LM strategy from MITO registry

Ogaki Municipal Hospital

Kensuke Takagi

Agenda

- Introduction
- MITO Registry
- Left Main PCI strategy

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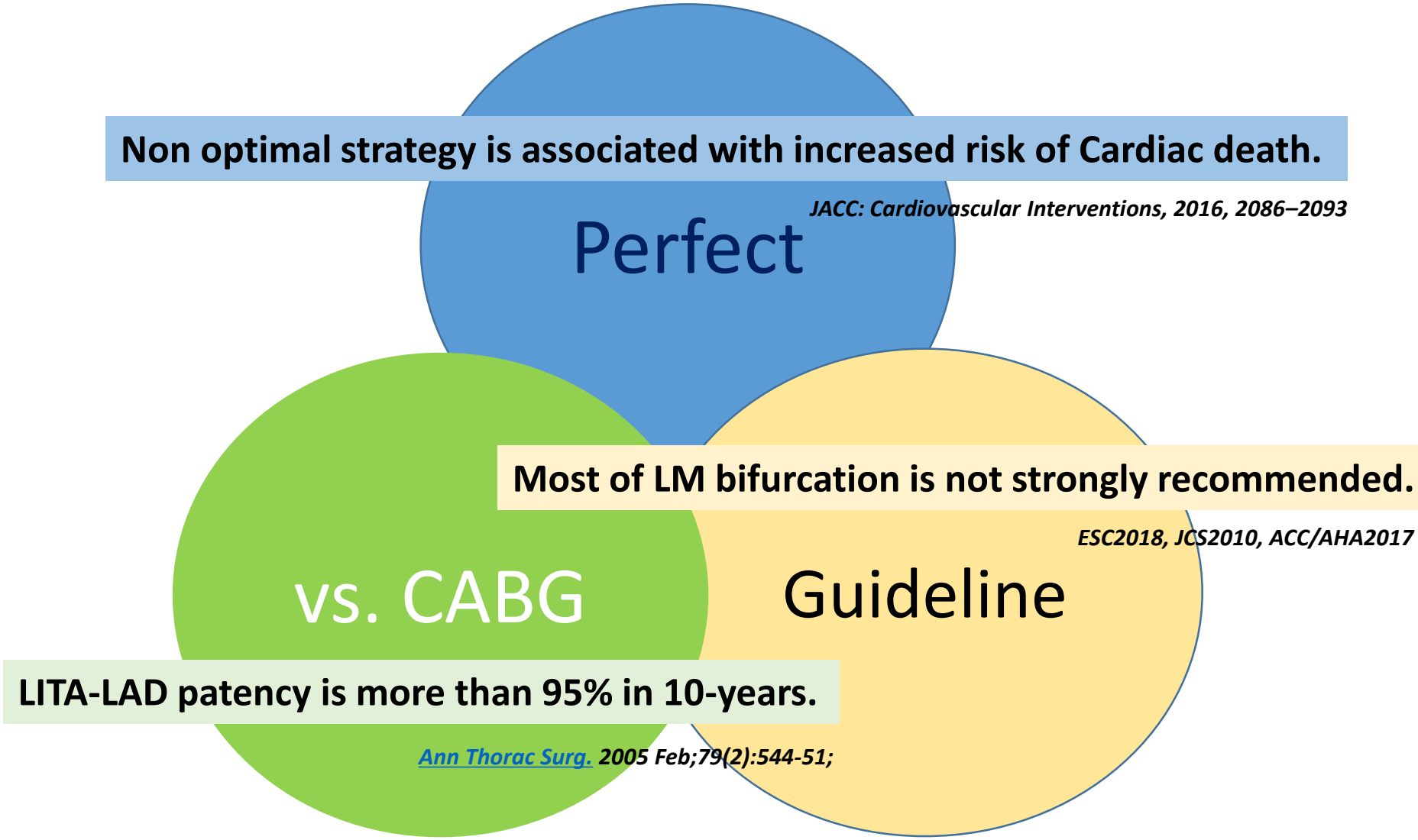
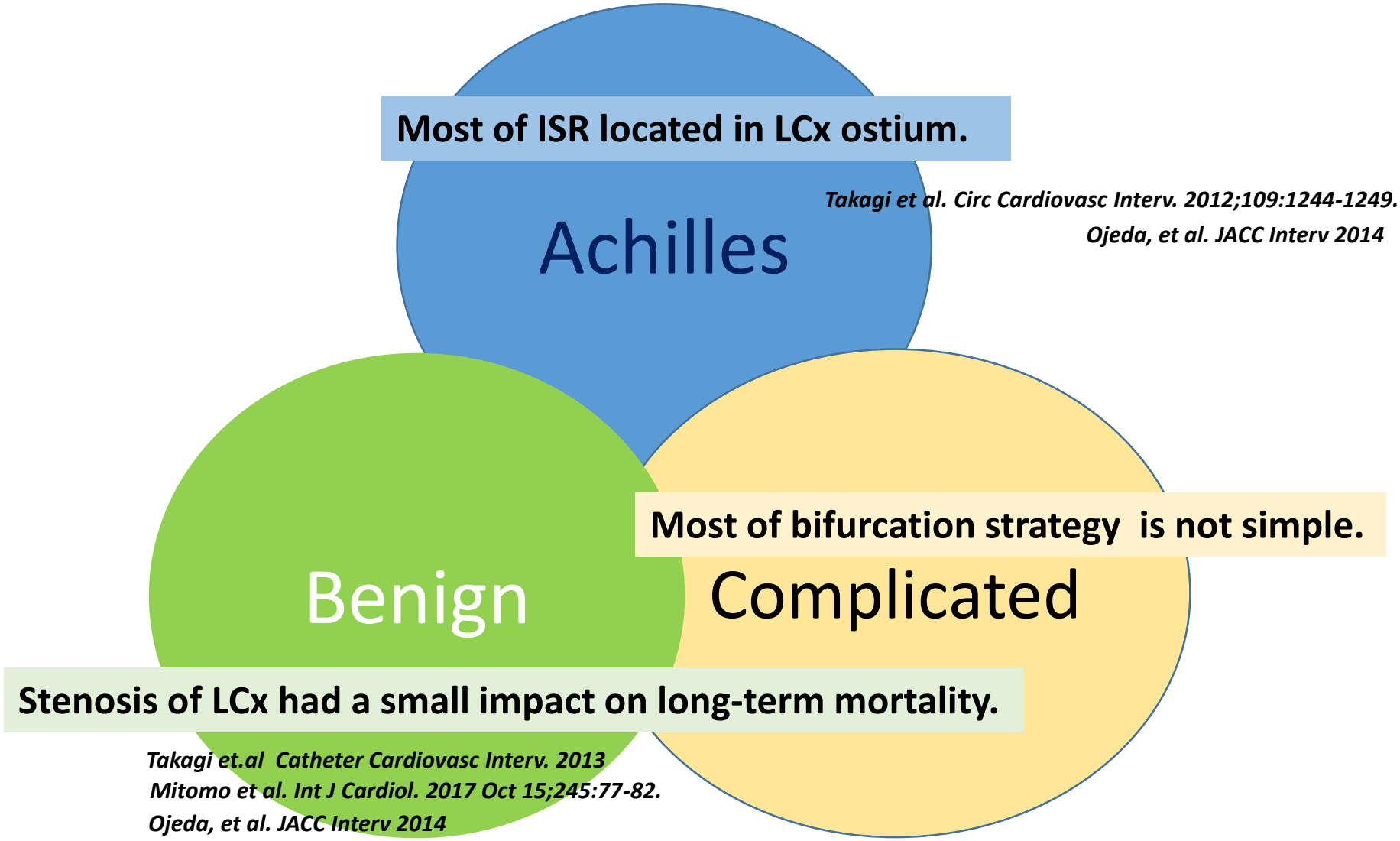
- Left Main PCI strategy

Introduction: LMT-PCI



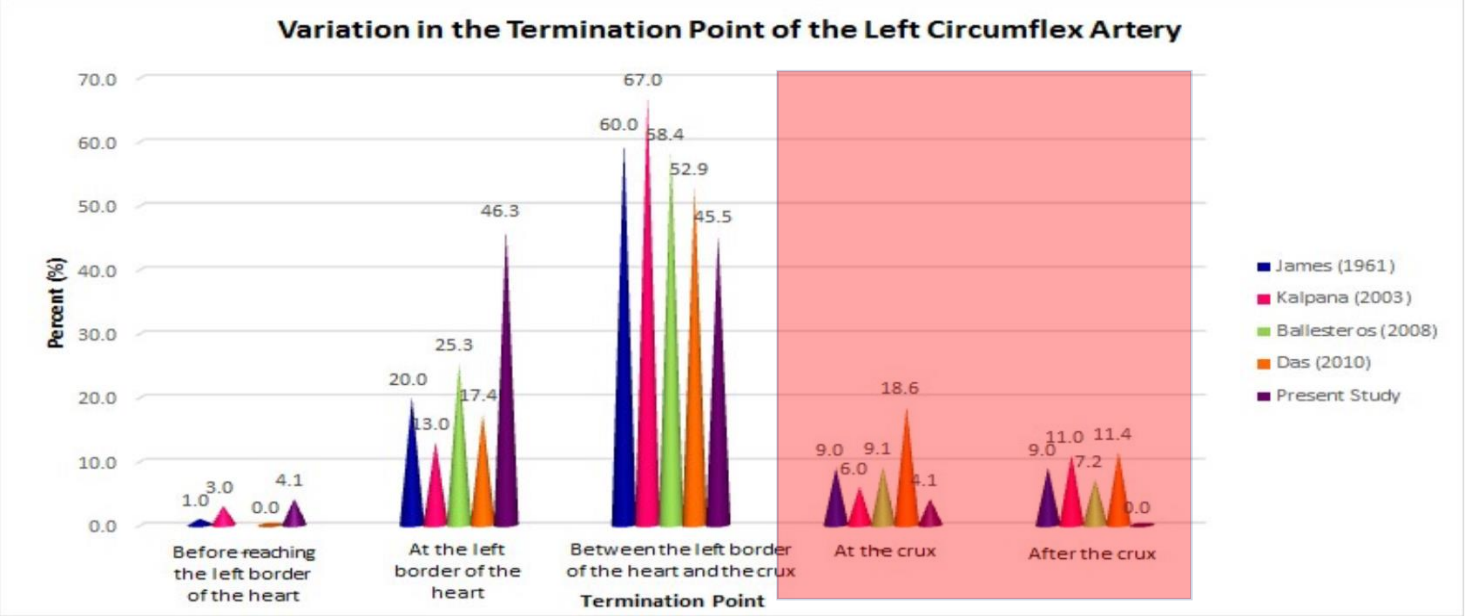
Introduction: LCx



Introduction: Territory of LCx

- ✓ Balloon Size 3.5mm≥: **10.4%** (n-579)
- ✓ Vessel diameter 3.0mm≥: **15.4%** (n-862)
- ✓ Vessel diameter 3.0mm≥ & TBL: **9.0%**(n-862)

Mito Registry



Eur. J. Anat. 22 (4): 355-365 (2018)

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MITO and New-Tokyo Registry

#8 Rota
#9 LM Optimal stenting
#10 OCT: mechanism of ISR
- OCT: effectiveness in LM

Fujino.Y

Milan
n=373
2002 April

New-Tokyo
n=656
2005 April

MITO LM Registry n=1029 patients

- 1st DES N=765
- 2nd DES N=264

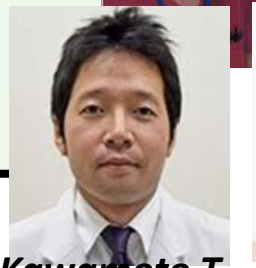
Naganuma.T

#1 LM-ISR
#2 LM MB restenosis
#3 Trifurcation
- RCA-CTO

#4 LM-LCx stenting
- Ostial

#5 Renal dysfunction
- Gender

#6 1-stent vs. 2-stent
#7 Mini vs. cullote
- TAP
- Cross-over with KBT



Kawamoto.T

Mitomo.S

Watanabe.Y

#1 Every MITO findings began….

Takagi et al. Circ Cardiovasc Interv. 2012;109:1244-1249.

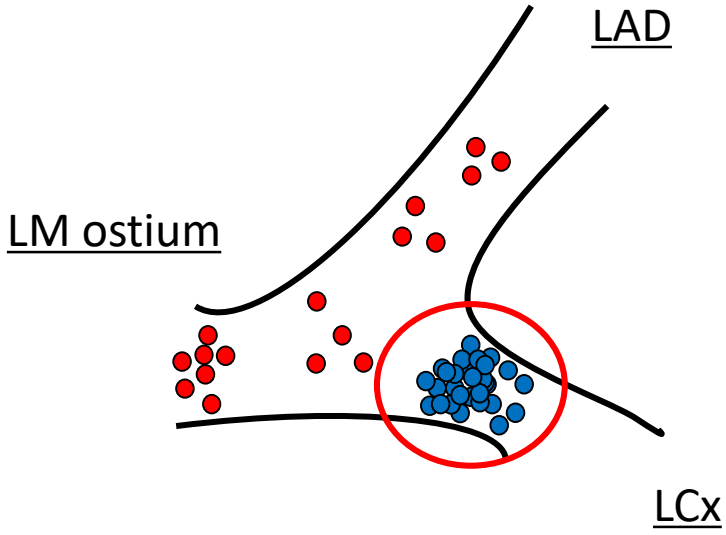
Baseline Angiographic Characteristics in UDLM Patients According to Stent Strategy

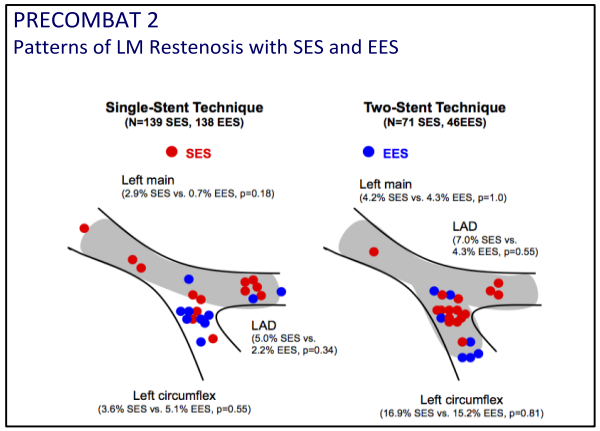
Patients: n (%)	All patients (n=474)	1-Stent Strategy (n=280)	2-Stent Strategy (n=194)	p-value
LM+ 3VD	191 (40.3)	98 (35.0)	93 (47.9)	0.006
Stenosis of LCx >75%	171 (36.1)	67 (23.9)	104 (53.6)	0.001
Stenosis Length of LCx >10mm	94 (19.8)	36 (12.9)	58 (29.9)	0.001
True-Bifurcation (Medina 111, 101, 011)	292 (61.6)	133 (47.5)	159 (82.0)	0.001
IABP	71 (15.0)	27 (9.6)	44 (22.7)	0.001
Angiographic follow-up	416 (87.8)	244 (87.1)	172 (88.7)	0.67

#1 ISR located in ostial LCx following LM-PCI

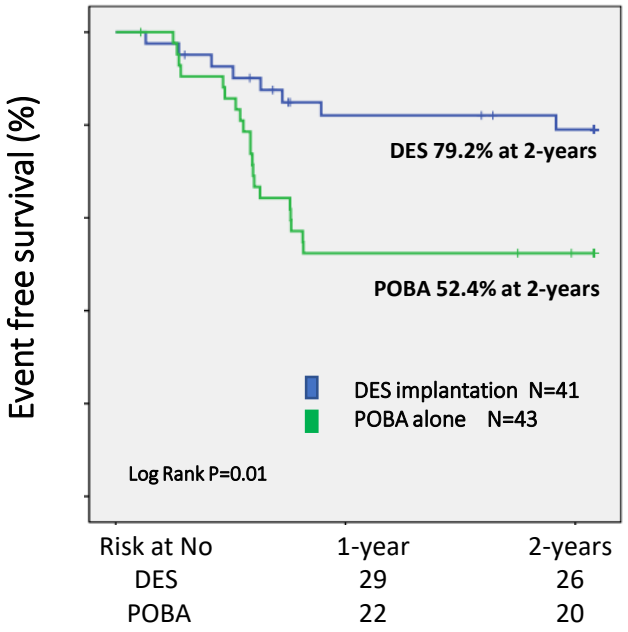
Takagi et al. Circ Cardiovasc Interv. 2012;109:1244-1249.

Mito registry in 1st DES





POBA vs. DES



Risk at No	1-year	2-years
DES	29	26
POBA	22	20

Supportive paper

Ojeda et al. JACC Caridovasc Interv 2014

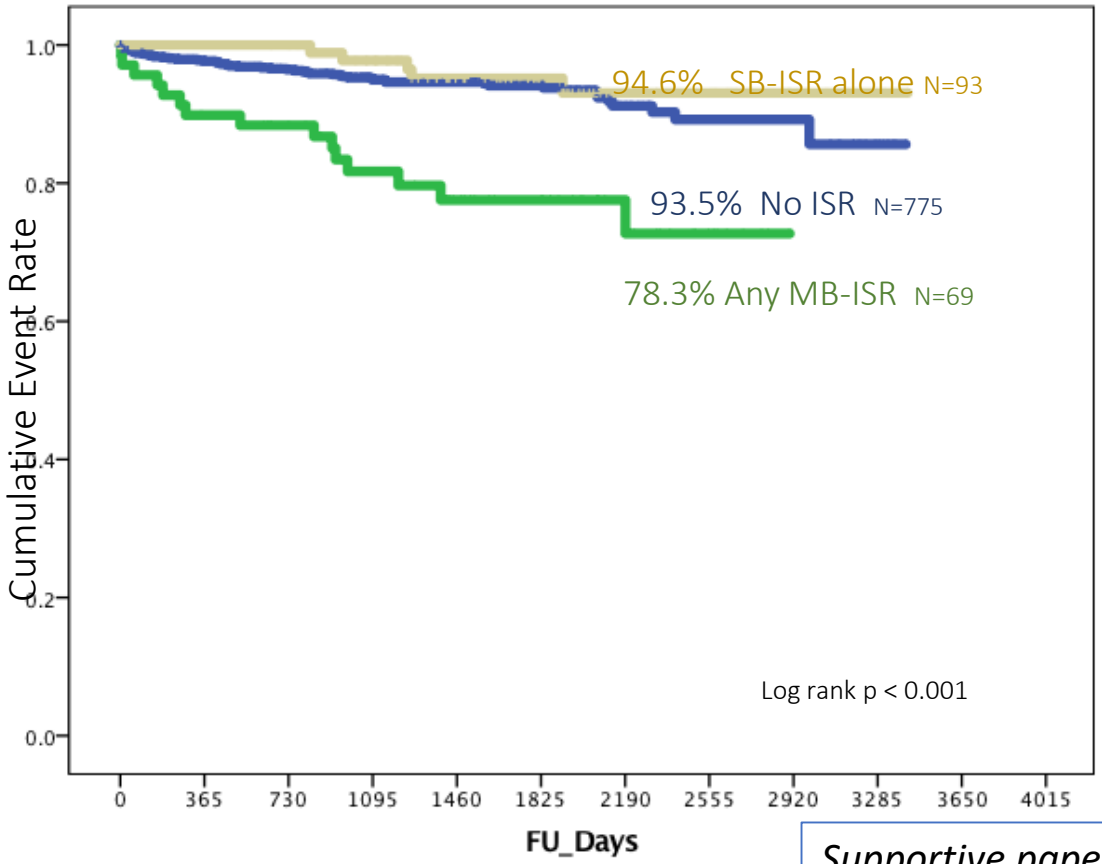
KIM et al. JACC Cardiovasc Interv. 2012 Jul;5(7):708-17.

#2 LCxos-ISR has a small impact on long-term mortality

Takagi et.al Catheter Cardiovasc Interv. 2013

937 Distal LM from MITO registry

Cumulative survival free from Cardiac death



Unpublished data

Supportive paper

Ojeda et al. JACC Caridovasc Interv 2014

JCR in Busan

#2 LM-LAD-ISR has a impact on long-term mortality

Takagi et.al Catheter Cardiovasc Interv. 2013 Sep 2

Predictors of LMMB-ISR

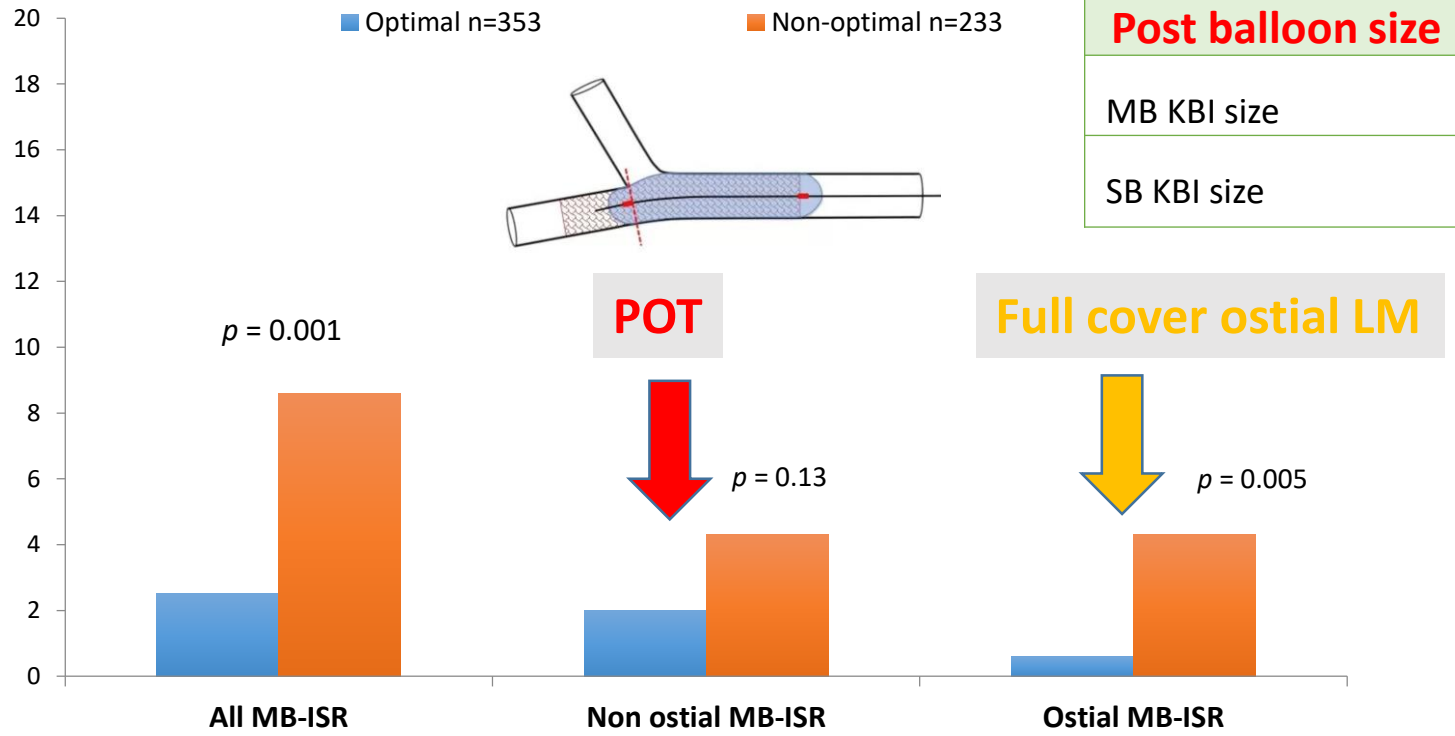
	Univariable HR (CI)	P Value	Coxadjusted HR (CI)	P Value
Calcification	2.114 (1.085-4.121)	0.03	2.284 (1.165-4.475)	0.02
True-bifurcation	2.764 (1.344-5.668)	0.01	2.331 (1.117-4.862)	0.02
IDDM	2.742 (1.234-6.092)	0.01	2.259 (1.007-5.068)	0.05
Post MLD	0.568 (0.346-0.932)	0.03	0.611 (0.364-1.026)	0.06
Post dilatation	**0.43** (0.23-0.81)	0.01	**0.55** (0.28-1.07)	0.08
Full cover	**0.41** (0.24-0.71)	0.001	**0.61** (0.34-1.09)	0.09
IABP	2.115 (1.126-3.971)	0.02		
3 VD	1.750 (1.015-3.016)	0.04		
Dialysis	2.760 (0.993-7.670)	0.05		
2-stent strategy	1.651 (0.957-2.848)	0.07		

#2/#9 Full cover + POT reduce MB-ISR

Takagi et.al Catheter Cardiovasc Interv. 2013 Sep 2 Cardiovasc Revasc Med. 2016 Sep 4

Not necessary in case of IVUS showing > 30% stenosis and long ostial LM

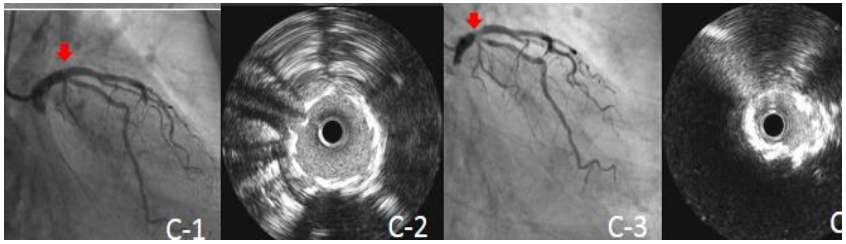
patients, N-141	
Stent size	3.4±0.3
Post balloon size	**4.4**±0.3
MB KBI size	3.4±0.4
SB KBI size	2.8±0.3



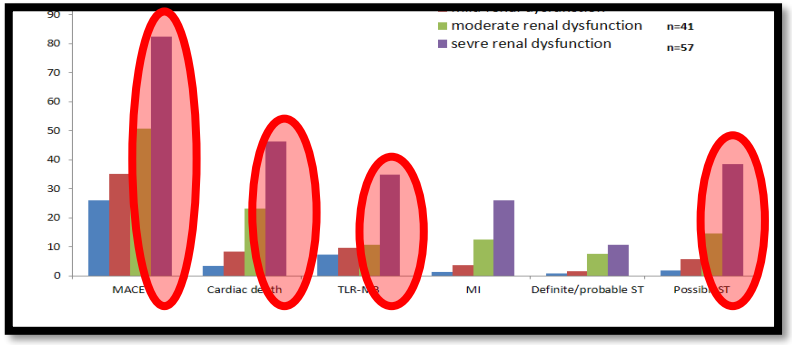
#5/#8 HD and calcified LM are associated with poor putcomes…

Yabushita, Takagi et.al Circ J. 2014;78(8):1867-72 *Takagi et al.* **Int J Cardiol. 2014 Dec 20;177(3):1131-3.**

New-Tokyo and MITO registry in HD



non-HD patients (n=51)	2.1%
HD patients (n=13)	46.2%
MI	4.7%
Definite/Probable ST	6.1%



Yabushita, Takagi et.al Circ J. 2014;78(8):1867-72
Takagi et al. **Int J Cardiol. 2014 Dec 20;177(3):1131-3.**

ROTATE registry 86 severe calcified UDLM patients

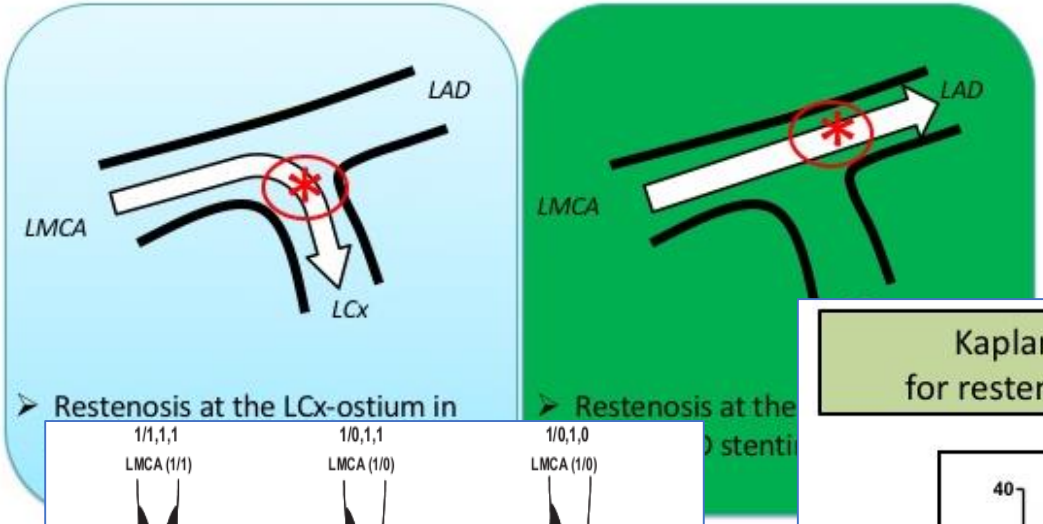
- definite/probable ST 3.9% in LM vs. 0.8% in non-LM

Lelasi, Kawamoto et al. Am J Cardiol. 2017 May 1;119(9):1331-1337.

#4 LM-LCx Stenting is not acceptable for medina 001.

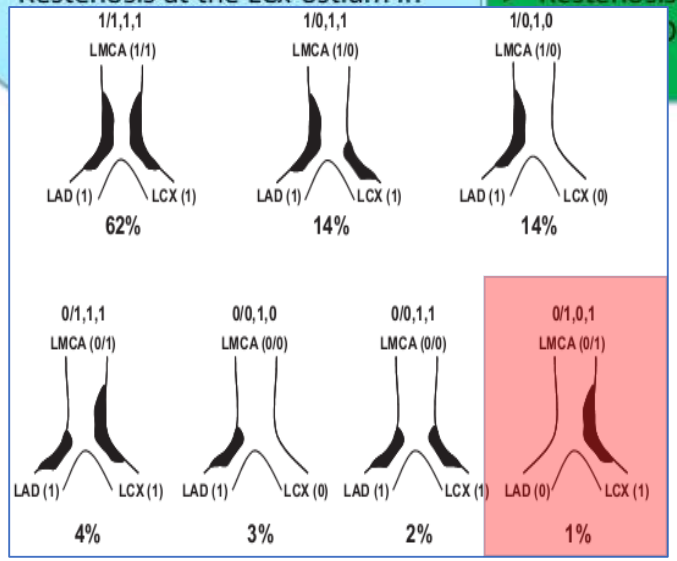
Naganuma T et al. Catheter Cardiovasc Interv. 2013

If we focus on TLR for restenosis at the ostium of the stented-branch…

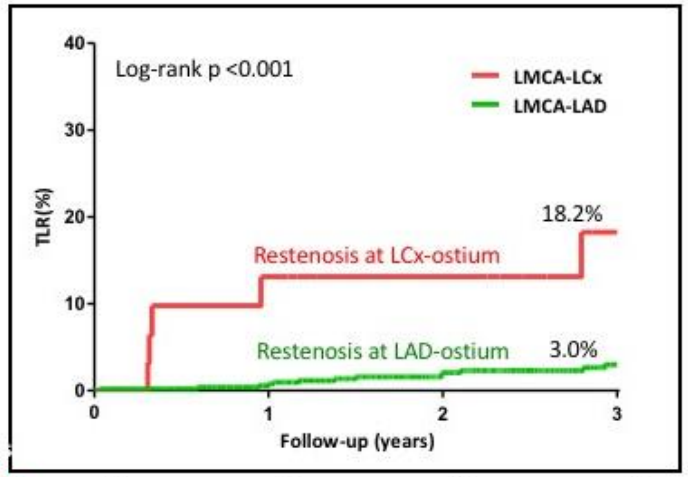


➢ Restenosis at the LCx-ostium in

➢ Restenosis at the



Kaplan-Meier 3-year incidence curve of TLR for restenosis at the ostium of the stented-branch

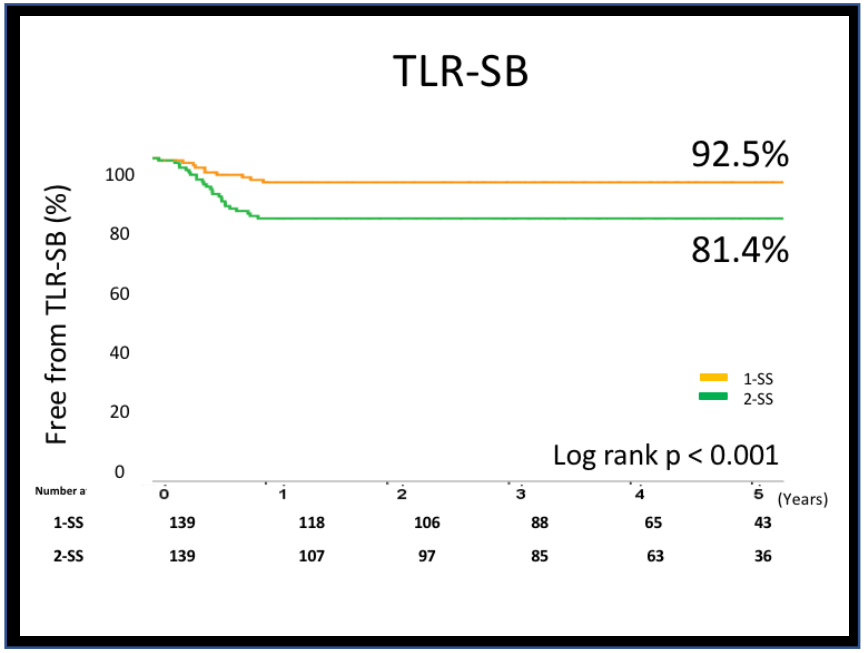


LMCA-LCx	31	27	23	15
LMCA-LAD	553	512	400	279

Oviedo C, et al. Circ Cardiovasc Interv 2010

#6 Cardiac death was quite low in 2-SS using Second-DES. However, LCx-ISR was still high.

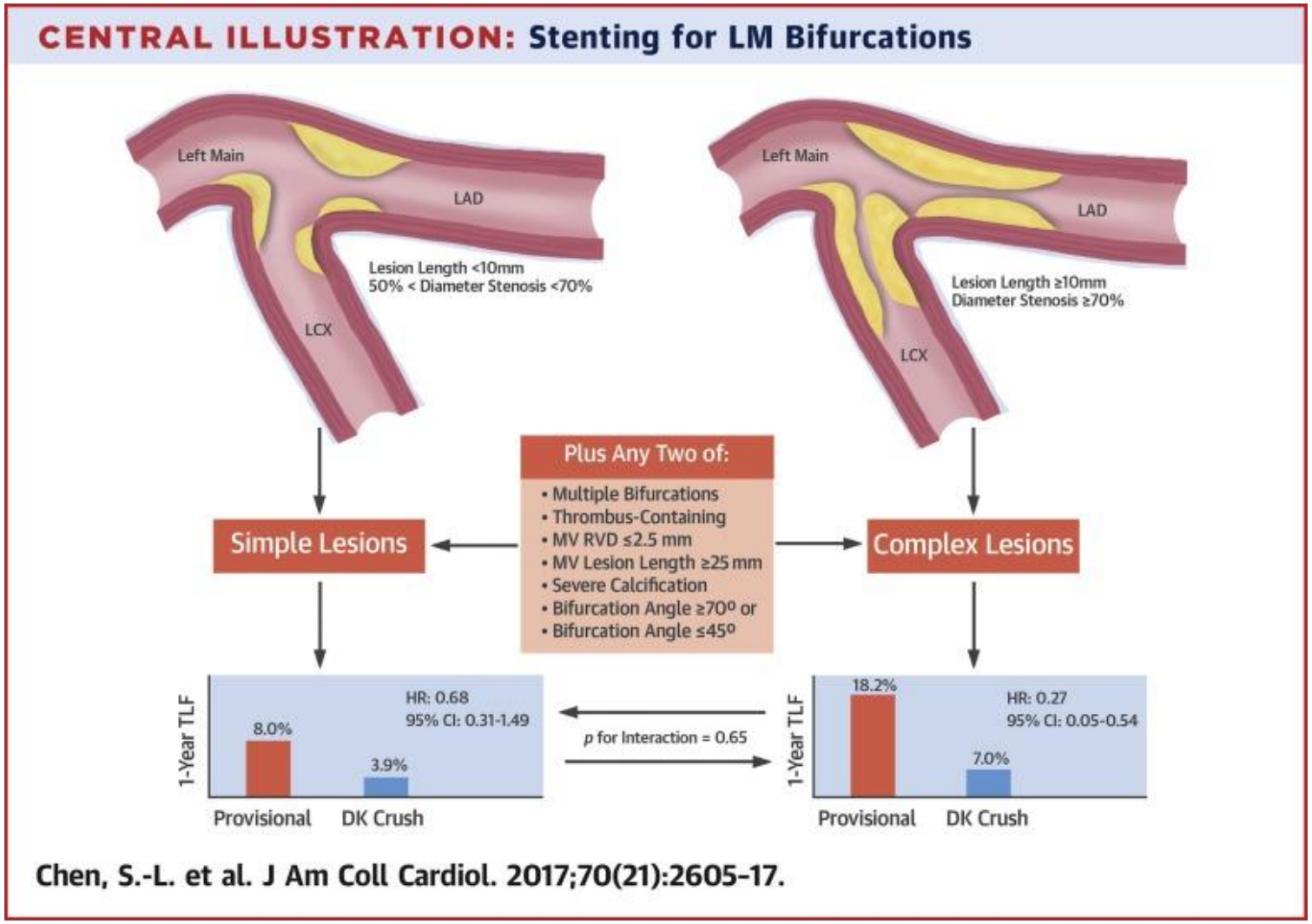
- Device :
  First DES in 75%
- Procedure:
  KBT in 95%, POT in 65%, IVUS in 60%
- Technique:
  Crush series in 51%
- Patient Background:
  High SYNTAX in 30%, ESRD in 7%



The difference between 1-SS and 2-SS in the LM-PCI is associated with the high development of SB restenosis in 2-SS, which had little impact on long-term mortality.

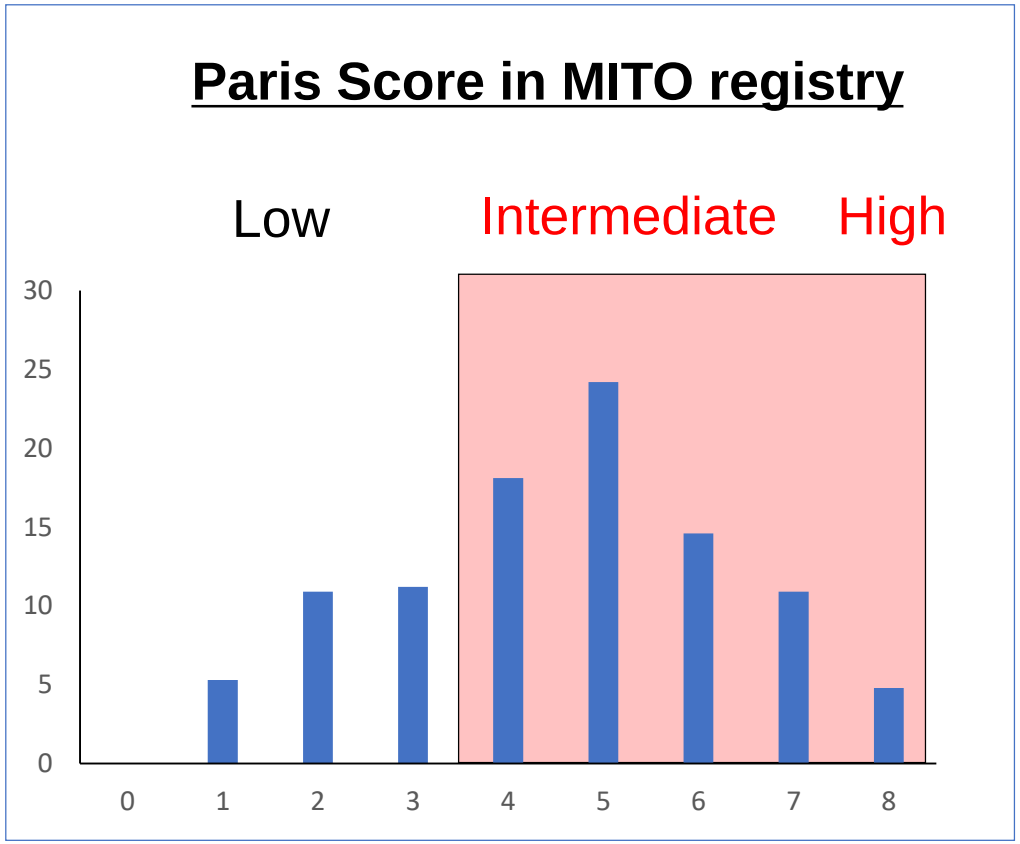
Takagi et al. Circ Cardiovasc Interv. 2016;Nov; 9 (11)

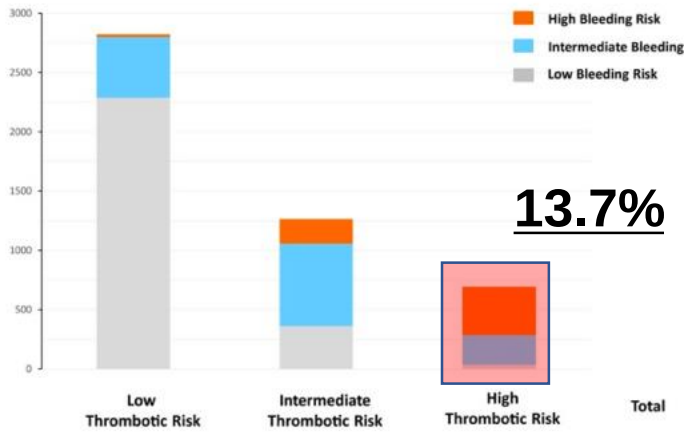
DK crush is better than 1-SS in TBLM



Chen, S.-L. et al. J Am Coll Cardiol. 2017;70(21):2605-17.

LM patients usually categorized to mode-high bleeding risk





[NATSUAKI et al.J Am Heart Assoc.](#) *2018 May 22;7(11)*

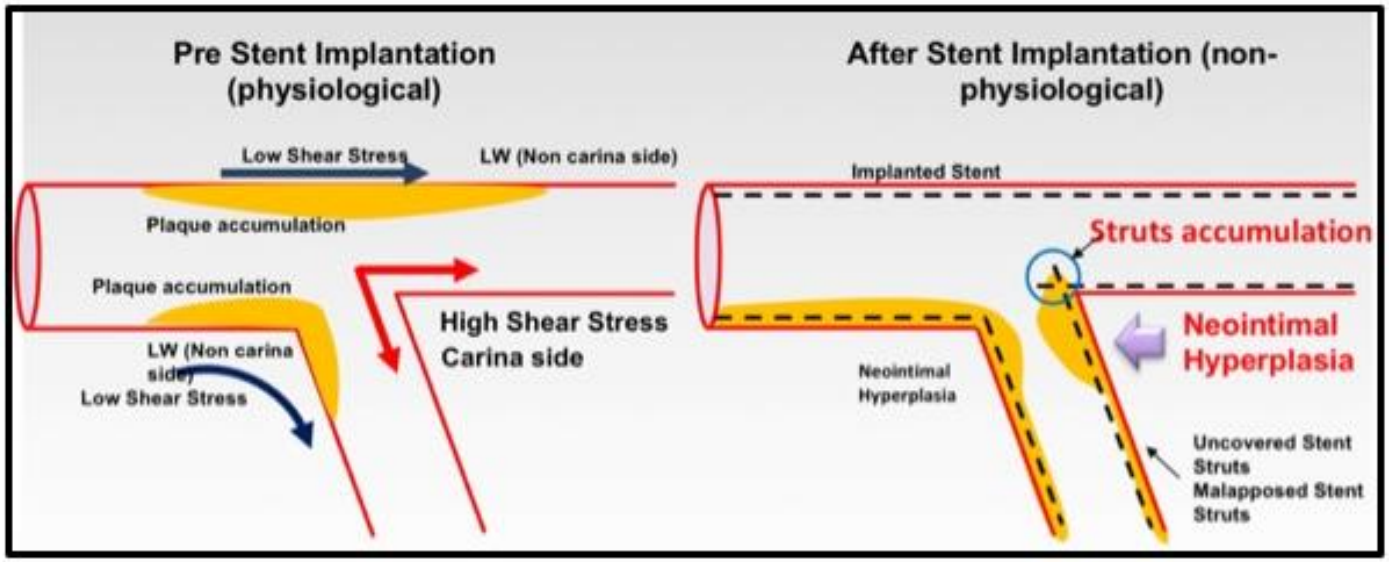
At least 72.6% of the LM patients belongs to intermediate and high bleeding risk group by Paris Score.

Takggi et al. EBC 2017.

#10 Suboptimal 2-SS increased risk of neointima hyperplasia in carina

Fujino et al. Int J Cardiol. 2016;219:285-92

Unique vessel reaction at carina side after 2-stent LM PCI



Usually, there is little plaque accumulation at carina side, however there is NIH accumulation at carina side of LCX proximal after 2 stent technique. Why does it happen?

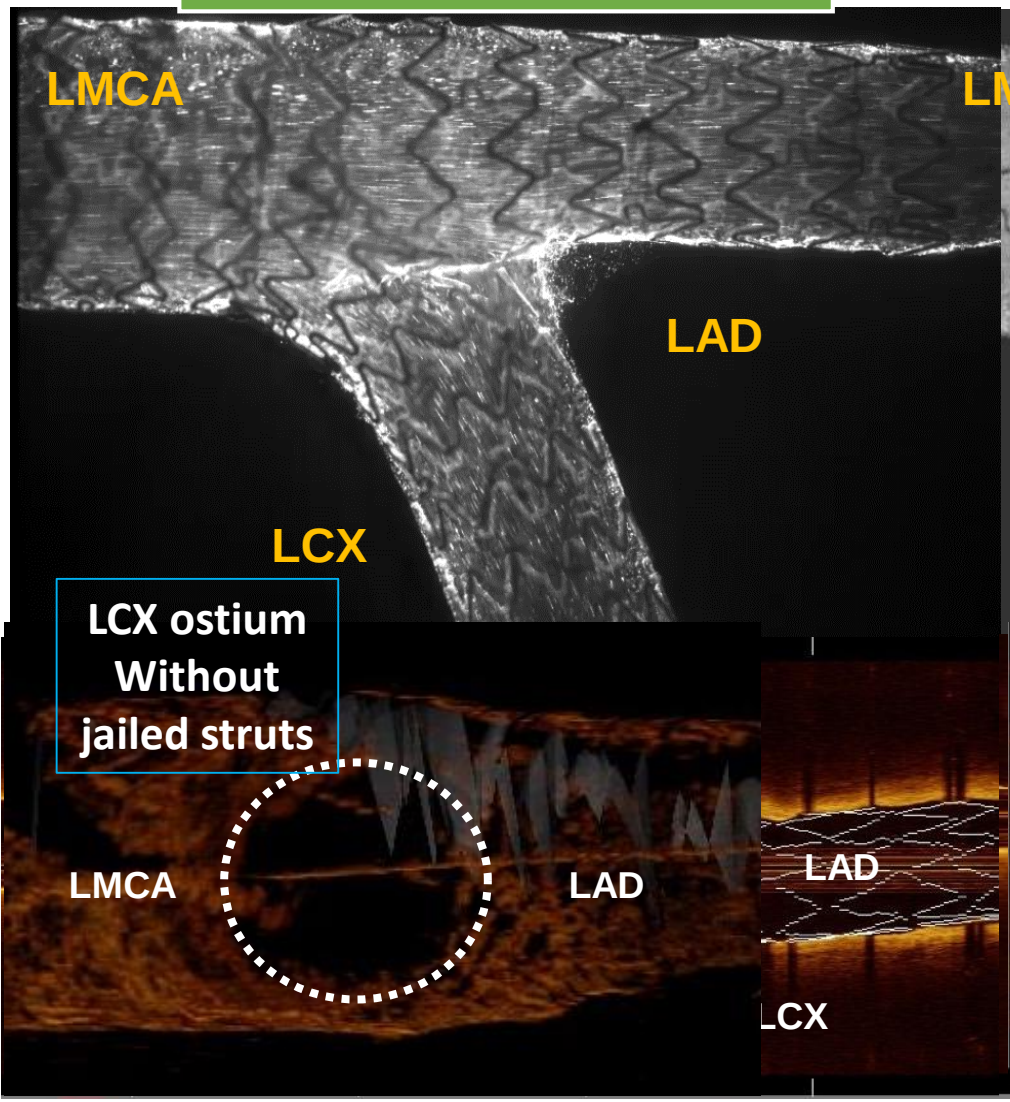
Fujino, Y. , Nakamura, S, et al. Int J Cardiol. 2016:219:285-92.

Suboptimal 2-SS increased risk of LSS

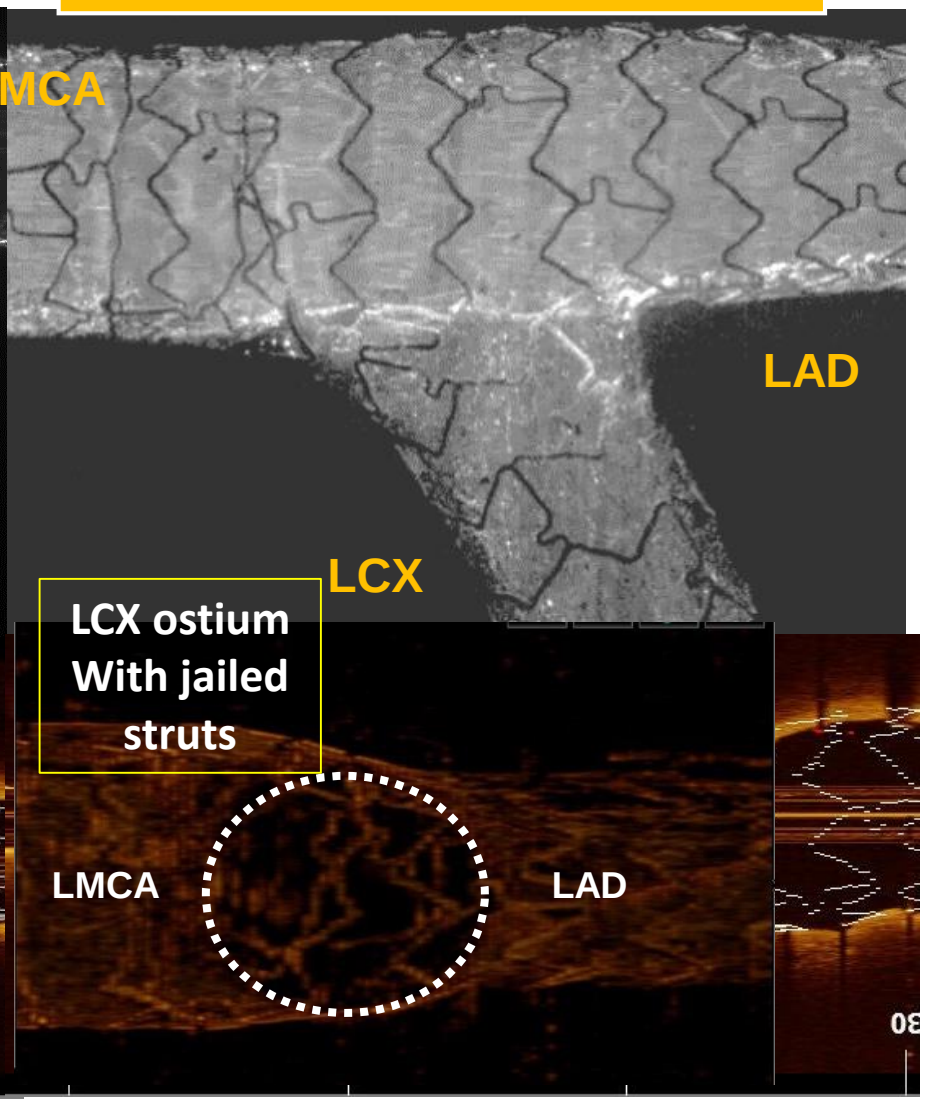
New Tokyo Hospital
Department of Cardiology

Courtesy of Dr. Y.Fujino

Favorable Culotte

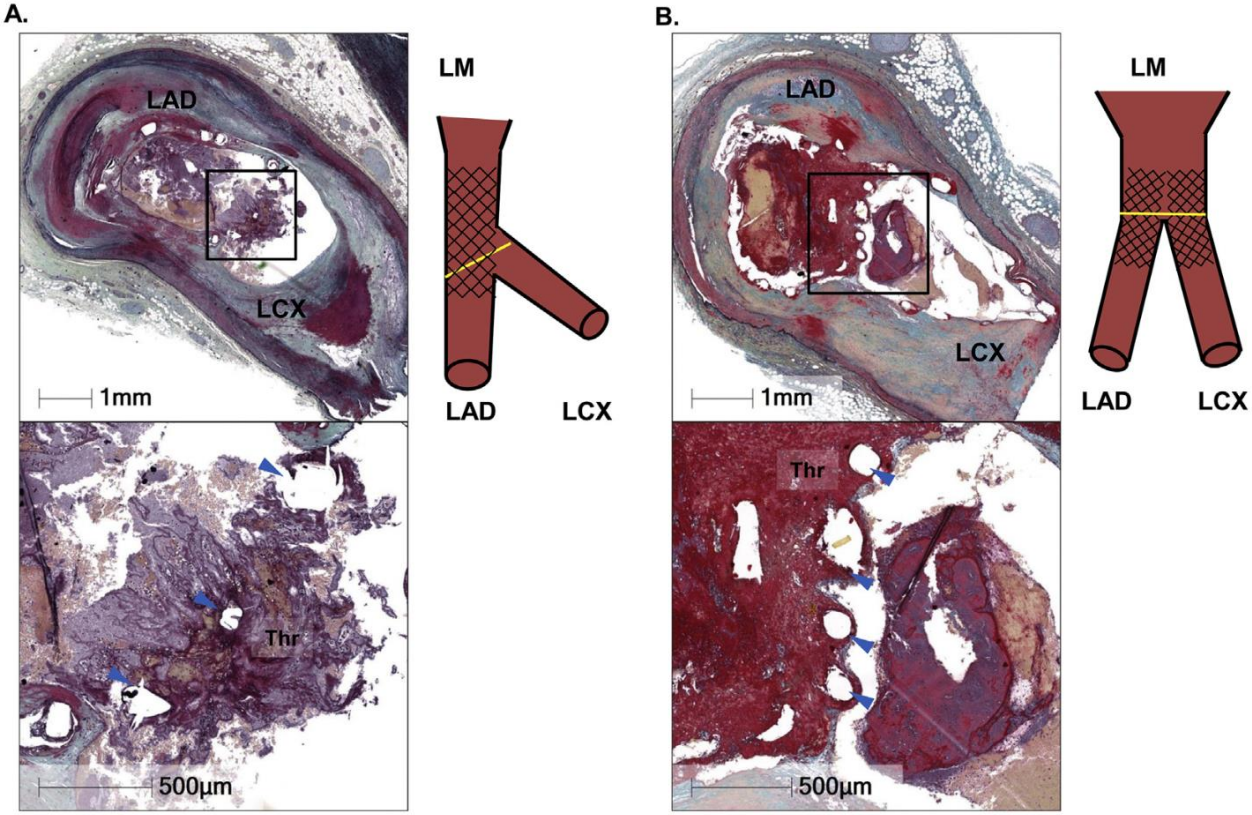


Unfavorable Culotte



Is KBI not necessary in LM bifurcation?

Uncovered and Malapposed strut in LCx increased cardiac mortality

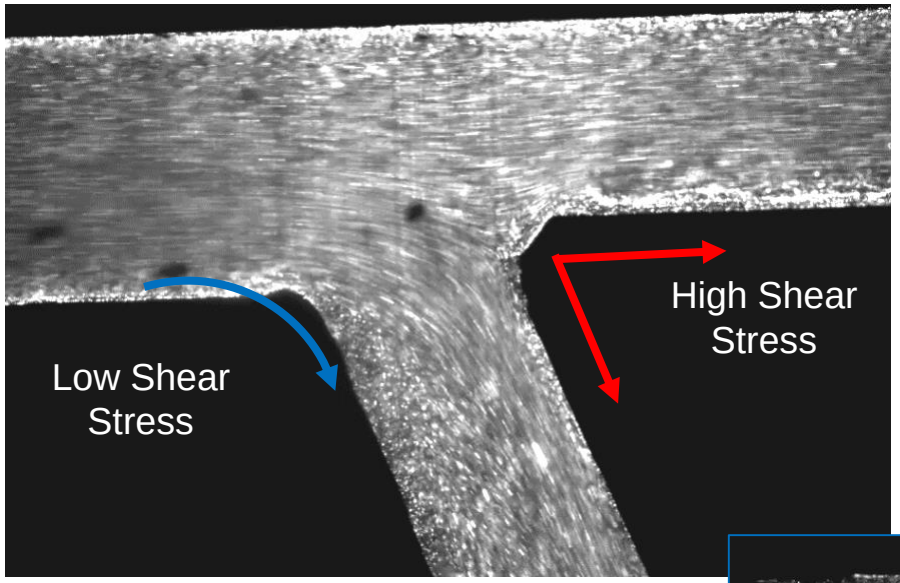


Failed lesions showed significantly greater prevalence of malapposition >20% of struts/section (65% vs. 13%, P < 0.01), stent struts crossing an **ostial side branch >30% of the LCx** (48% vs. 13%, P < 0.01) and **uncovered struts > 30%** (57% vs. 18%, P = 0.03).

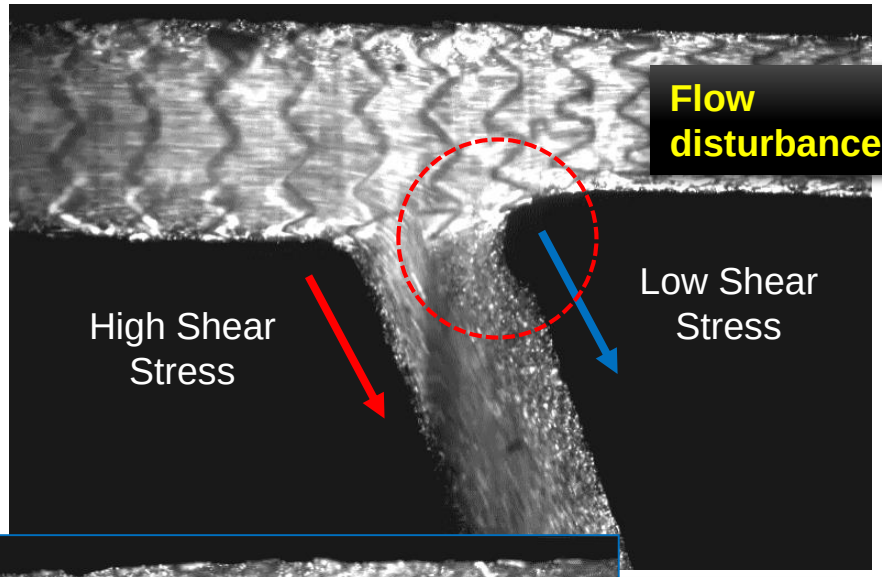
Mori et al. International Journal of Cardiology 263 (2018) 9–16

Residual stent Strut led to Low Share stress in Carina

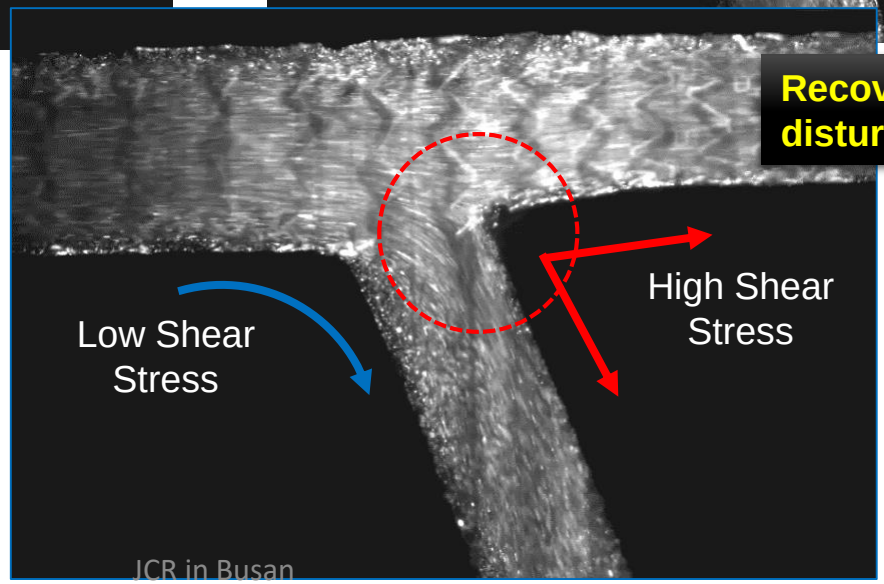
Without stent



Single stent <pre KBT>

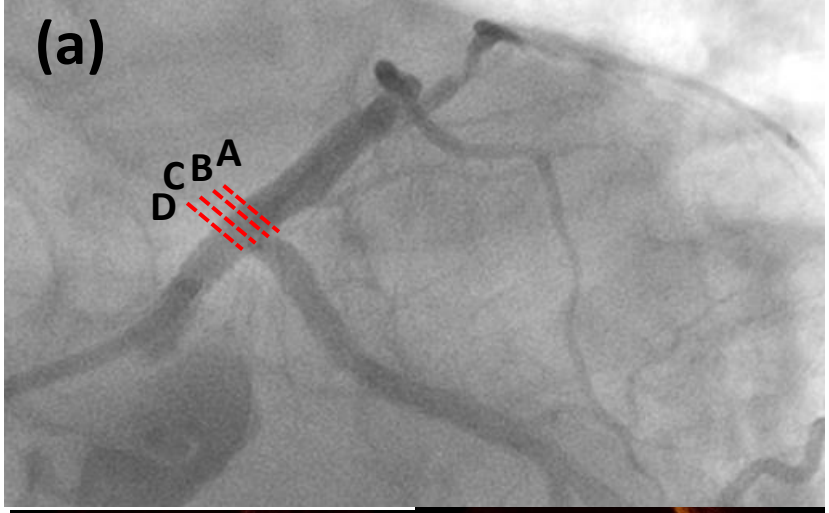


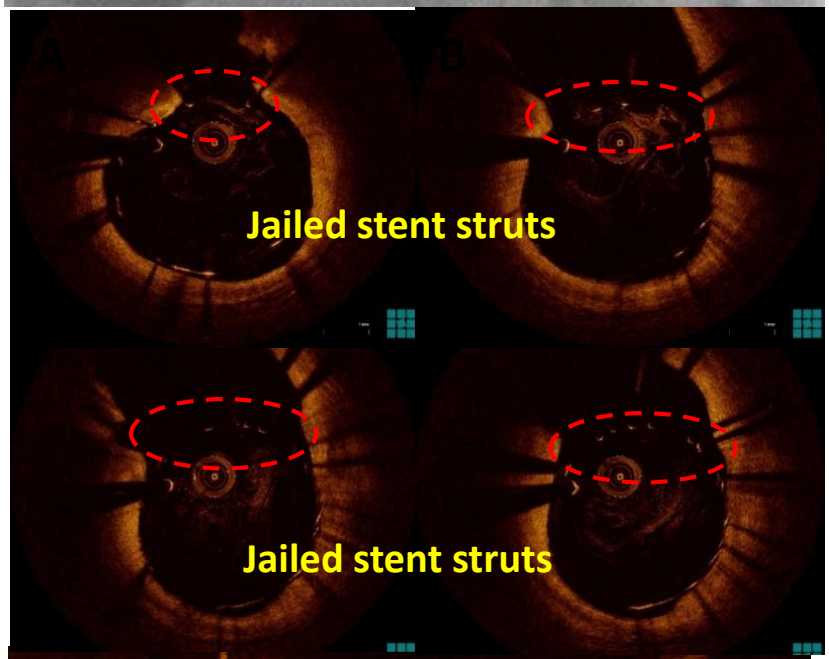
Single stent <post KBT>

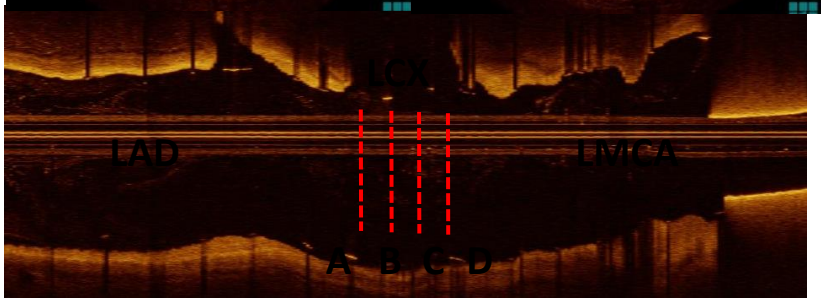


New Tokyo Hospital
Department of Cardiology

Courtesy of Dr. Y.Fujino

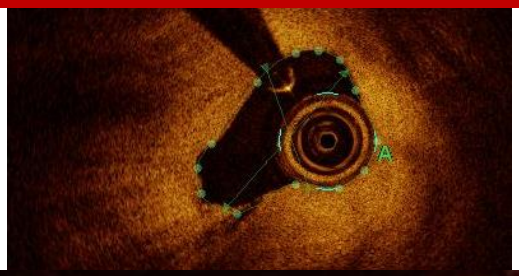


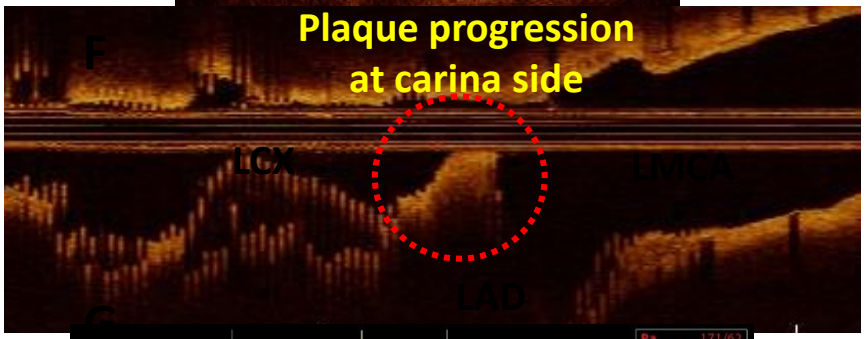


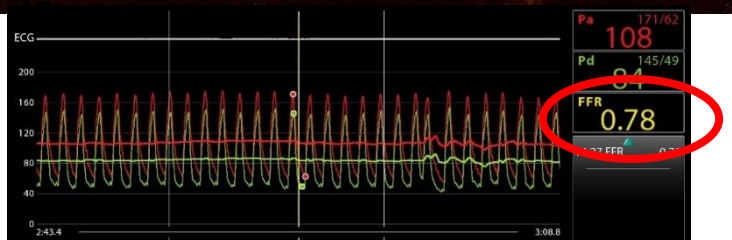


E

LCXos Area 1.68mm²



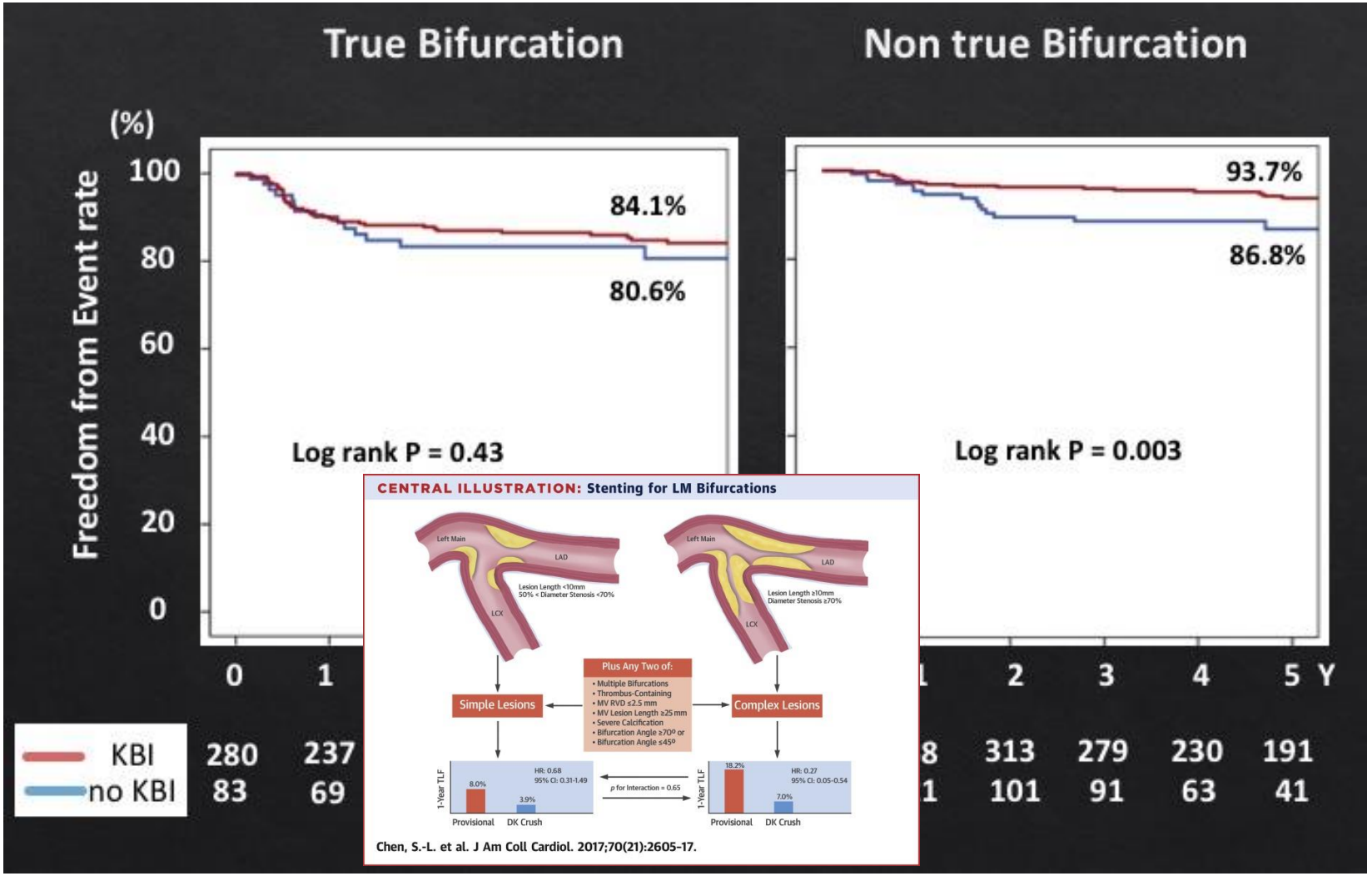




KBI is necessary in non true bifurcation LM

Watanabe et al. Under review

Kaplan–Meier curve of TLR for LCXos according to KBT



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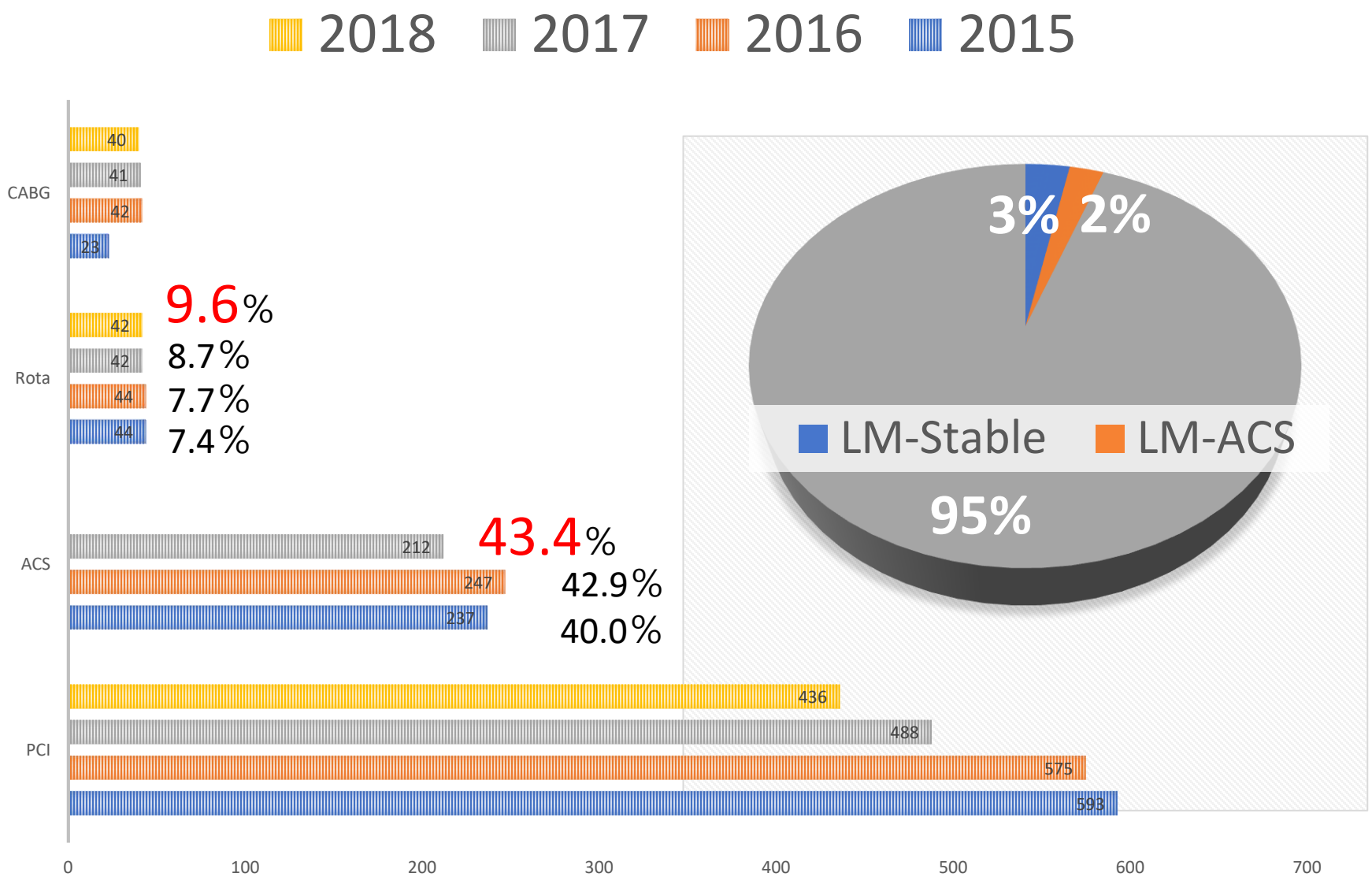
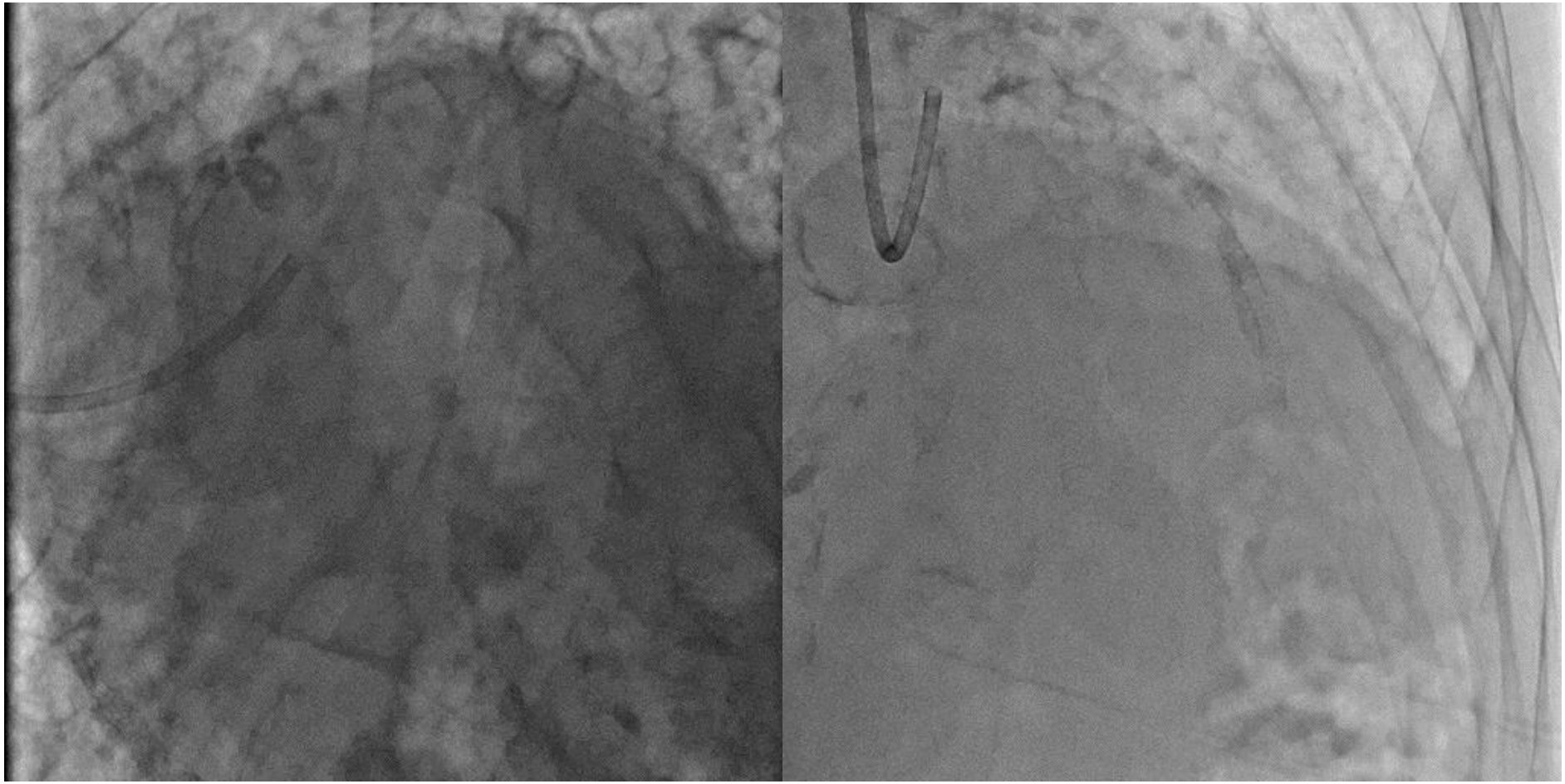
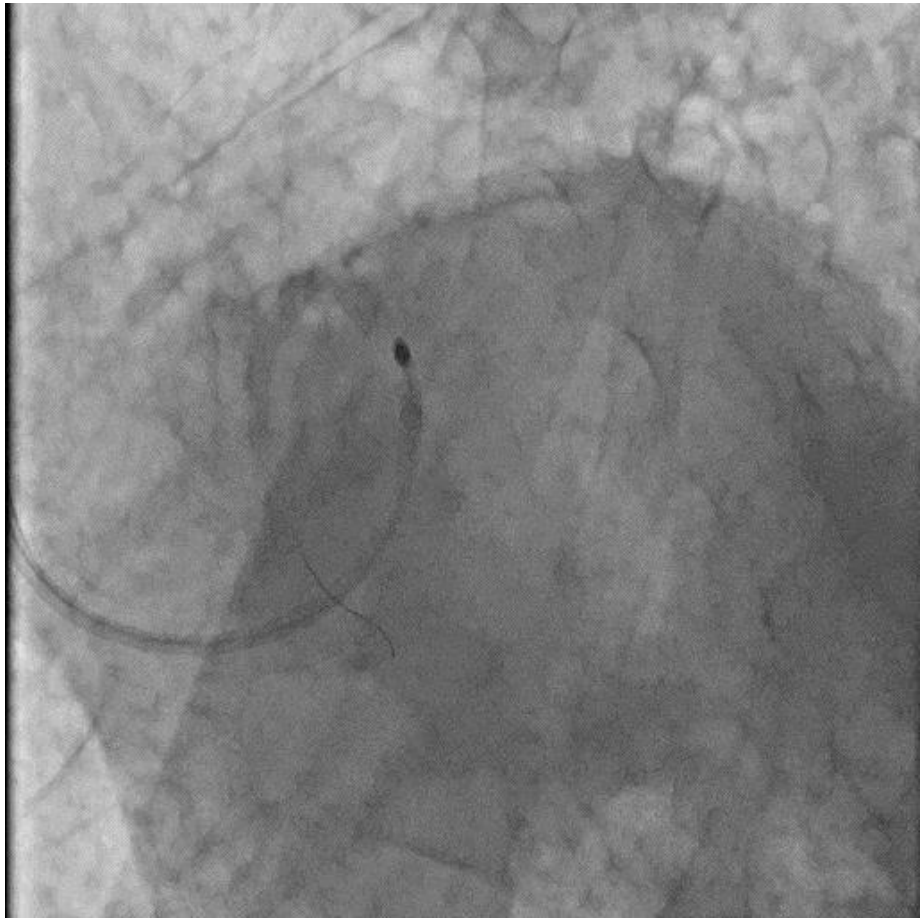
The number of PCI in Ogaki Municipal Hospital



LM-PCI①　76y.o Male EF30%

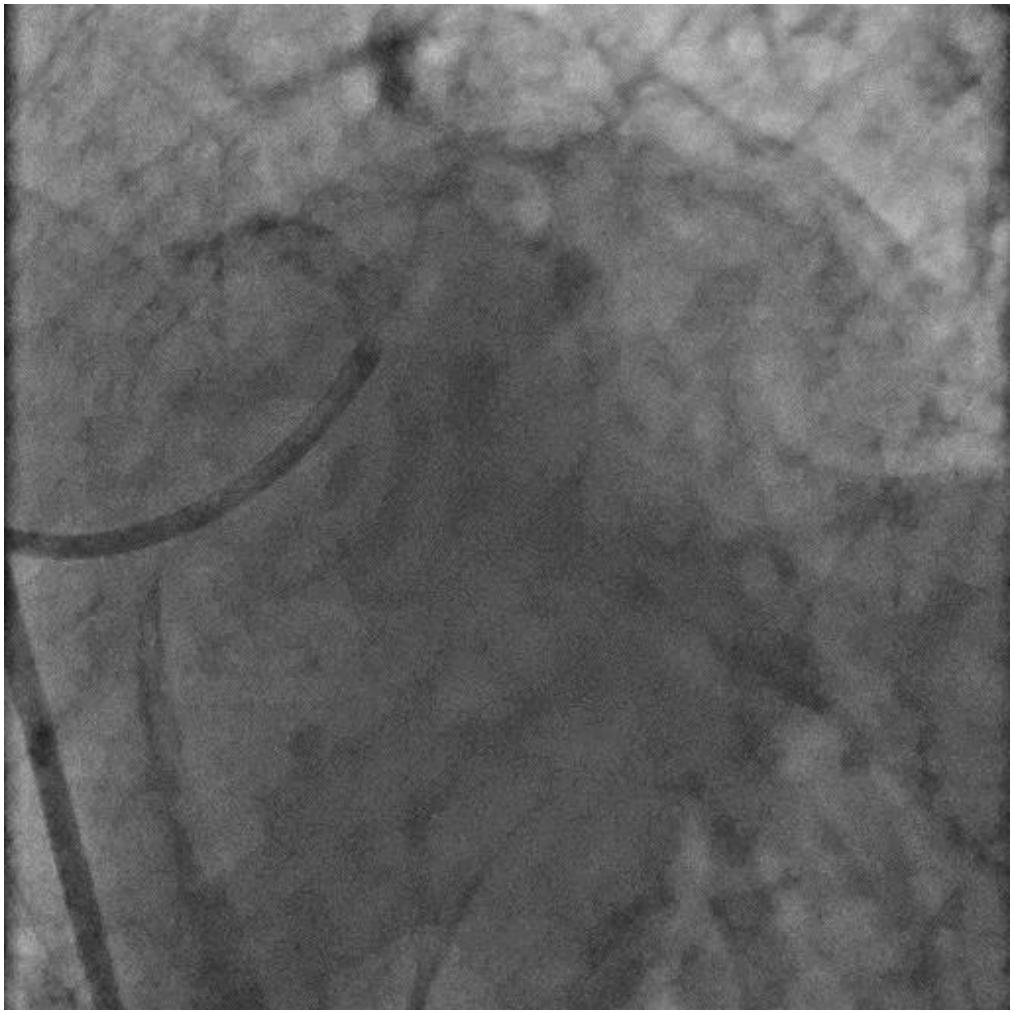


LM-PCI① Rota burr 2.0mm



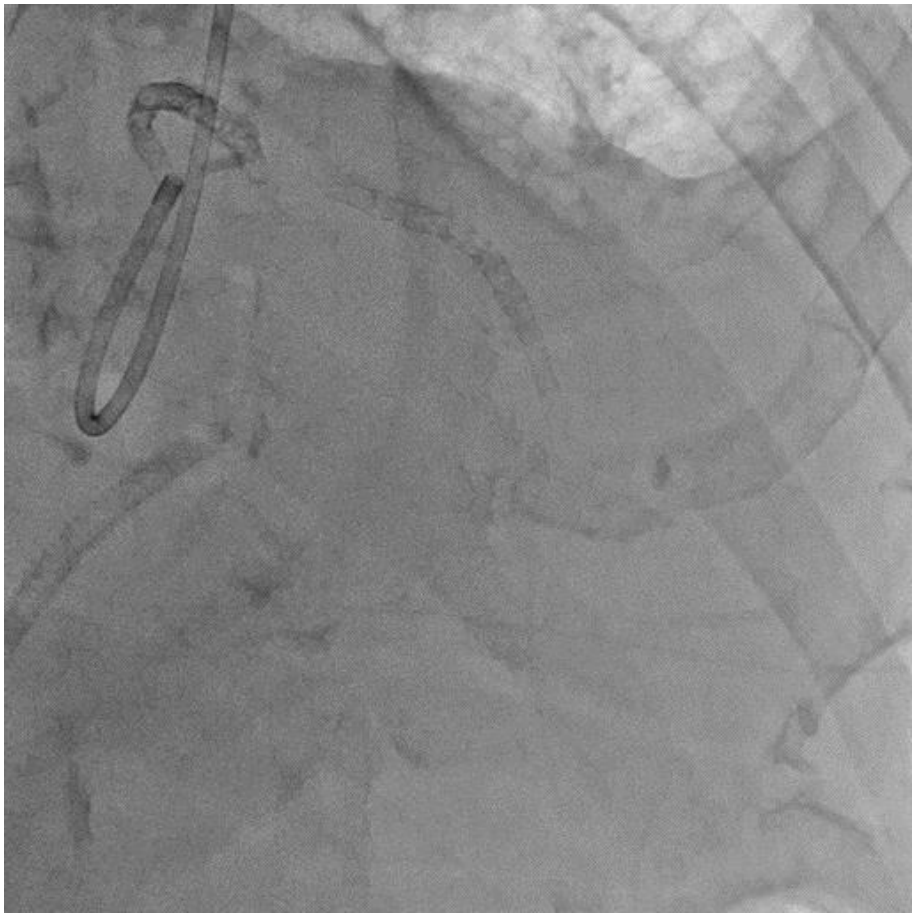
LM-PCI① Final Angiography

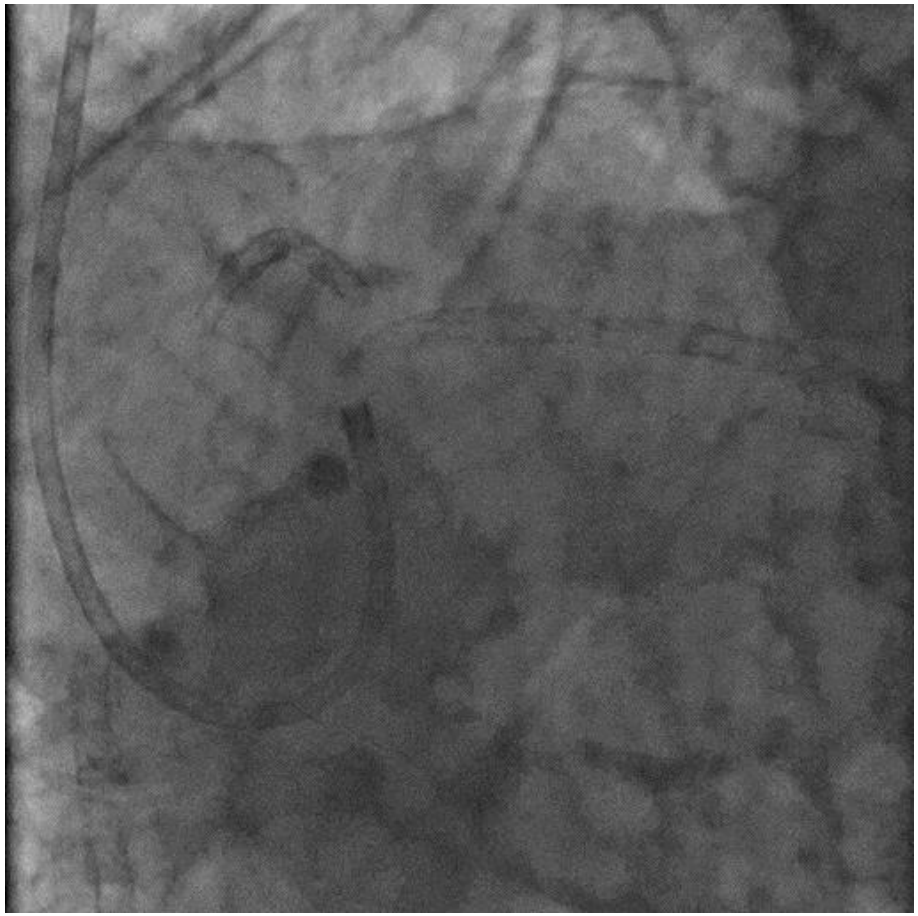
Full cover, EES, POT, KBT, 3DOCT, re-POT



LM-PCI②　83y.o male Severe AS

LAD FFR : 0.66



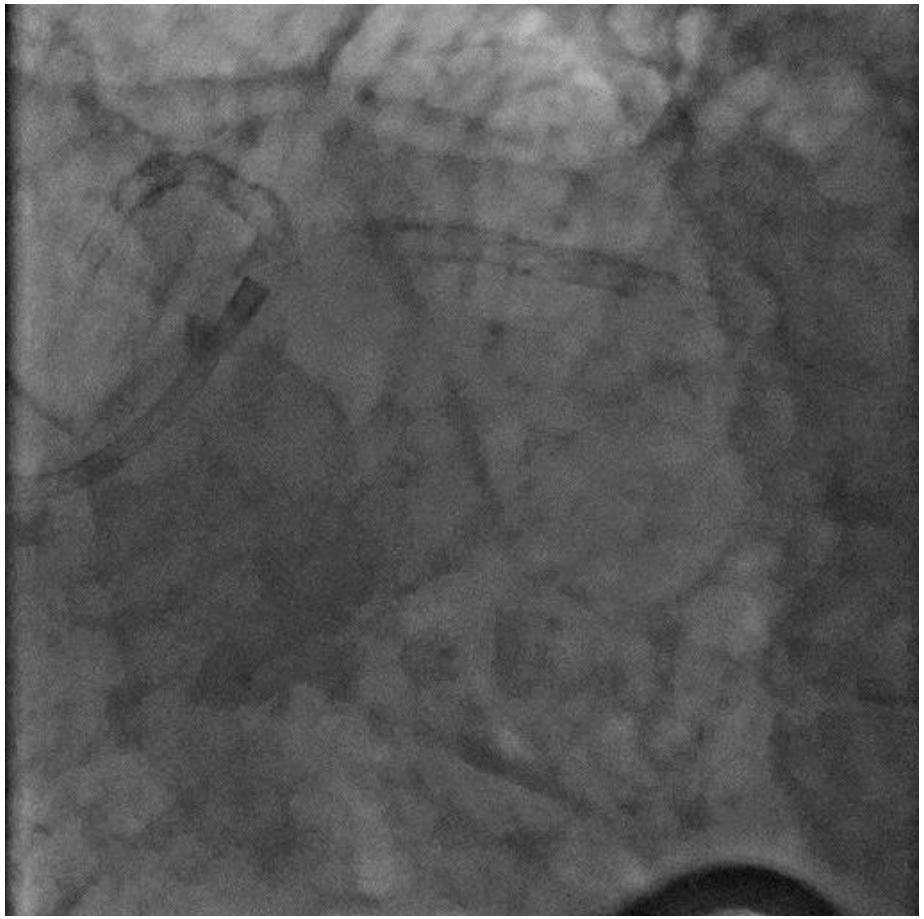


LM-PCI② Rota burr 2.0mm

LCx: Rota, CB, DCB

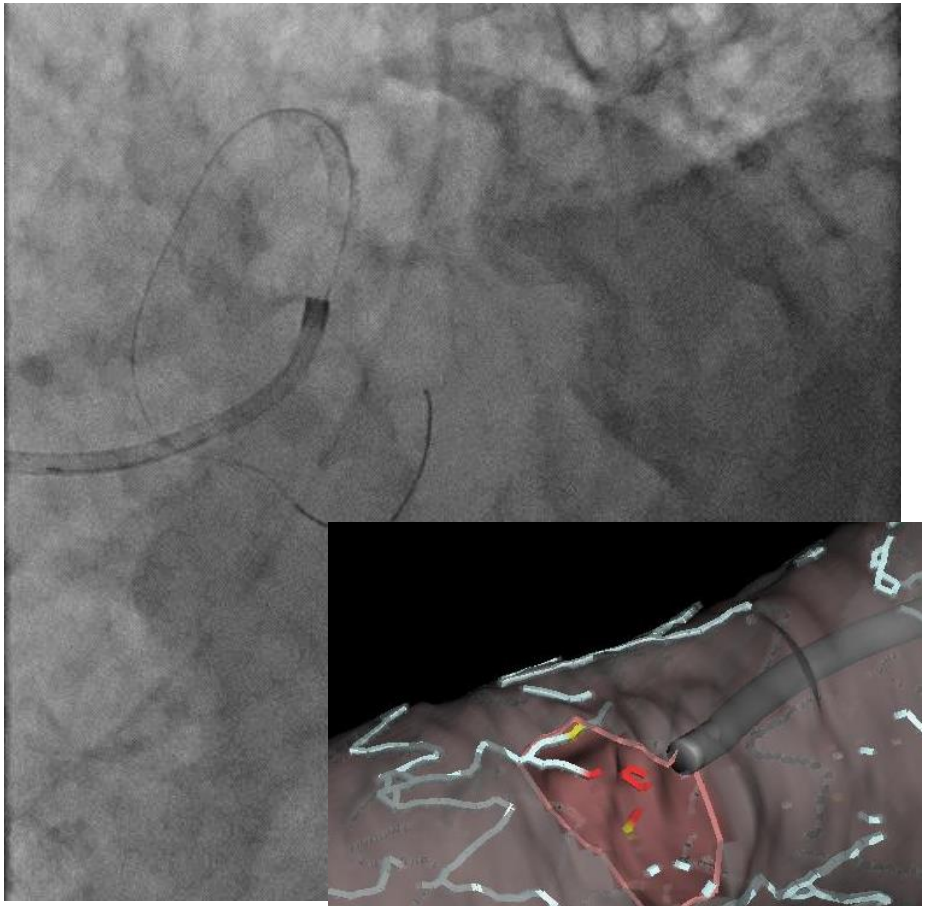
LM-PCI② Final Angiography

Full cover, EES, POT, KBT, 3DOCT, re-POT



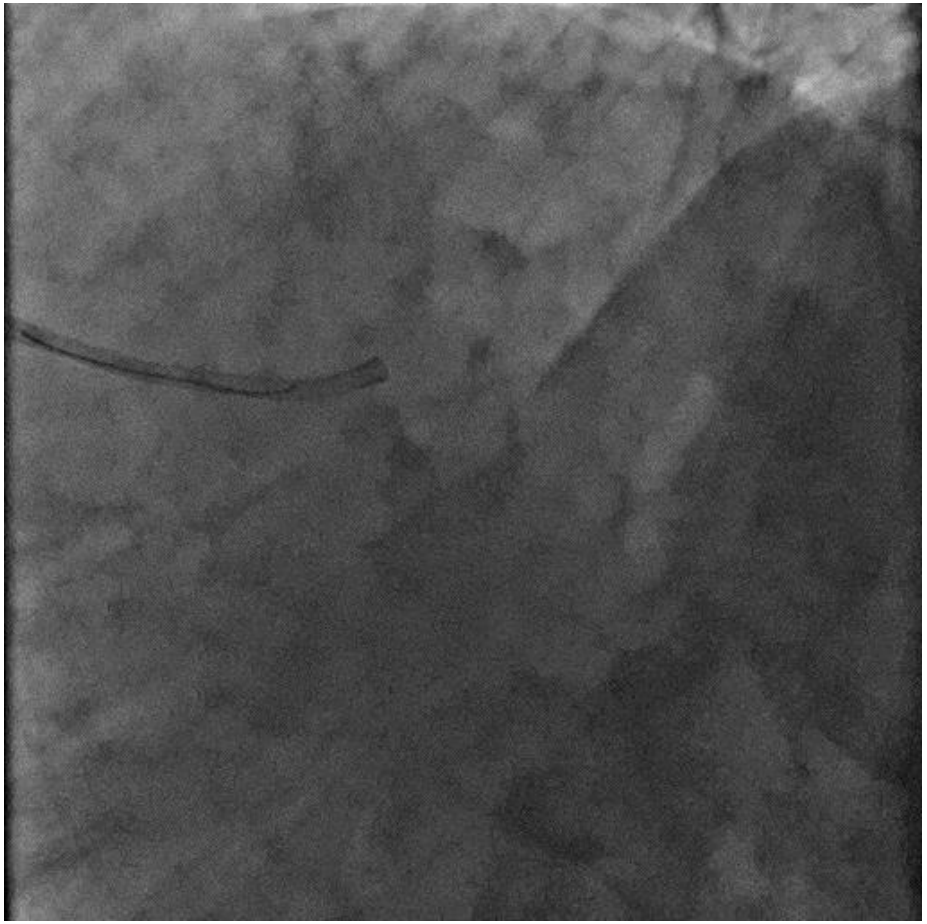
LM-PCI③ Suboptimal Case

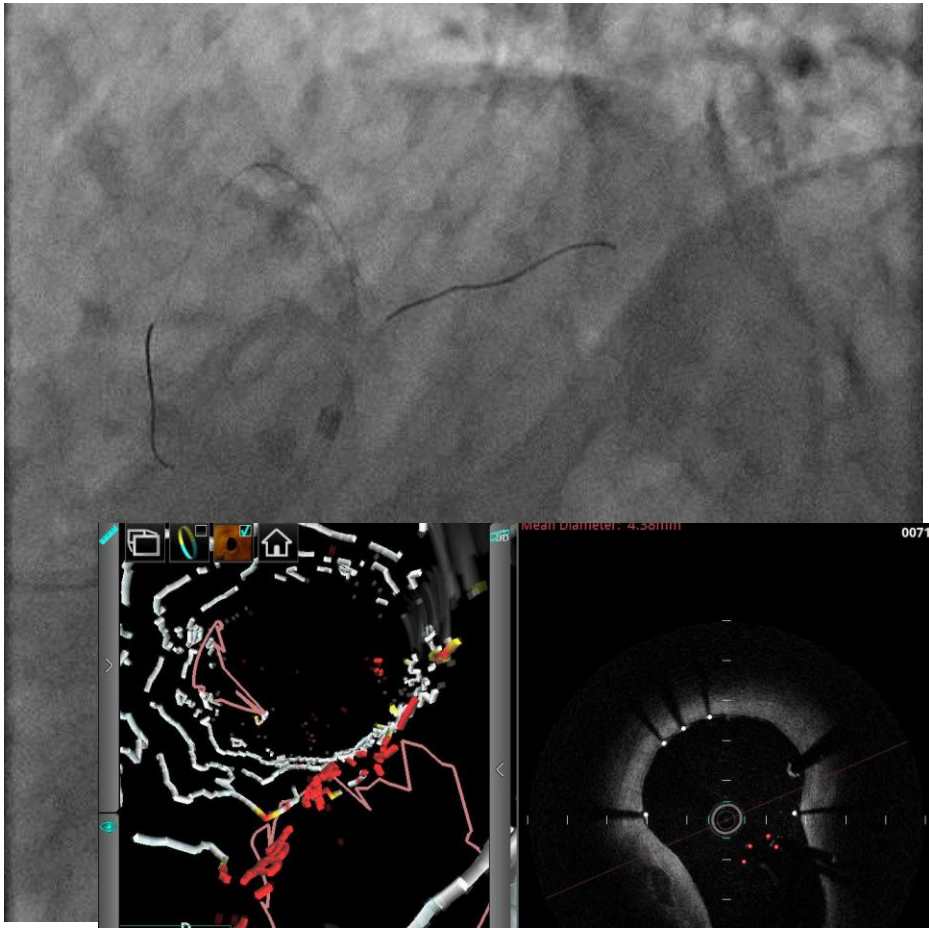
Full cover, EES, POT, KBT, 3DOCT, re-POT



LM-PCI④ Suboptimal Case

Full cover, EES, POT, KBT, 3DOCT, re-POT





Take home message

- ✓ **Current Guideline does not support LM-PCI for complex LM. Therefore, optimal result should be achieved in all the LM patients.**
- ✓ **The indication should be carefully considered using physiological assessment. Furthermore, optimal medication and CABG is sometimes good alternative option.**
- ✓ **Single stent is still gold standard in LM-PCI. Using imaging modality, POT, Full coverage and KBI could guarantee the quality of LM-PCI.**