Impact of Final KB and of Imaging on Patients Treated on ULMCA With Thin-Strut Stents

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Conflict of interest

- Abbot
- Chiesi
- Medtronic

Imaging and FKB for ULM

Always the same tale………..

......but which impact on everyday practice?

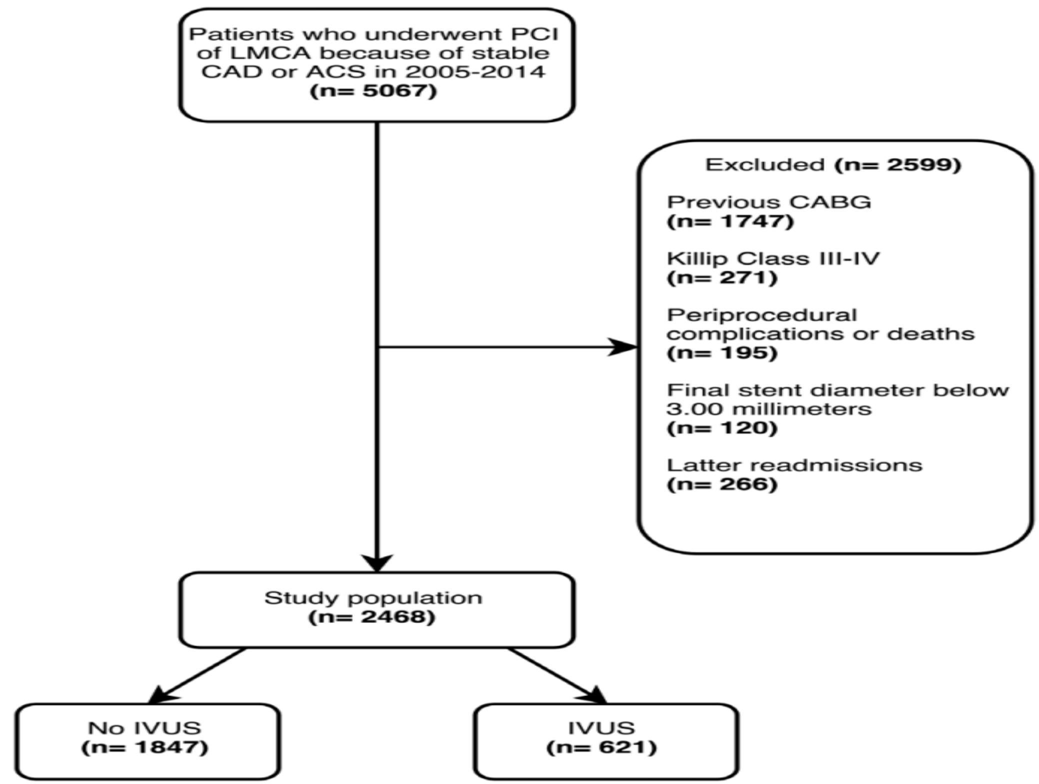
Imaging

2468 patients

1847 no IVUS

621 IVUS

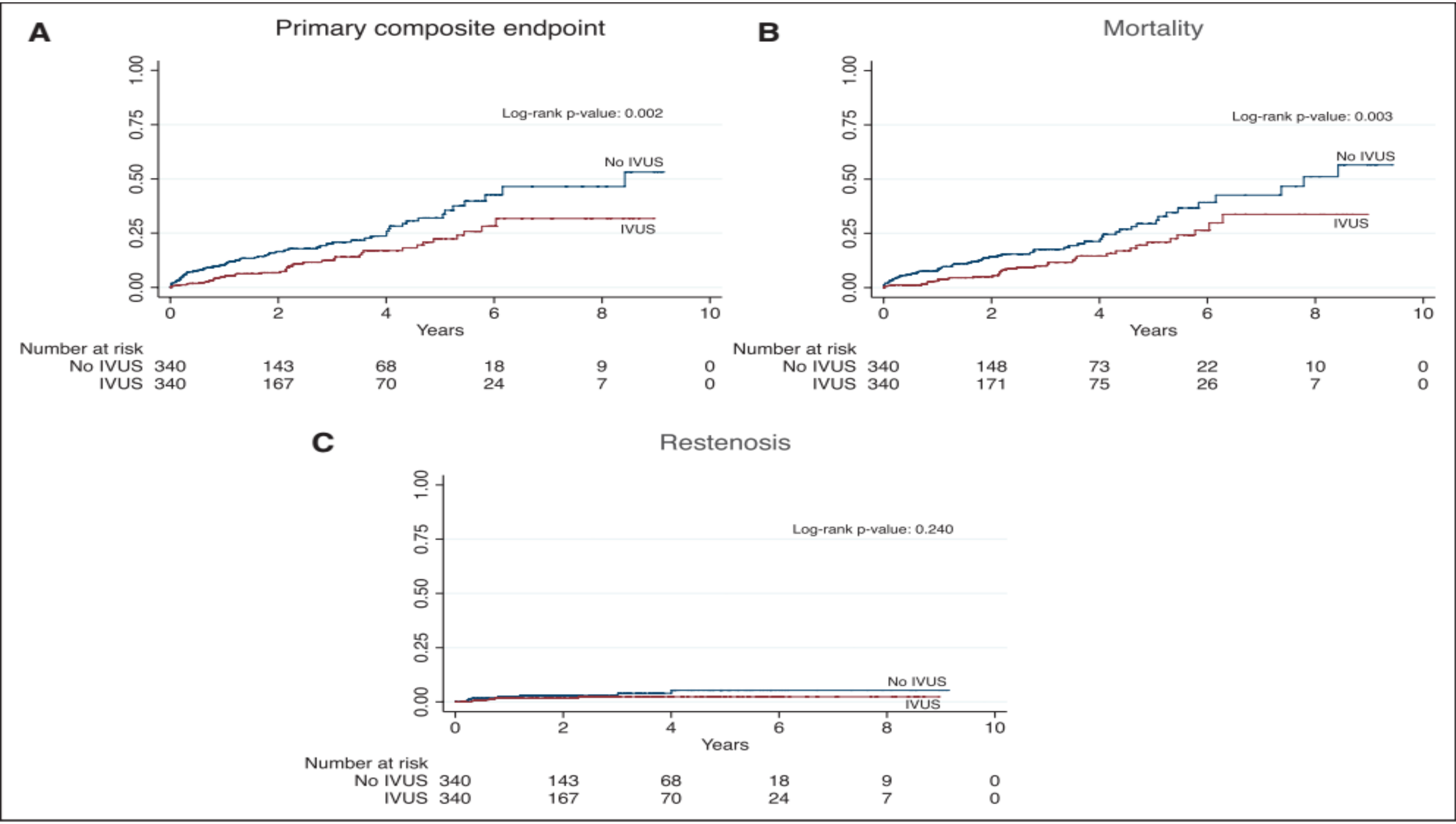
54% bifurcation



Intravascular Ultrasound Guidance Is Associated With Better Outcome in Patients Undergoing Unprotected Left Main Coronary Artery Stenting Compared With Angiography Guidance Alone

Pontus Andell, MD, PhD; Sofia Karlsson, MD; Moman A. Mohammad, MD; Matthias Götberg, MD, PhD; Stefan James, MD, PhD; Jens Jensen, MD, PhD; Ole Fröbert, MD, PhD; Oskar Angerås, MD, PhD; Johan Nilsson, MD, PhD; Elmir Omerovic, MD, PhD; Bo Lagerqvist, MD, PhD; Jonas Persson, MD, PhD; Sasha Koul, MD, PhD; David Erlinge, MD, PhD

Imaging


A
Primary composite endpoint
Log-rank p-value: 0.002
No IVUS
IVUS
0.00
0.25
0.50
0.75
1.00
0
2
4
6
8
10
Years
Number at risk
No IVUS 340 143 68 18 9 0
IVUS 340 167 70 24 7 0
B
Mortality
Log-rank p-value: 0.003
No IVUS
IVUS
Years
Number at risk
No IVUS 340 148 73 22 10 0
IVUS 340 171 75 26 7 0
C
Restenosis
Log-rank p-value: 0.240
No IVUS
IVUS
Years
Number at risk
No IVUS 340 143 68 18 9 0
IVUS 340 167 70 24 7 0

Imaging

Study/First Author (Ref. #)	Age (yrs)	DM (%)	ACS (%)	HTN (%)	Men (%)	LVEF (%)	LM (%)	LAD (%)	LCX (%)	RCA (%)
Angiography vs. IVUS										
RESIST (8)	56/57	11/11	0/0	34/30	93/86	53/51	NA	47/48	11/11	42/41
CRUISE (9)	61/60	18/23	NA	59/52	72/69	54/55	0/0	46/43	18/24	36/33
OPTICUS (10)	61.5/60.1	17/17	32/36	52/48	78/77	57.7/56.5	0/0	50/51	14/18	35/30
Gaster et al. (11)	57/57	11/4	0/0	24/20	100/100	69/65	NA	46/48	26/24	28/28
TULIP (12)	63/61	21/16	0/0	30/27	72/71	NA	0/0	38/39	21/10	41/51
DIPOL (13)	54/56	11/10	0/0	NA	73/71	48/52	0/0	46.3/41.0	23.8/26.5	30.0/32.5
AVID (14)	63/62	17/15	NA	45/46	68/73	55/53	0.5/0.8	37/40	18/15	32/35
HOME DES IVUS (15)	60.2/59.4	45/42	60/72	71/67	71/73	NA	4/3	54/56	15/11	24/29
Kim et al. (16)	64.3/62.8	29.9/31.6	48.5/46.8	65.8/61.3	54.7/65.8	54.0/55.3	0/0	57.5/50.0	18.4/20.7	24.1/29.3
AVIO (17)	63.6/63.9	26.8/23.9	26.1/26.9	66.9/70.4	76.8/82.4	55.9/55.3	NA	48.6/53.3	NA	NA
CTO-IVUS (18)	61.4/61.0	33.8/34.8	0/0	63.7/62.7	80.6/80.6	56.7/56.9	0/0	46.8/41.8	15.9/14.4	37.3/43.8
AIR-CTO (19)	66/67	27.0/29.6	24.4/28.7	70.4/74.8	80.0/88.7	56/55	2.6/0	36.5/44.3	14.8/20.9	46.1/34.8
IVUS-XPL (20)	64/64	37/36	49/49	63/65	69/69	62.4/62.9	NA	60/65	15/14	25/21
Tan et al. (21)	75.9/76.5	29.5/34.4	66.1/70.5	46.8/41.0	69.4/62.3	53.3/55.3	100/100	NA	NA	NA
Roy et al. (22)	65.6/66.0	34.4/35.9	60.9/62.1	81.6/81.8	70.0/69.3	48/47	2.3/2	33.0/32.9	23.2/24.7	34.3/34.4
MAIN-COMPARE (23)	64.3/65.3	31.3/34.8	61.7/60.7	51.7/57.7	72.6/69.2	61.4/61.5	100/100	NA	NA	64.3/37.8
MATRIX (24)	64.4/64.8	31.0/31.6	36.0/33.4	80.7/81.5	73.9/73.7	NA	3.3/3.3	50.9/51.1	38.3/37.8	28.3/28.5
Kim et al. (25)	61.8/62.0	33.3/31.8	56.5/53.2	58.3/60.0	66.9/66.5	58.8/60.1	3.9/3.5	82.5/83.0	12.9/12.9	4.5/4.1
Chen et al. (26)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wakabayashi et al. (27)	67.0/66.7	39.9/41.9	56.4/57.6	89.8/91.5	68.9/67.8	NA	3.8/4.3	24.9/25.7	23.2/23	31.7/32.5
EXCELLENT (28)	62.8/62.5	37.8/37.4	51.6/50.5	74.5/72.8	63.3/65.7	NA	0/0	23.5/53.6	23.5/19.7	27/26.8
De la Torre Hernandez et al. (29)	66.9/66.1	34.6/36.2	61/59	64.3/67.7	78.7/80	55.3/54.9	100/100	NA	NA	NA
Gao et al. (30)	NA	NA	9.6/8.9 (STEMI)	NA	NA	56.9/57.3	100/100	13.4/9.6	7.9/6.5	10.3/7.2
Hong et al. (31)	62/62	31/30	42/39	60/58	77/77	NA	1/1	34/44	25/16	NA
			/100	41.7/55.8	75.8/79.2	NA	0/0	50.0/46.7	23.3/21.7	26.7/31.6
			/59.1	73.8/75.5	75.5/78.2	52.8/53.8	2.4/6.6	53.4/60.9	NA	NA
			/100	NA	82.7/78	NA	0/0	45.8/44.8	7.7/8.9	48.6/49.5
			/100	59/56	79/79	NA	4.6/4.2	55/59	27/26	31/35
			/68.4	44.7/43.9	78.1/73.7	56.2/57.0	0/0	61.4/71.1	11.4/6.1	27.2/22.8
			/11.7	73.8/76.5	79.5/76.5	NA	0/0	48.6/54.1	21.5/20.4	28.9/24.8
			6/36	75/77/77	73/73/69	NA	0/0/0	57/47/51	21/29/27	22/25/22

Clinical Outcomes Following Intravascular Imaging-Guided Versus Coronary Angiography–Guided Percutaneous Coronary Intervention With Stent Implantation

A Systematic Review and Bayesian Network Meta-Analysis of 31 Studies and 17,882 Patients

Sergio Buccheri, MD, Gabriele Franchina, MD, Sara Romano, MD, Sebastiano Puglisi, MD, Giuseppe Venuti, MD, Paolo D'Arrigo, MD, Bruno Francaviglia, MD, Matteo Scalia, RT, Antonio Condorelli, RT, Marco Barbanti, MD, Piera Capranzano, MD, Corrado Tamburino, MD, PhD, Davide Capodanno, MD, PhD

AD = left anterior descending coronary artery; LCX = left circumflex coronary artery; LM = left main coronary artery;

Imaging

TABLE 3 Main Analysis for Secondary Endpoints

	Angiography	IVUS	OCT/OFDI
MACE			
Angiography	–	0.79 (0.67-0.91)	0.68 (0.49-0.97)
IVUS	1.30 (1.10-1.50)	–	0.87 (0.61-1.30)
OCT/OFDI	1.50 (1.00-2.00)	1.10 (0.78-1.60)	–
Cardiovascular death			
Angiography	–	0.47 (0.32-0.66)	0.31 (0.13-0.66)
IVUS	2.10 (1.50-3.10)	–	0.66 (0.27-1.50)
OCT/OFDI	3.20 (1.50-7.60)	1.50 (0.66-3.70)	–
Myocardial infarction			
Angiography	–	0.72 (0.52-0.93)	0.79 (0.44-1.40)
IVUS	1.40 (1.10-1.90)	–	1.10 (0.60-2.10)
OCT/OFDI	1.30 (0.72-2.30)	0.90 (0.47-1.70)	–
Target lesion revascularization			
Angiography	–	0.74 (0.58-0.90)	0.66 (0.35-1.20)
IVUS	1.40 (1.10-1.70)	–	0.88 (0.47-1.60)
OCT/OFDI	1.50 (0.83-2.90)	1.10 (0.61-2.10)	–
Stent thrombosis			
Angiography	–	0.42 (0.20-0.72)	0.39 (0.10-1.20)
IVUS	2.40 (1.40-5.10)	–	0.93 (0.24-3.40)
OCT/OFDI	2.60 (0.80-10.0)	1.10 (0.29-4.20)	–

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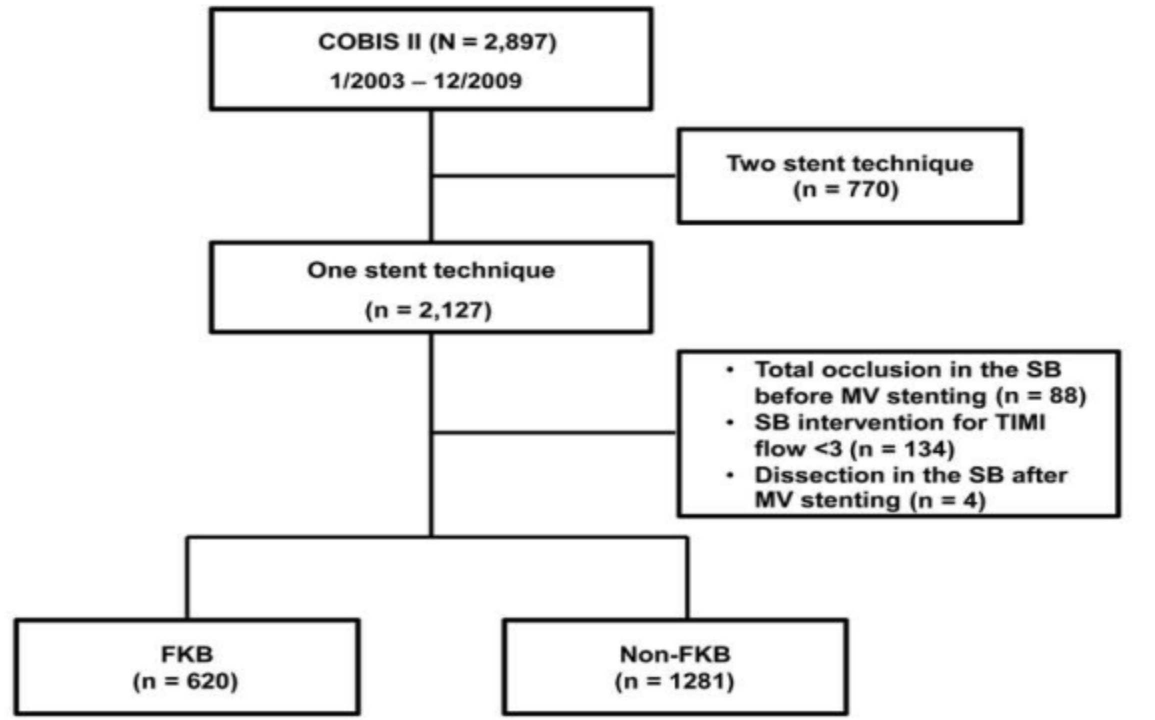
FKI

1901 pts

620 FKI

184 ULM-FKI

308 ULM no-FKI



1,901 patients who met the selection criteria were included in final analysis. COBIS II = Korean Coronary Bifurcation Stenting Registry II; FKB = final kissing ballooning; MV = main vessel; SB = side branch; TIMI = Thrombolysis In Myocardial Infarction.

Long-Term Clinical Outcomes of Final Kissing Ballooning in Coronary Bifurcation Lesions Treated With the 1-Stent Technique

Results From the COBIS II Registry (Korean Coronary Bifurcation Stenting Registry)

	FKB (n = 545)	Non-FKB (n = 545)	Unadjusted HR (95% CI)	p Value	Adjusted HR* (95% CI)	p Value
All-cause death	17 (3.1)	20 (3.7)	0.67 (0.30-1.48)	0.32	0.68 (0.28-1.63)	0.39
Cardiac death	3 (0.6)	8 (1.5)	0.43 (0.11-1.66)	0.22	0.50 (0.11-2.29)	0.37
MI	4 (0.7)	5 (0.9)	0.50 (0.09-2.73)	0.42	0.18 (0.01-20.36)	0.48
Stent thrombosis†	3 (0.6)	4 (0.7)	0.72 (0.16-3.23)	0.67	0.77 (0.17-3.45)	0.73
Target lesion revascularization	32 (5.9)	43 (7.9)	0.53 (0.30-0.94)	0.03	0.51 (0.28-0.91)	0.02
Main vessel	31 (5.7)	40 (7.3)	0.53 (0.30-0.96)	0.04	0.51 (0.28-0.93)	0.03
Side branch	12 (2.2)	18 (3.3)	0.57 (0.24-1.36)	0.21	0.57 (0.24-1.37)	0.21
Both vessels	23 (4.2)	38 (7.0)	0.47 (0.25-0.88)	0.02	0.47 (0.25-0.90)	0.02
MACE‡	37 (6.8)	53 (9.7)	0.54 (0.32-0.89)	0.02	0.50 (0.30-0.85)	0.01

Long-Term Clinical Outcomes of Final Kissing Ballooning in Coronary Bifurcation Lesions Treated With the 1-Stent Technique

Results From the COBIS II Registry (Korean Coronary Bifurcation Stenting Registry)

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Table 2. Procedural and follow-up characteristics.

Study	KBI	NO-KBI	LM	Dual antiplatelet(months)	IVUS	MACE	Follow-Up(months)
Yamawaki et al.	56	57	No	NA	Yes	cardiac death, TLR, MI	36
Nordic III	238	239	Yes	12	No	cardiac death, MI, stent thrombosis, TLR	6
CROSS	151	155	No	12	Yes	comprising death, MI, TVR, TLR, MI	12
SMART-STRATEGY	130	128	Yes	NA	Yes	cardiac death, MI, TVR	12
THUEBIS	56	54	No	6	No	cardiac death, TLR, stent thrombosis.	6

RESEARCH ARTICLE

Should kissing balloon inflation after main vessel stenting be routine in the one-stent approach? A systematic review and meta-analysis of randomized trials

Ming Zhong, Biao Tang, Qiang Zhao, Jian Cheng, Qiangsong Jin, Shenwen Fu*

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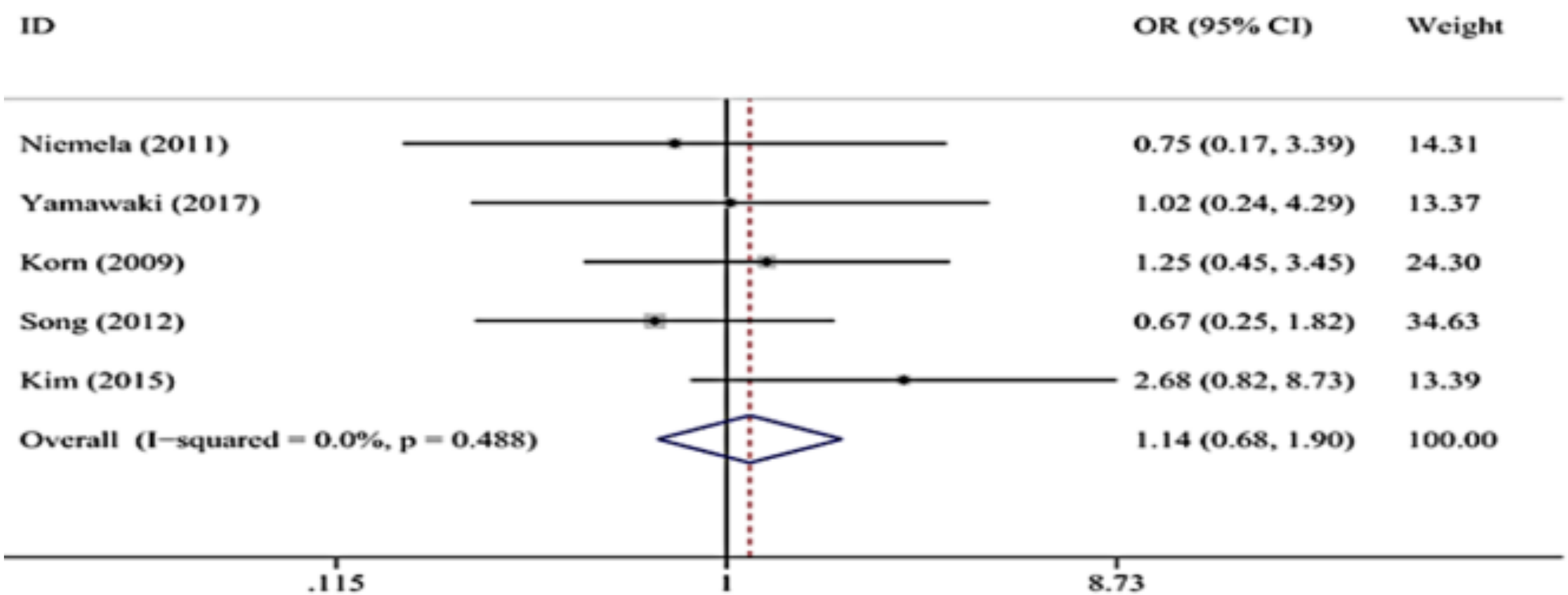

RESEARCH ARTICLE

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From aspera to astra....

	EXCEL ($n = 935$)	NOBLE ($n = 580$)	IRIS–MAIN ($n = 1707$)
PCI procedures			
Stent technique			
Left main stenting only or simple crossover	NA	395 (69.7)	1332 (78.0)
Two-stent technique	NA	181 (31.4)	375 (22.0)
Final kissing balloon	NA	277 (54.5)	507 (29.7)
Total stent number per patient	2.4 ± 1.5	2 (IQR: NA)	2.2 ± 1.2
Stent number in LMCA	NA	1 (IQR: 1–2)	1.7 ± 0.9
Total stent length per patient	49.1 ± 35.6	52 (IQR: NA)	52.3 ± 34.1
IVUS-guided PCI	722 (77.2)	430 (74.1)	1309 (76.7)

Thin stents in ULM

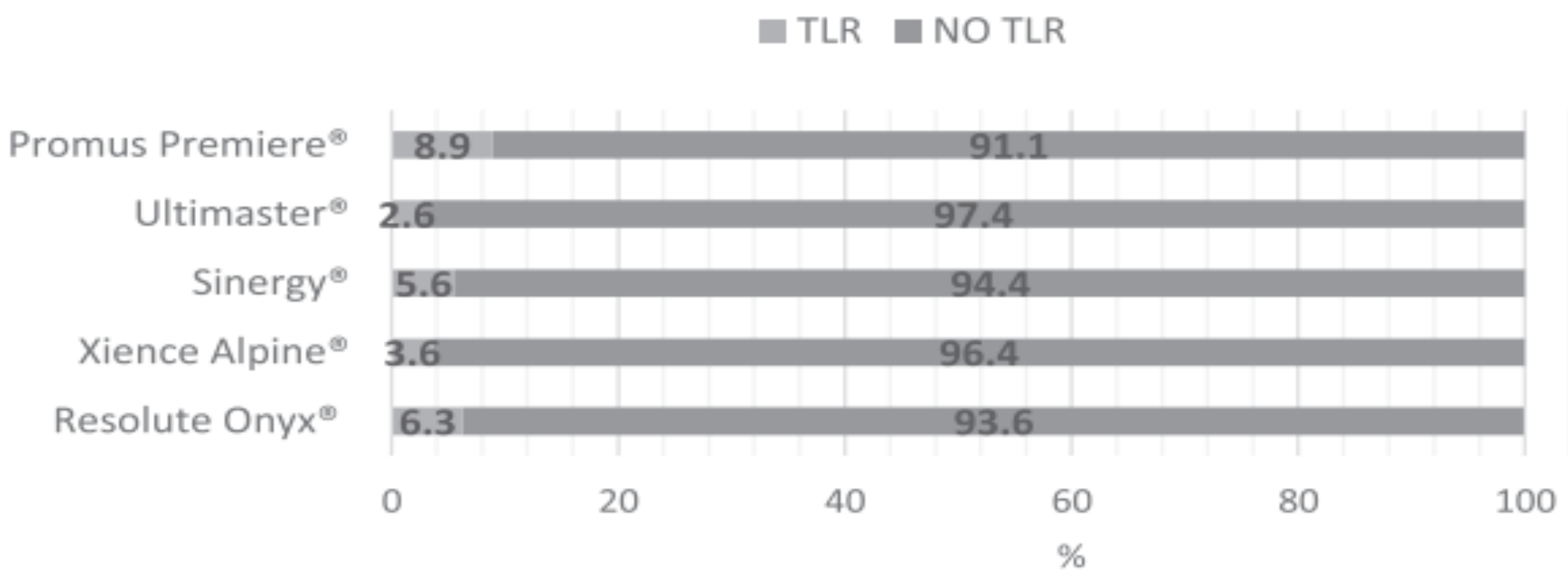
792 patients with ULM stenosis

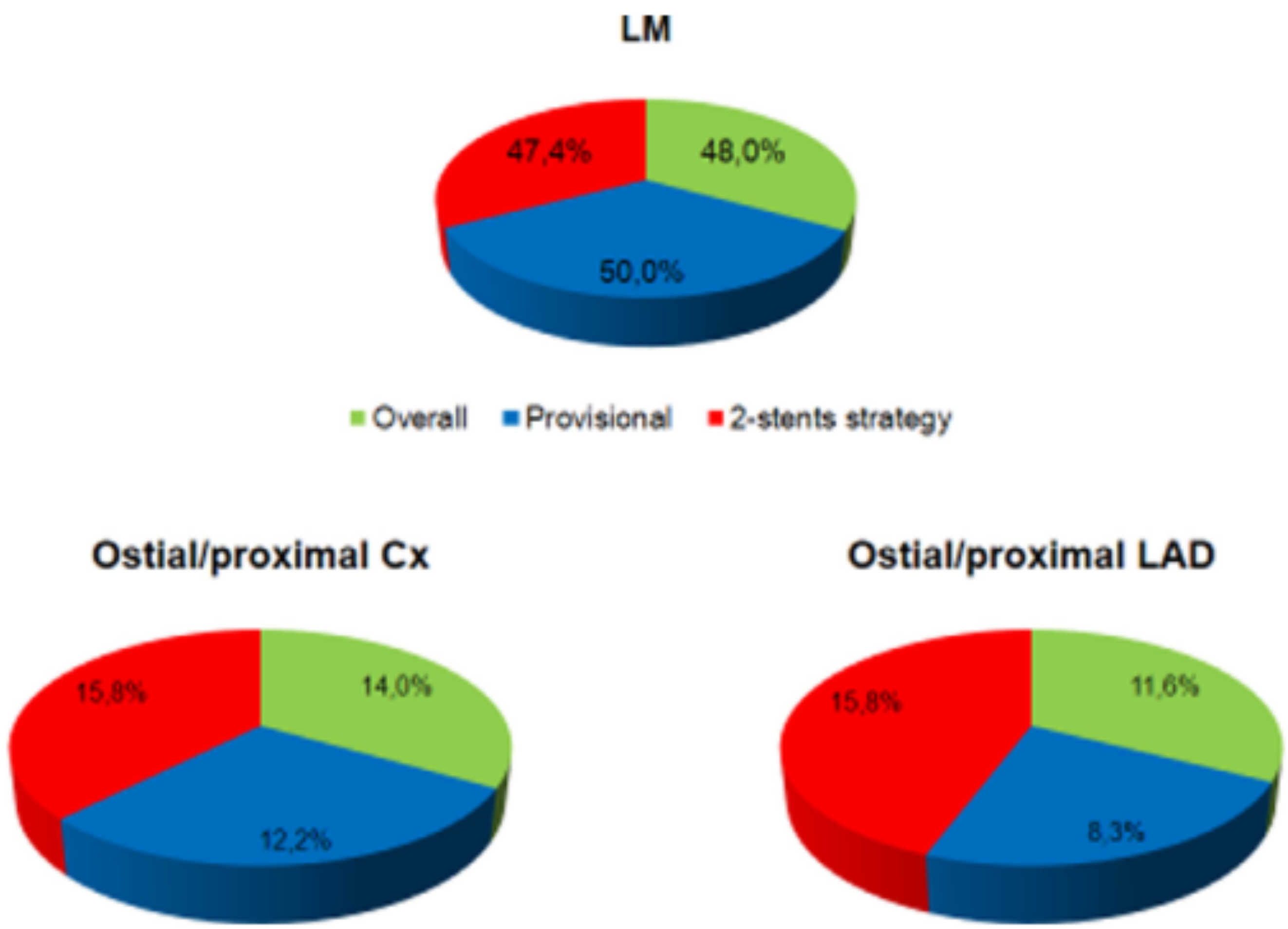
Treated with thin struts stents

After 16 months (12-22) 44 (5.5%) experienced TLR

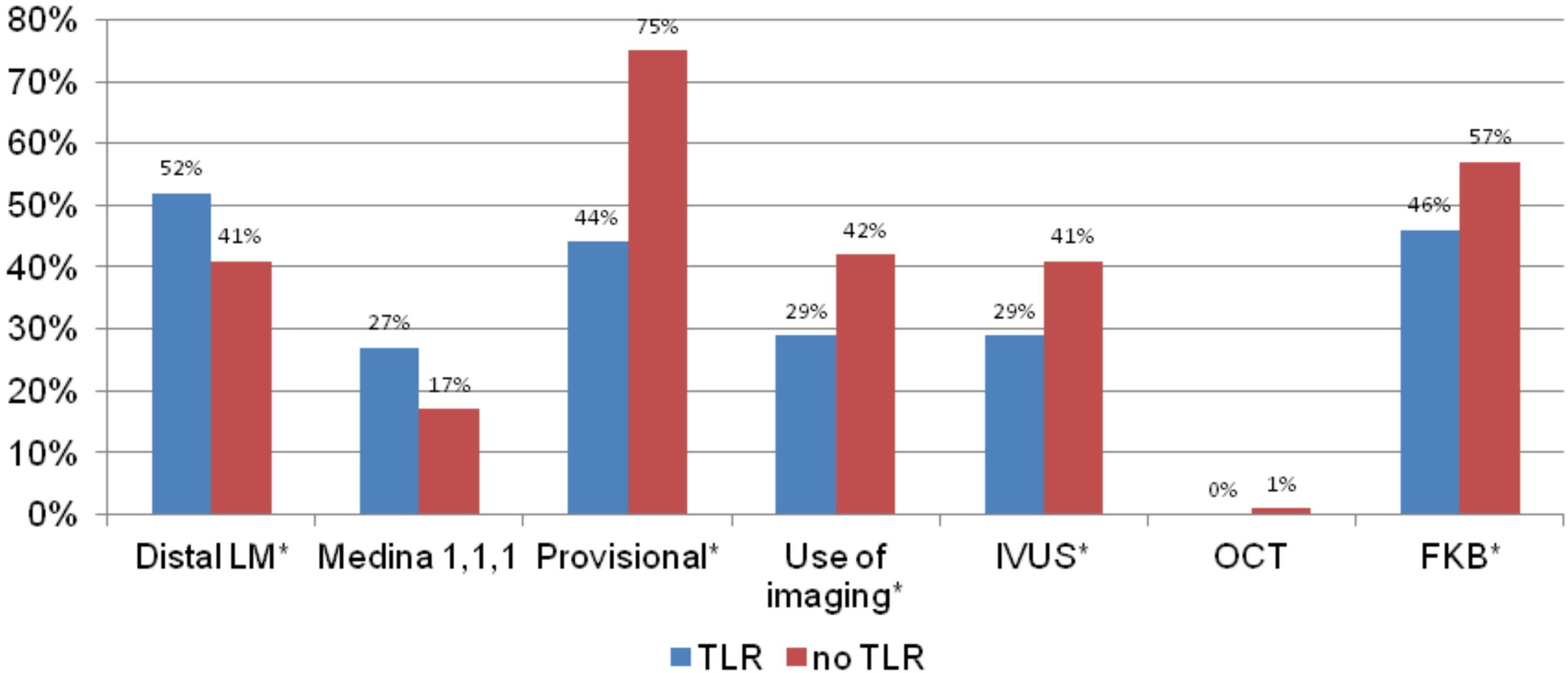
Impact of Final Kissing Balloon and of Imaging on Patients Treated on Unprotected Left Main Coronary Artery With Thin-Strut Stents (From the RAIN-CARDIOGROUP VII Study)

Fabrizio D'Ascenzo, MD[a,*], Pierluigi Omedè, MD[a], Ovidio De Filippo, MD[a], Enrico Cerrato, MD[b], Michele Autelli, MD[a], Daniela Trabattoni, MD[c], Nicola Ryan, MD[d], Giuseppe Venuti, MD[e], Saverio Muscoli, MD[f], Andrea Montabone, MD[g], Wojciech Wojakowski, MD[h], Andrea Rognoni, MD Gerard Helft, MD[j], Diego Gallo, PhD[k], Radoslaw Parma, MD[h], Leonardo De Luca, MD[l], Filippo Figini, MD[m], Satoru Mitomo, MD[n], Giacomo Boccuzzi, MD[g], Alessio Mattesini, MD[o], Wojciech Wańha, MD[h], Grzegorz Smolka, MD[h], Zenon Huczek, MD[p], Bernardo Cortese, MD[q], Imad Sheiban, MD[m], Javier Escaned, MD[d], Carloalberto Biolè, MD[a], Federico Conrotto, MD[a], Christian Templin, MD[r], Giorgio Quadri, MD[b], Cristina Rolfo, MD[s], Davide Capodanno, MD[e], Alaide Chieffo, MD[n], Ivan Nuñez-Gil, MD[d], Umberto Morbiducci, PhD[k], Mario Iannaccone, MD[t], Sebastiano Gili, MD[c], Carlo di Mario, MD[o], Claudio Moretti, MD[a], Maurizio D'Amico, MD[a], Ferdinando Varbella, MD[b], Francesco Romeo, MD[f], and Thomas F. Lüscher, MD[u]


TLR
NO TLR
Promus Premiere®
Ultimaster®
Sinergy®
Xience Alpine®
Resolute Onyx®
8.9
91.1
2.6
97.4
5.6
94.4
3.6
96.4
6.3
93.6
0
20
40
60
80
100
%

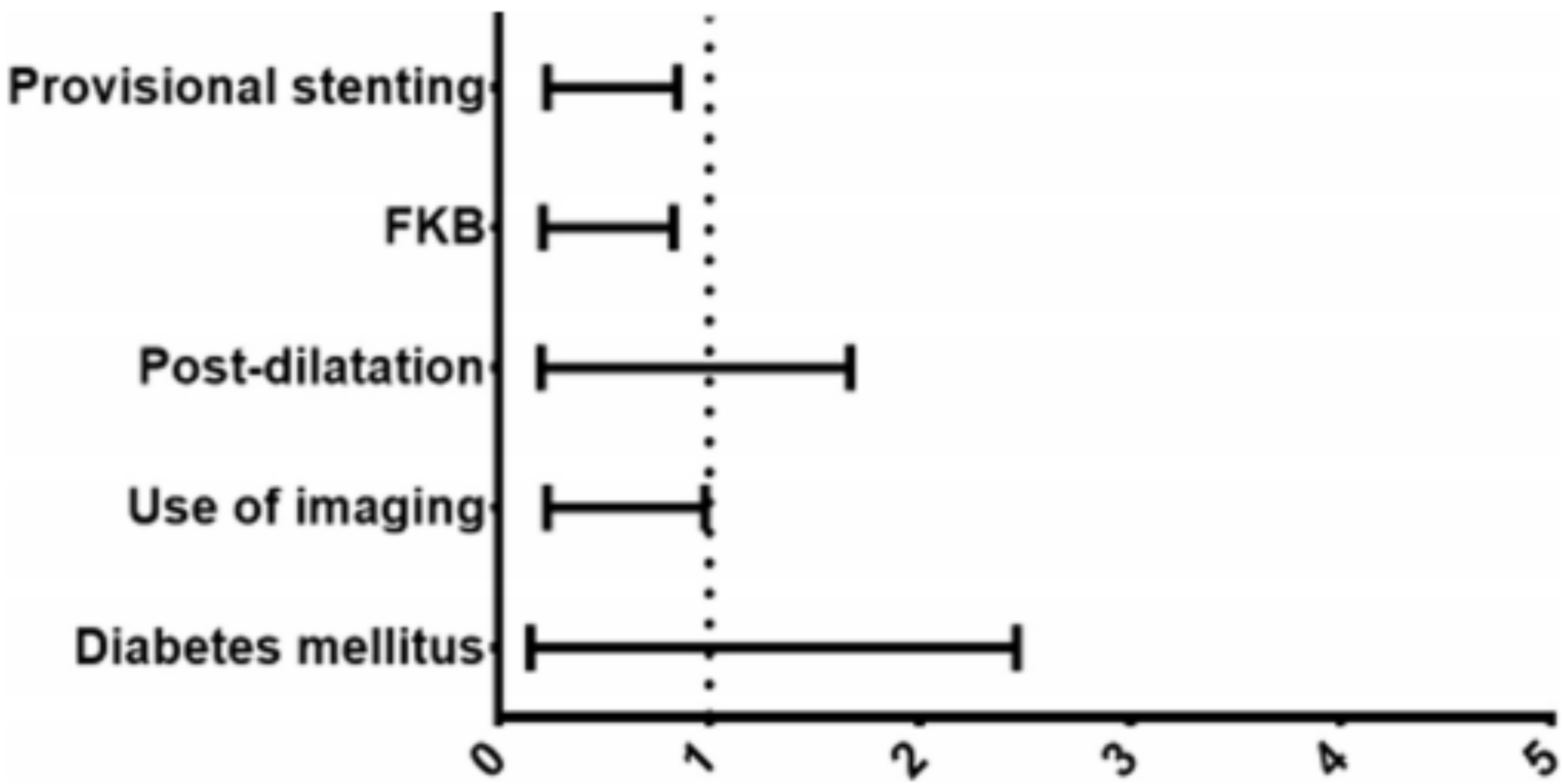

LM
47,4%
48,0%
50,0%
Overall
Provisional
2-stents strategy
Ostial/proximal Cx
15,8%
14,0%
12,2%
Ostial/proximal LAD
15,8%
11,6%
8,3%

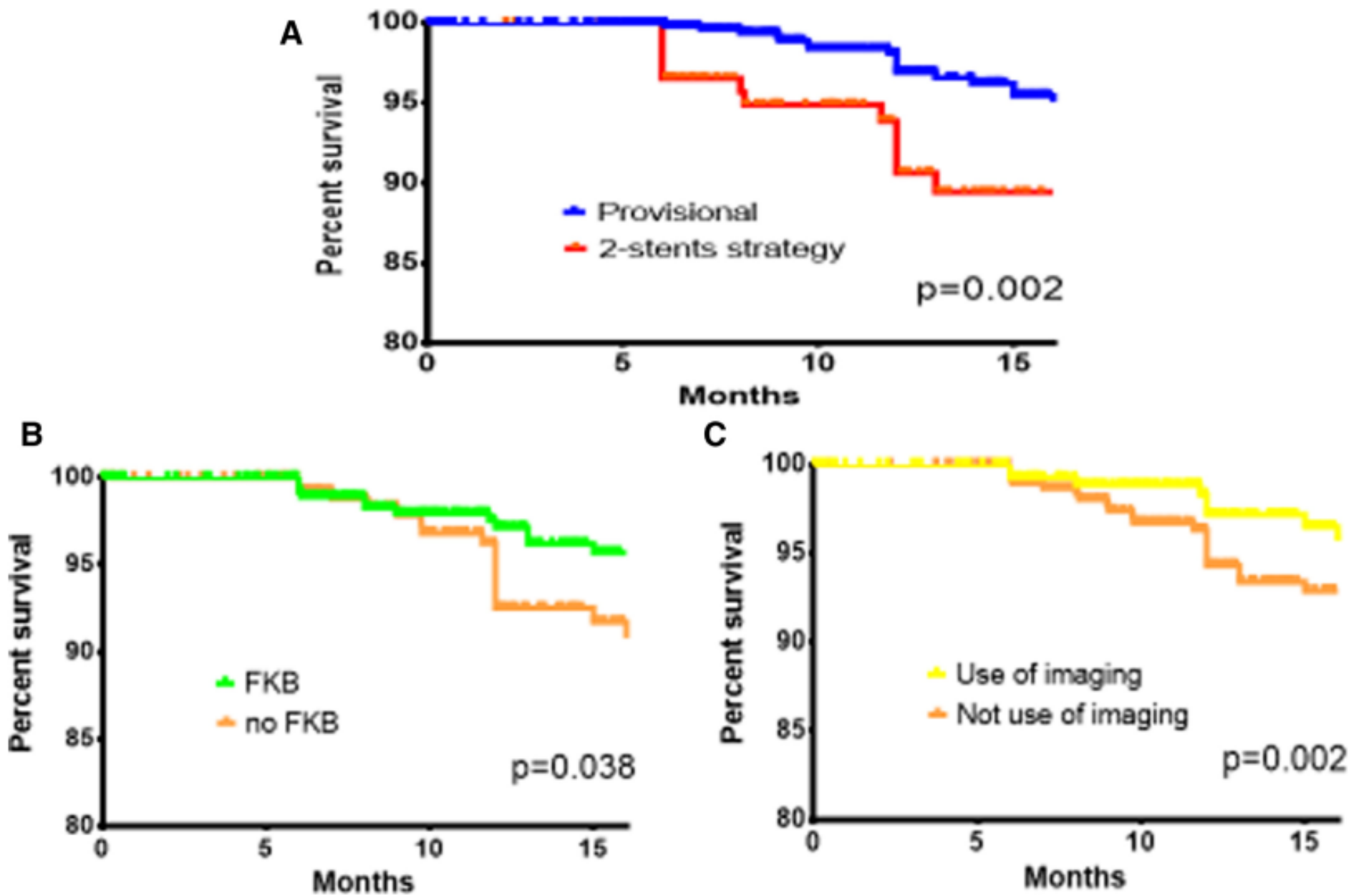
Variable	Target lesion revascularization		p Value
	YES n = 44 (5.6%)	NO n = 748 (94.4%)	
Age (years)	70.82 ± 9	70.76 ± 10.6	0.974
Women	8 (18.2%)	164 (21.9%)	0.733
Hypertension	38 (86.4%)	568 (77.1%)	0.308
Hyperlipidemia	25 (56.8%)	463 (62.8%)	0.317
Noninsulin-treated diabetes mellitus	9 (20.5%)	186 (25.2%)	0.174
Insulin-treated diabetes mellitus	2 (4.7%)	50 (7.1%)	0.796
Previous smoker	16 (36.4%)	214 (29.2%)	0.753
Current smoker	5 (11.4%)	106 (14.5%)	0.753
Renal disease (estimated glomerular filtration rate <60 ml/min/m^2)	11 (25%)	154 (20.5%)	0.889
Previous percutaneous coronary intervention	15 (34.1%)	255 (34.7%)	0.764
Previous coronary artery bypass graft	6 (13.6%)	81 (11.1%)	0.819
Previous myocardial infarction	9 (20.5%)	233 (31.9%)	0.224
Indication for percutaneous coronary intervention:			0.211
ST-elevation myocardial infarction	0	98 (13.1%)	
Non ST-elevation myocardial infarction	14 (32.1%)	167 (22.3%)	
Unstable angina	10 (23.3%)	110 (14.7%)	
Stable angina	16 (36%)	325 (40%)	
Planned angiographic follow up	4 (7.5%)	48 (6.4%)	

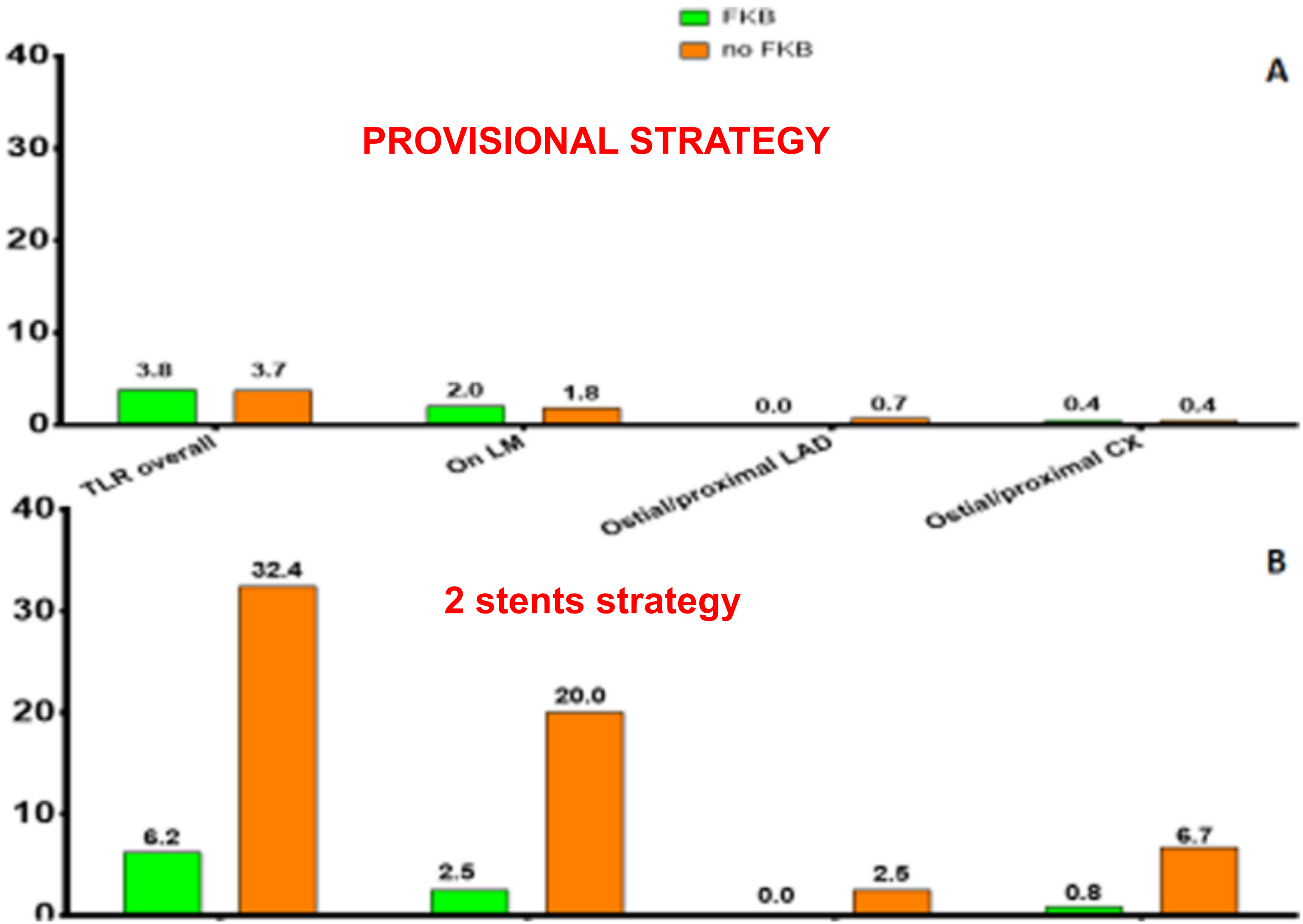


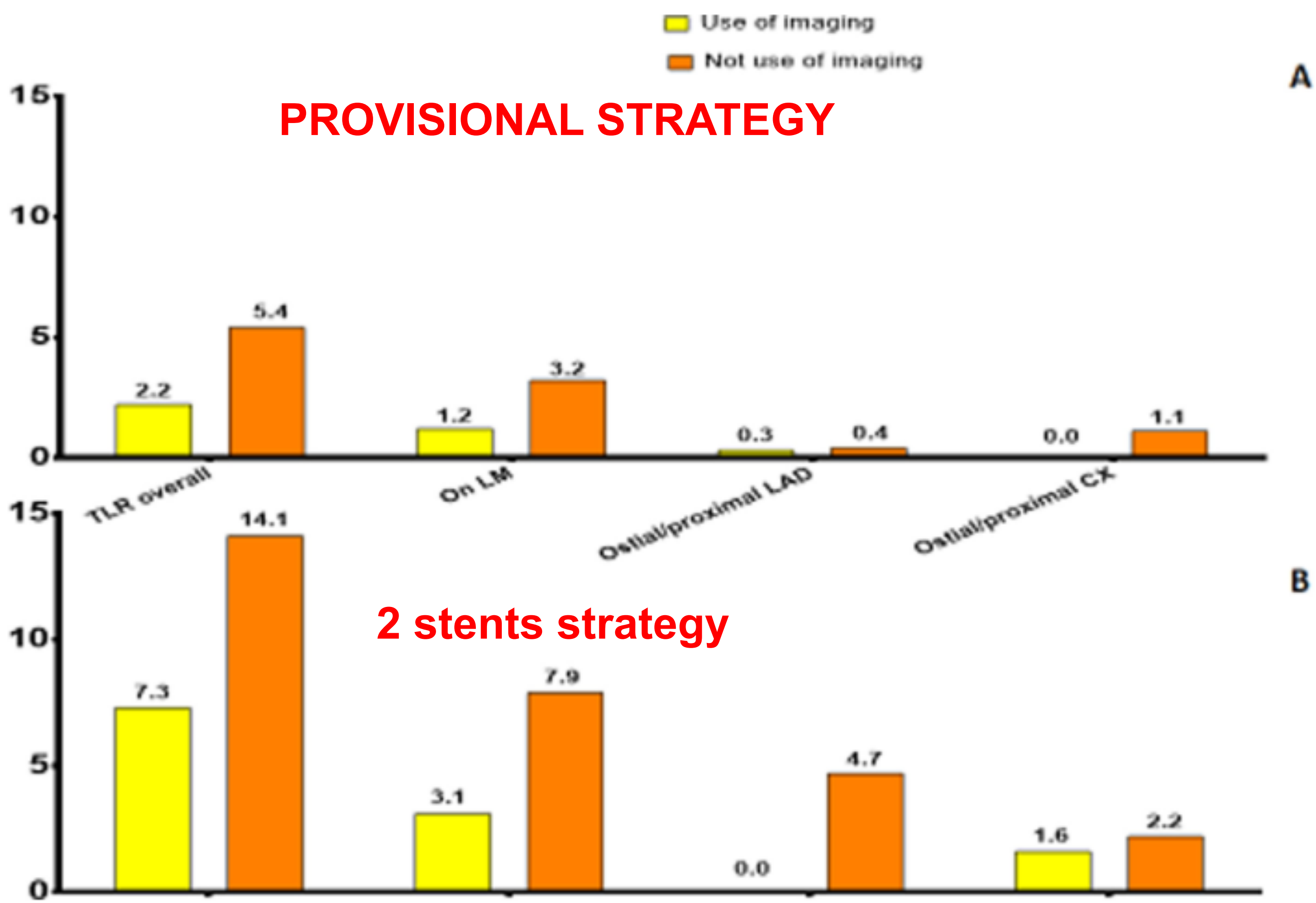
80%
70%
60%
50%
40%
30%
20%
10%
0%
52%
41%
27%
17%
44%
75%
29%
42%
29%
41%
0%
1%
46%
57%
Distal LM*
Medina 1,1,1
Provisional*
Use of imaging*
IVUS*
OCT
FKB*
TLR
no TLR

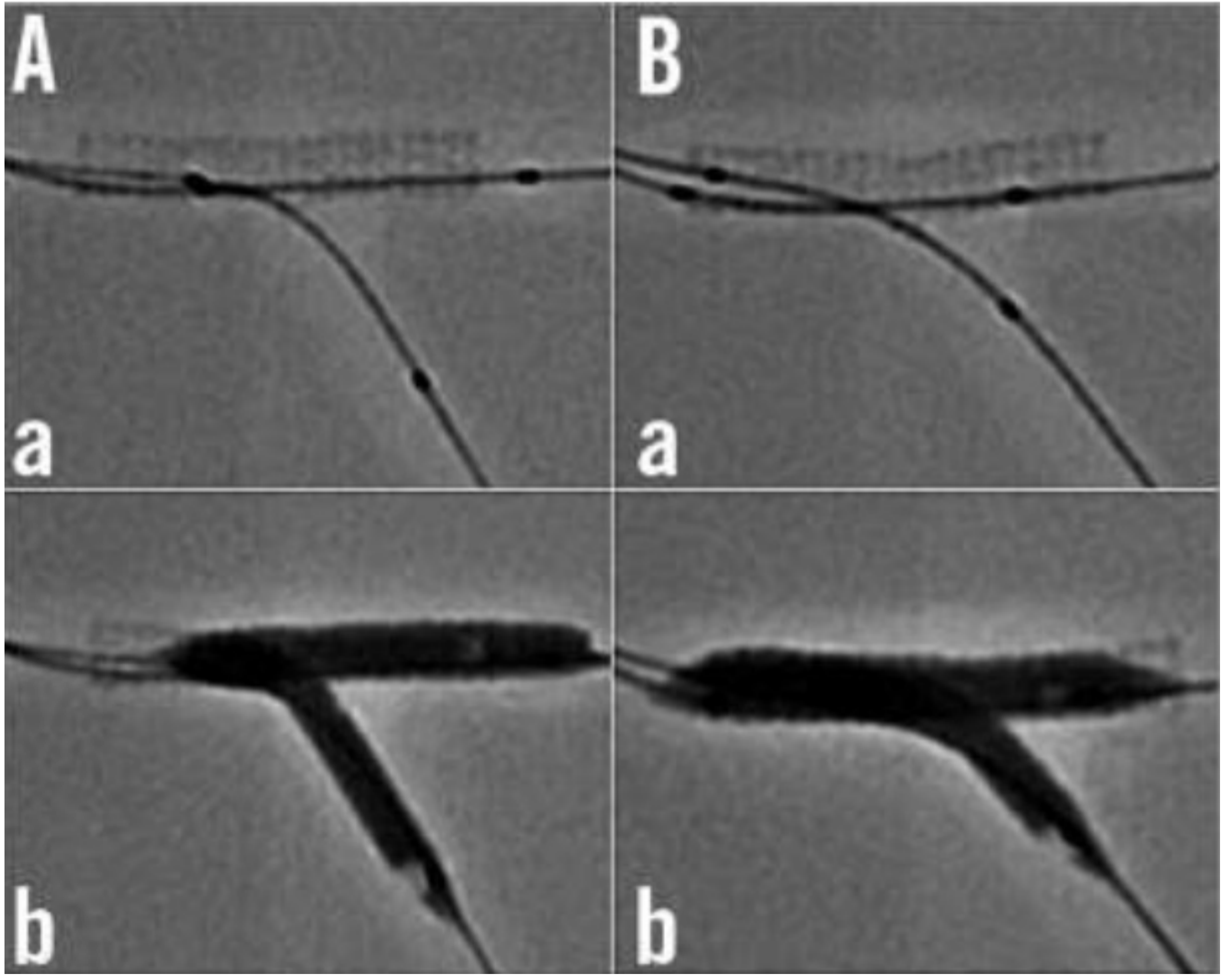
INDEPENDENT PREDICTORS OF TLR




A
100
95
90
85
80
Percent survival
Provisional
2-stents strategy
p=0.002
0
5
10
15
Months
B
100
95
90
85
80
Percent survival
FKB
no FKB
p=0.038
0
5
10
15
Months
C
100
95
90
85
80
Percent survival
Use of imaging
Not use of imaging
p=0.002
0
5
10
15
Months


FKB
no FKB
A
PROVISIONAL STRATEGY
40
30
20
10
0
3.8
3.7
2.0
1.8
0.0
0.7
0.4
0.4
TLR overall
On LM
Ostial/proximal LAD
Ostial/proximal CX
B
2 stents strategy
40
30
20
10
0
6.2
32.4
2.5
20.0
0.0
2.5
0.8
6.7

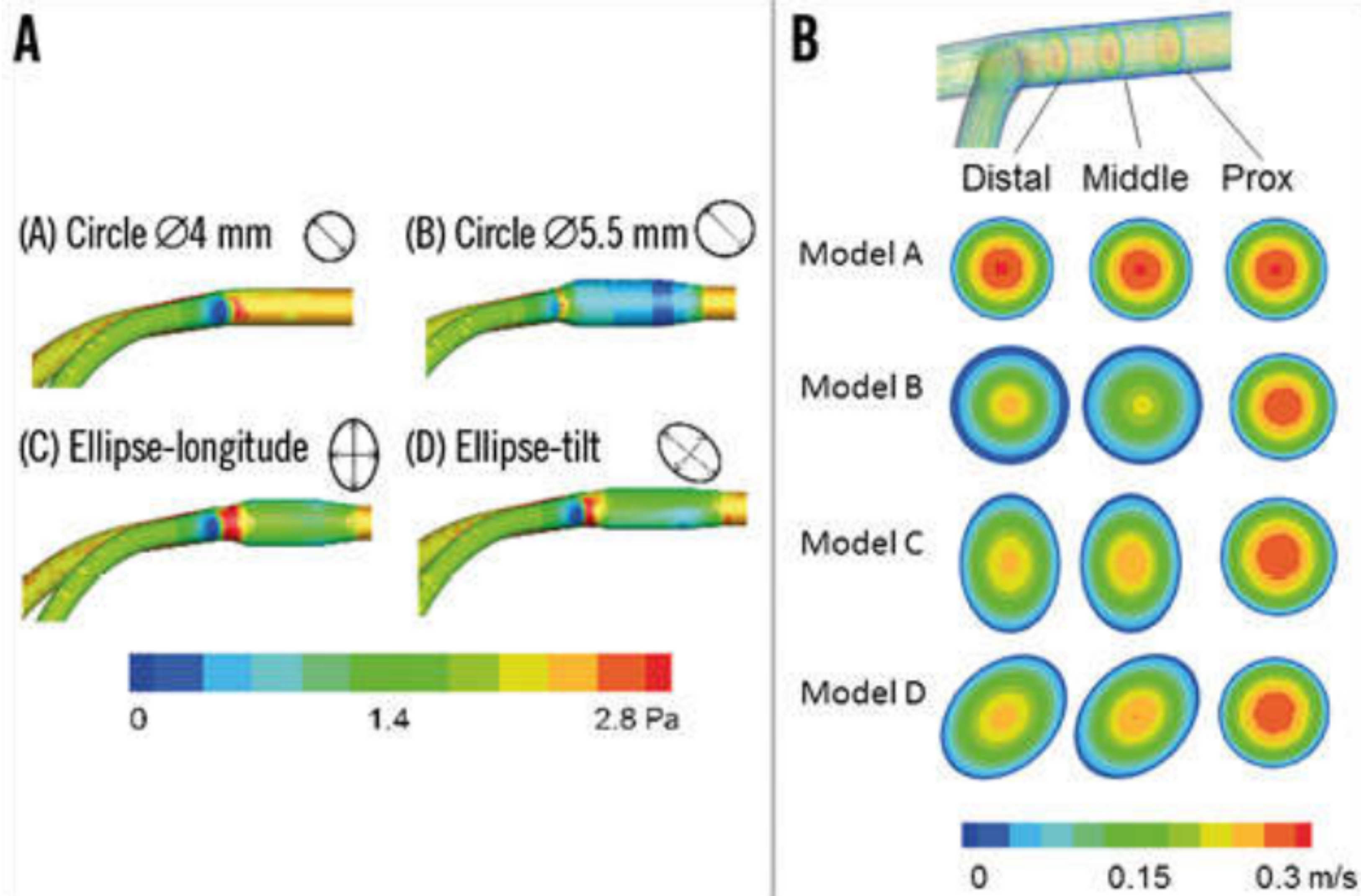

Use of imaging
Not use of imaging
A
PROVISIONAL STRATEGY
15
10
5
0
2.2
5.4
1.2
3.2
0.3
0.4
0.0
1.1
TLR overall
On LM
Ostial/proximal LAD
Ostial/proximal CX
B
2 stents strategy
15
10
5
0
7.3
14.1
3.1
7.9
0.0
4.7
1.6
2.2



Optimal kissing balloon inflation after single-stent deployment in a coronary bifurcation model

EuroIntervention 2014;10:934-941 published online ahead of print February 2014. DOI: 10.4244/EIJV10I8A160

Yoshinobu Murasato[1]*, MD, PhD; Kiyotaka Iwasaki[2], PhD; Tadashi Yamamoto[2], MD; Takanobu Yagi[2], PhD; Yutaka Hikichi[2,3], MD, PhD; Yasunori Suematsu[1], MD; Tomohiko Yamamoto[1], MD



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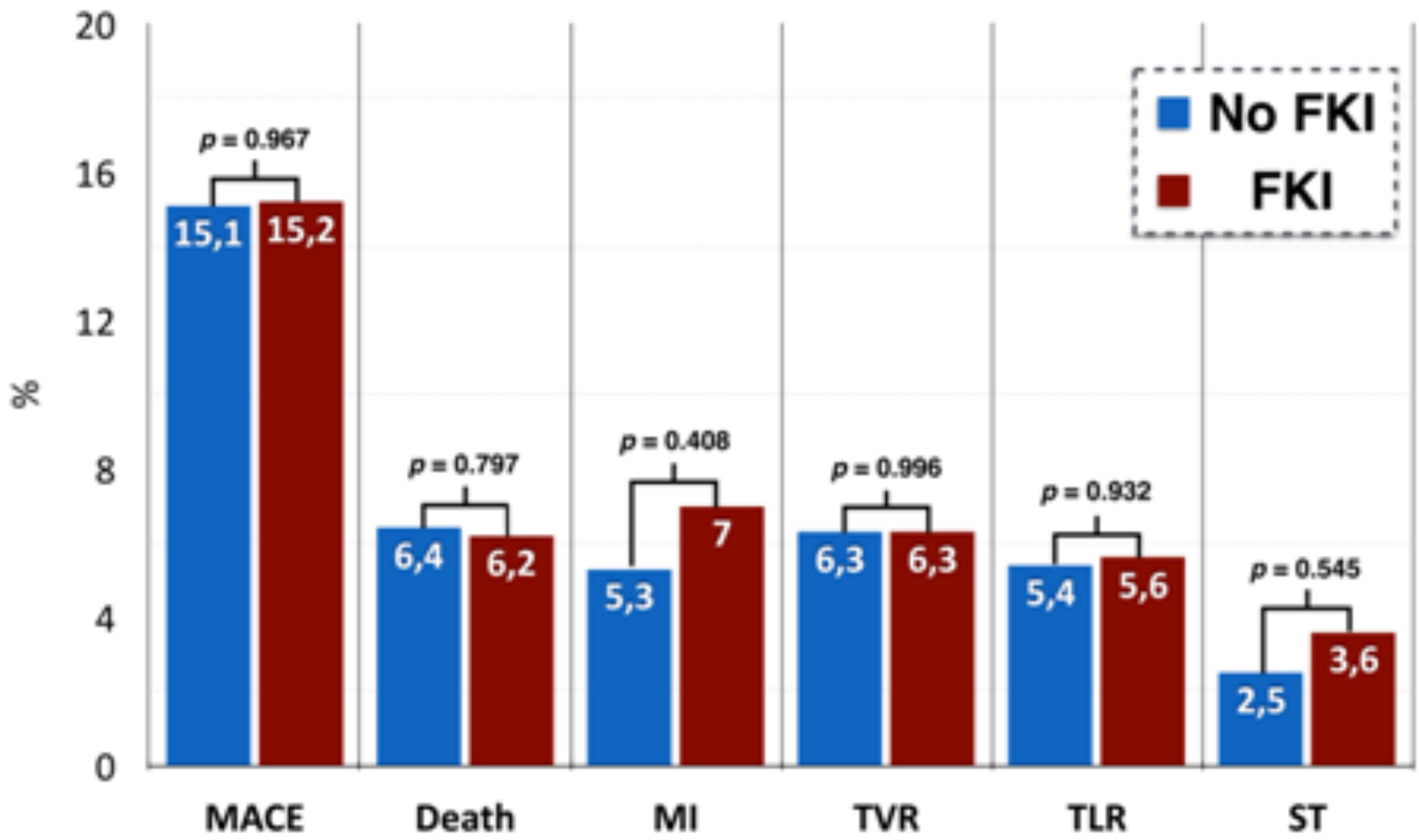


Figure 1. Follow-up in the overall population, stratified by Final Kissing Balloon Inflation (FKI).
MACE = Major Adverse Cardiac Events; MI = Myocardial Infarction; TVR = Target Vessel Revascularisation;
TLR = Target Lesion Revascularization; ST = Stent Thrombosis.

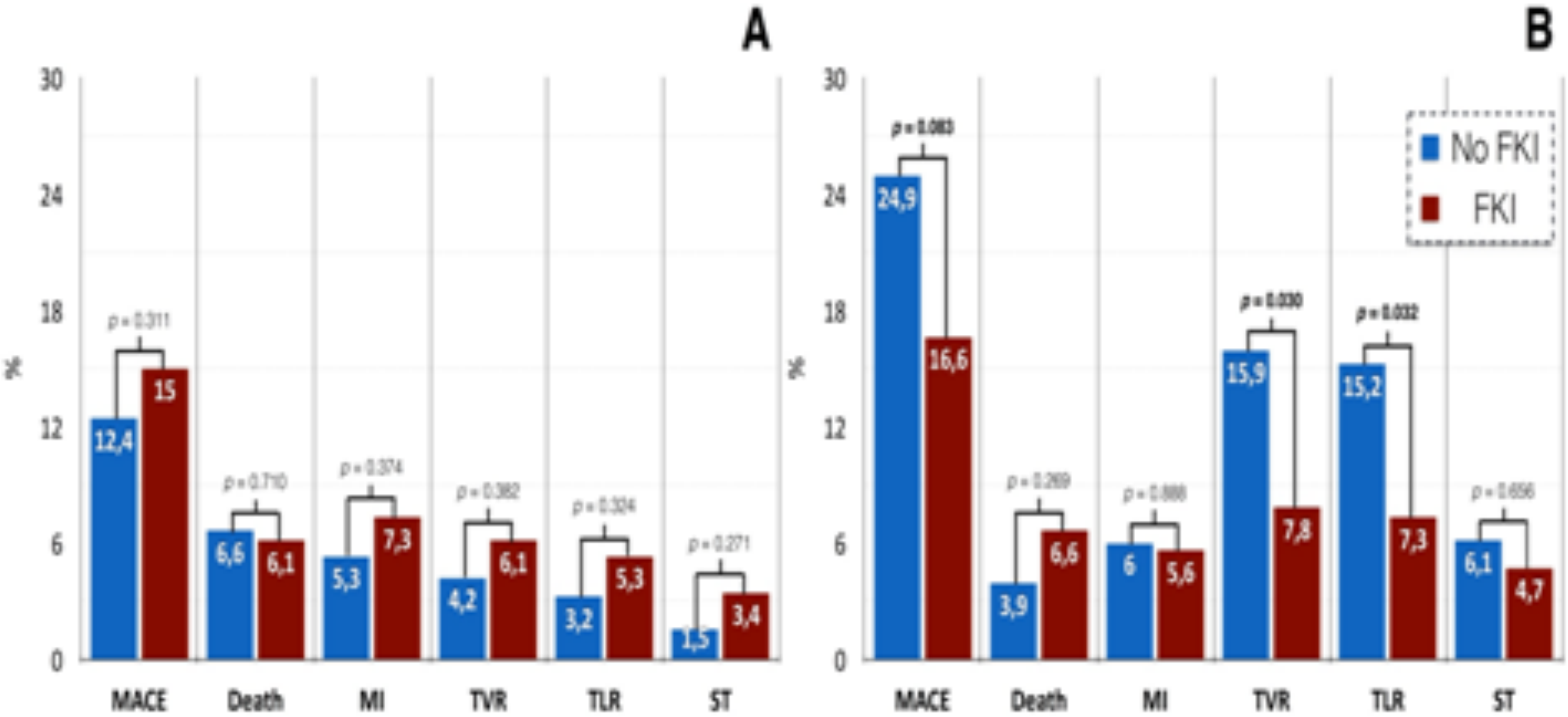


Figure number 2. Follow-up of patients treated with provisional technique (**A**) and with 2 stents technique (**B**).

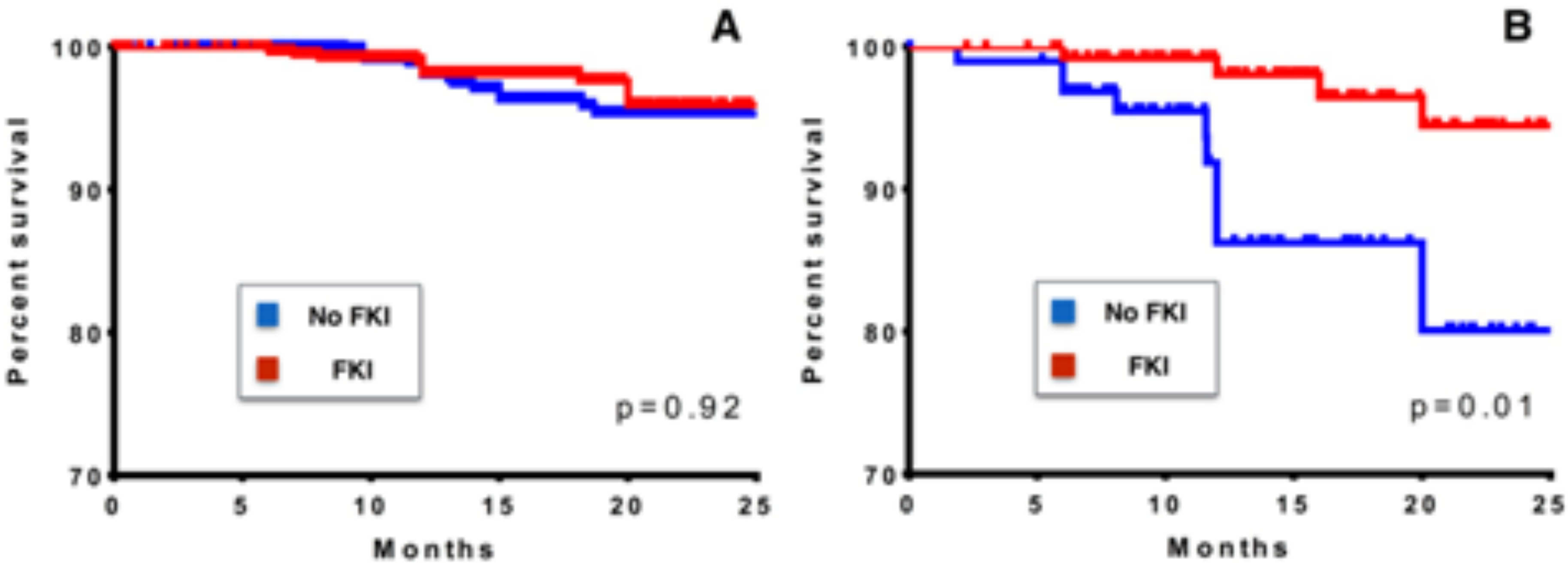
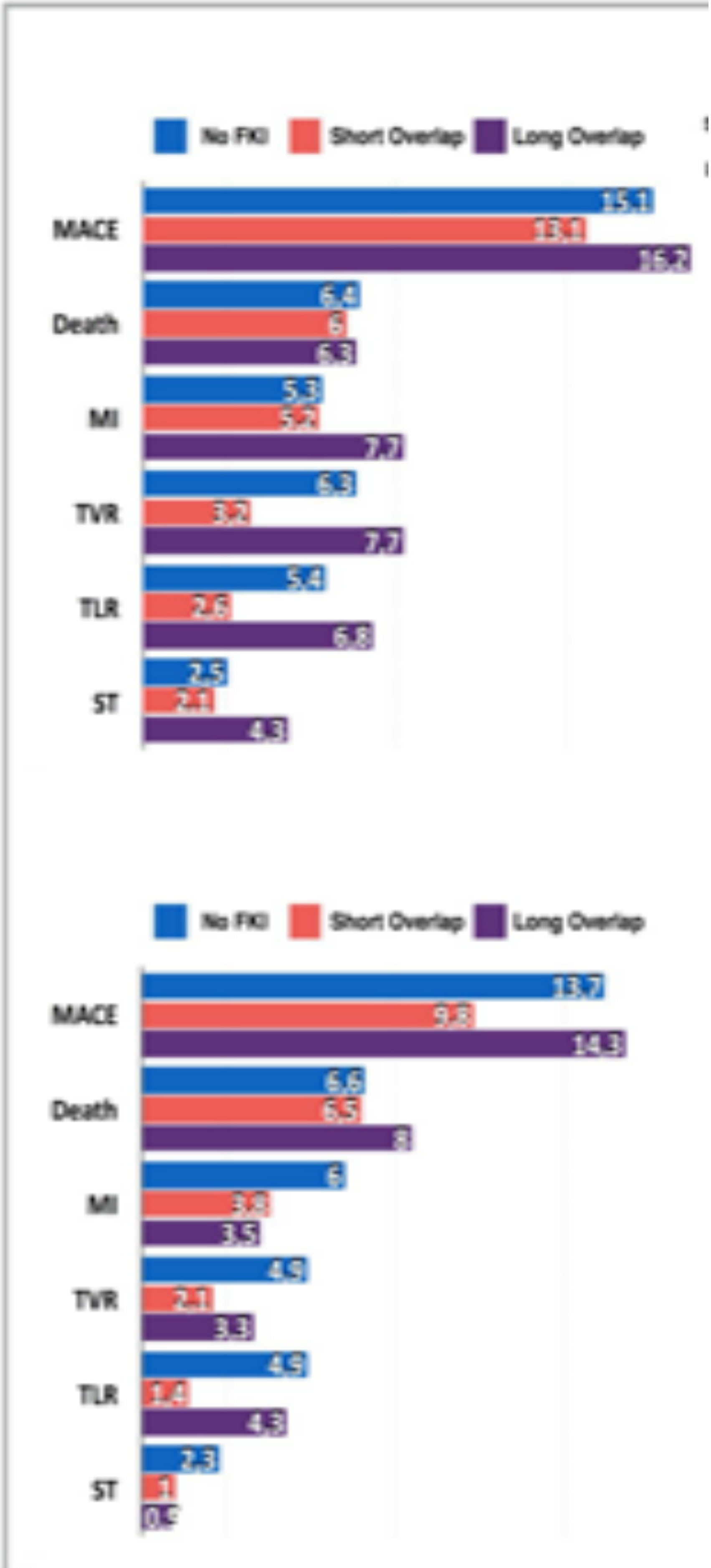


Figure 3. Kaplan-Meier curves show freedom from Target Lesion Revascularization (TLR) in provisional (**A**) and 2 stents strategy (**B**).



No FKI
Short Overlap
Long Overlap
MACE
Death
MI
TVR
TLR
ST
15.1
13.1
15.2
6.4
6
6.3
5.3
5.2
7.7
6.3
3.2
7.7
5.4
2.6
6.8
2.5
2.1
4.3
No FKI
Short Overlap
Long Overlap
MACE
Death
MI
TVR
TLR
ST
13.7
9.8
14.3
6.6
6.5
8
6
3.8
3.5
4.9
2.1
3.3
4.9
1.4
4.3
2.3
1

CONCLUSIONS.

- Imaging reduced restenosis in ULM and should be exploited more.

- FKI for sure reduce restenosis in 2 stents

- If you perform provisional, perform FKI with a short overlap

Thanks a lot!