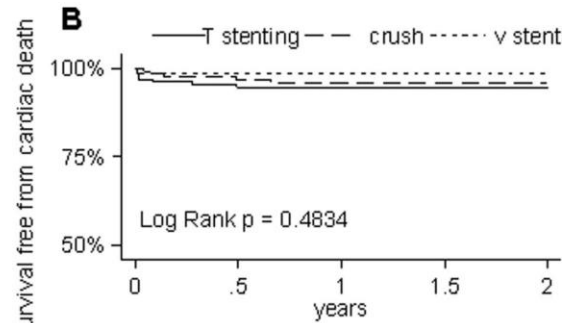
	Advantages	Disadvantages
Culotte	Compatible with 6 Fr guider Independent of bifurcation angle Predictable scaffolding	Leaves multiple layers of strut Potential acute closure of MB
Classic crush	Relatively simple Low risk of SB occlusion Good coverage of SB ostium	Difficult FKI Requires 7 or 8 Fr guider Leaves multiple layers of strut
Mini-crush	Minimises multiple layers of strut Good scaffolding at SB ostium Facilitates FKI Compatible with 6 Fr guider using balloon crushing	Still leaves multiple layers of strut
DK-crush	Good scaffolding at SB ostium Facilitates FKI Compatible with 6 Fr guider	Complex procedural steps
Simultaneous kissing stenting	No risk of occlusion for both branches No need to re-cross any stent Technically easy and quick	Requires 7 or 8 Fr guider Leaves long metallic carina Over-dilatation in proximal MB Diaphragmatic membrane formation at the overlapped stents Difficulty in repeat revascularisation
T-stenting	Good SB scaffolding with angles >70°	Potential gap at SB ostium Protrusion of SB stent into the MB (in the case of TAP)

- **No clear guidelines in selecting a particular technique relative to the specific anatomy of LM disease**
 - **Patient's clinical manifestations**
 - **LM bifurcation morphology (diameter of the two branches, bifurcation angle, severity of the ostial SB stenosis, extent of the MV disease)**
 - **Operator's preference.**

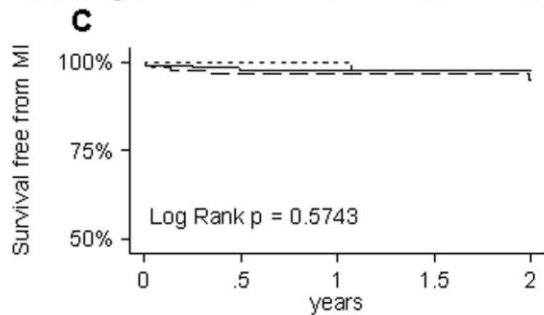
Comparison of 2- stent techniques



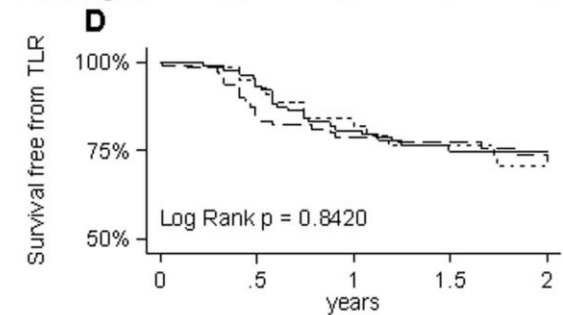
At-risk	0	.5	1	1.5	2
T stenting	128	104	84	65	56
crush	121	97	76	59	50
v stenting	60	50	42	33	30



At-risk	0	.5	1	1.5	2
T stenting	128	104	84	65	56
crush	121	97	76	59	50
v stenting	60	50	42	33	30



At-risk	0	.5	1	1.5	2
T stenting	128	99	79	61	53
crush	121	96	75	58	49
v stenting	60	50	42	32	29



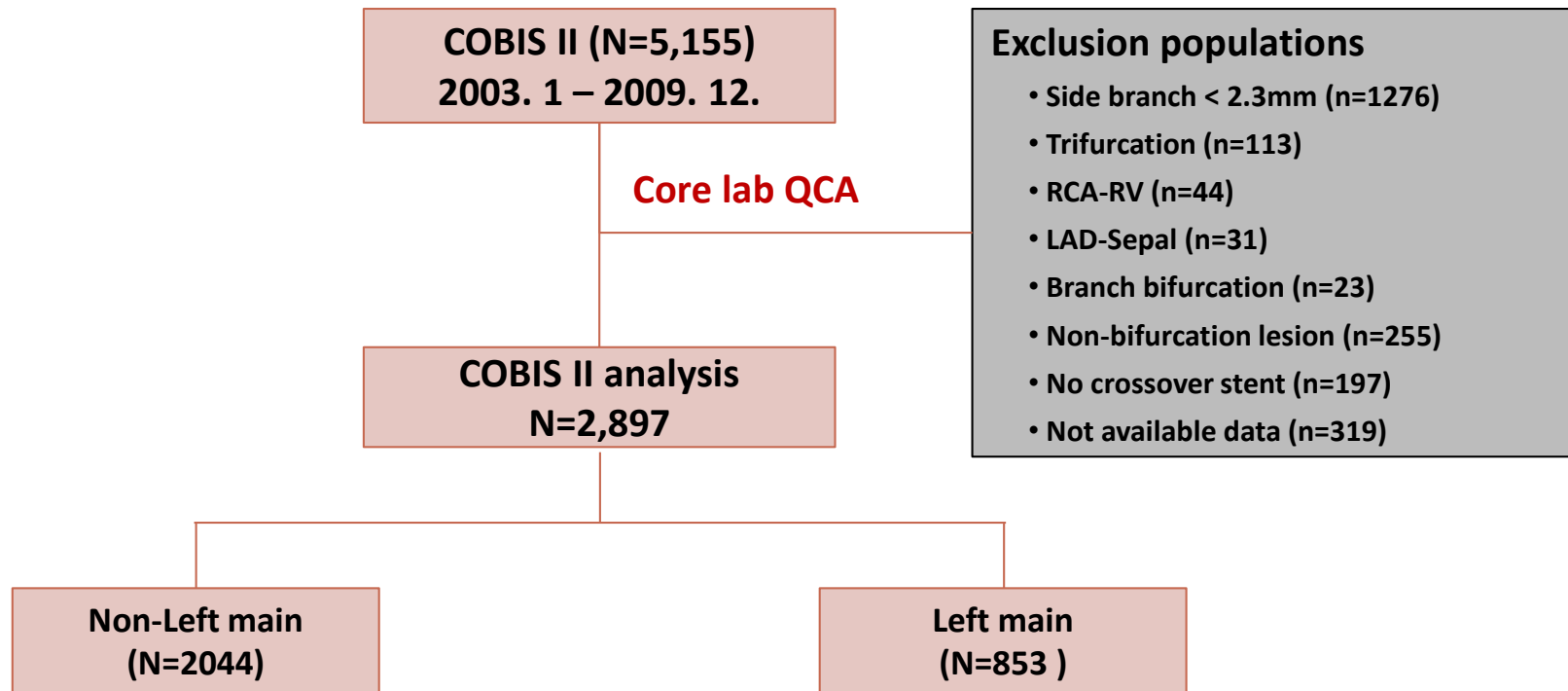
At-risk	0	.5	1	1.5	2
T stenting	128	96	67	46	38
crush	121	82	61	47	38
v stenting	60	46	35	26	23

Similar MACE-free survival, irrespective of technique used in 2-stent group!!

COBIS registry

	COBIS I	COBIS II	COBIS III
N of patients	1,668	2,897	2,749
N of centers	16	18	21
Procedure period	2004.1~2006.6	2003.1~2009.12	2010.1~2014.12
Left main bifurcation	None	853 (29%)	988 (36%)
Side branch RD	2.09±0.24 mm	2.54±0.43 mm	2.55±0.59 mm
2nd generation DES	None	15%	100%
2-stent technique	18%	27%	19%
Median FU duration (years)	1.8 [1.3-2.6]	3.0 [2.1-4.3]	4.3 [2.9-5.6]

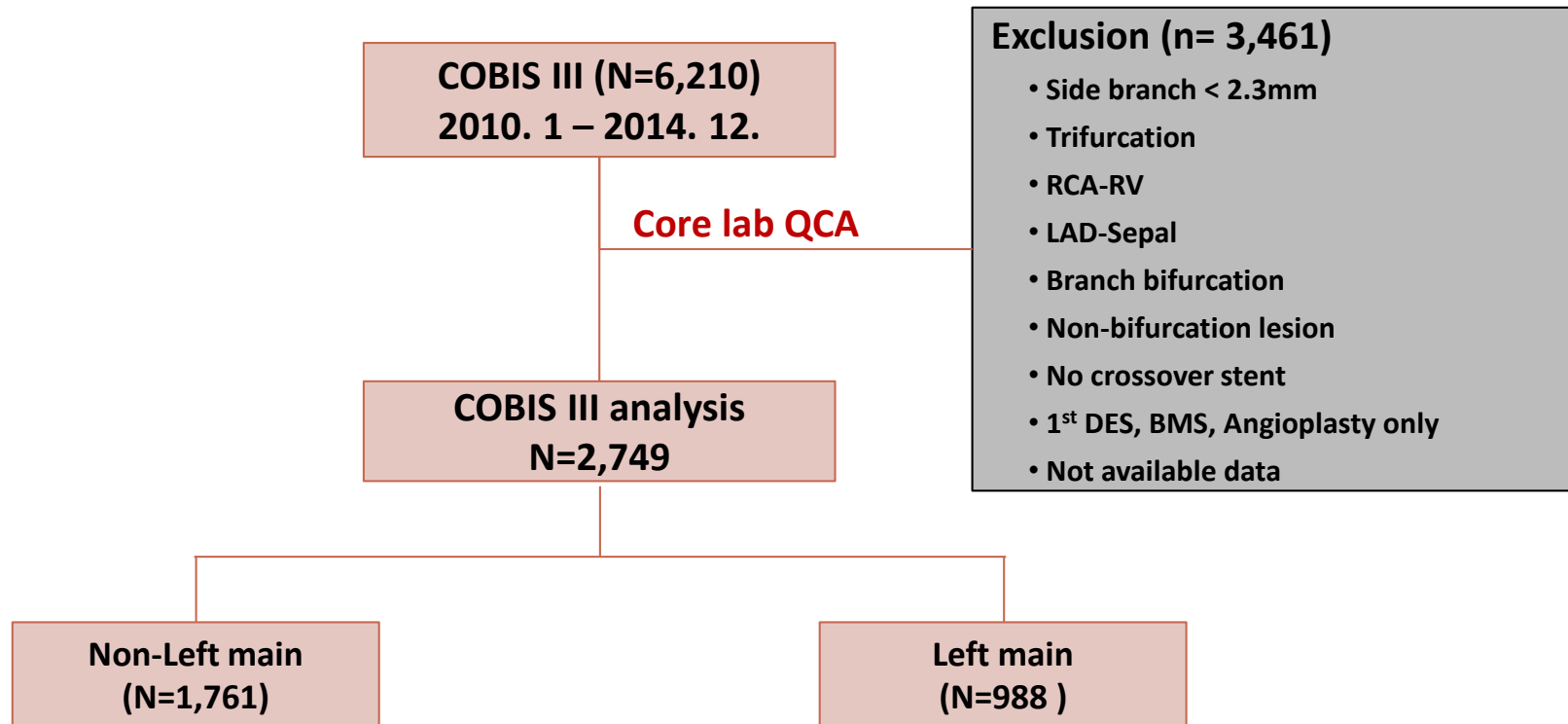
COBIS II registry



■ Final analysis set

- N=2,897 patients from 18 centers in Korea
- Median Follow-up duration: 36 months

COBIS III registry



■ Final analysis set

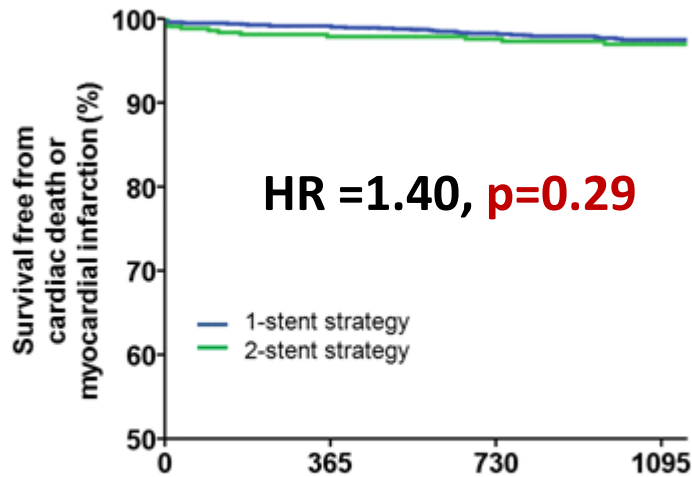
- N=2,749 patients from 21 centers in Korea
- Median Follow-up duration: 50 months

COBIS II Registry

- 1-stent vs 2-stent in LM vs. non-LM bifurcation

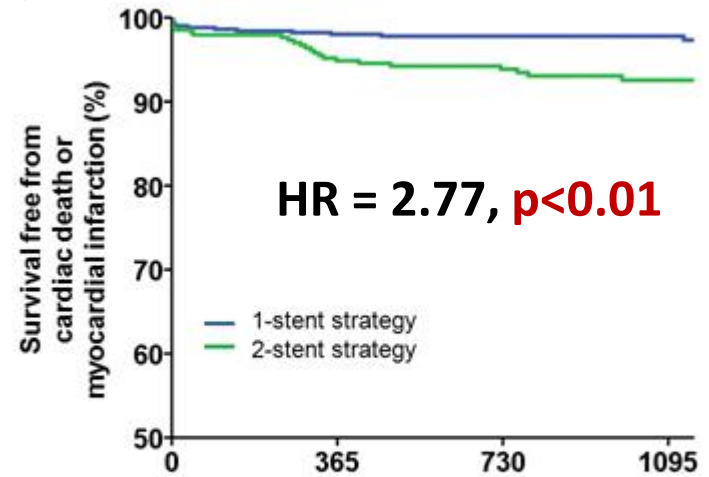
■ Cardiac death or MI

Non-LM bifurcation



Numbers at risk	0	365	730	1095
1-stent strategy	1618	1453	1201	798
2-stent strategy	426	389	346	243

LM bifurcation



Numbers at risk	0	365	730	1095
1-stent strategy	509	466	390	228
2-stent strategy	344	302	253	153

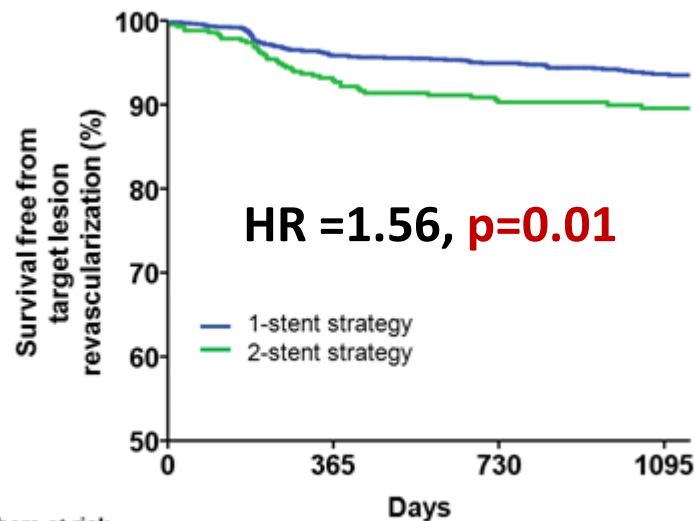
Hazard ratio was calculated by a weighted Cox proportional hazards model using inverse-probability-of-treatment weighting (IPTW) including all clinical, angiographic, and procedural variables.

COBIS II Registry

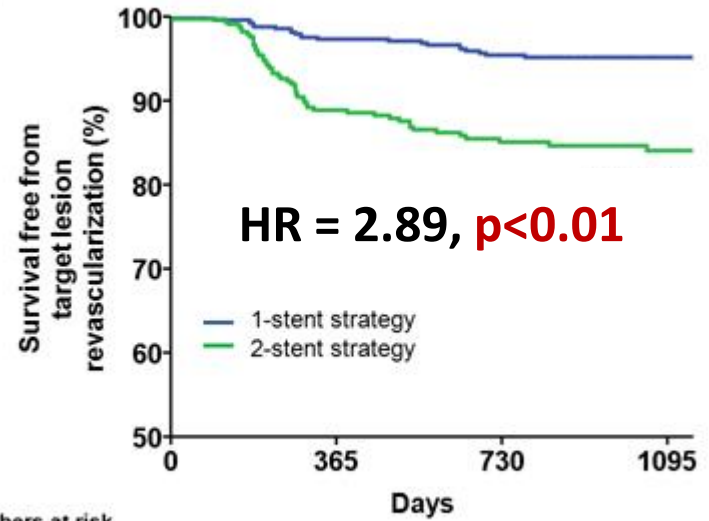
- 1-stent vs 2-stent in LM vs. non-LM bifurcation

■ Target lesion revascularization

Non-LM bifurcation



LM bifurcation



Conservative provisional stenting is still the standard strategy to treat left main bifurcation, until the results of randomized controlled trials are available.

Hazard ratio was calculated by a weighted Cox proportional hazards model using inverse-probability-of-treatment weighting (IPTW) including all clinical, angiographic, and procedural variables.

COBIS II Registry

- Predictors of TVF in 2 stent technique

- Treated with 2-stent strategy: N=951

	Adjusted HR*	95% CI	p Value
Treated bifurcation in LM	2.09	1.43 – 3.03	<0.001
High SYNTAX score >32	2.00	1.28 – 3.14	0.002
Diabetes mellitus	1.41	1.00 – 1.99	0.05
Second-generation DES	0.26	0.12 – 0.57	0.001
Non-compliant balloon	0.53	0.36 – 0.79	0.002
Final kissing ballooning	0.44	0.29 – 0.68	<0.001

*Adjusted for age (continuous), acute coronary syndrome as presentation, preprocedural hemoglobin level, pre-procedural creatinine level, bifurcation angle (continuous), multi-vessel coronary disease, transradial approach, intravascular ultrasound, provisional approach, stenting techniques, total stent length in side branch (continuous).

COBIS III registry (preliminary results)

- Lesion and procedural characteristics

Variables	Total (n=2,749)	Non-LM Bifurcation (n=1,761)	LM Bifurcation (n=988)	P value
Multi-vessel disease	1686 (61.3%)	876 (49.7%)	810 (82.0%)	<0.001
Bifurcation location				NA
Left main	988 (35.9%)		100 (100%)	
LAD/diagonal	1237 (45.0%)	1237 (70.2%)		
LCX/OM	362 (13.2%)	362 (20.6%)		
RCA (PL/PDA)	162 (5.9%)	162 (9.2%)		
Medina classification				<0.001
1.1.1	879 (32.0%)	638 (36.2%)	241 (24.4%)	
1.0.1	174 (6.3%)	132 (7.5%)	42 (4.3%)	
0.1.1	261 (9.5%)	181 (10.3%)	80 (8.1%)	
1.0.0	305 (11.1%)	218 (12.4%)	87 (8.8%)	
1.1.0	446 (16.2%)	258 (14.7%)	188 (19.0%)	
0.1.0	591 (21.5%)	297 (16.9%)	294 (29.8%)	
0.0.1	93 (3.4%)	37 (2.1%)	56 (5.7%)	
True bifurcation	1314 (47.8%)	951 (54.0%)	363 (36.7%)	<0.001

COBIS III registry (preliminary results)

- Lesion and procedural characteristics

Variables	Total (n=2,749)	Non-LM Bifurcation (n=1,761)	LM Bifurcation (n=988)	P value
No. of used stent	1.8 ± 1.0	1.7 ± 0.9	1.9 ± 1.0	<0.001
Stent type				<0.001
EES (Xience)	827 (30.1%)	462 (26.2%)	365 (36.9%)	
EES (Promus)	491 (17.9%)	328 (18.6%)	163 (16.5%)	
ZES	749 (27.2%)	506 (28.7%)	243 (24.6%)	
BES	527 (19.2%)	349 (19.8%)	178 (18.0%)	
Other	85 (3.1%)	66 (3.7%)	19 (1.9%)	
Stent technique				<0.001
1-stenting	2237 (81.4%)	1534 (87.1%)	703 (71.2%)	
T-stenting or TAP	129 (4.7%)	69 (3.9%)	60 (6.1%)	
Crush techniques	256 (9.3%)	105 (6.0%)	151 (15.3%)	
Culottes	31 (1.1%)	15 (0.9%)	16 (1.6%)	
Kissing or V stenting	47 (1.7%)	17 (1.0%)	30 (3.0%)	
Others	49 (1.8%)	21 (1.2%)	28 (2.8%)	
Access site				<0.001
Trans-radial	1502 (54.6%)	1024 (58.1%)	478 (48.4%)	
Trans-femoral	1185 (43.1%)	692 (39.3%)	493 (49.9%)	
SB pre-dilatation	312 (13.0%)	236 (14.6%)	76 (9.6%)	<0.001
Final kissing ballooning	821 (29.9%)	405 (23.0%)	416 (42.1%)	<0.001
Proximal optimization technique	774 (28.2%)	463 (26.3%)	311 (31.5%)	0.004
IVUS-guidance	1093 (39.8%)	471 (26.7%)	622 (63.0%)	<0.001
NC balloon use				
MV	559 (20.3%)	308 (17.5%)	251 (25.4%)	<0.001
SB	207 (7.5%)	94 (5.3%)	113 (11.4%)	<0.001

COBIS III registry (preliminary results)

- Clinical outcomes

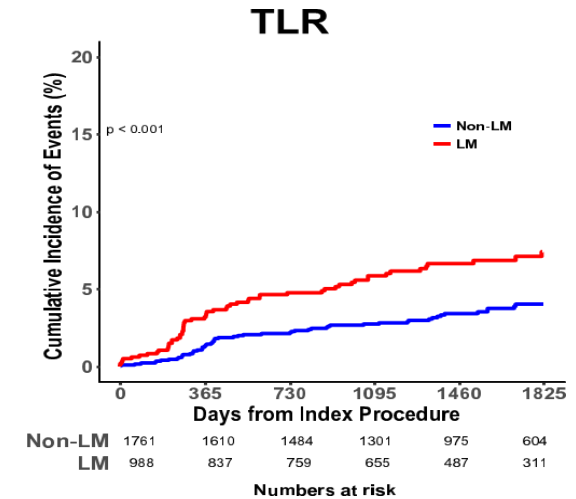
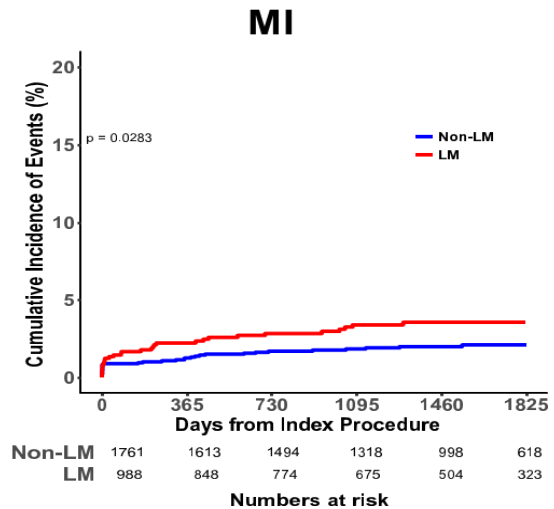
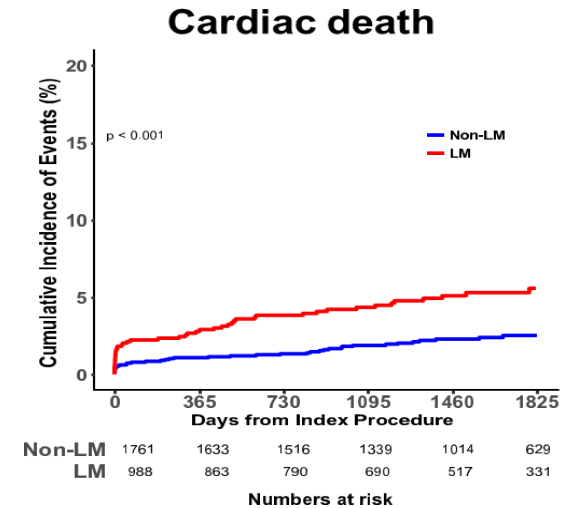
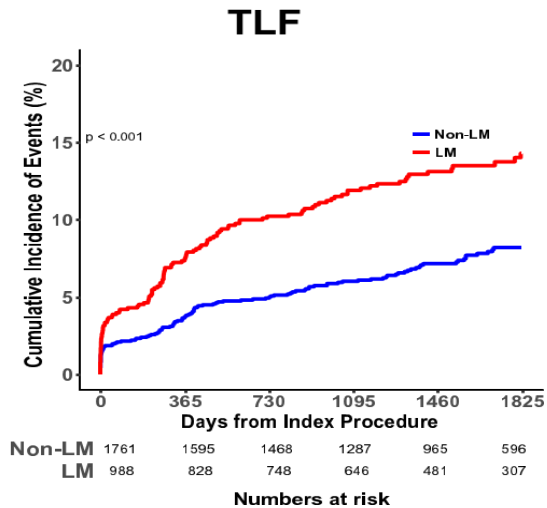
Median FU: 4.3 [2.9-5.6] years

	Non-LM Bifurcation (n=1,761)	LM Bifurcation (n=988)	HR (95% CI)	P value
Target lesion failure*	135 (7.7%)	130 (13.2%)	1.84 (1.45-2.34)	<0.001
Cardiac death	45 (2.6%)	51 (5.2%)	2.17 (1.45-3.24)	<0.001
All-cause death	88 (5.0%)	91 (9.2%)	1.97 (1.47-2.64)	<0.001
Any MI	38 (2.2%)	34 (3.4%)	1.67 (1.05-2.65)	0.030
Target vessel MI	17 (1.0%)	20 (2.0%)	2.22 (1.16-4.23)	0.016
TLR	61 (3.5%)	63 (6.4%)	1.99 (1.40-2.82)	<0.001
TVR	92 (5.2%)	64 (6.5%)	1.75 (1.32-2.33)	<0.001
Definite or probable ST	26 (1.5%)	35 (3.5%)	2.47 (1.49-4.10)	<0.001

COBIS III registry (preliminary results)

- Clinical outcomes

— Non-LM
— LM



Conclusion

- ✓ **Unique characteristics of LM**
 - Short length and large caliber
 - Diffuse nature of disease
- ✓ **Lesion severity & treatment strategy**
 - IVUS / FFR rather than angiography
- ✓ **Bifurcation (vs Ostial / mid shaft)**
 - Provisional strategy
 - FFR-guided approach for SB
 - IVUS for optimization



Thank you for your attention^^.