Samsung Medical Center
Sungkyunkwan University
School of Medicine

Distal Left Main Lesion: How I Usually Do My PCI

Hyeon-Cheol Gwon

Cardiac&Vascular Center, Samsung Medical Center

Sungkyunkwan University School of Medicine

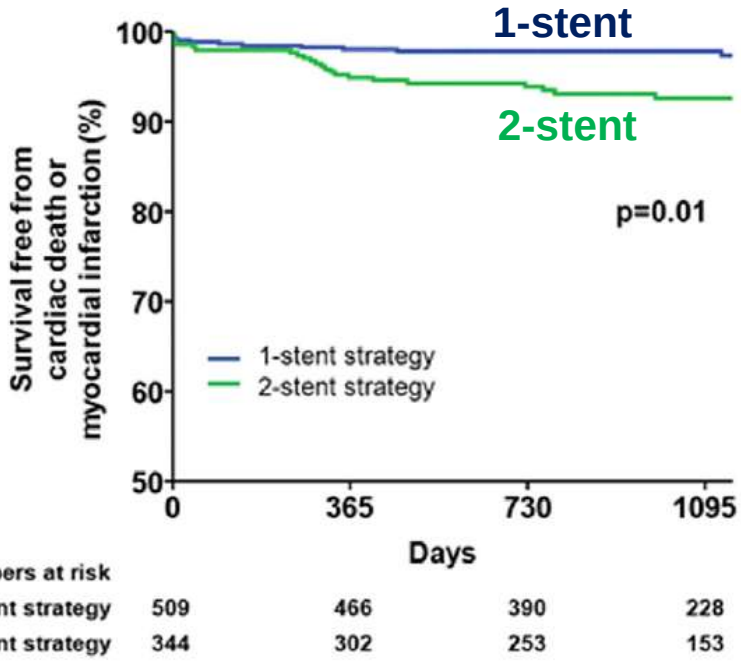
Samsung Medical Center
Sungkyunkwan University
School of Medicine

1-stent vs. 2-stent in LM bifurcation

COBIS II Registry (N=2,897)

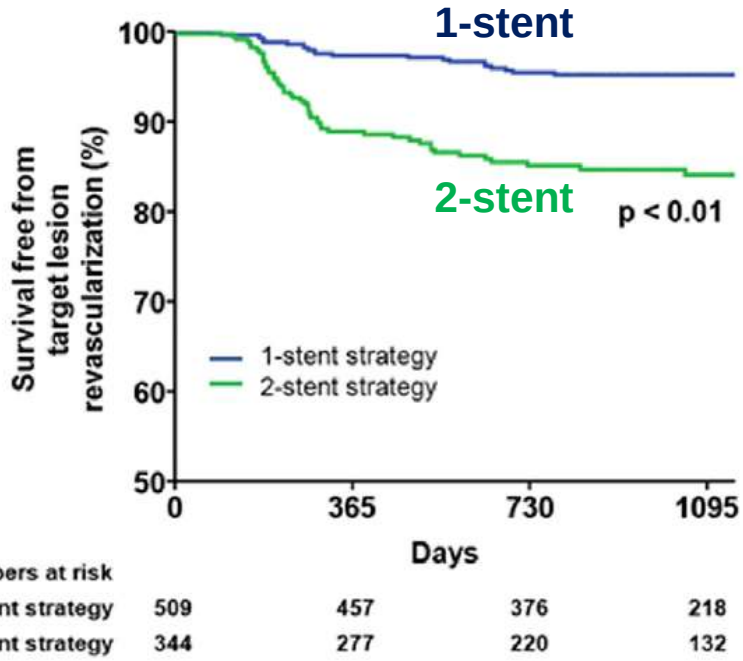
* N=853, left main bifurcation lesions treated with DES

Cardiac death or MI



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

Target Lesion Revasc



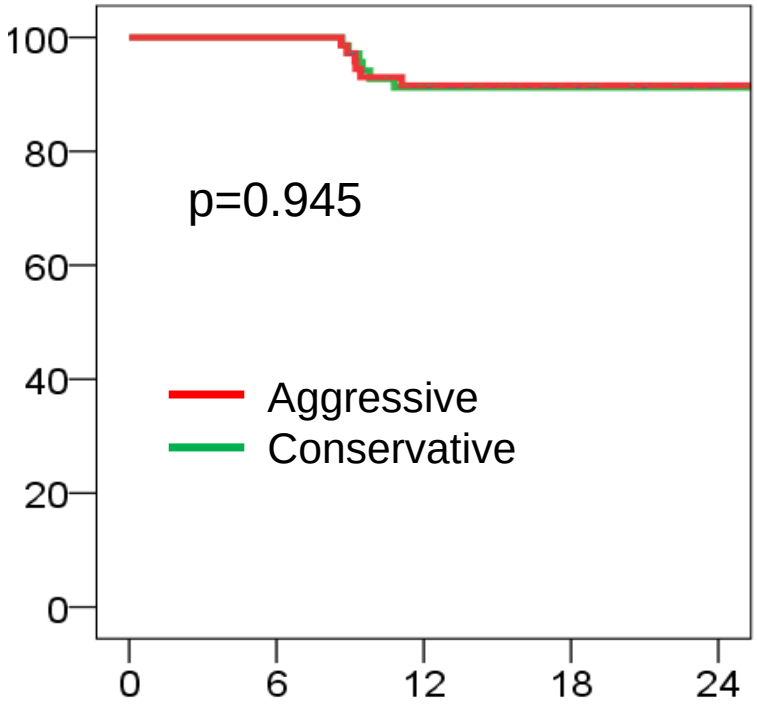
Numbers at risk				
1-stent strategy	509	457	376	218
2-stent strategy	344	277	220	132

Song YB, Gwon HC, JACC CVI 2014

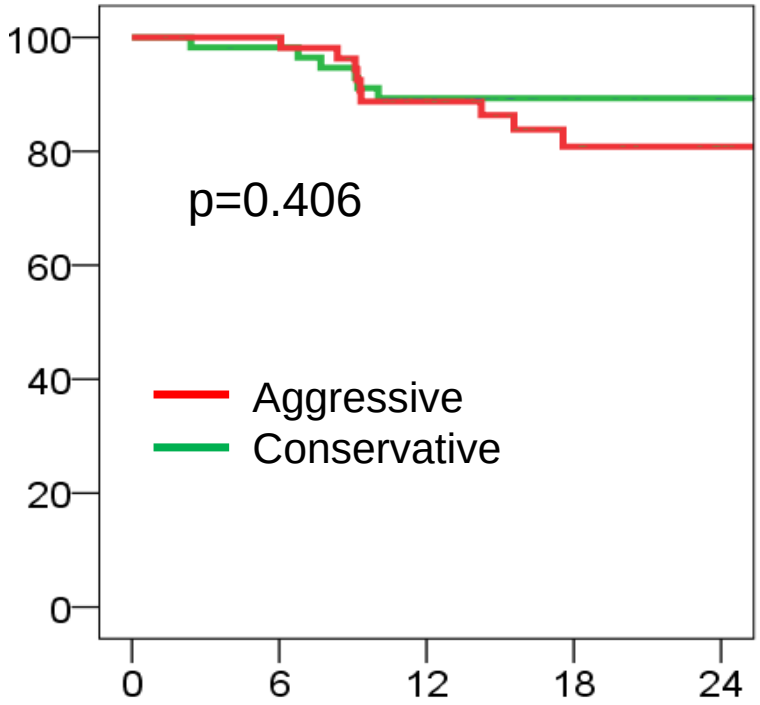
Conservative provisional vs. Aggressive provisional strategy: SMART-STRATEGY trial

Conservative group: SB ballooning 24%, stenting 7%
Aggressive group: SB ballooning 70%, stenting 30%

TVF-free Survival
Non-LM bifurcation (N=144)



TVF-free Survival
LM Bifurcation (N=114)

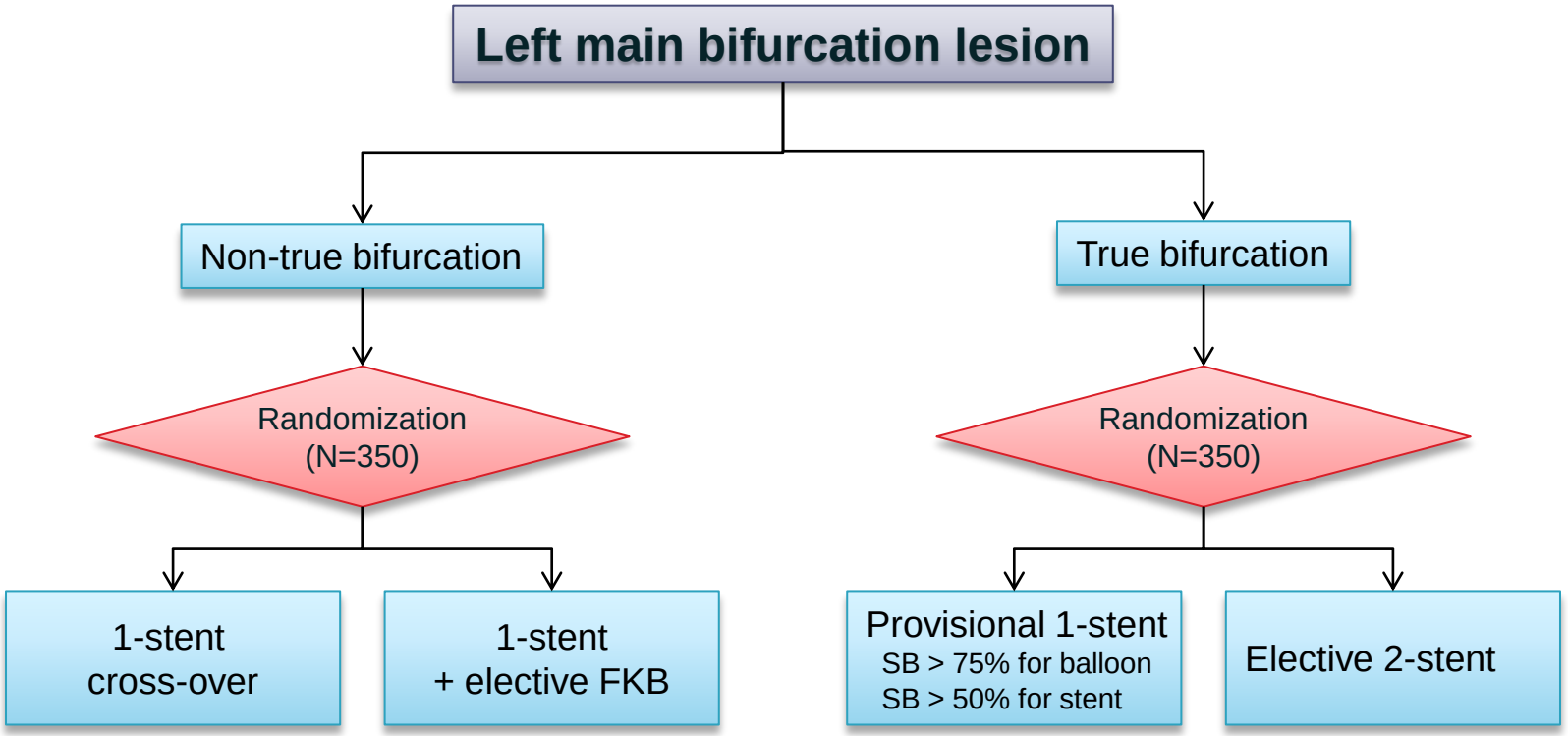


Song YB, Gwon HC, JACC CVI 2012

SMART-STRATEGY II Trial

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Multi-center, open-label, randomized controlled trial



Primary endpoint: 12-month target lesion failure, defined as a composite of cardiac death, MI, or ischemia-driven TLR

My strategies

- Access: Transradial approach
- Guiding catheter
  - 6F for non-true bifurcation, 7F for true bifurcation
  - XB (EBU) for LCA, Judkins for RCA
- IVUS guidance in all cases
- Jailed wire technique
- Try to avoid LCX predilatation
- Conservative for ballooning and stenting LCX
- Proximal optimization technique (POT)

Jailed wire protect side branch?

- COBIS II registry (N=2,227)
- SB occlusion after MV stenting (TIMI flow <3): **N=187, 8.4%**

Variables	Odds ratio [95% CI]	p Value
SB ostial DS ≥50%	2.34 [1.59-3.43]	<0.001
SB lesion length (by 1 mm)	-1.06]	<0.001
Acute coronary syndrome	1.53 [1.06-2.19]	0.02
Proximal MV disease (DS ≥50%)	2.34 [1.57-3.50]	0.03
Left main lesions (vs. non-left main lesions)	0.34 [0.16-0.72]	0.005

SB ostial disease

MV plaque burden

* DS = diameter stenosis, SB = side branch, MV = main vessel

Important non-predictors: jailed wire technique, SB predilation, IVUS guidance

Hahn JY, Gwon HC, J Am Coll Cardiol 2013

Jailed wire can help recovery

- COBIS II registry (N=2,227)
- SB occlusion after MV stenting (TIMI flow <3): **N=187, 8.4%**

	SB recovery (n=129)	No SB recovery (n=58)	p Value
Bifurcation location			0.65
Left main bifurcation	9 (7.0)	5 (8.6)	
LAD/diagonal		)	
LCX/OM			
RCA bifurcation			
True bifurcation	94 (72.9)	45 (77.6)	0.49
Jailed wire in the SB	**92 (71.3)**	**31 (53.4)**	**0.02**
SB predilation before MV stenting	45 (34.9)	16 (27.6)	0.33
Guidance of intravascular ultrasound	39 (30.2)	13 (22.4)	0.27
MV stent diameter (mm)	3.0 (3.0-3.5)	3.0 (2.9-3.5)	0.62
MV stent length (mm)	24.0 (20.0-30.0)	24.0 (20.0-32.0)	0.91
MV stent maximal pressure (atm)	12.0 (10.0-15.5)	12.0 (10.0-14.0)	0.57
MV stent to artery ratio	1.2 (1.1-1.3)	1.2 (1.1-1.4)	0.25

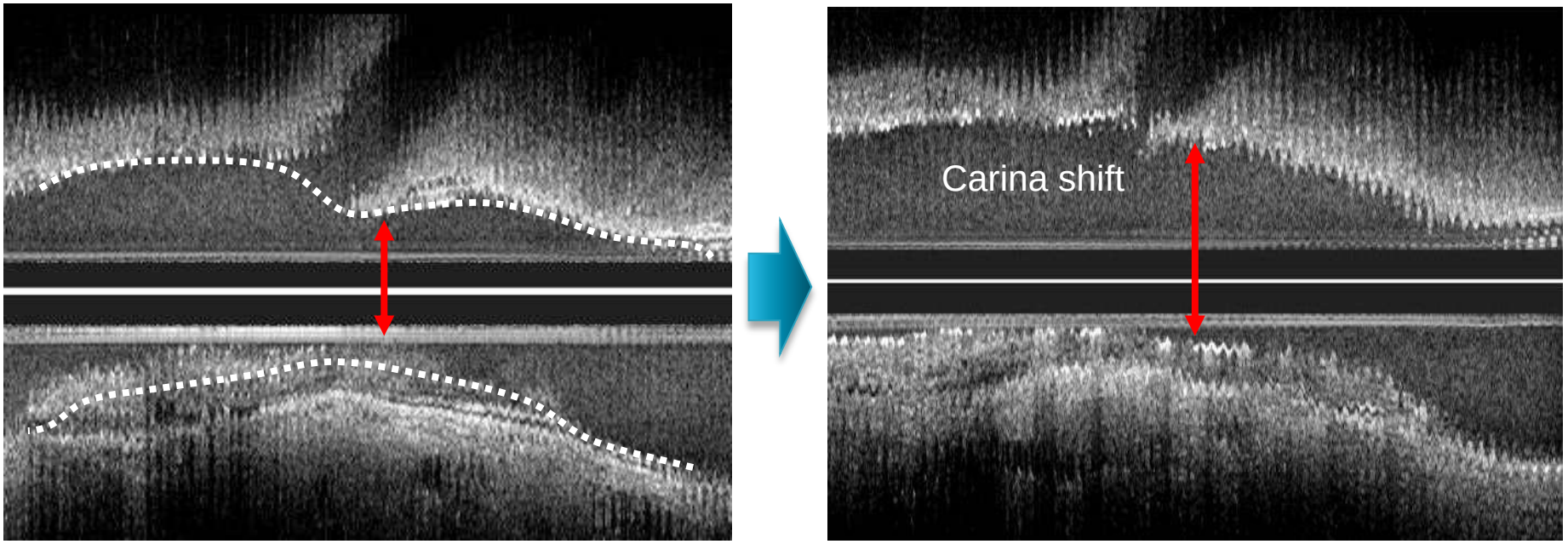
SB recovery after SB occlusion
Jailed wire group: 75%
No jailed wire group: 58%

Hahn JY, Gwon HC, J Am Coll Cardiol 2013

Technical factor for SB compromise

Before stenting

After stenting

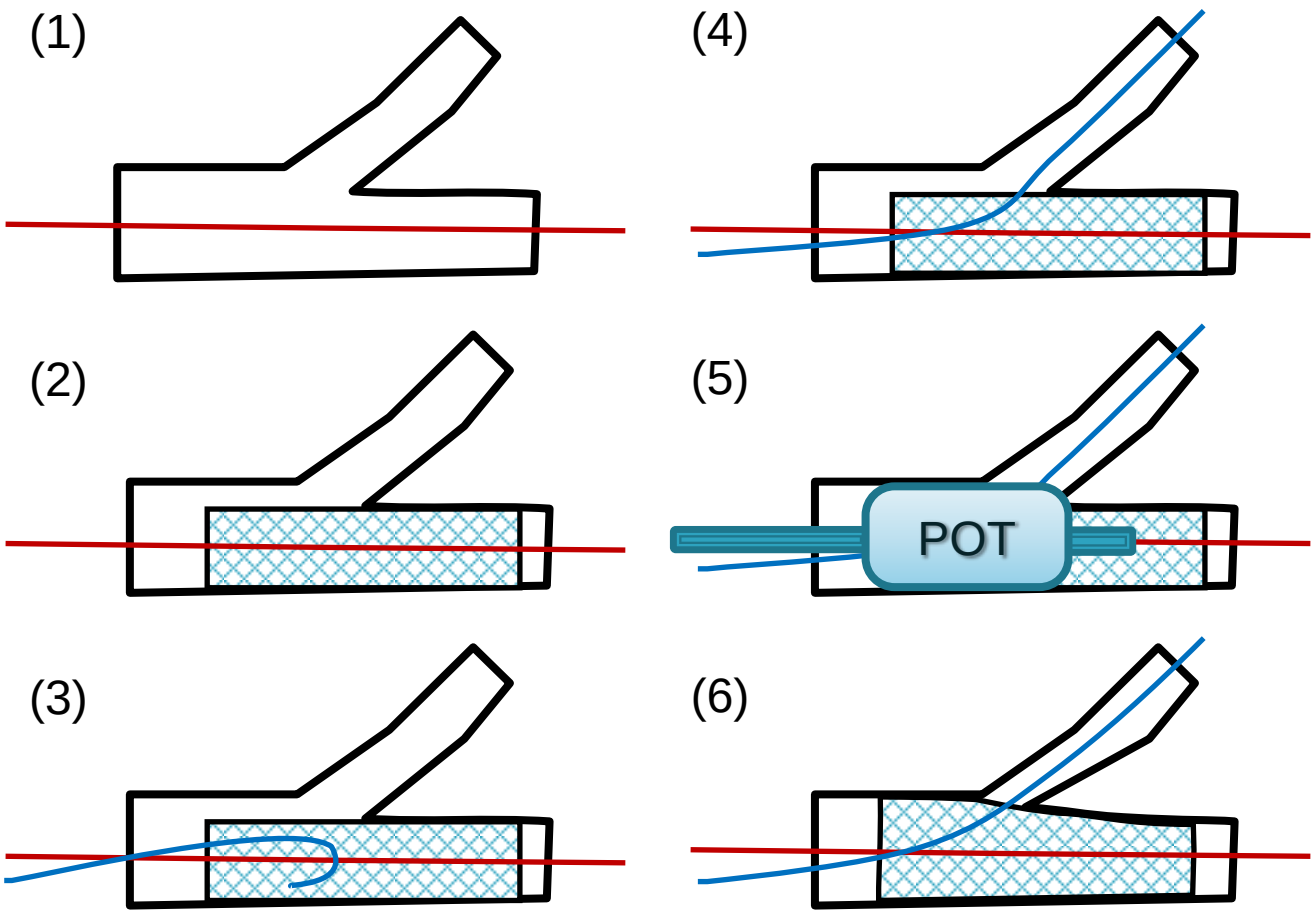


Stent over-expansion in the main branch increases the risk of SB occlusion, which can be reduced by IVUS-guided stent size selection.

Vassilev D, Kardiol Pol 2008

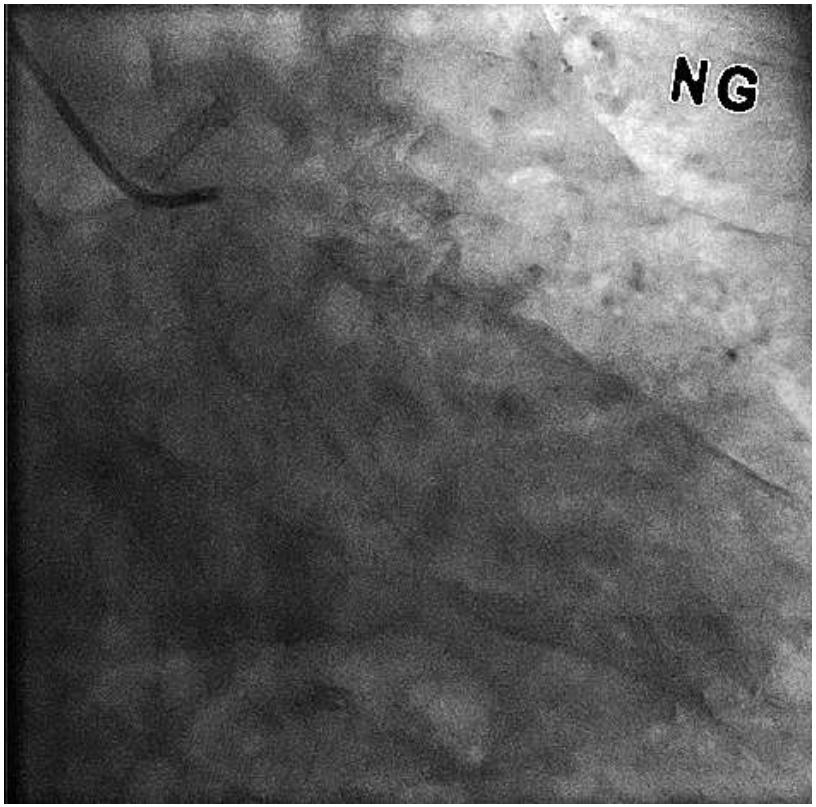
My strategy to reduce SB compromise

* IVUS for all cases, focused on the vessel size
* Provisional approach in all cases, trying to avoid 2-stent technique

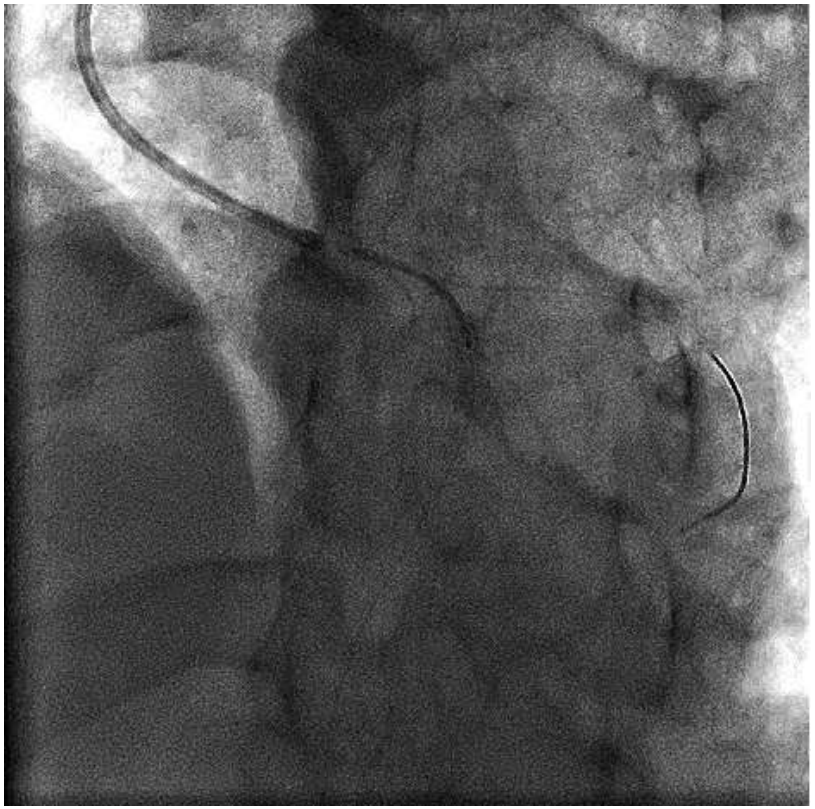


POT
= Proximal optimization technique

Case 1. Left main bifurcation

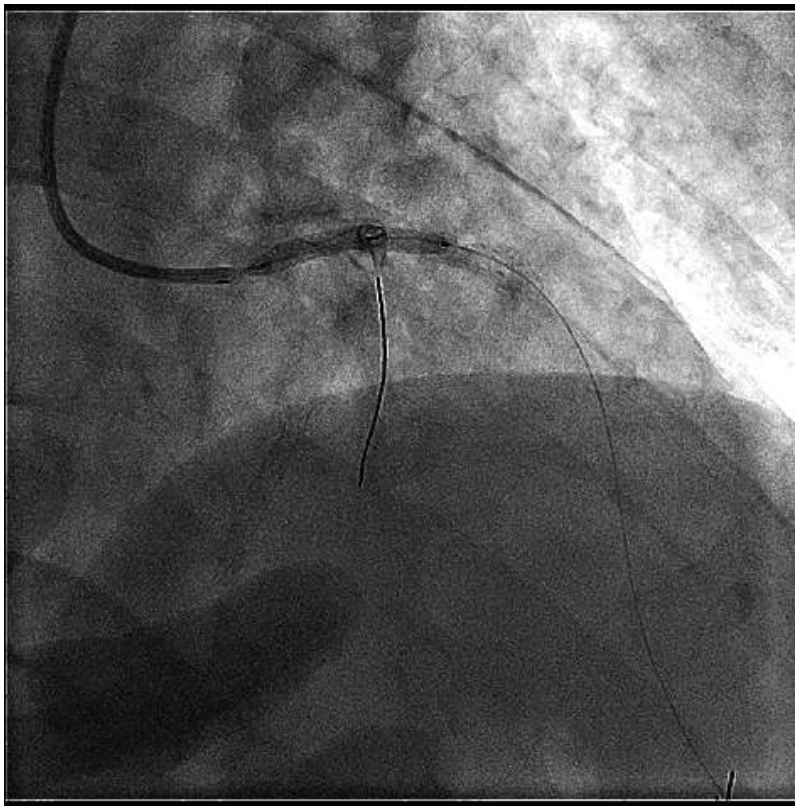


Medina 1,1,0 lesion

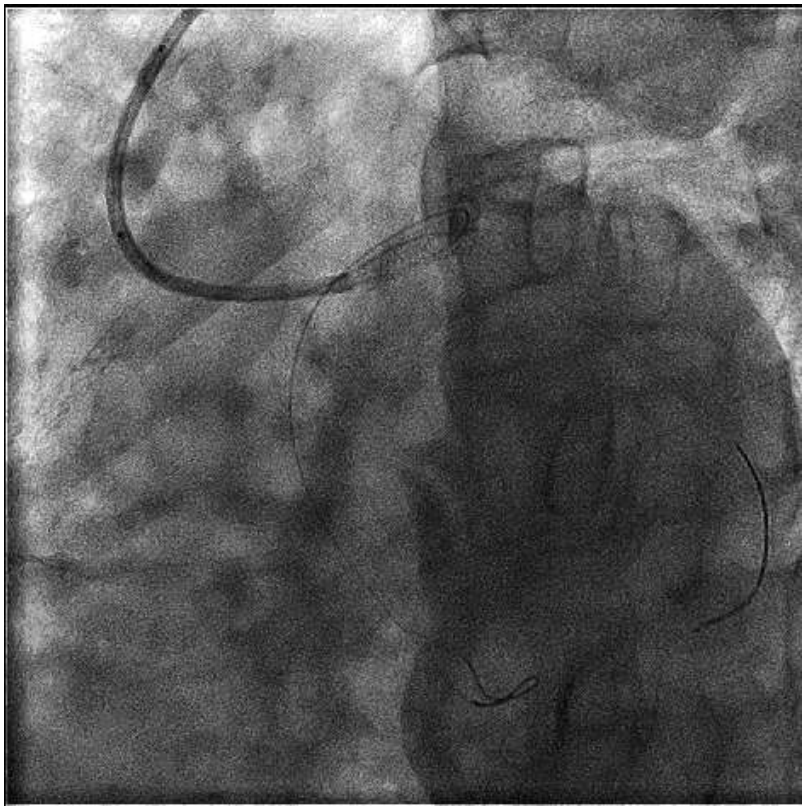


Shallow LAO view is helpful
for LM os stent coverage

Case 1. Left main bifurcation

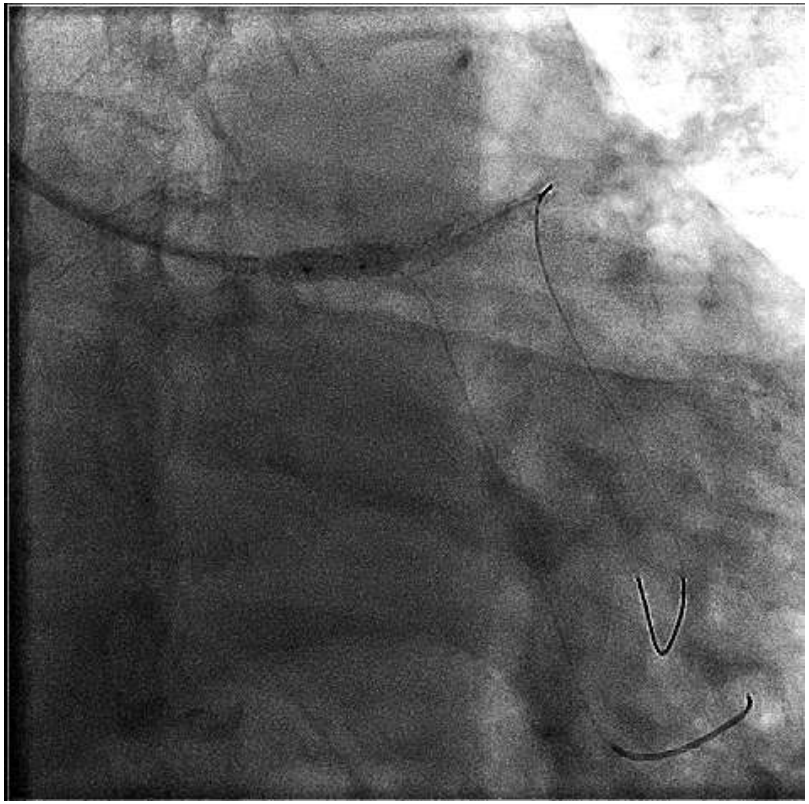


3.5x24 mm DES, 20 atm

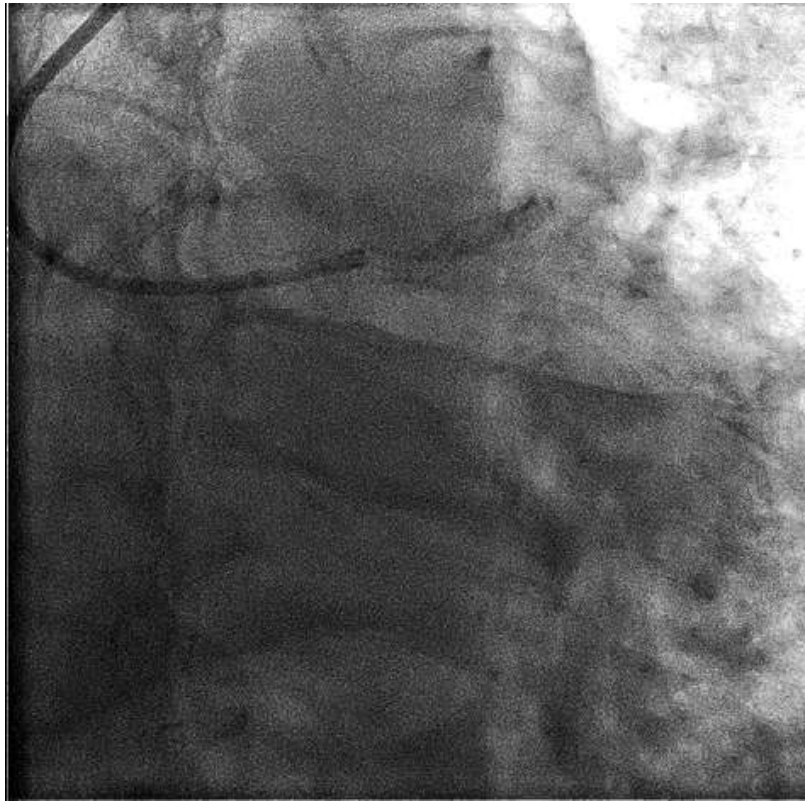


Looking at LCX os
Ballooning if DS > 50~70%
Stenting if DS > 30~50%

Case 1. Left main bifurcation



POT with 5.0x8 mm balloon, 18 atm

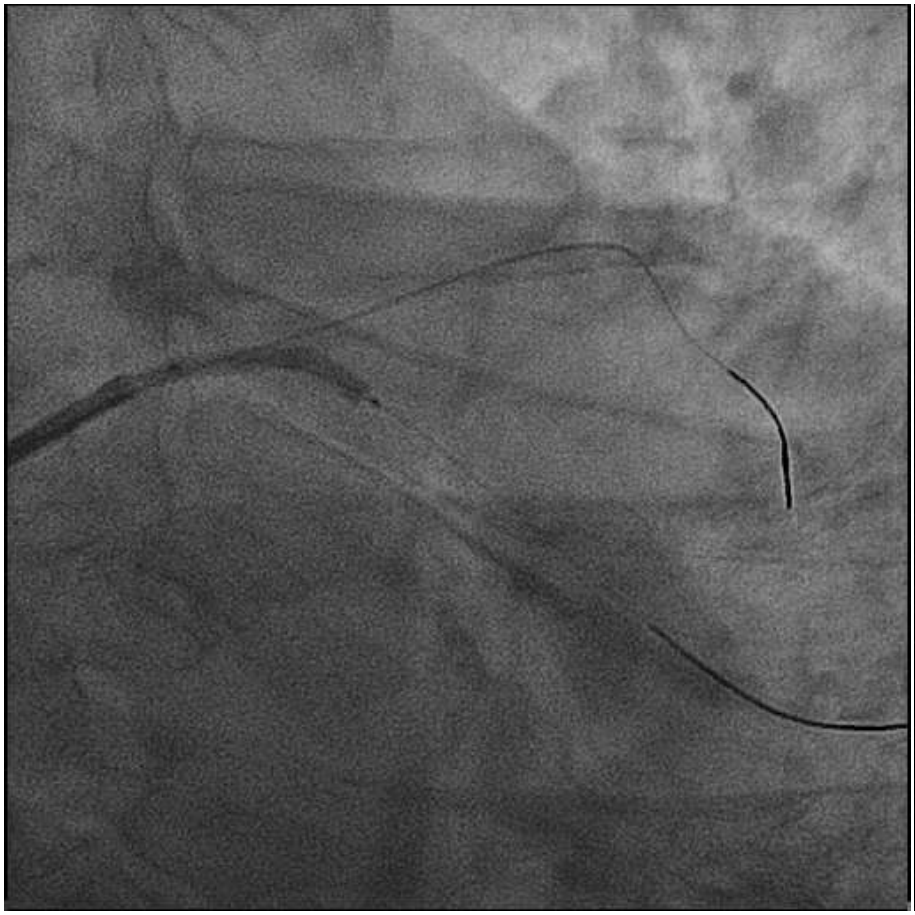


Final angiogram

Case 2. Left main bifurcation lesion

Which two stent technique?

Case 2. Left main bifurcation lesion



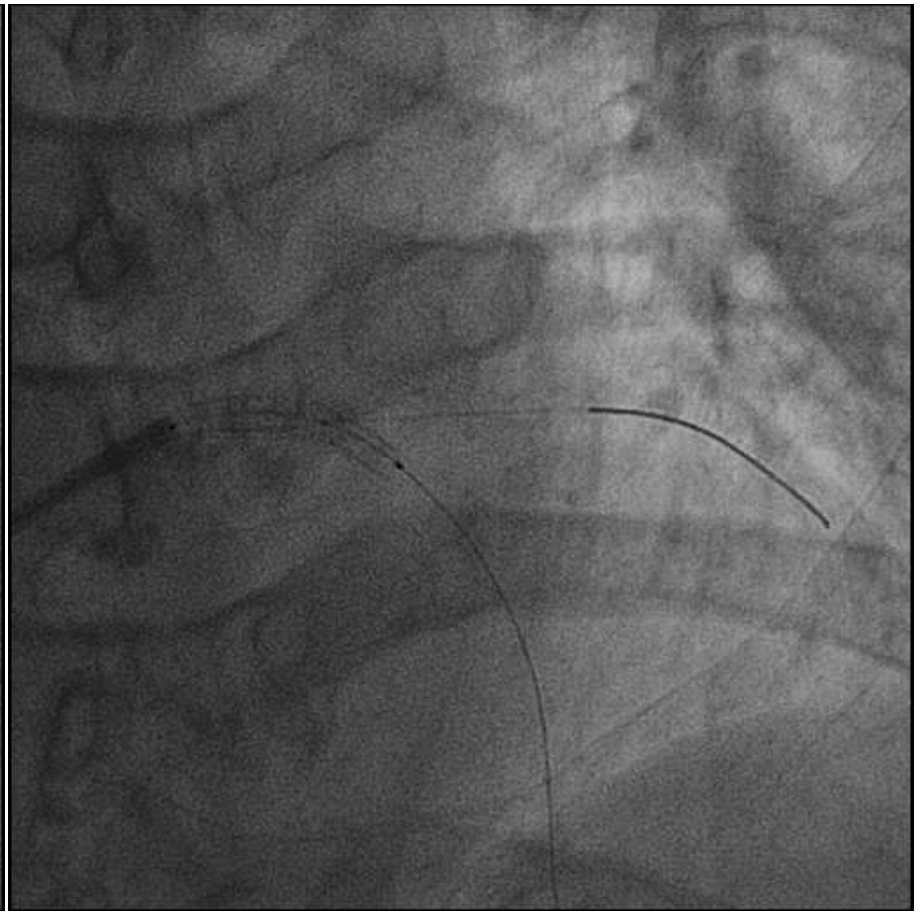
2.5x20mm balloon (12atm)

2.5x20mm balloon (12atm)

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Case 2. Left main bifurcation lesion

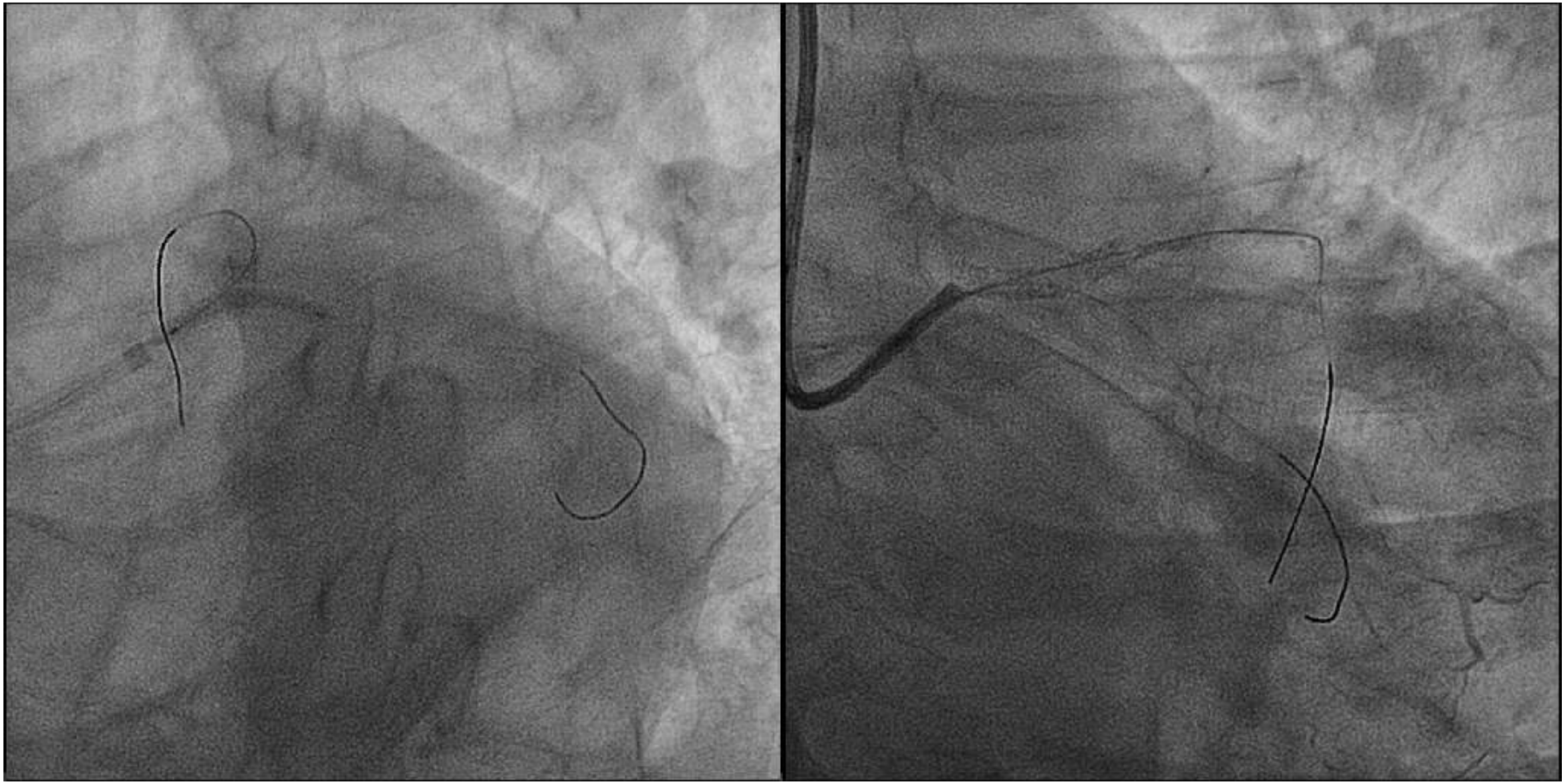
4.0x24mm Promus element stent (12atm)



LCX compromised.
Mechanism?

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Case 2. Left main bifurcation lesion

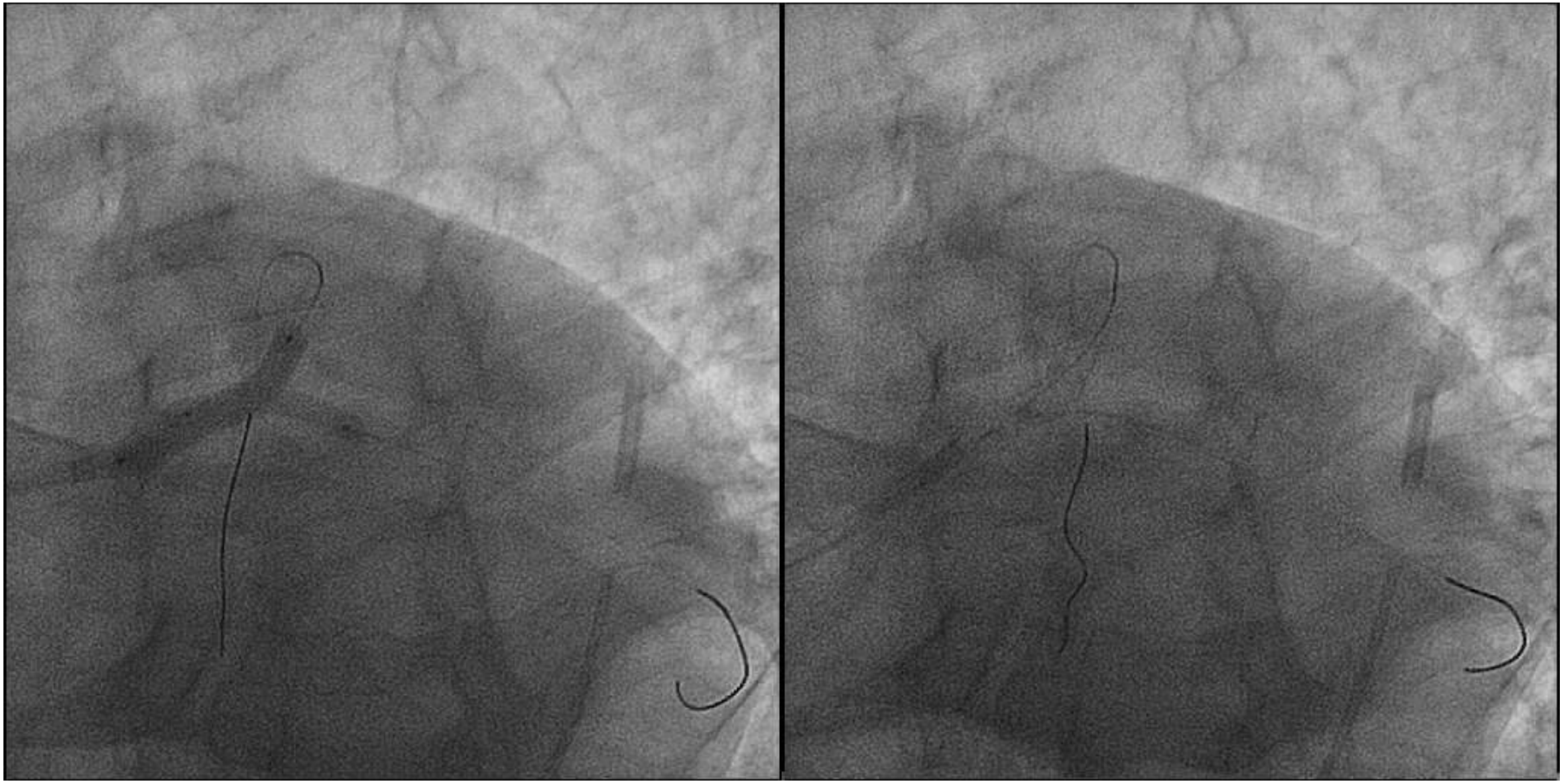


2.5x20mm balloon(max.=12atm)

After ballooning

Even after LCX ballooning, the slow flow persisted.
Meanwhile, BP was dropped down to 60/30 mmHg

Case 2. Left main bifurcation lesion

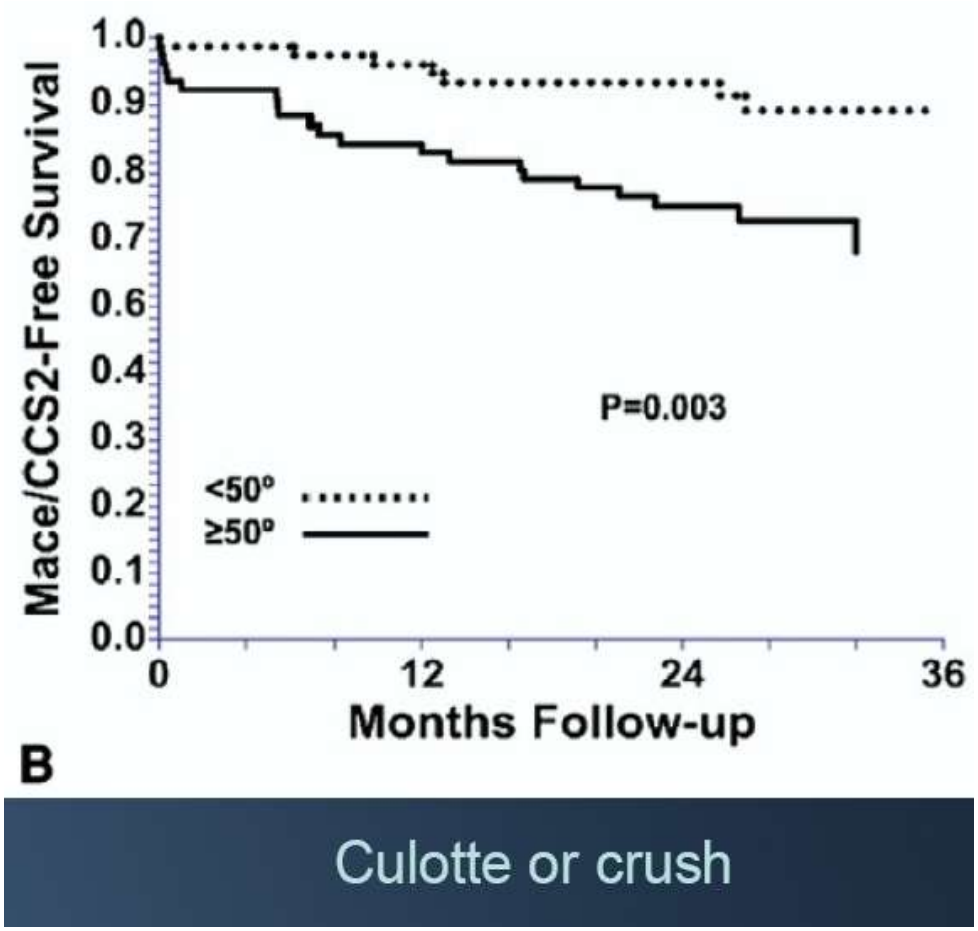


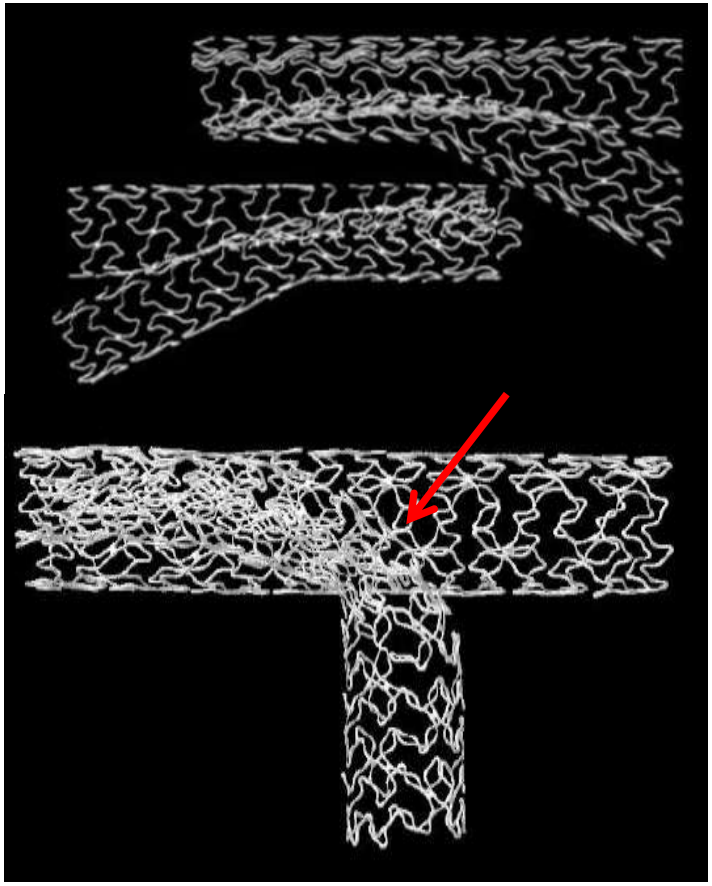
IABP was inserted. Then kissing ballooning with 4.0x24mm stent balloon(10atm) at LM-LAD & 3.0x20mm balloon (12atm) for LM-LCX

Crush, culottes, kissing stenting is angle-dependent

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Crush, culottes, kissing stenting is angle-dependent





Collins et al. Am J Cardiol 2008, Ormiston TCT 2009

T-stenting and Small Protrusion

- Advantage
  - Provisional
  - FKB guaranteed
  - Angle independent MACE
- Disadvantage
  - SB stent protrusion

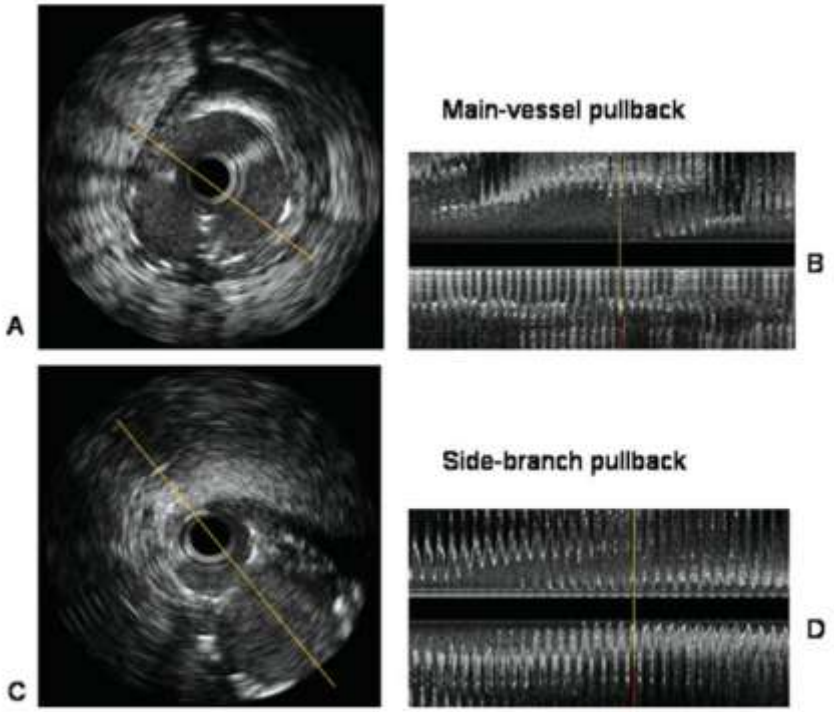


Fig. 4. Postintervention intravascular ultrasound study in a case of TAP-stenting: (A,B) Intravascular ultrasound image of the main branch showing the neocarina, about 3 mm in length. (C,D) Intravascular ultrasound image of the side-branch showing the other side of the neocarina. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]

Burzotta F, Gwon HC, CCI 2007

Case 2. Left main bifurcation lesion

3.5x12mm Promus element stent
Positioning for TAP technique

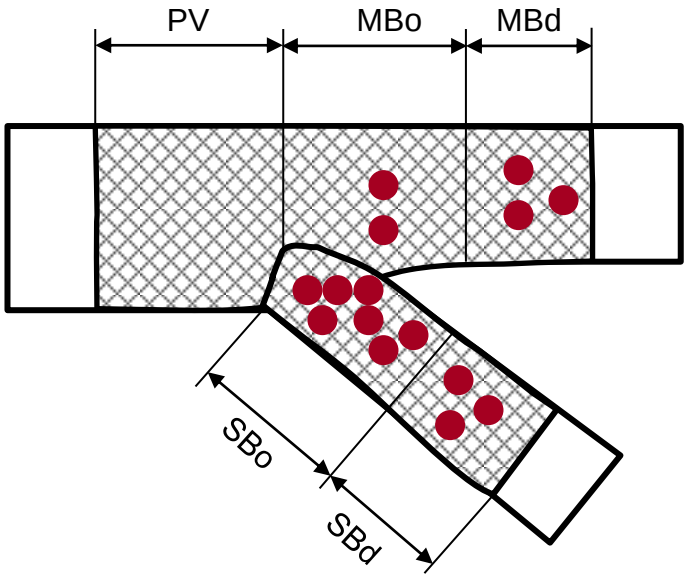
Dilatation with 12 atm, followed by
Pull-back and dilatation with 16 atm

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Stent Expansion in Side Branch

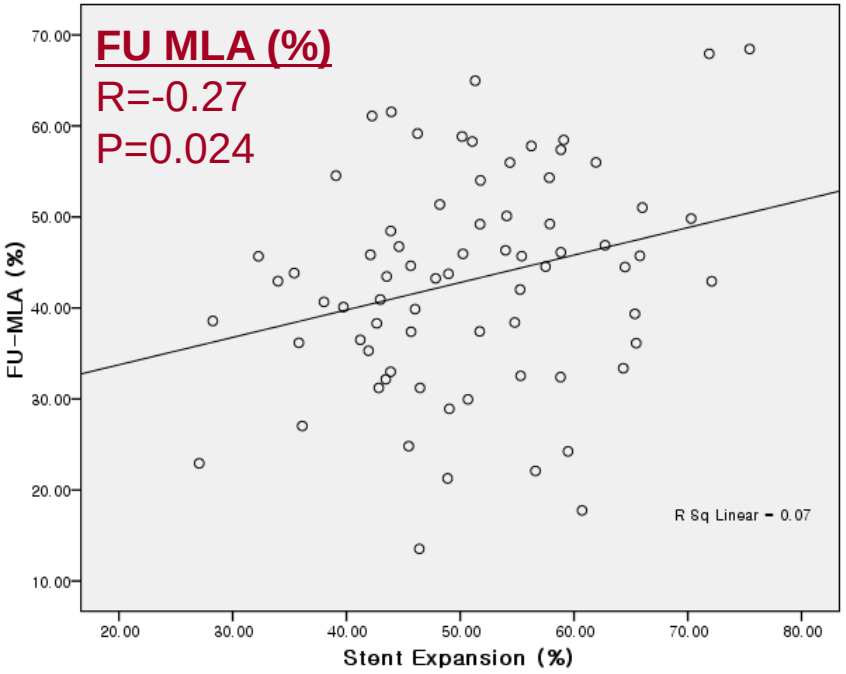
IVUS FU study in Two stent TAP Technique (N=73)

Restenosis Location



SB ostium is the most frequent location of restenosis

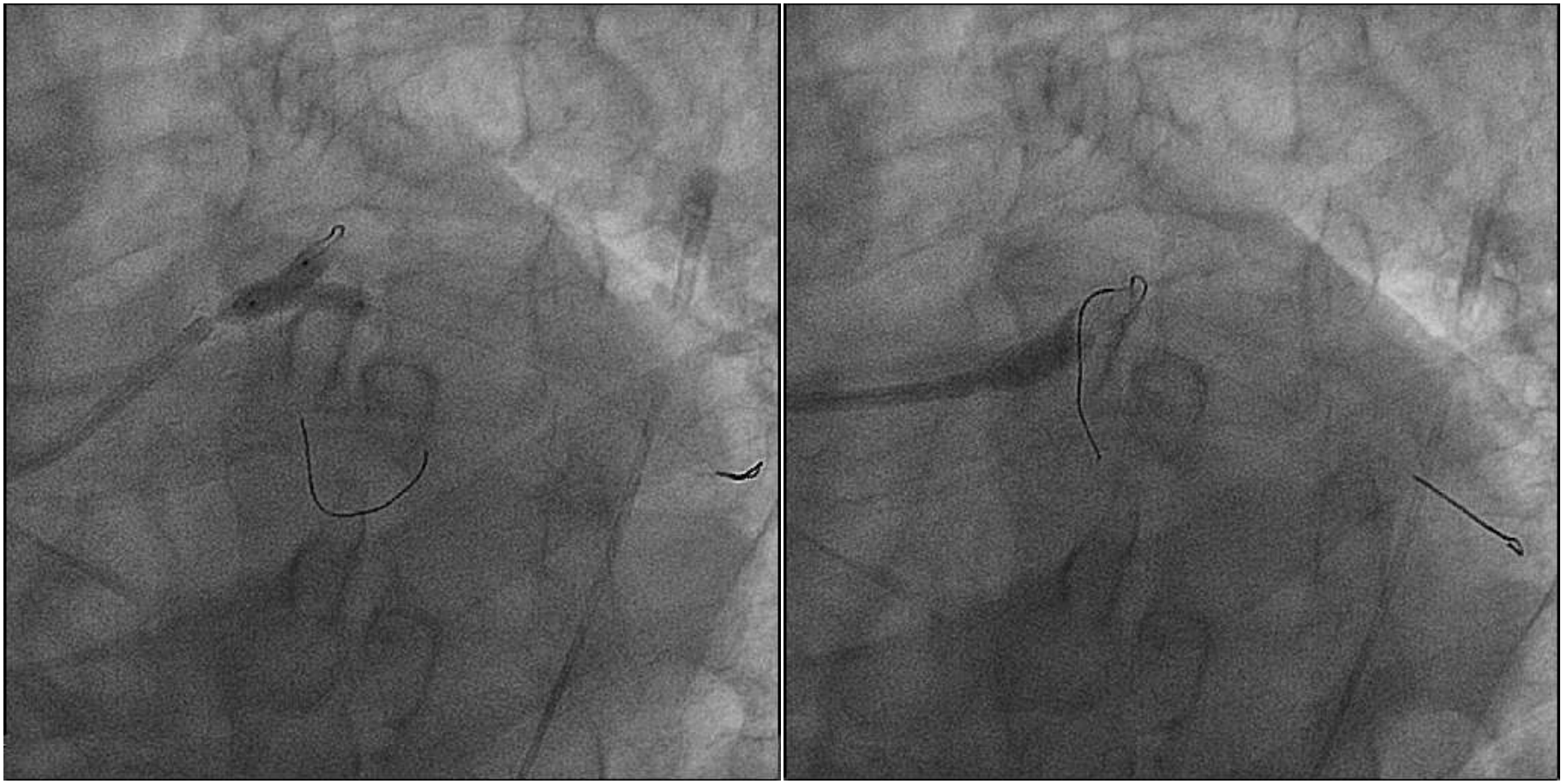
Impact of Stent expansion



Higher stent expansion reduces restenosis

Hahn JY, Gwon HC, JACC 2009

Case 2. Left main bifurcation lesion



Kissing ballooning with 4.0x15mm stent balloon (10atm) at LM-LAD &
3.5x12mm stent balloon(max.=10atm) at LM-LCX.
Proximal optimization with 5.0x8mm balloon (10atm) at LM

Case 2. Left main bifurcation lesion

IABP removed the day after the procedure.
Discharged 3 days after the procedure.

Samsung Medical Center
Sungkyunkwan University
School of Medicine

Thank you for your attention