

Left Main Bifurcation Stenting: Current status and Perspectives

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Disclosure Statement of Financial Interest

I, (Zhang Jun-Jie) DO NOT have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.



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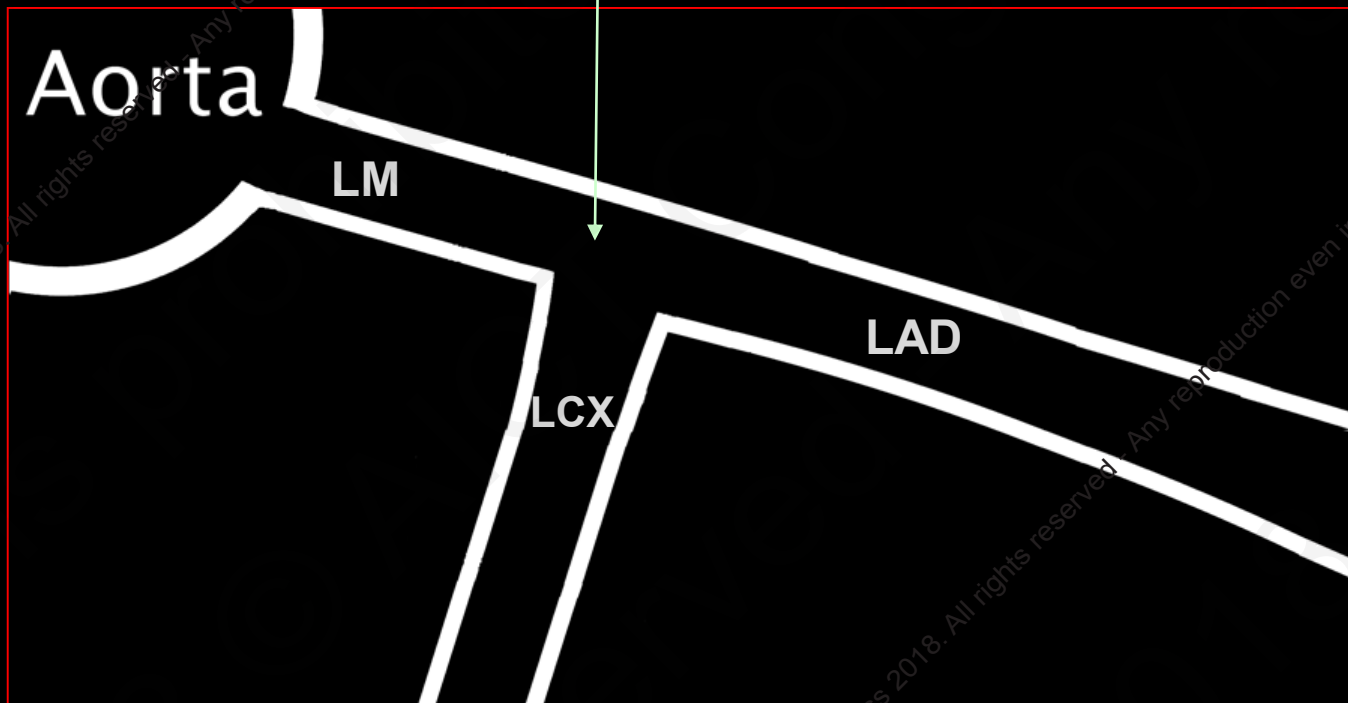


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Location of LM disease

EXCEL trial--LM PCI group(N=942)

Distal LM n=771(81.8%)



2018 ESC Guidelines on Myocardial revascularization

Bifurcation lesion subsets

I IIa IIb III



- **MB-only stenting with provisional stenting of the side branch should be the preferred approach for most bifurcation lesions.**

- **Exceptions to this rule, where upfront side branch stenting may be preferable, include:**
 - the presence of a large SB (>2.75 mm) with a long ostial SB lesion (>5 mm)
 - or anticipated difficulty in accessing an important SB after MB stenting,
 - and true distal LM bifurcations



2018 ESC Guidelines on Myocardial revascularization

Bifurcation lesion subsets

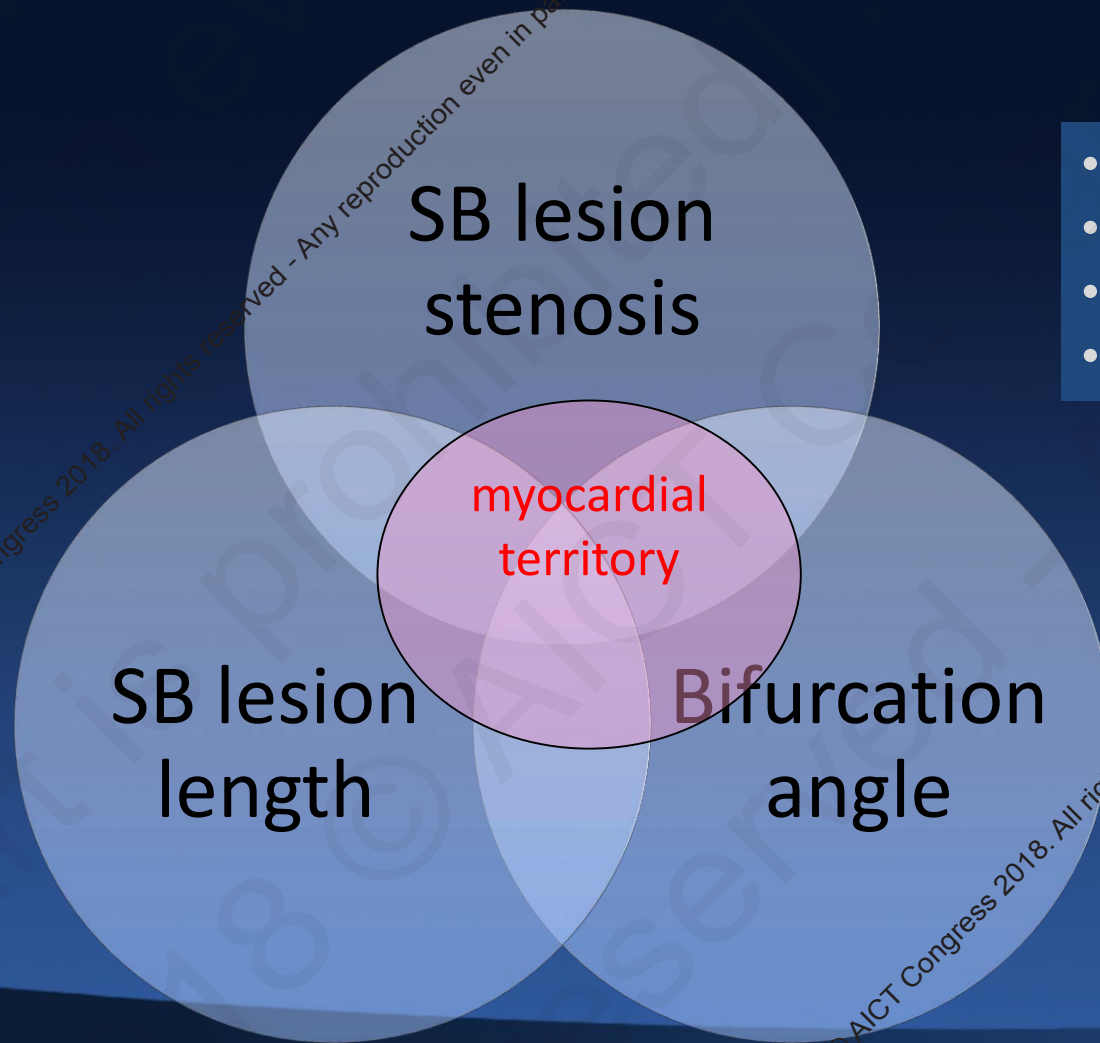
- MB-only stenting with provisional stenting of the side branch should be the preferred approach for **simple bifurcation lesions**.

complex bifurcation lesion?

- the presence of **a long ostial SB lesion (>5 mm)**
- or anticipated difficulty **in accessing an important SB after MB stenting,**
- and **true distal LM bifurcations.**



What is complex bifurcations?



- Severe Calcified
- Thrombus containing
- Small vessel
-



Impact of the Complexity of Bifurcation Lesions Treated With Drug-Eluting Stents

The DEFINITION Study

Shao-Liang Chen, MD,* Imad Shehwan, MD,† Bo Xu, MBBS,‡ Nigel Jepson, MD,§ Chitprapai Paiboon, MD,|| Jun-Jie Zhang, PhD,¶ Fei Ye, MD,¶ Teugh Sansoto, MD,# Tak W. Kwan, MD,** Michael Lee, MD,†† Ya-Ling Han, MD,‡‡ Shu-Zheng Lv, MD,§§ Shang-Yu Wen, MD,||| Qi Zhang, MD,¶¶ Hai-Chang Wang, MD,## Tie-Ming Jiang, MD,*** Yan Wang, MD,††† Liang-Long Chen, MD,‡‡‡ Nai-Liang Tian, MD,* Feng Cao, MD,## Chun-Guang Qiu, MD,§§§ Yao-Jun Zhang, PhD,¶ Martin B. Leon, MD|||||

Inclusion criteria:

----SB diameter ≥ 2.5 mm

----Medina 1,1,1 or 0,1,1

----Prospective registry

----Multi-center



DEFINITION Study Flowchart

1550 patients with true bifurcation lesions



To build criteria of lesions complexity

Criteria of lesions complexity

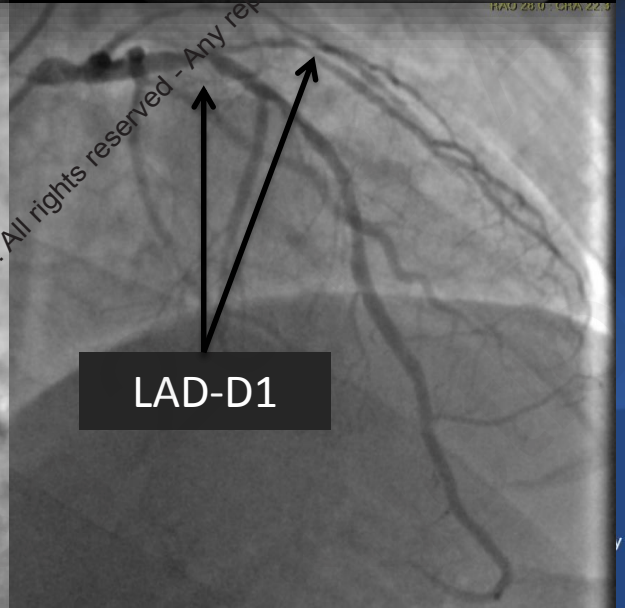
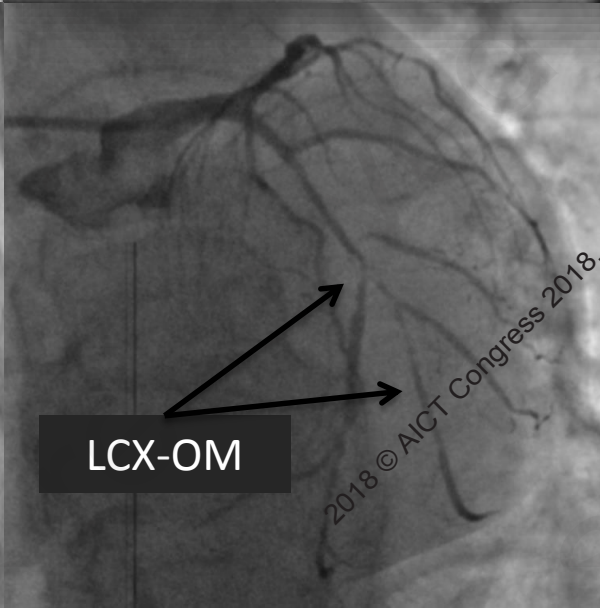
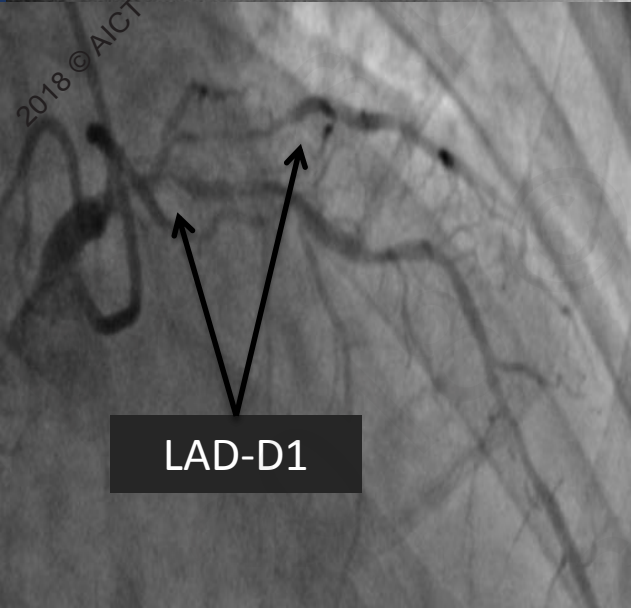
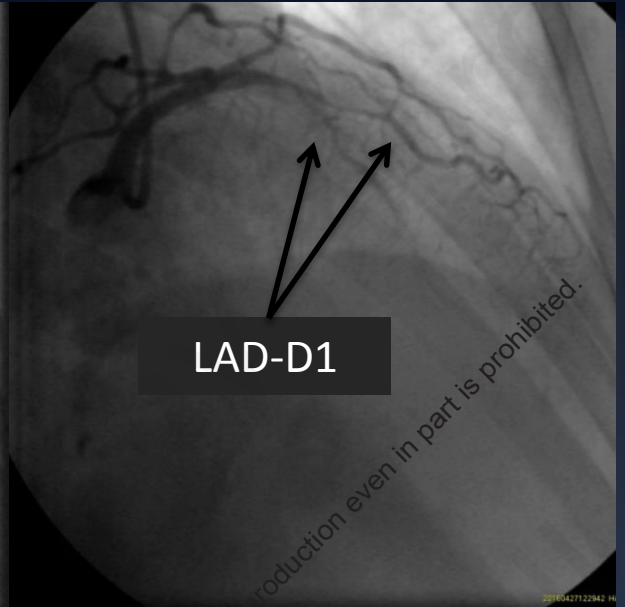
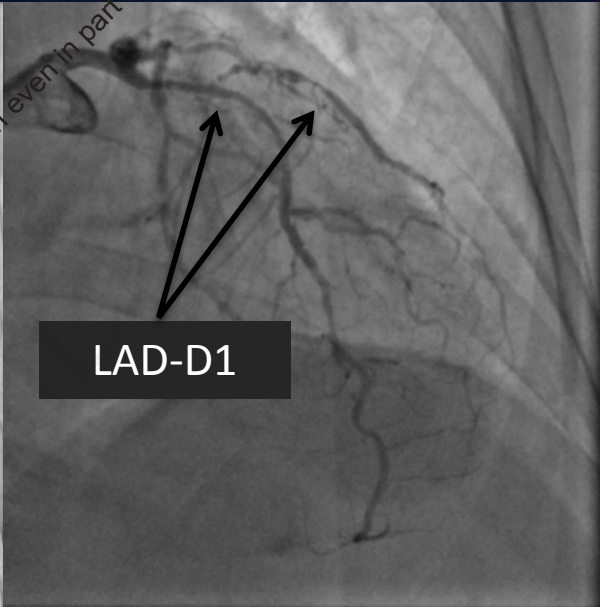
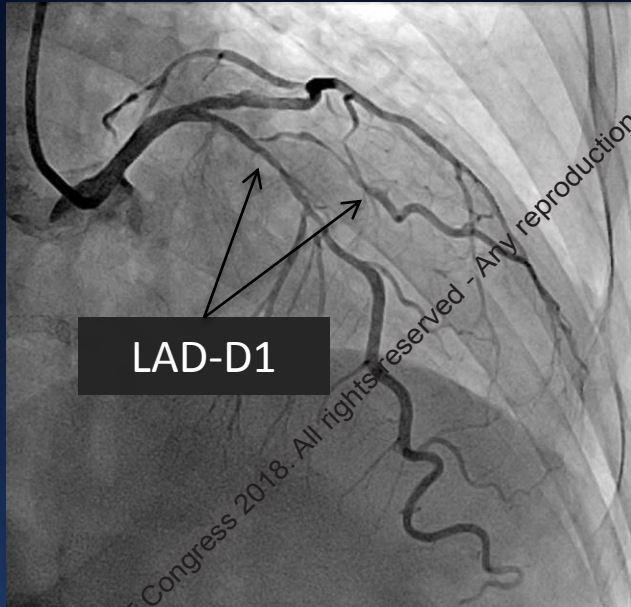


**To test these criteria in another 3060 patients
With bifurcation lesions**

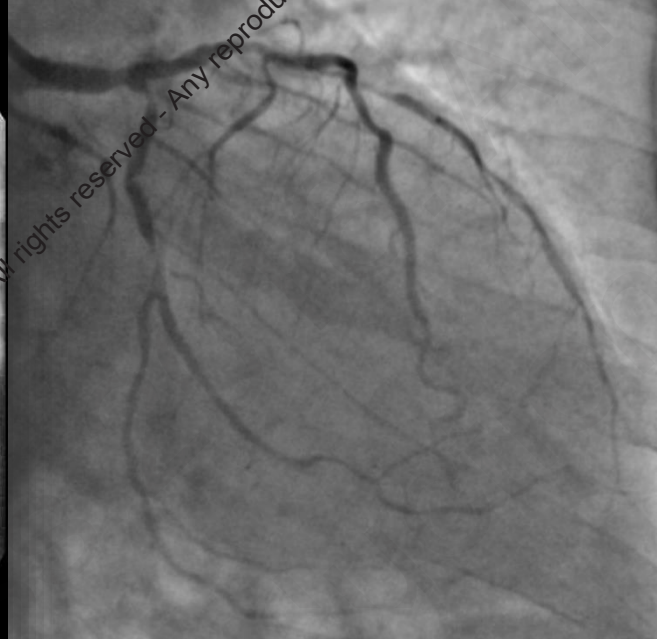
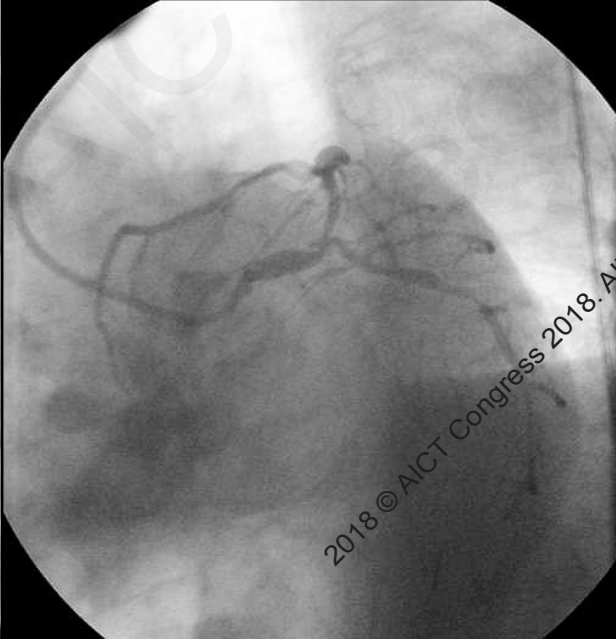
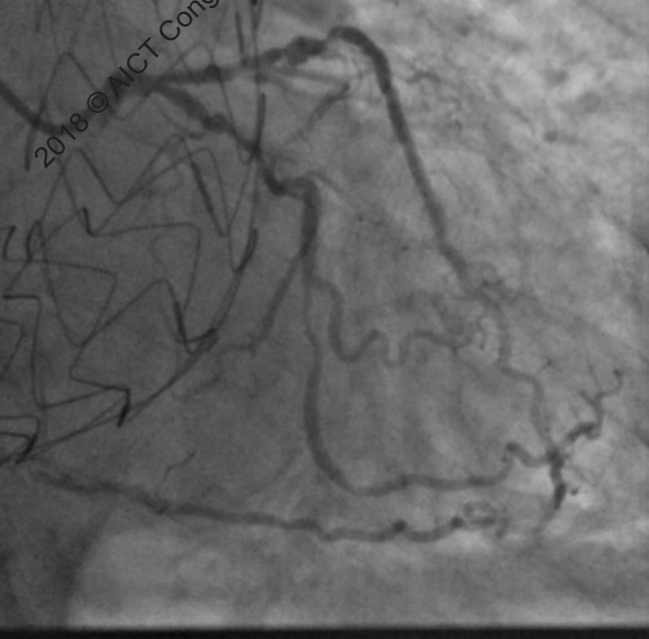
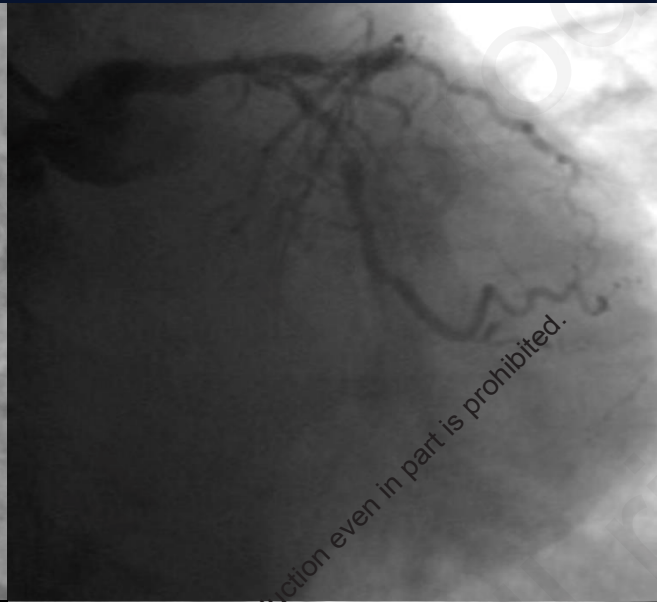
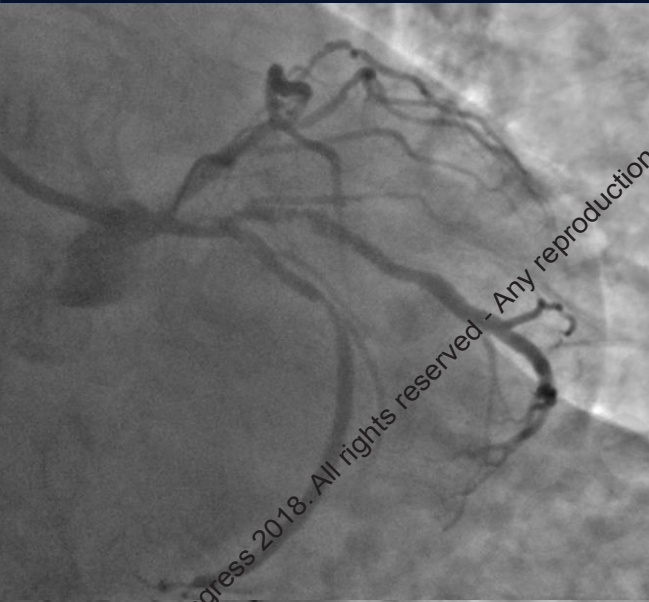
DEFINITION criteria

	P	Sensitivity (%)	Specificity (%)
Major :CX-DS \geq 70%, CX-LL \geq 10mm	<0.001	80	72
SB-DS \geq 90%, SB-LL \geq 10mm	<0.001	80	74
Minor: >mild calcification	0.002	64	65
Multiple lesions	0.007	68	60
thrombus-containing	0.004	64	53
MV-LL \geq 25 mm	0.010	69	58
Angle<45 $^{\circ}$ or >70 $^{\circ}$	0.002	66	64
MV-RVD \leq 2.5 mm	0.010	57	66
Major 1 + any 2 of minor criteria	-----	87	83
Major 2+ any 2 of minor criteria	-----	88	83

Complex non-LM BLs

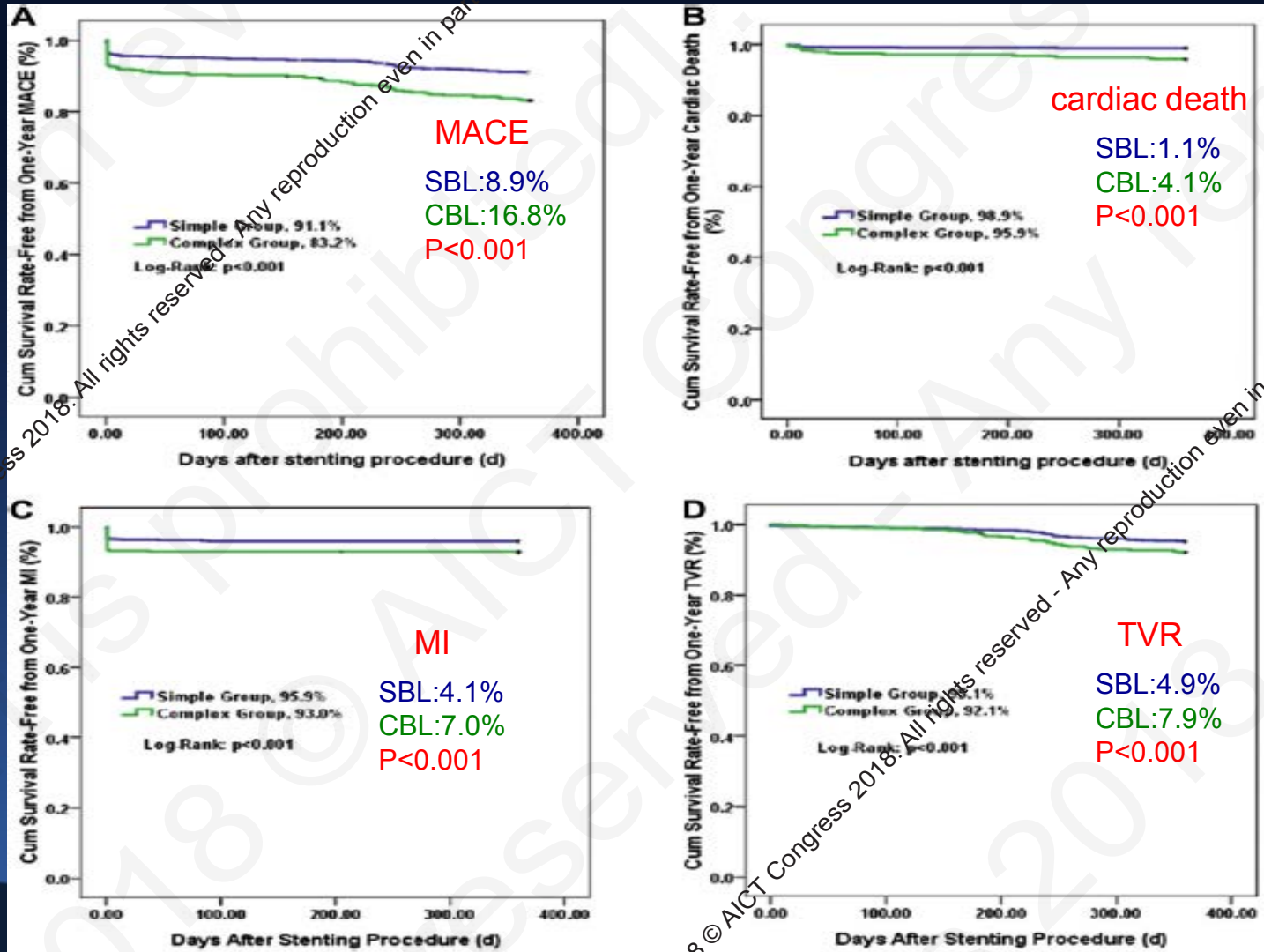


Complex LM BLs



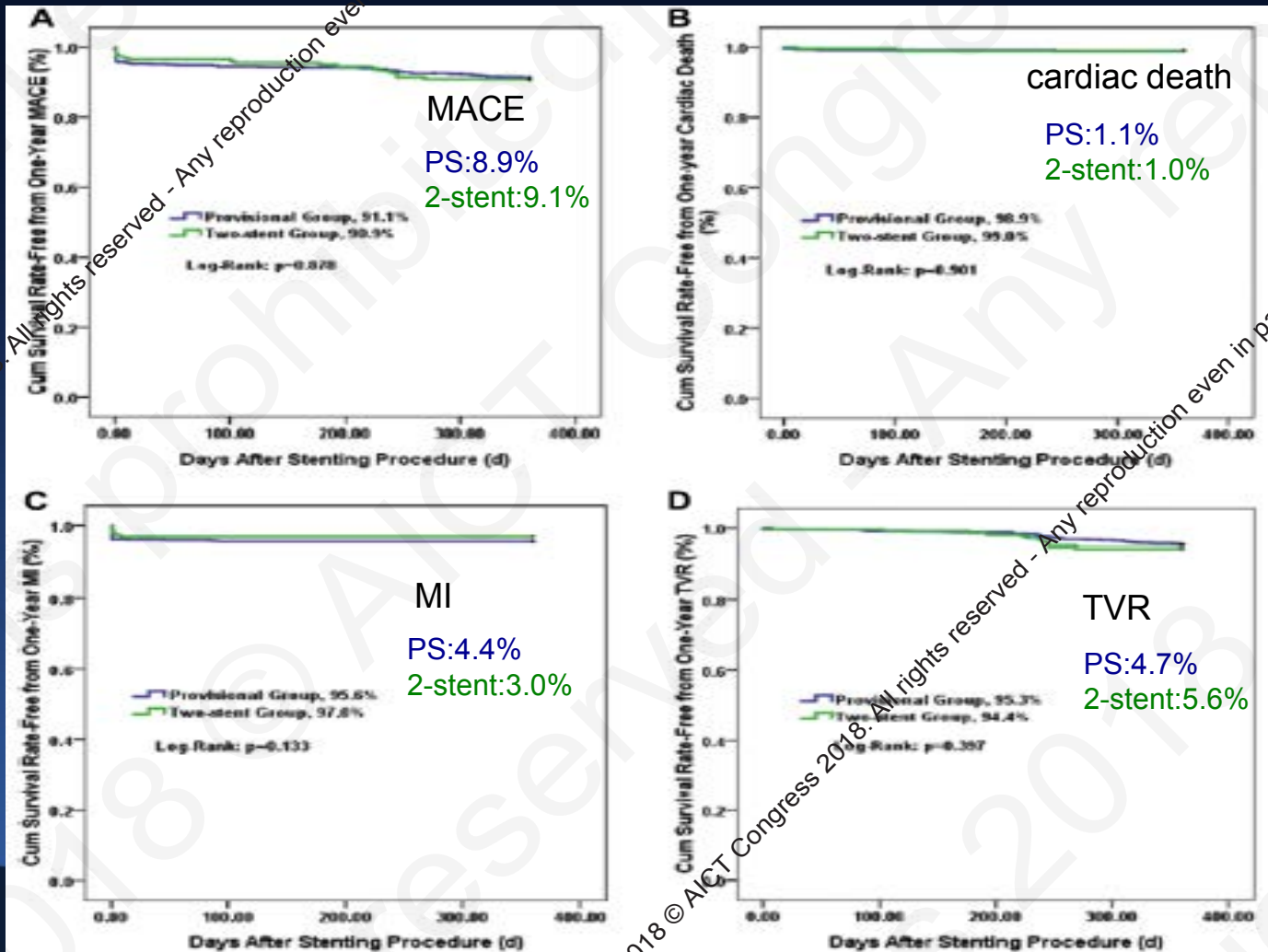
Simple vs. Complex BL

1-year FU



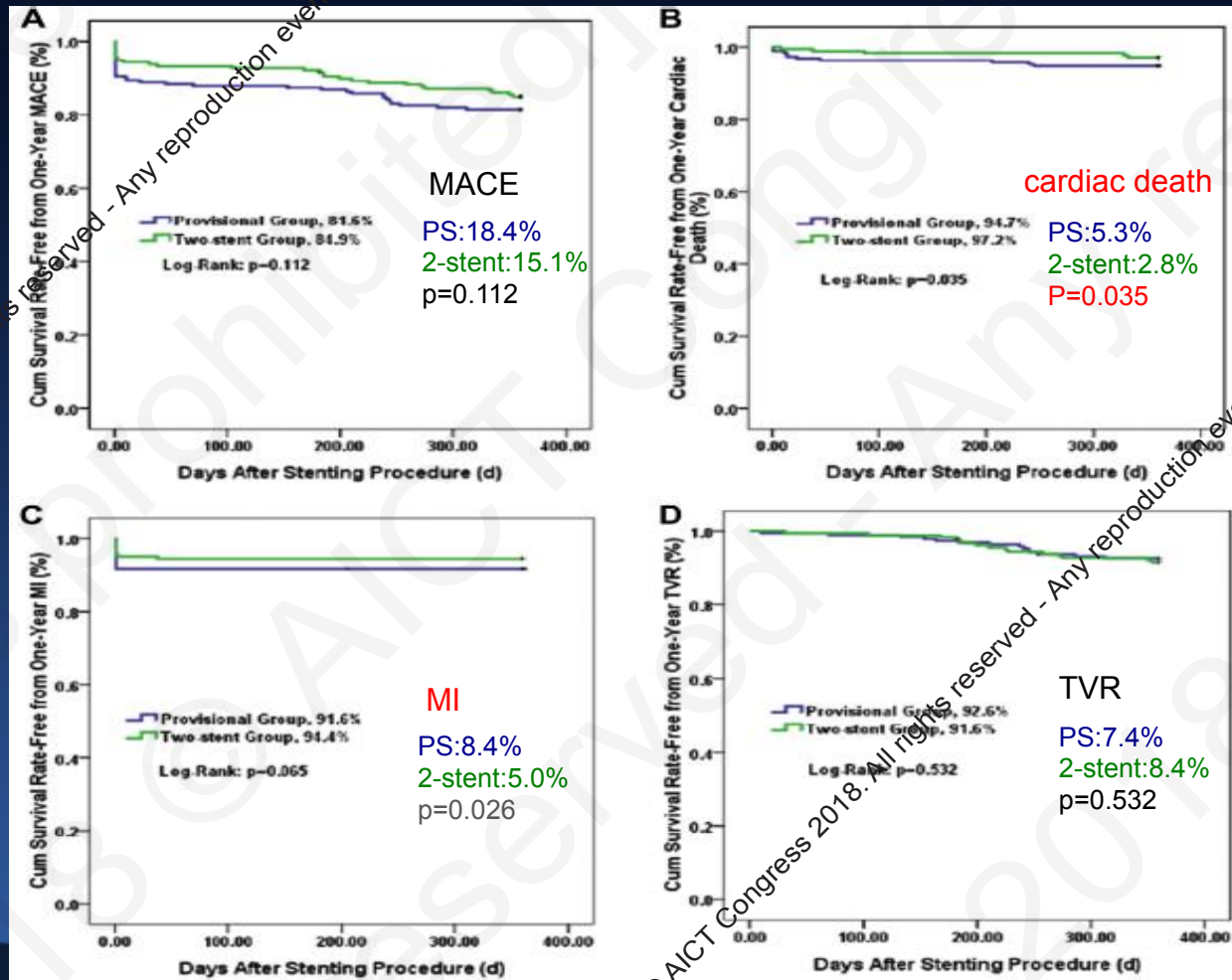
Simple BL (n=2552)

PS(77%) vs.2-stent(23%)



Complex BL (n=1108)

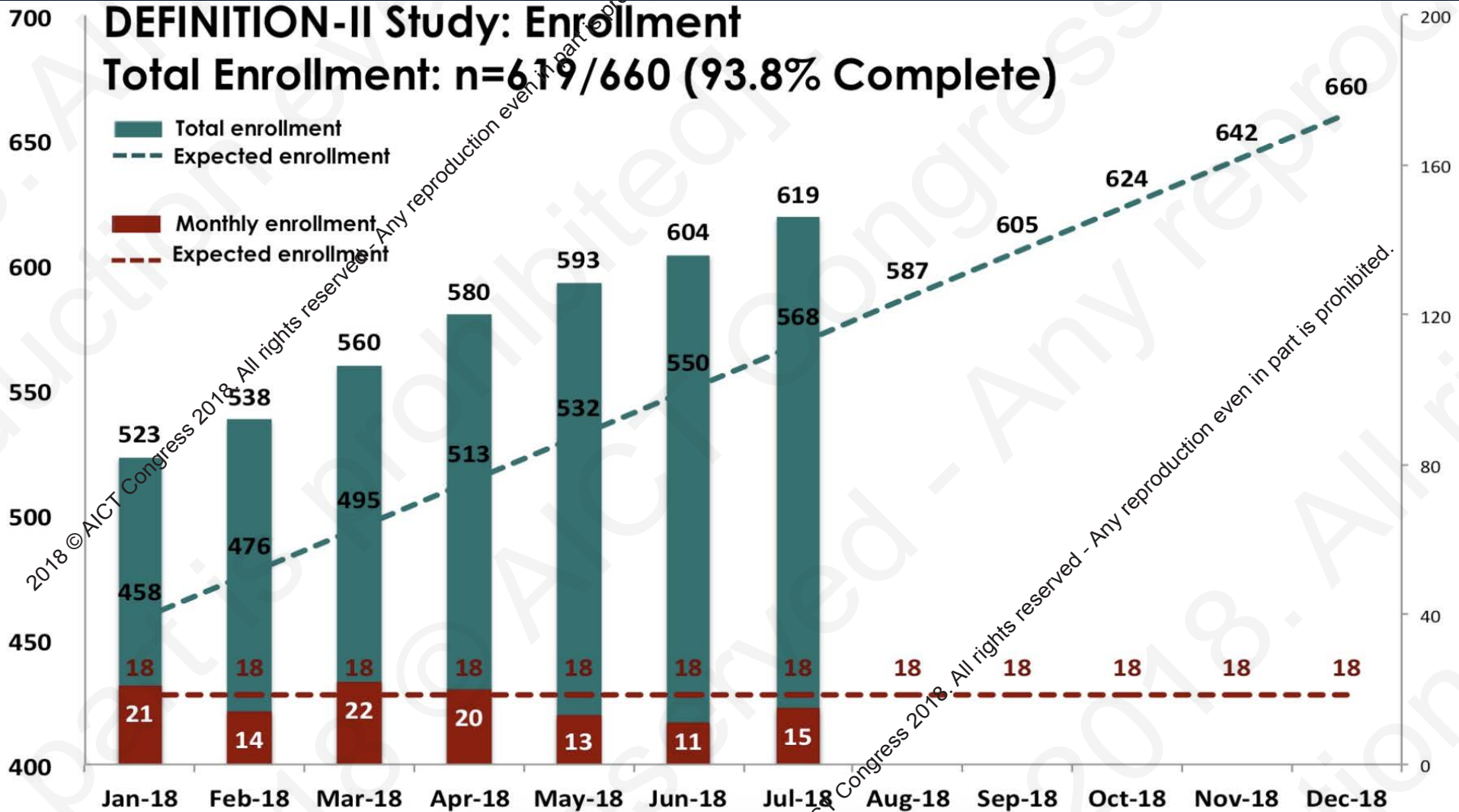
PS(52%) vs.2-stent(48%)



BMJ Open Treatment effects of systematic two-stent and provisional stenting techniques in patients with complex coronary bifurcation lesions: rationale and design of a prospective, randomised and multicentre DEFINITION II trial

Jun-Jie Zhang,¹ Xiao-Fei Gao,¹ Ya-Ling Han,² Jing Kan,³ Ling Tao,¹ Zhen Ge,¹ Damras Tresukosol,⁵ Shu Lu,⁶ Li-Kun Ma,⁷ Feng Li,⁸ Song Yang,⁹ Jun Zhang,¹⁰ Muhammad Munawar,¹¹ Li Li,¹² Rui-Yan Zhang,¹³ He-Song Zeng,¹⁴ Teguh Santoso,¹⁵ Ping Xie,¹⁶ Ze-Ning Jin,¹⁷ Leng Han,¹⁸ Wei-Hsian Yin,¹⁹ Xue-Song Qian,²⁰ Qi-Hua Li,²¹ Lang Hong,²² Chotnopapatt Paiboon,²³ Yan Wang,²⁴ Li-Jun Liu,²⁵ Lei Zhou,²⁶ Xue-Ming Wu,²⁷ Shang-Yu Wen,²⁸ Qing-Hua Lu,²⁹ Jun-Qiang Yuan,³⁰ Liang-Long Chen,³¹ Francesco Lavarra,³² Alfredo E Rodríguez,³³ Li-Min Zhou,³⁴ Shi-Qin Ding,³⁵ Kitigon Vichairuangthum,³⁶ Yuan-Sheng Zhu,³⁷ Meng-Yue Yu,³⁸ Chan Chen,³⁹ Imad Sheiban,⁴⁰ Yong Xia,⁴¹ Yu-Long Tian,⁴² Zheng-Lu Shang,⁴³ Qing Jiang,⁴⁴ Yong-Hong Zhen,⁴⁵ Xin Wang,⁴⁶ Fei Ye,¹ Nai-Liang Tian,¹ Song Lin,¹ Zhi-Zhong Liu,¹ Shao-Liang Chen^{1,3}

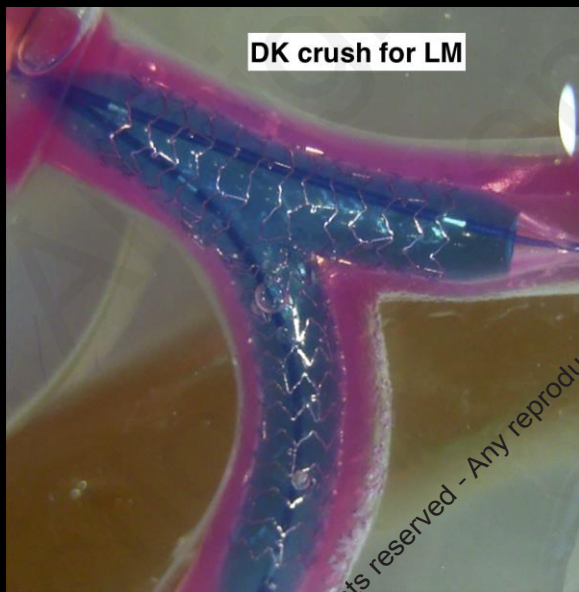
DEFINITION II: Enrollment



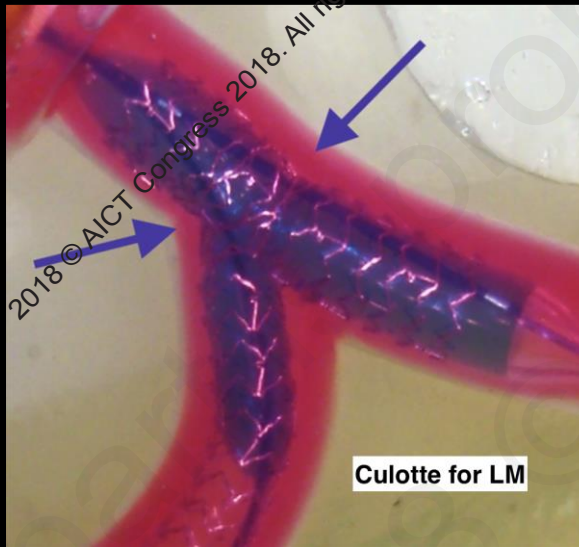
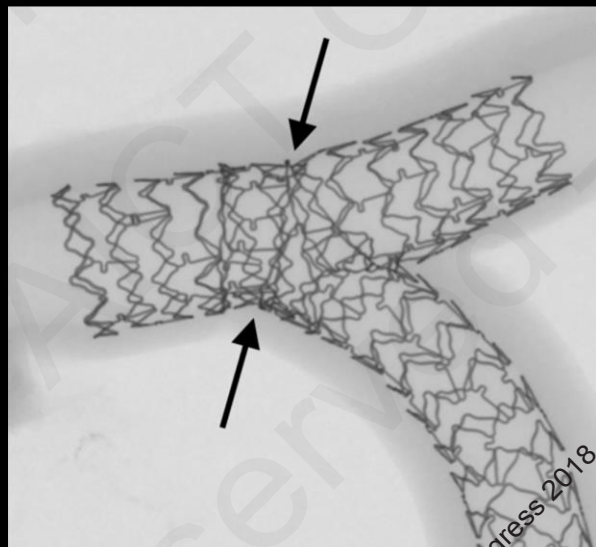
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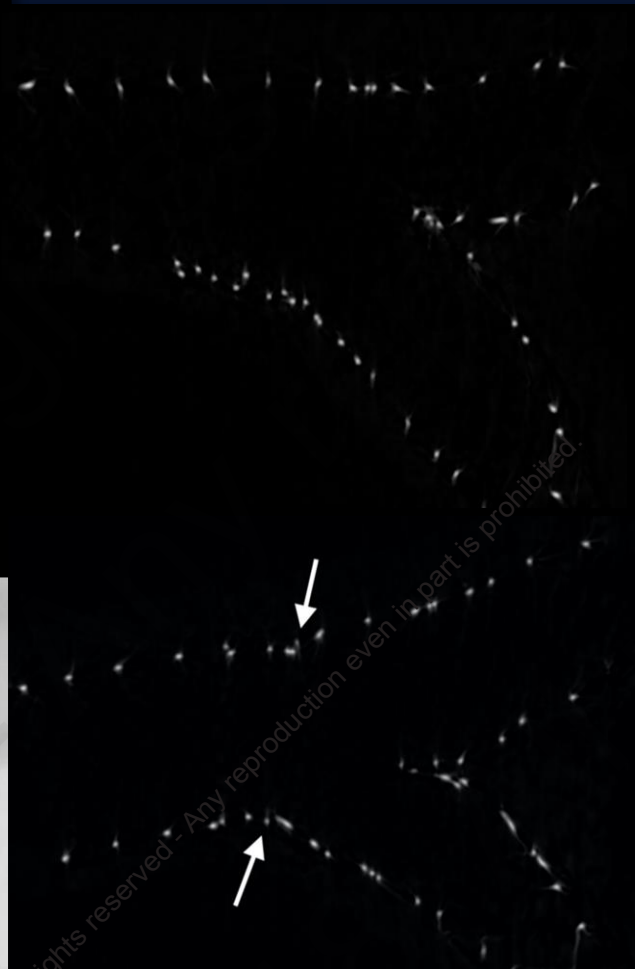
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DK crush for LM

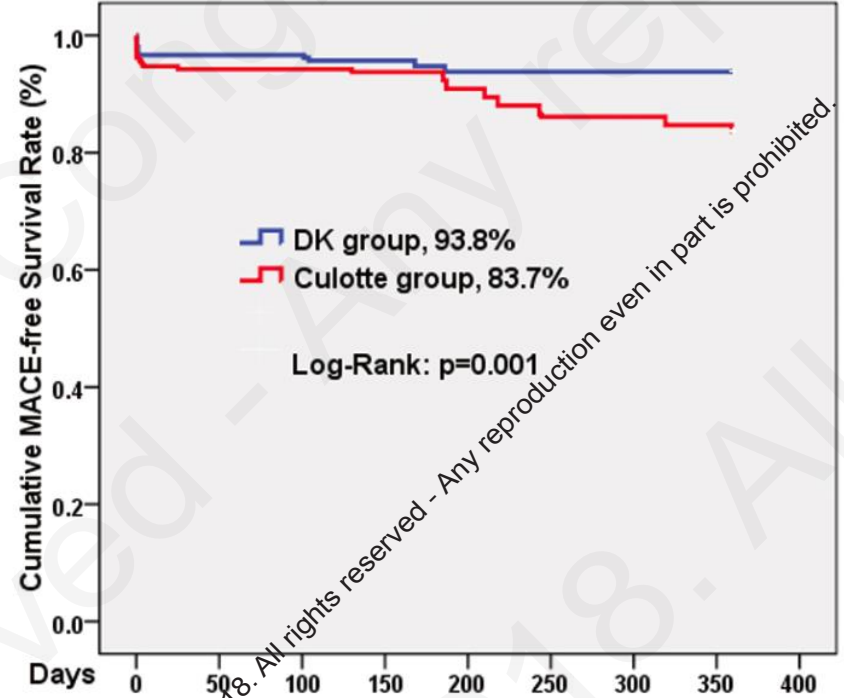
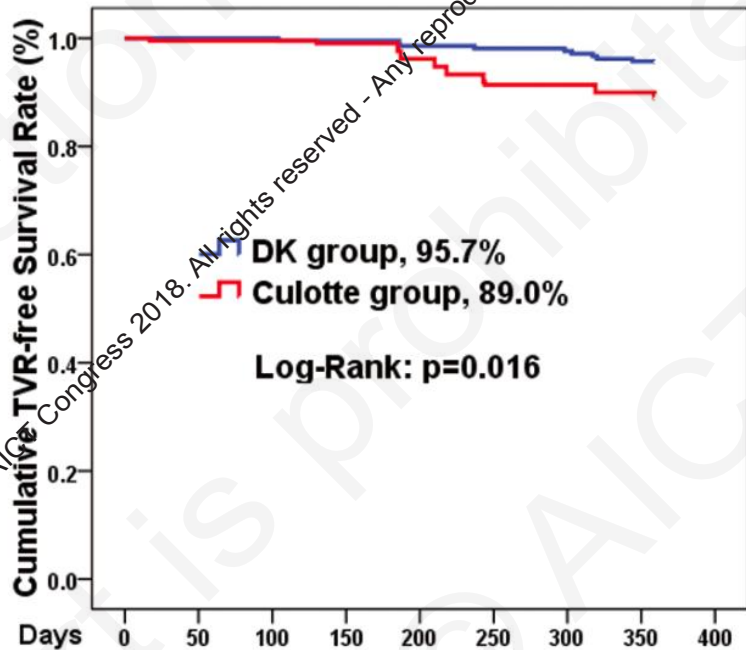


- Significant “napkin ring” restriction (arrow)



Comparison of DK Crush Versus Culotte Stenting for Unprotected Distal Left Main Bifurcation Lesions

Results From a Multicenter Randomized, Prospective DKCRUSH-III Study

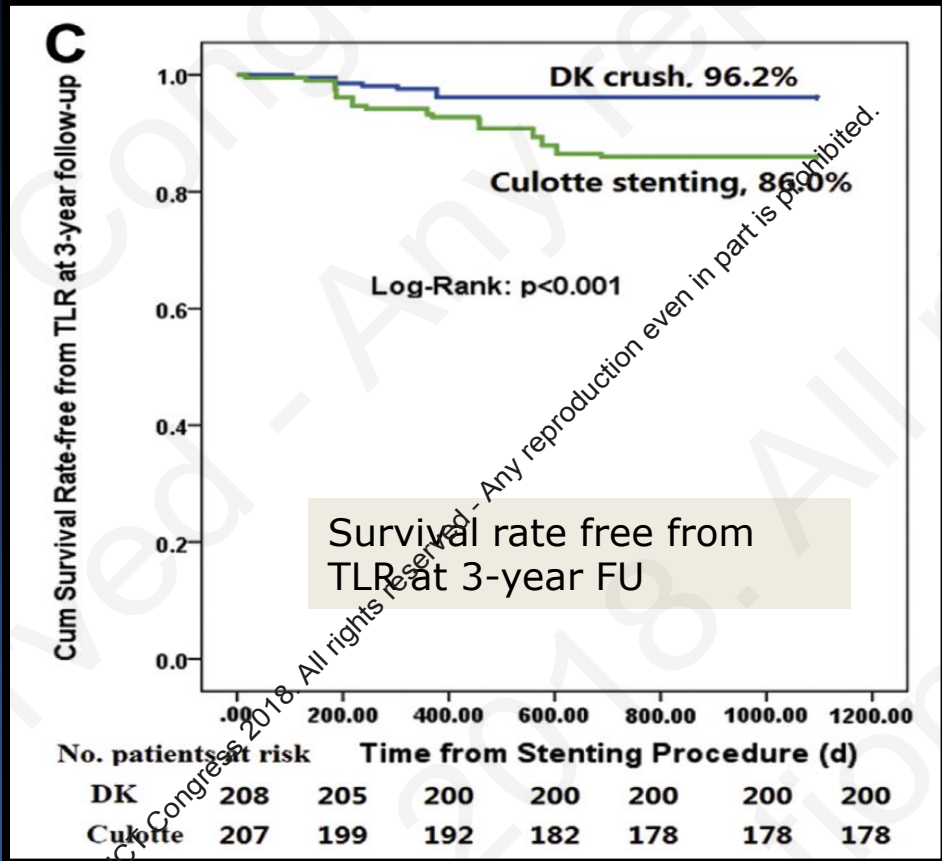
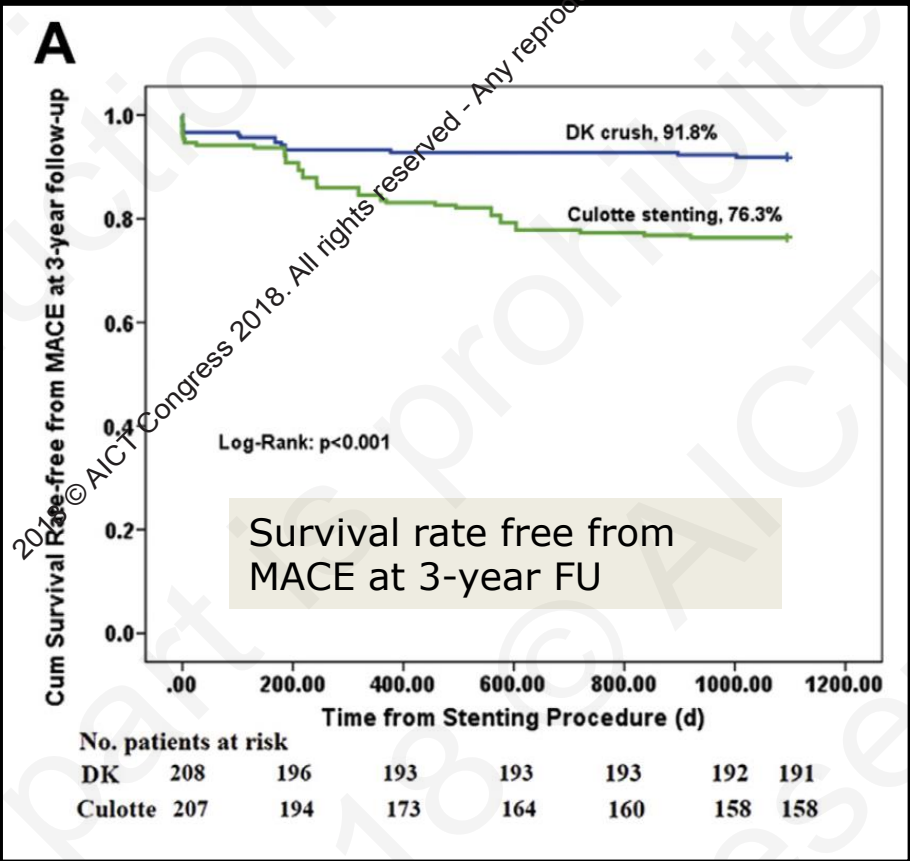


Clinical Outcome After DK Crush Versus Culotte Stenting of Distal Left Main Bifurcation Lesions



The 3-Year Follow-Up Results of the DKCRUSH-III Study

Shao-Liang Chen, MD,* Bo Xu, MBBS,† Ya-Ling Han, MD,‡ Imad Sheiban, MD,§ Jun-Jie Zhang, MD,* Fei Ye, MD,*



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<https://doi.org/10>

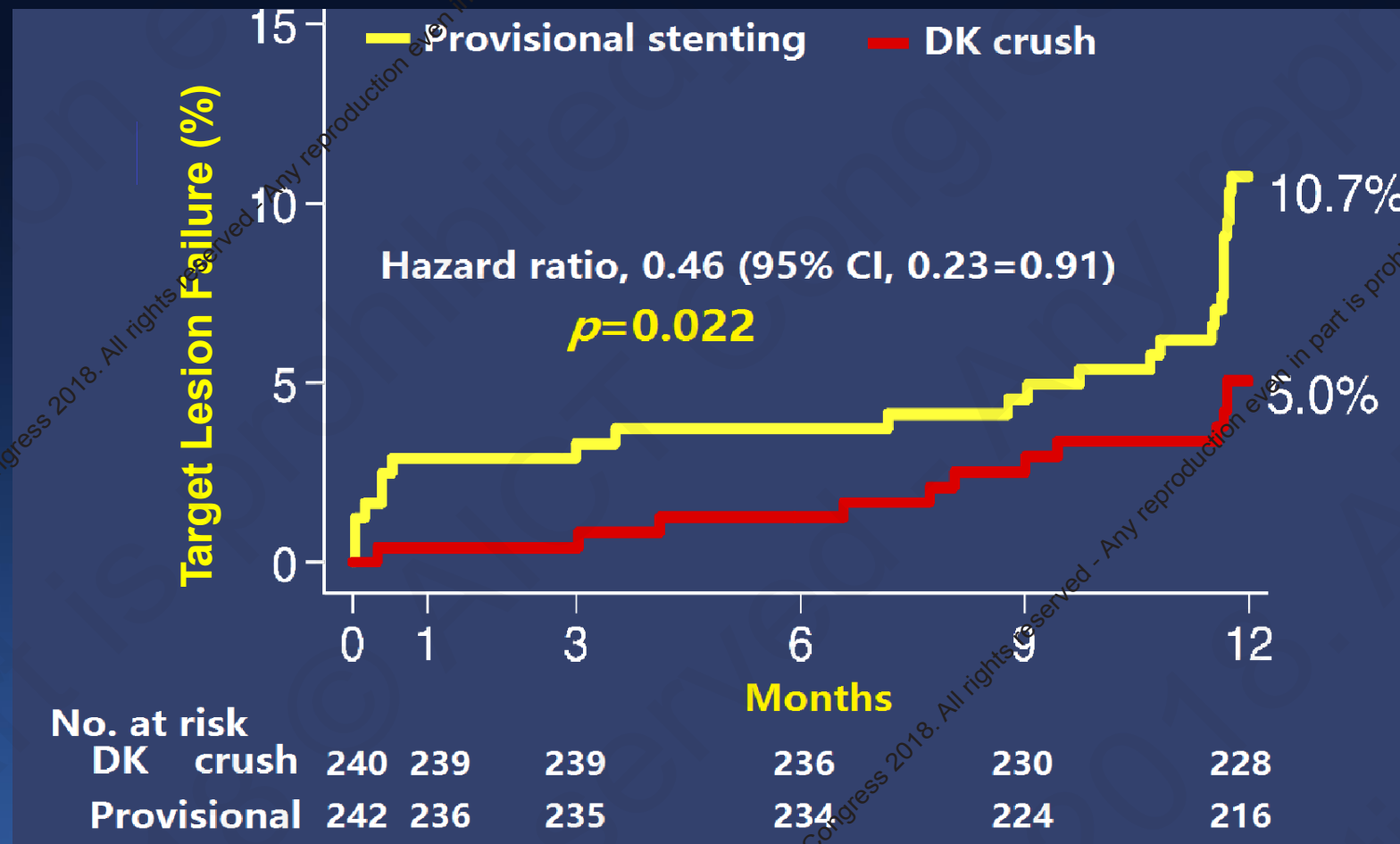
Double Kissing Crush Versus Provisional Stenting for Left Main Distal Bifurcation Lesions

DKCRUSH-V Randomized Trial

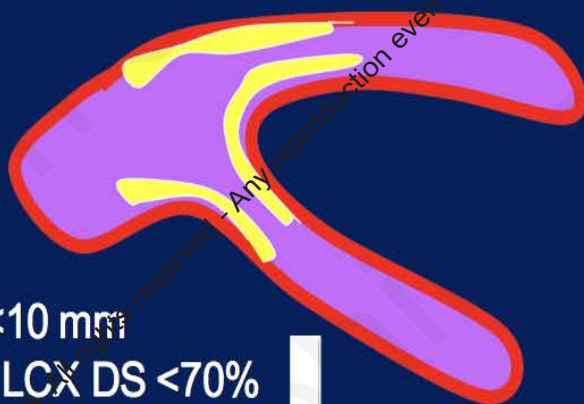
Shao-Liang Chen, MD,^a Jue-Jie Zhang, PhD,^a Yaling Han, MD,^b Jing Kan, MBBS,^a Lianglong Chen,^a Chunguang Qiu, MD,^d Tiemin Jiang, MD,^e Ling Tao, MD,^f Hesong Zeng, MD,^g Li Li, MD,^h Yong Chuanyu Gao, MD,^j Teguh Santoso, MD,^k Chootopol Paiboon, MD,^l Yan Wang, MD,^m Tak W. Kwan, MD,ⁿ Nailiang Tian, MD,^o Zhizhong Liu, PhD,^a Song Lin, MD,^o Chengzhi Lu, MD,^p Shangyu Wen, MD,^q Qi Zhang, MD,^s Imad Sheiban, MD,^t Yawei Xu, MD,^u Lefeng Wang, MD,^v Tanveer S. Rab, MD,^v Guanchang Cheng, MD,^y Lianqun Cui, MD,^z Martin B. Leon, MD,^{aa} Gregg W. Stone, MD^{aa}



Primary Endpoint TLF at 1-y



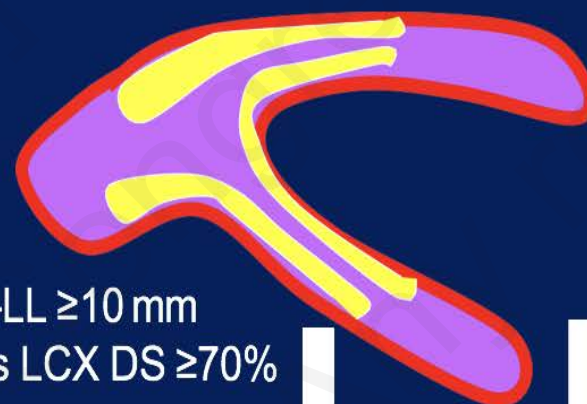
Target Lesion Failure at 1-Year Simple vs. Complex Bifurcation Lesions



LCX-LL < 10 mm
and/or LCX DS < 70%



Simple Lesions

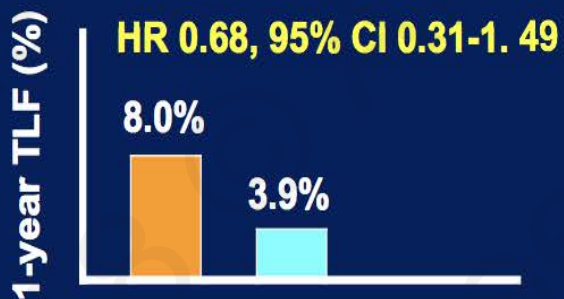


LCX-LL ≥ 10 mm
and/or LCX DS ≥ 70%

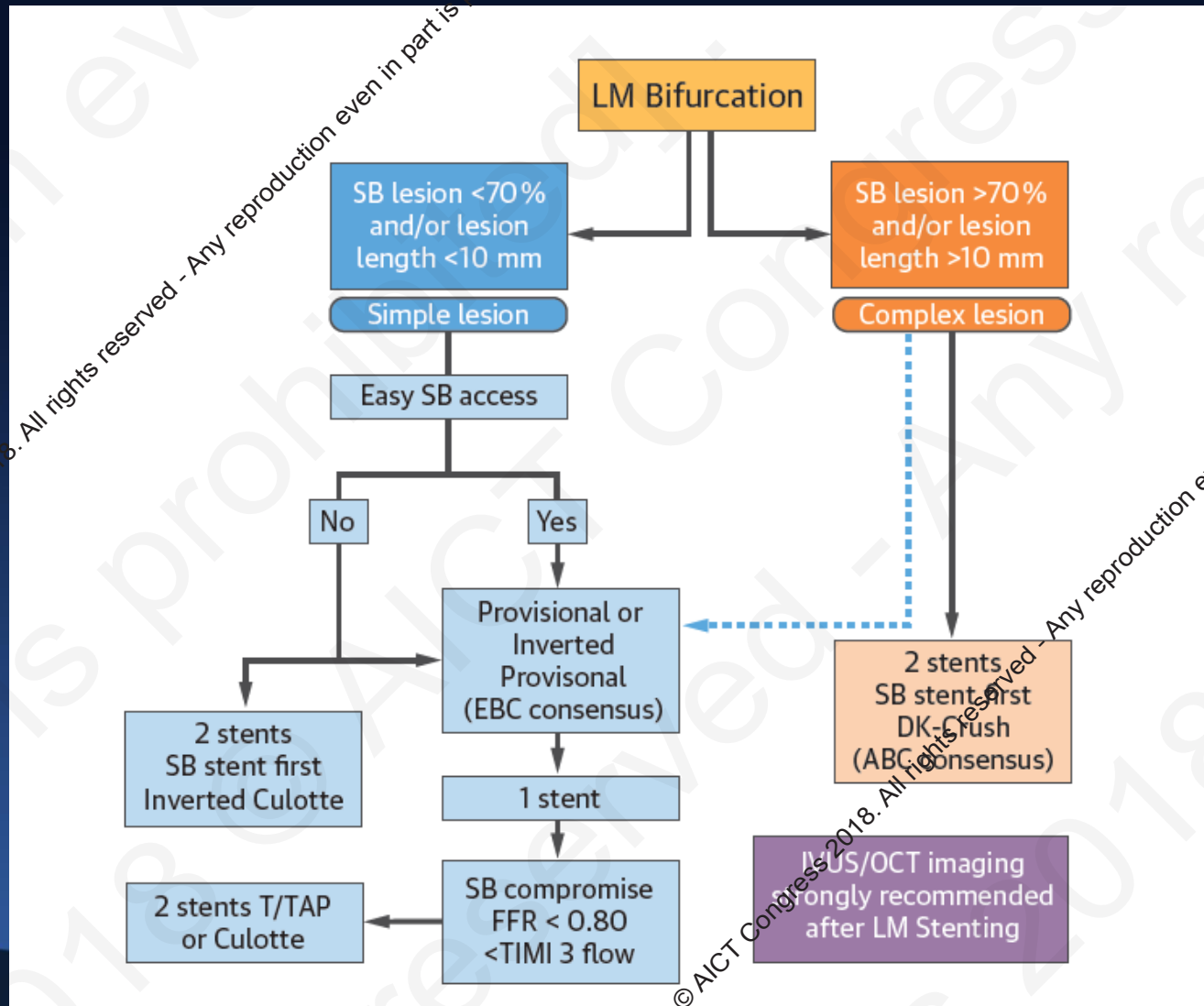


Complex Lesions

Plus ≥ 2 of 6
minor criteria



Current Intervention for LM Bifurcations

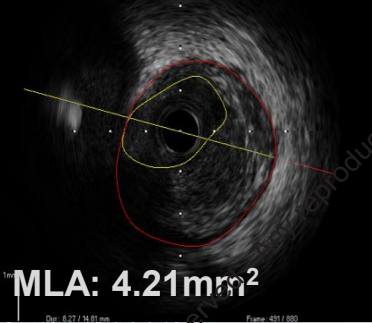


- 46-ys male, UAP, EF:61%

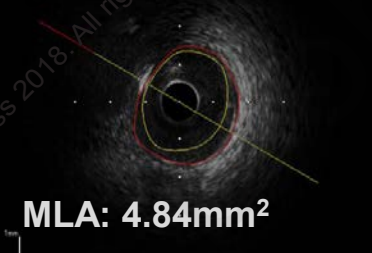


- Distal LM(1,1,1) : 90% stenosis
- Simple LM bifurcation
- Provisional stenting with IVUS guidance

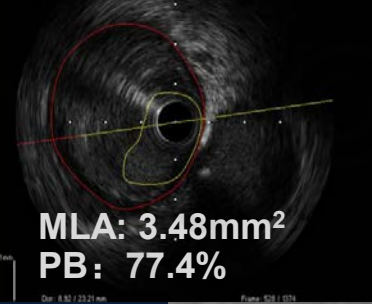
Ostial-LCX



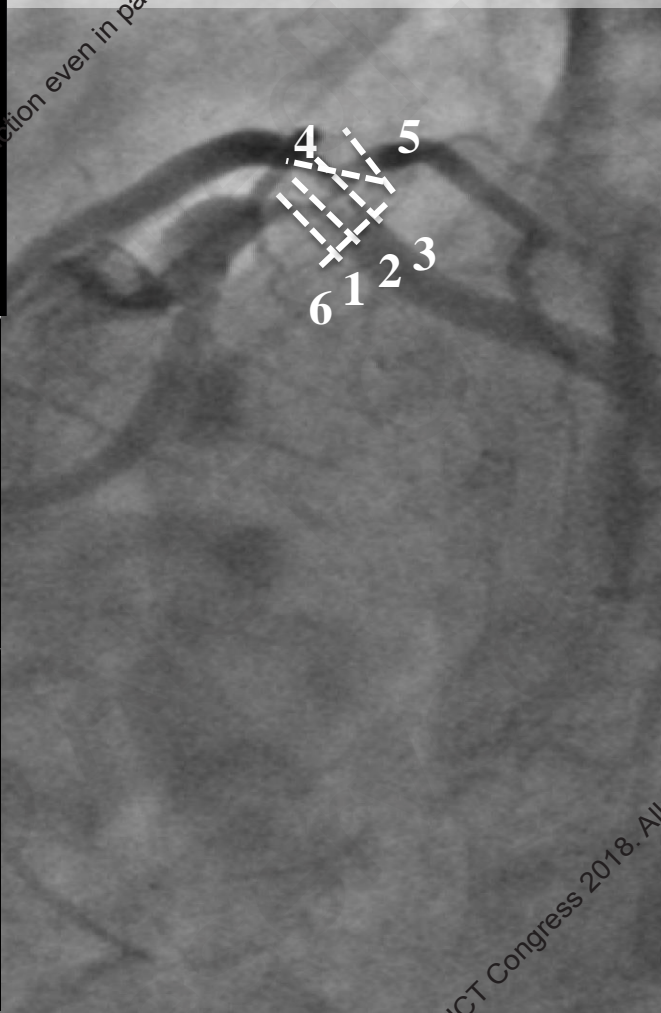
ostial-D1



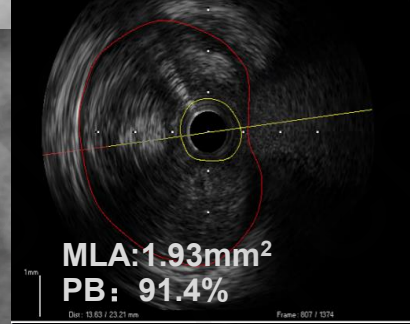
Proximal-LAD



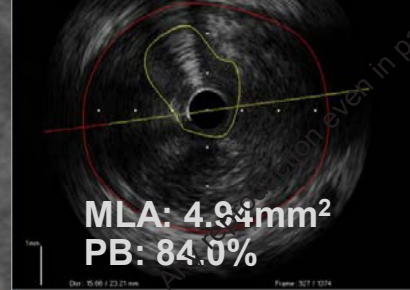
IVUS Finding before Predilatation



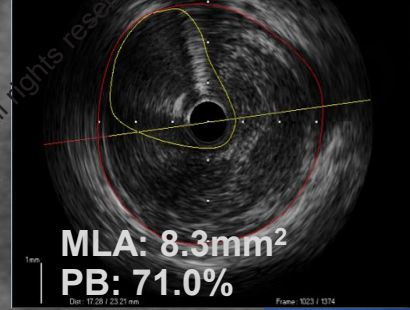
Ostial-LAD



POC



Distal-LM



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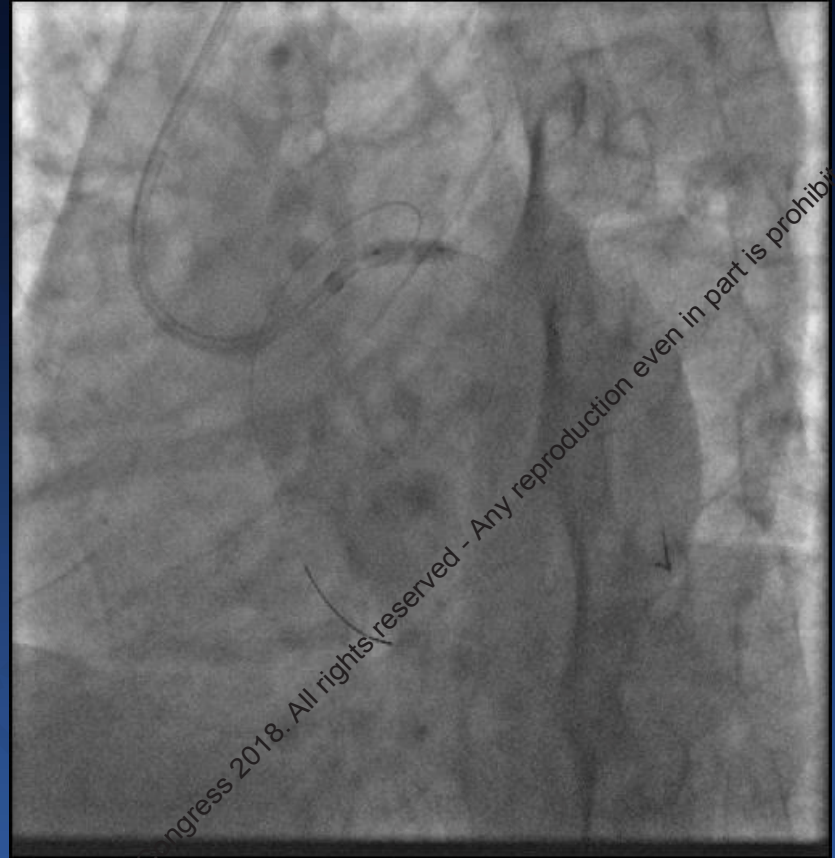


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Cutting Balloon pre-dilatation



LAD: 3.5/10 Flextome@12atm



LCX: 3.5/10 Flextome@12atm

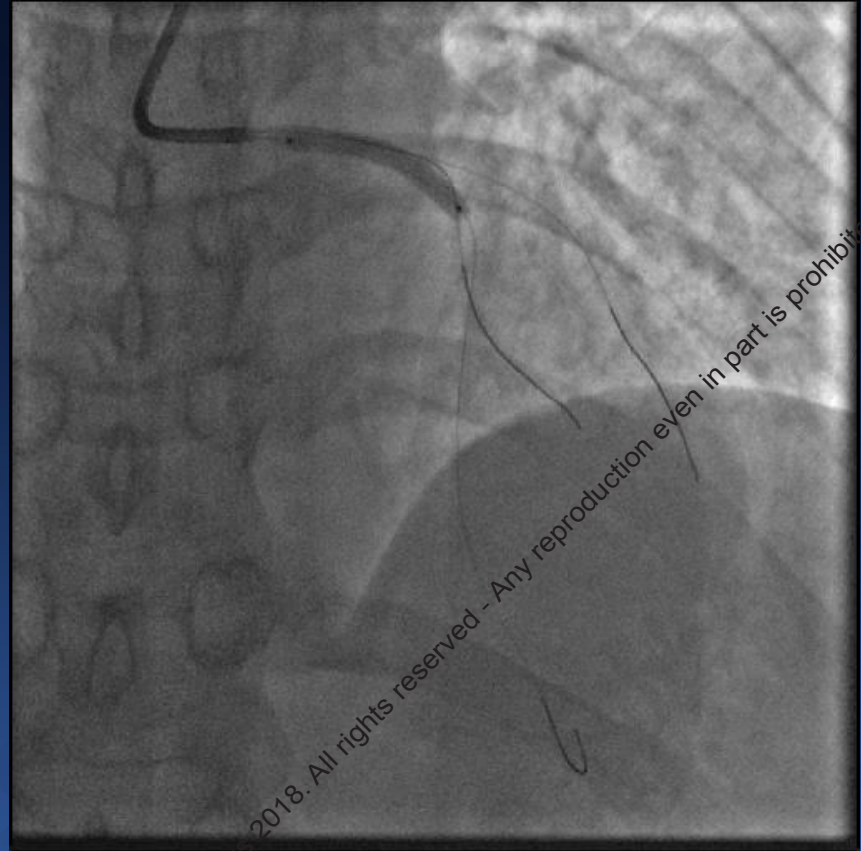


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Stenting LM-LAD with jailed wire



LM-LAD: 3.5/30 Resolute @ 10atm



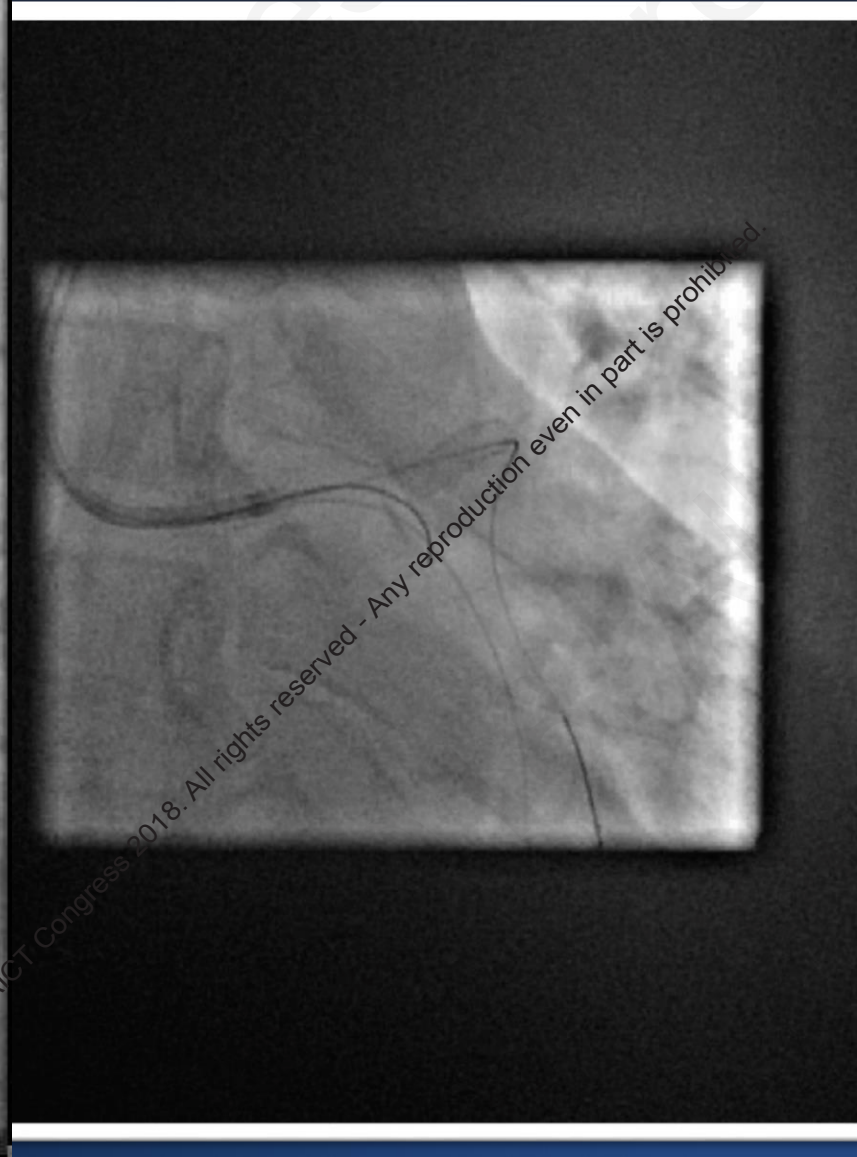
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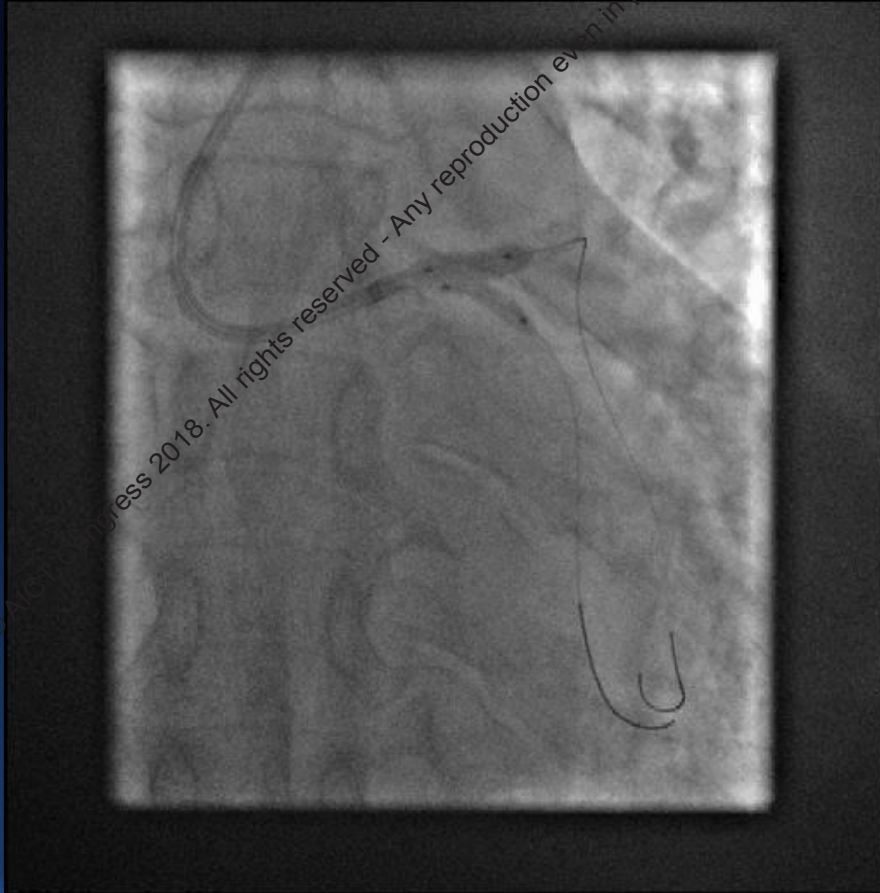
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POT and distal access SB

LM: 5.0/08 Quantum @ 20atm



Kissing Inflation and Re-POT



LAD: 4.0/12 NC sprinter@8atm
LCX: 3.5/12 NC sprinter@8atm

LM: 5.0/8 Quantum@ 20atm

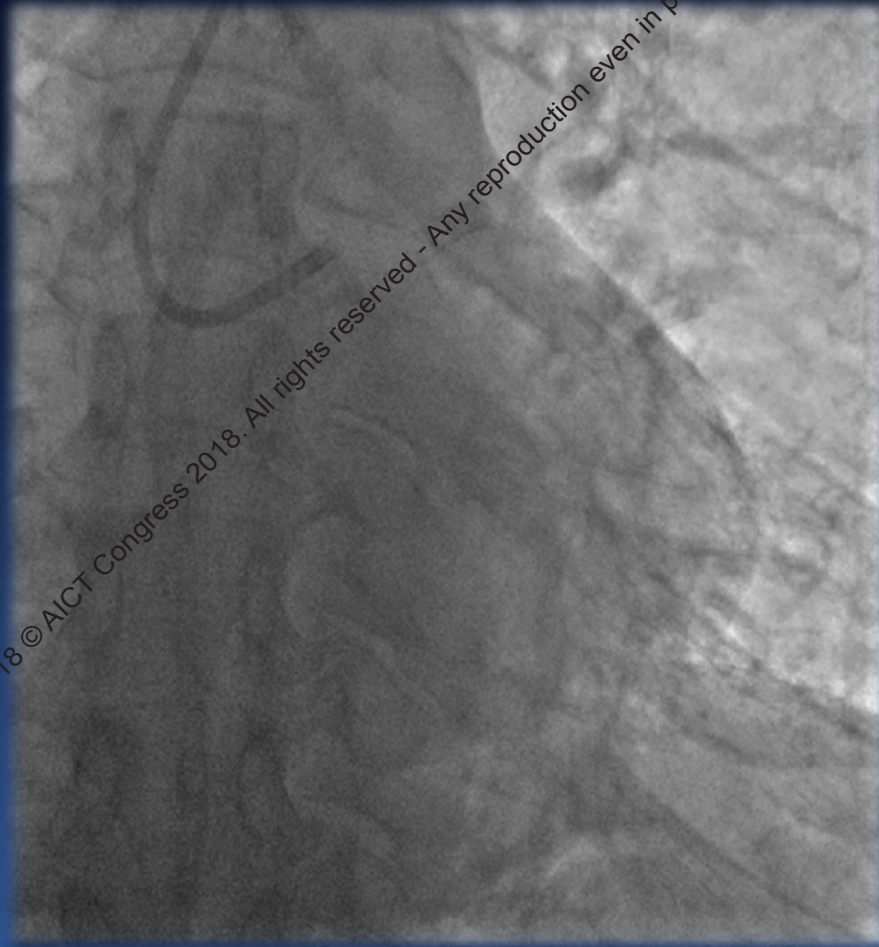


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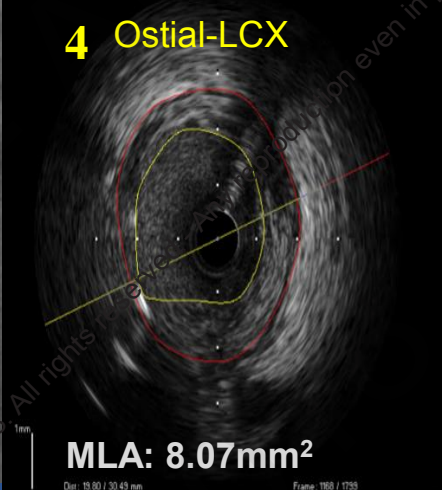
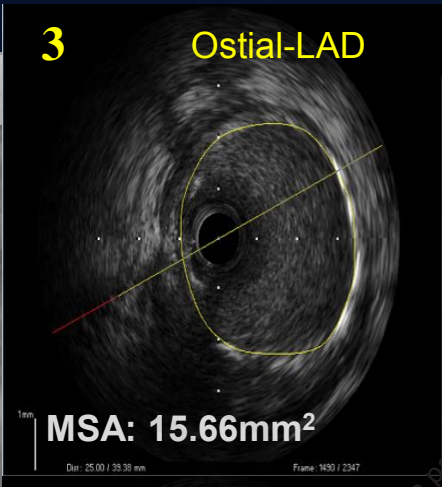
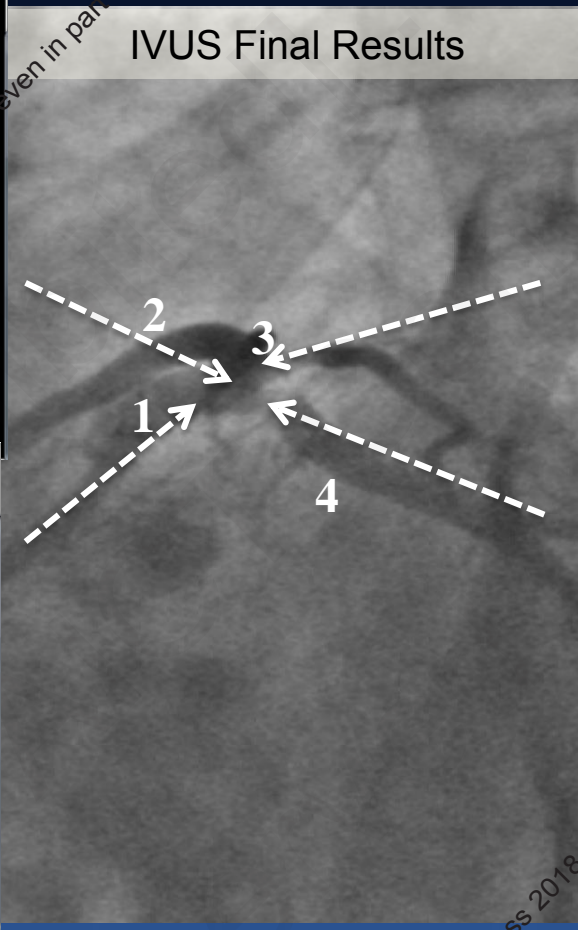
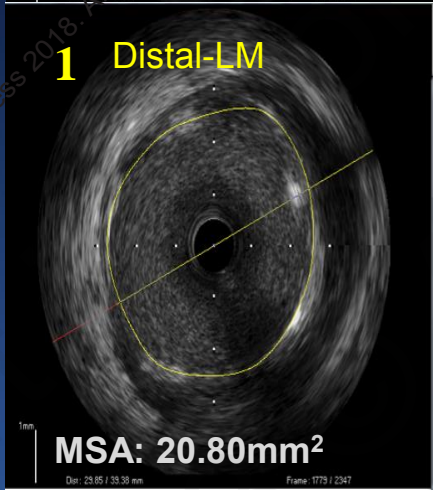
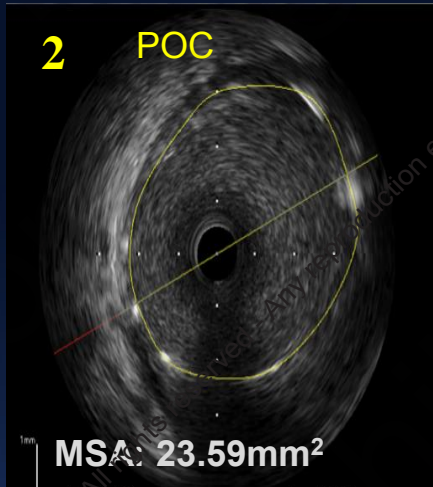
Final Result



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13-month Angiographic FU

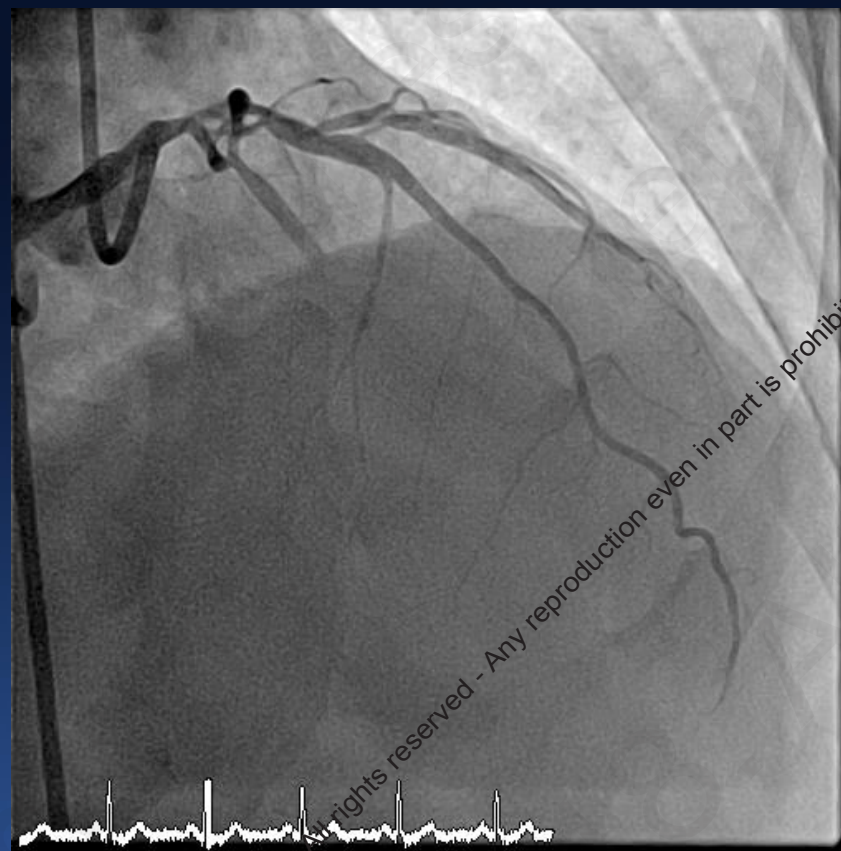
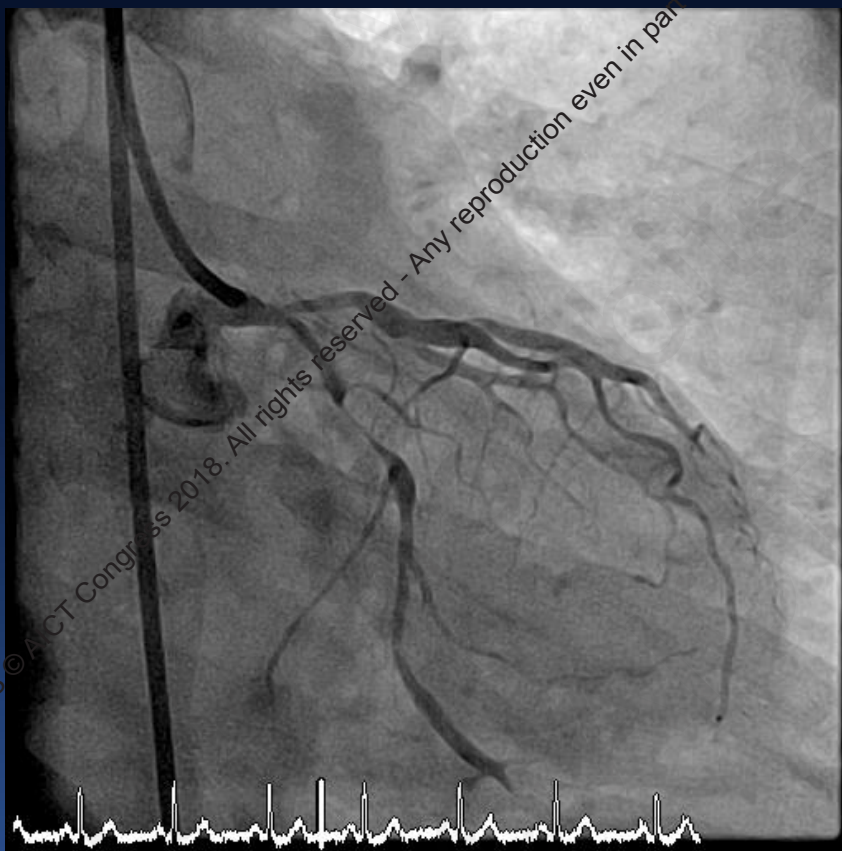


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- 64-ys male, UAP, EF:64%



- Distal LM(1,1,1)
- Complex LM bifurcation
- DK crush with IVUS guidance



DK crush – Step 1: stenting LCX



DK crush—Step 2: balloon crush

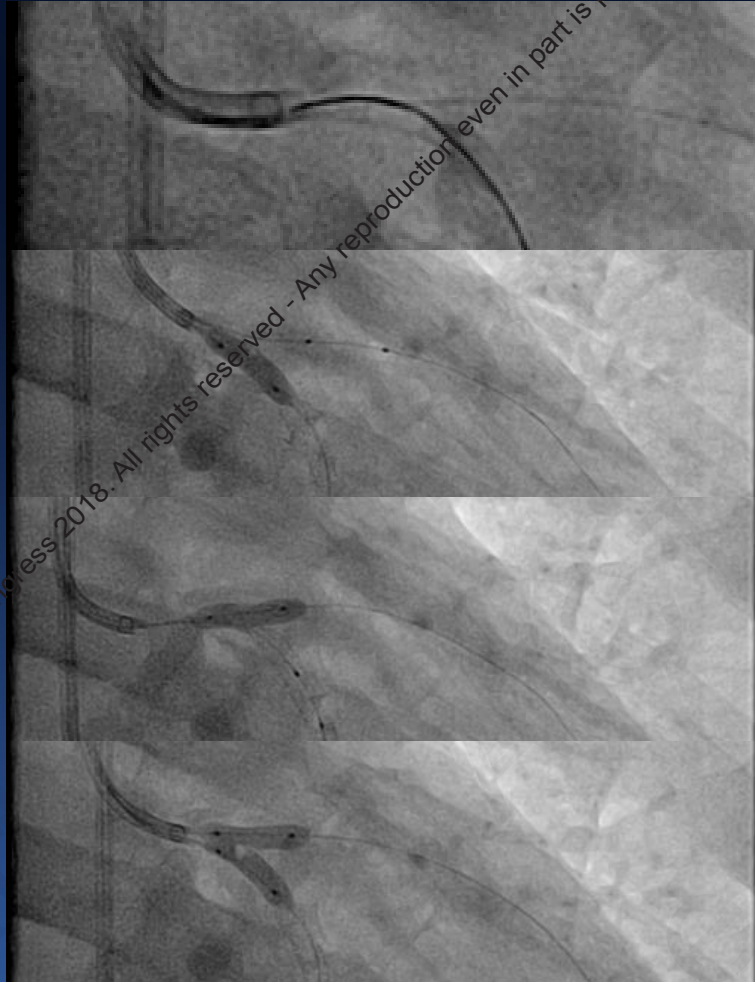


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Tips of 1st rewiring LCX



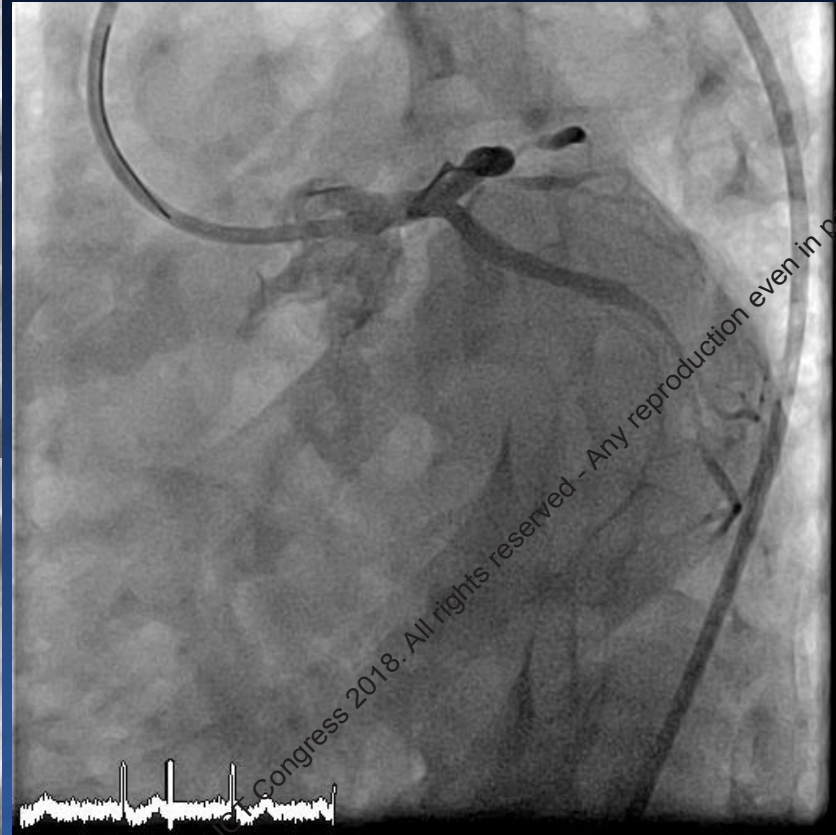
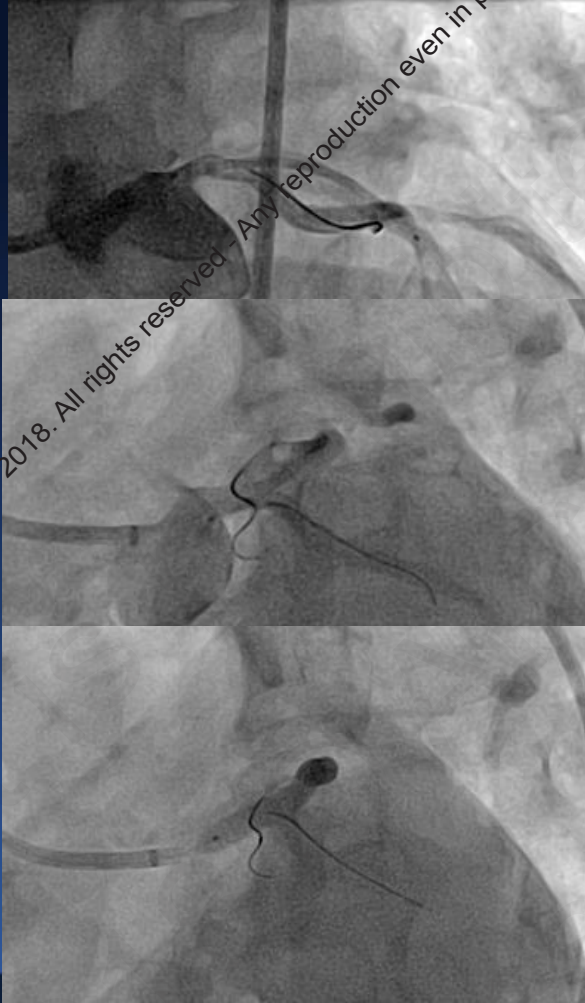
1st Rewiring from Proximal Cells of Ostial LCX Stent

Sequential dilation

First kissing balloon inflation

DK crush—Step 3: first kissing inflation

DK crush—Step 4: stenting LAD-LM

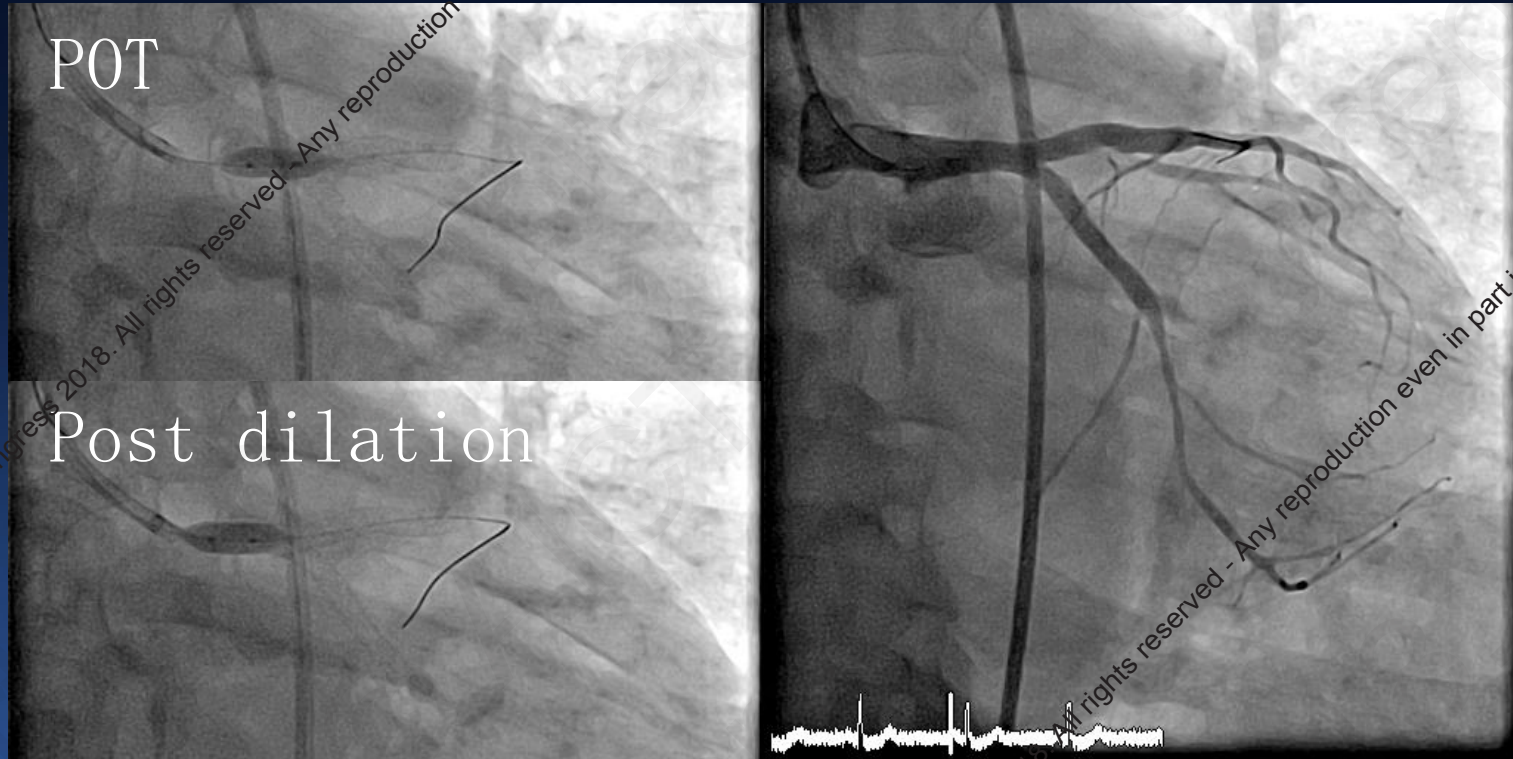


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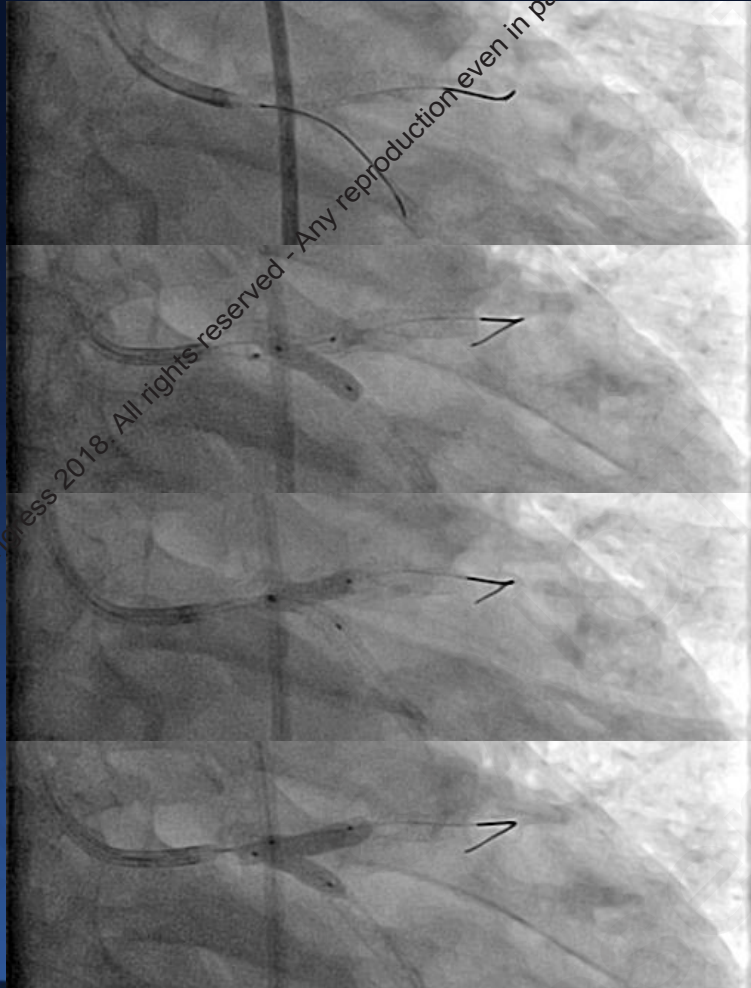


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DK crush—Step 5: POT



DK crush—Step 6: Final KBI



2nd Rewiring from Proximal-mid Cells of Ostial LCX Stent

Sequential dilation

Final kissing balloon inflation

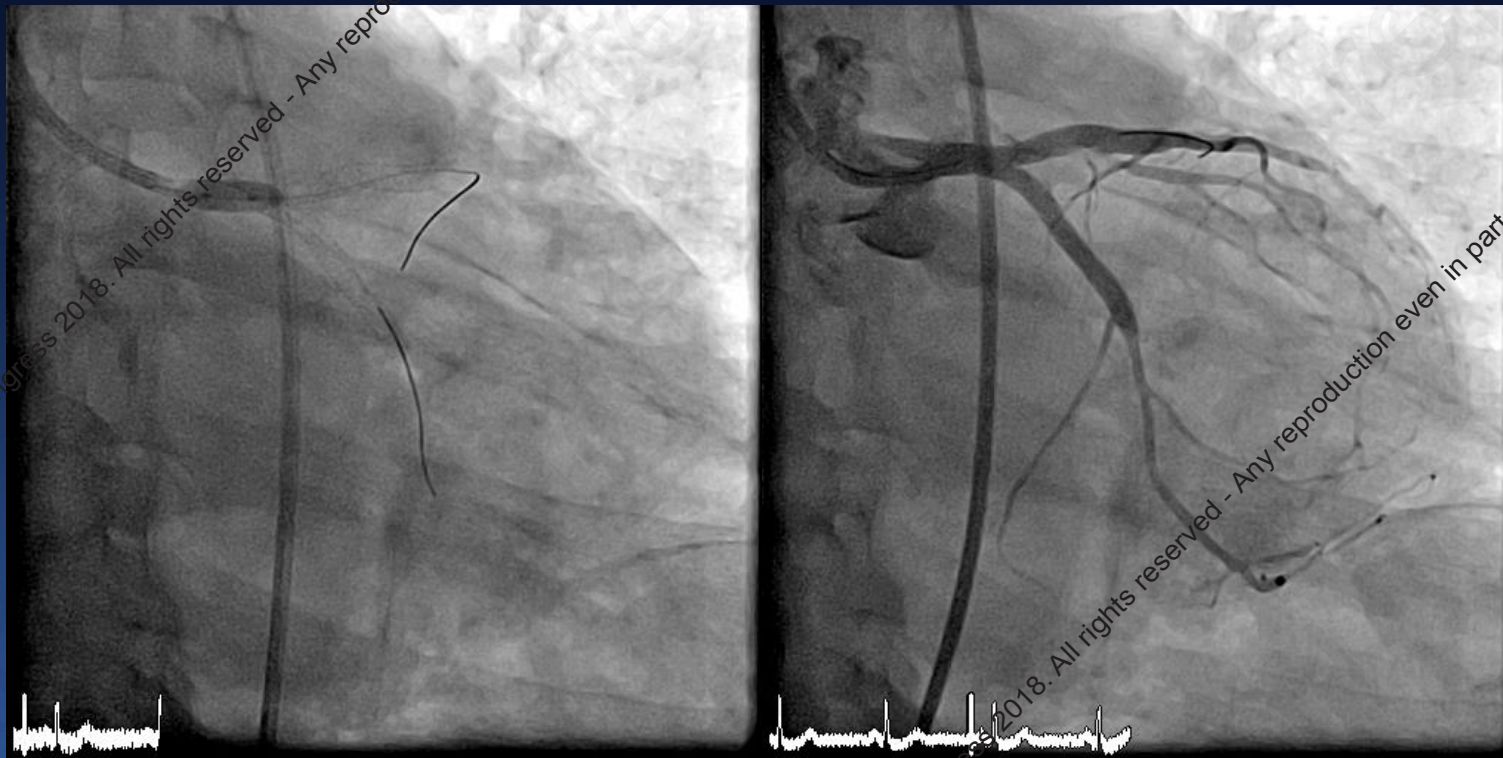


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DK crush—Step 4: Final POT



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Final Results



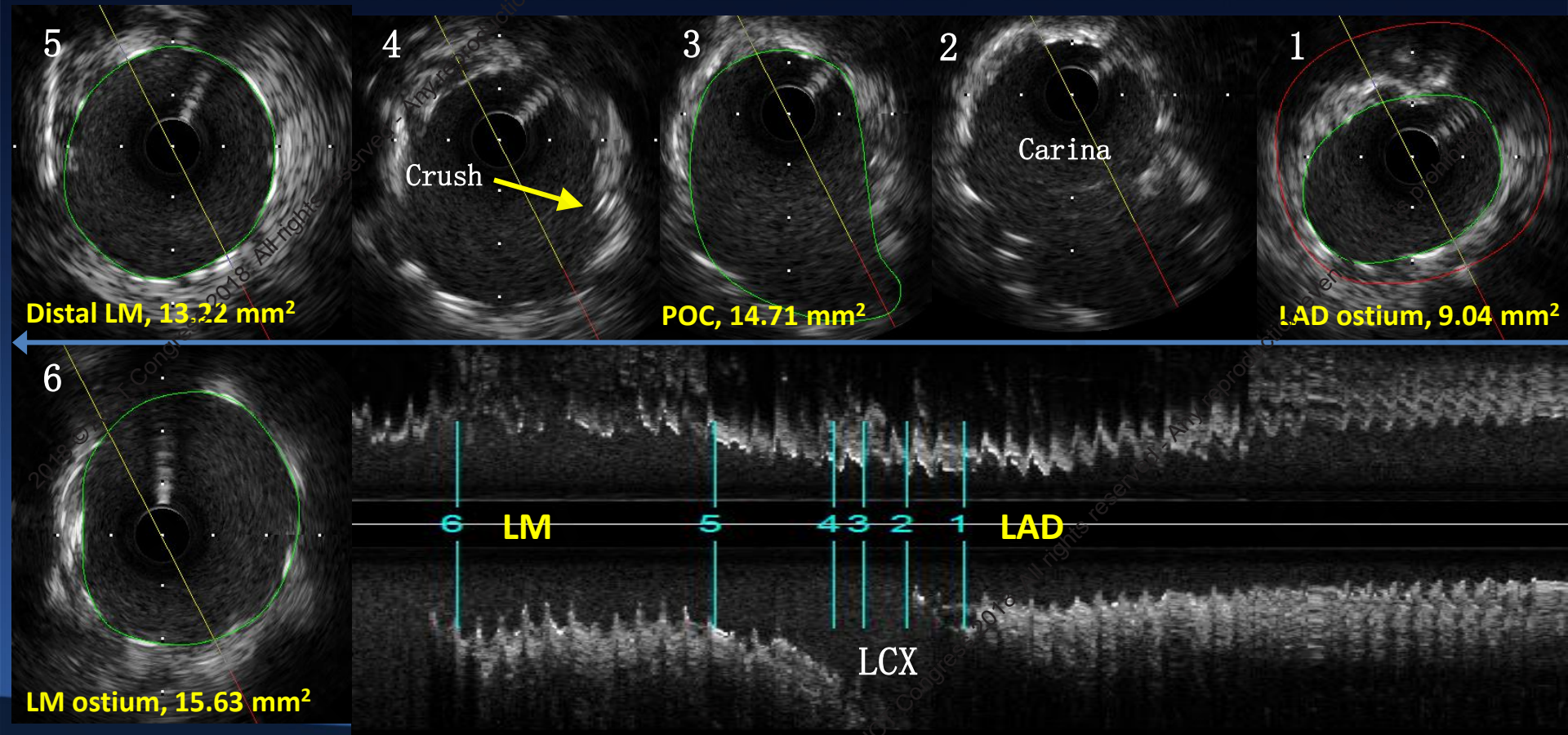
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IVUS results

LM-LAD



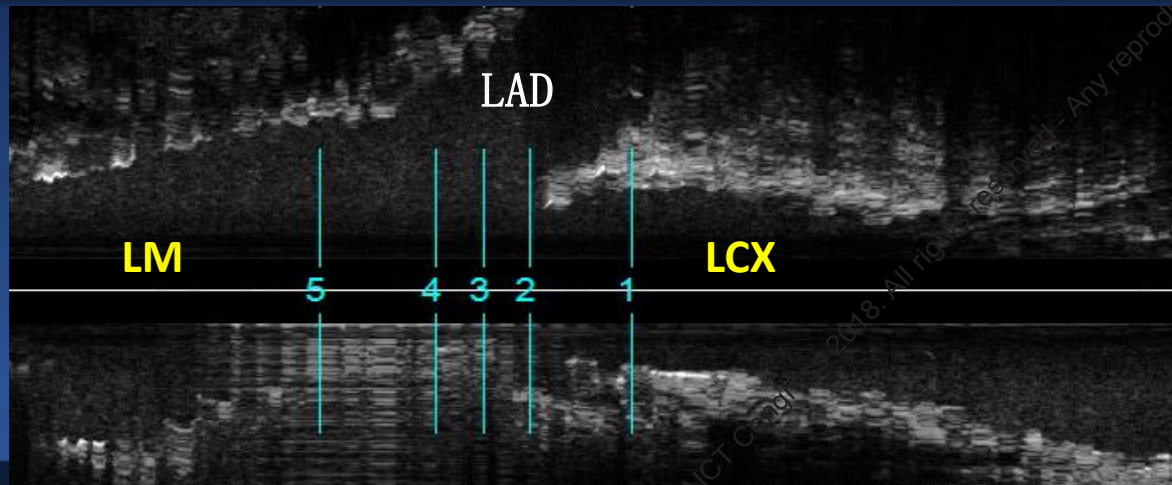
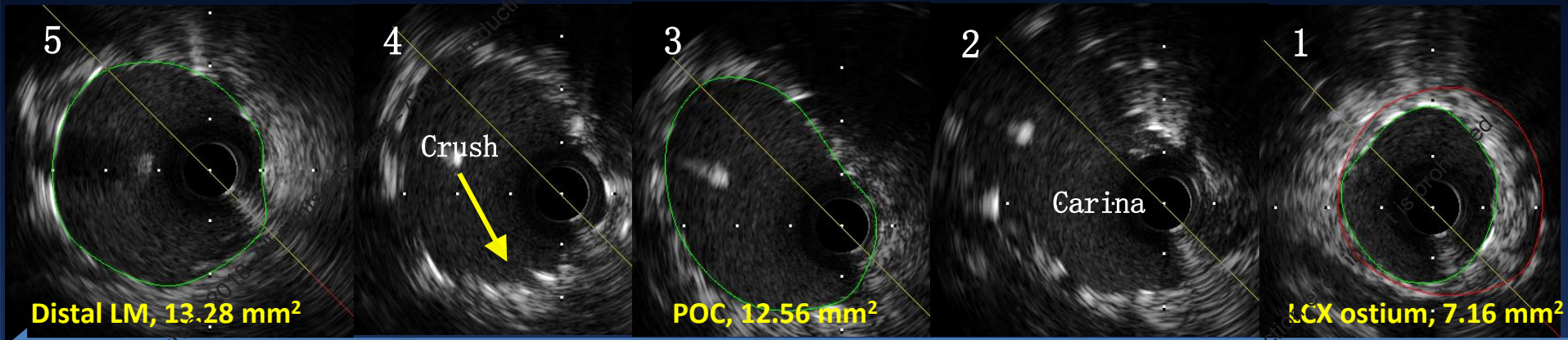
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IVUS results

LM-LCX



Take Home Message

- The DEFINITION criteria can differentiate complex from simple bifurcation lesions (BLs).
- For simple LM BLs, provisional stenting may be the preferred approach.
- For complex LM BLs, 2-stent technique especially DK crush was associated with superior result compared to culotte.
- Intro-coronary imaging guided LM stenting could improve clinical outcomes through facilitating stenting optimization
- **DEFINITION-II trial (NCT02284750)** randomly comparing 2-stent vs. PS for the treatment of Complex BLs is on-going.



Thanks for Your Attention!

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