

Case & Review 1.

Mini-Crush for Bifurcation PCI

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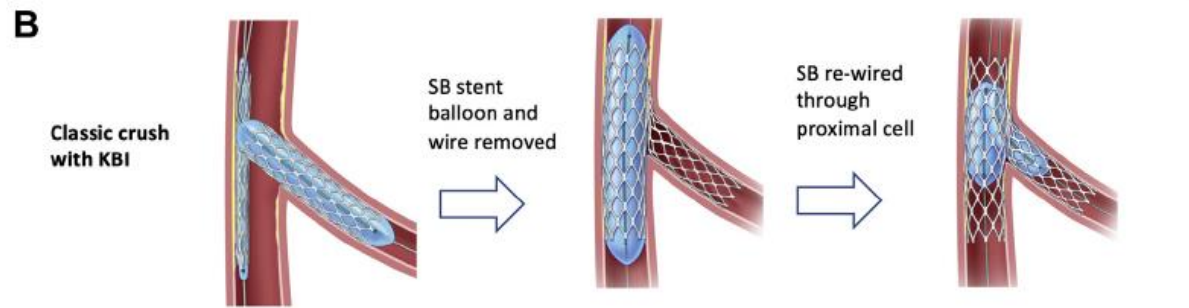
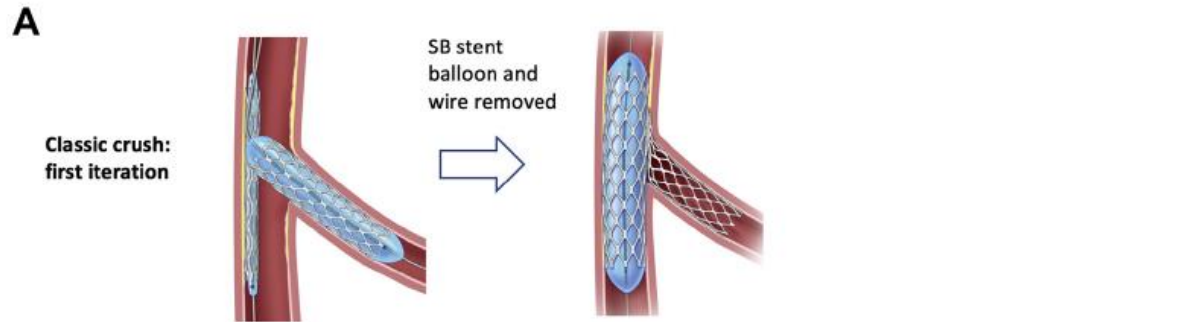
TCTAP, 25 Apr 2024

COI Disclosure

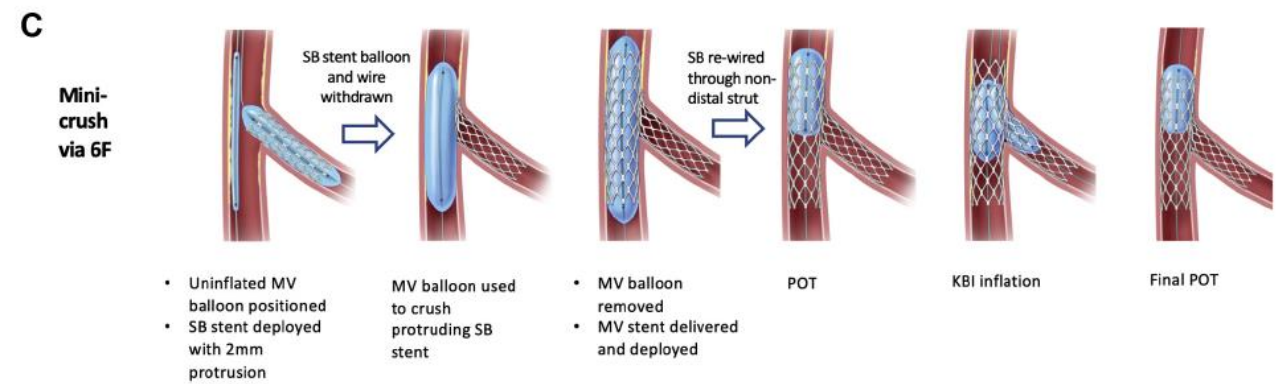
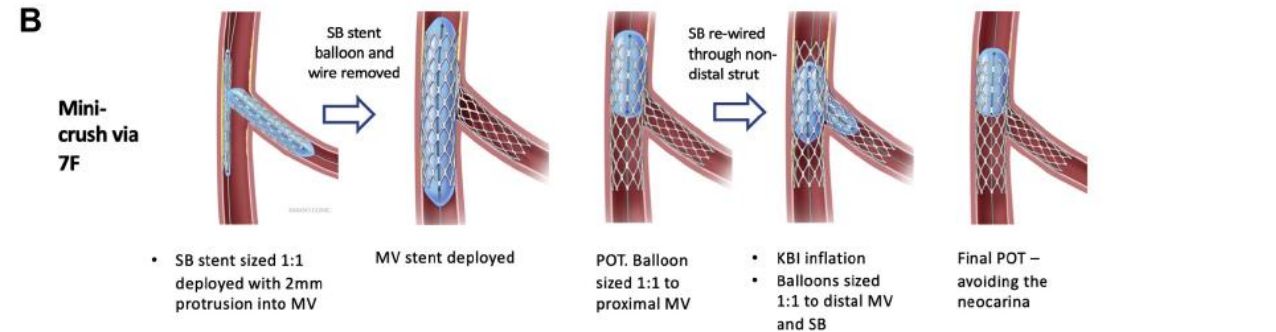
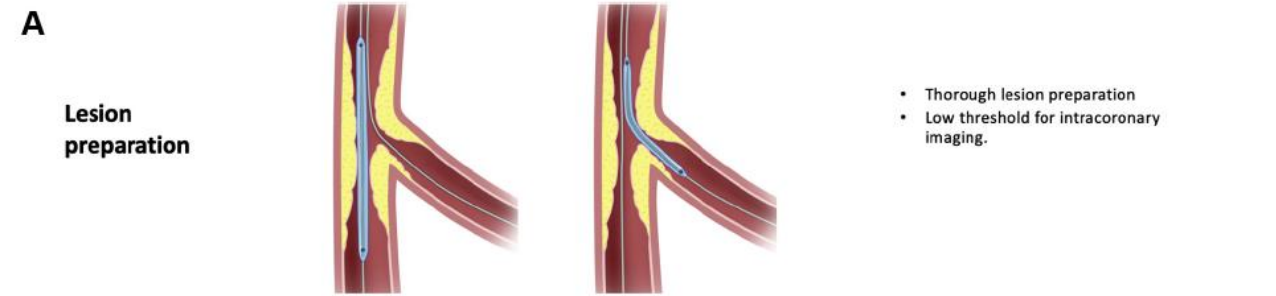
Do-Yoon Kang

The author has no financial conflicts of interest to disclose concerning the presentation

Classic Crush / Mini-Crush



- MV and SB stents positioned with 4-5mm protrusion of SB stent into MV
- SB stent deployed
- MV stent deployed which crushes the protruding section of the SB stent
- Kissing balloon inflation



Data – Mini / Nano Crush

	N	Design	Years	LM	FKB	FU Time	Cardiac Death	ST	TLR
Mini-Crush									
MITO	135	Registry	2002-2013	100%	99%	5 yr	1.5%	0%	25.4%
Freixa et al	304	Registry	2003-2007	4%	80%	4.1 yr	2.3%	1.7%	12.5%
Yang et al	111	Registry	2005-2009	22%	98%	3 y	NA	1.8%	8.9%
PERFECT	213	RCT (vs. PS)	2007-2013	0%	96%	1 y	0.9%	0.5%	1.9%
FAILS-2	104	Registry	2007-2015	100%	92%	2.3 yr	NA	0%	9.7%
Yurtdas	125	Registry	2015-2016	0%	100%	2 yr	-	-	-
Nano-Crush									
Rigatelli et al	205	Registry	2014-2017	35%	98.5%	1.3 yr	4%	0%	0%

Mini-Crush Technique in AMC

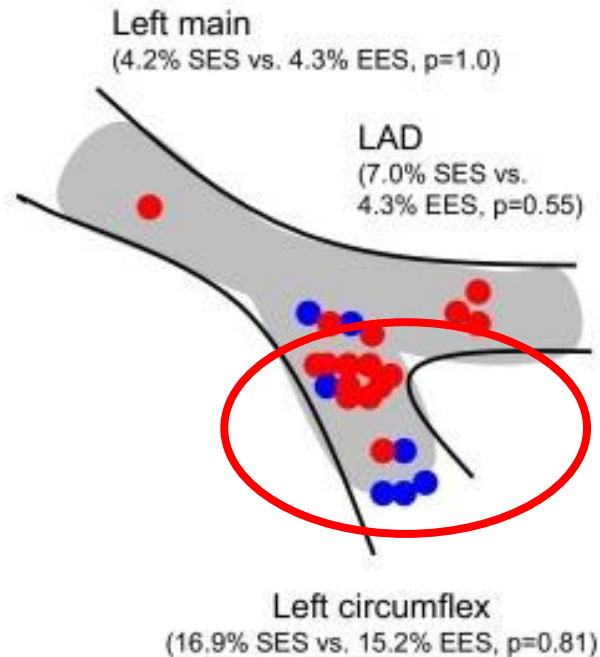
AMC Data - I

- Side Branch Ostium is the Achilles Heel of Two-Stent Technique

PRECOMBAT-2

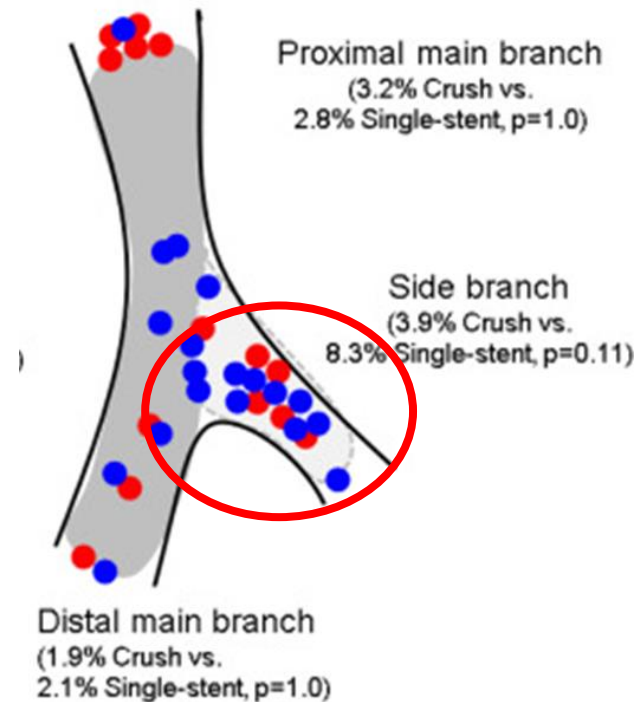
Two-Stent Technique
(N=71 SES, 46EES)

● EES



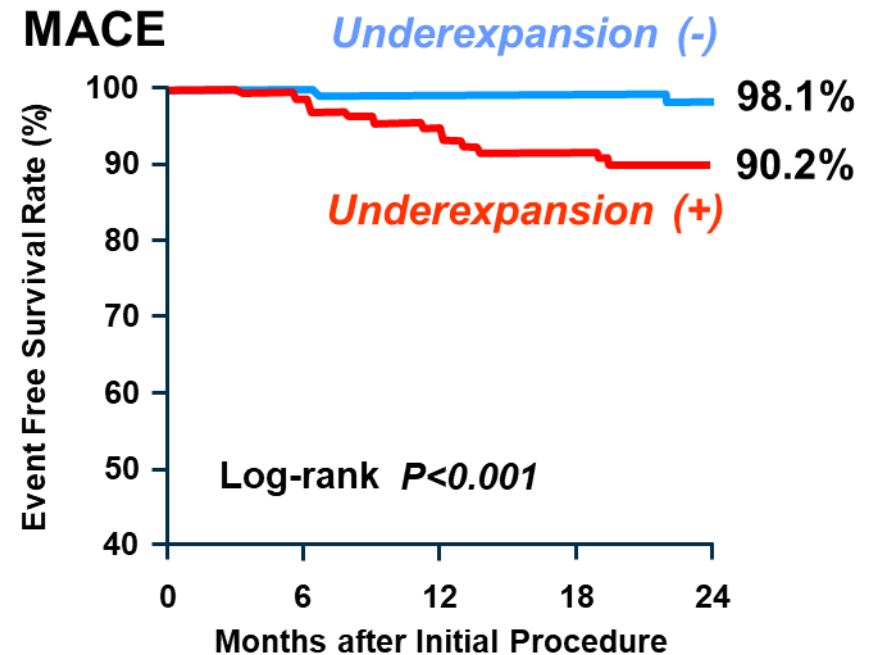
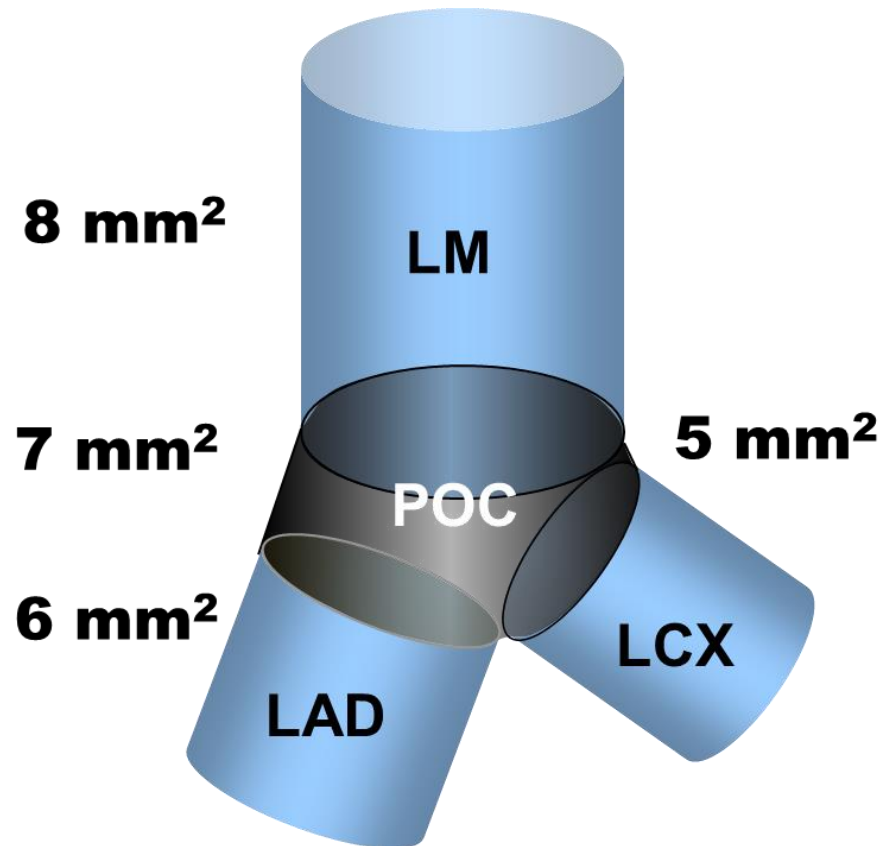
B PERFECT study

● Crush ● Single-stent



AMC Data - II

- Bigger MSA is associated with Better Clinical Outcome, Especially for LM



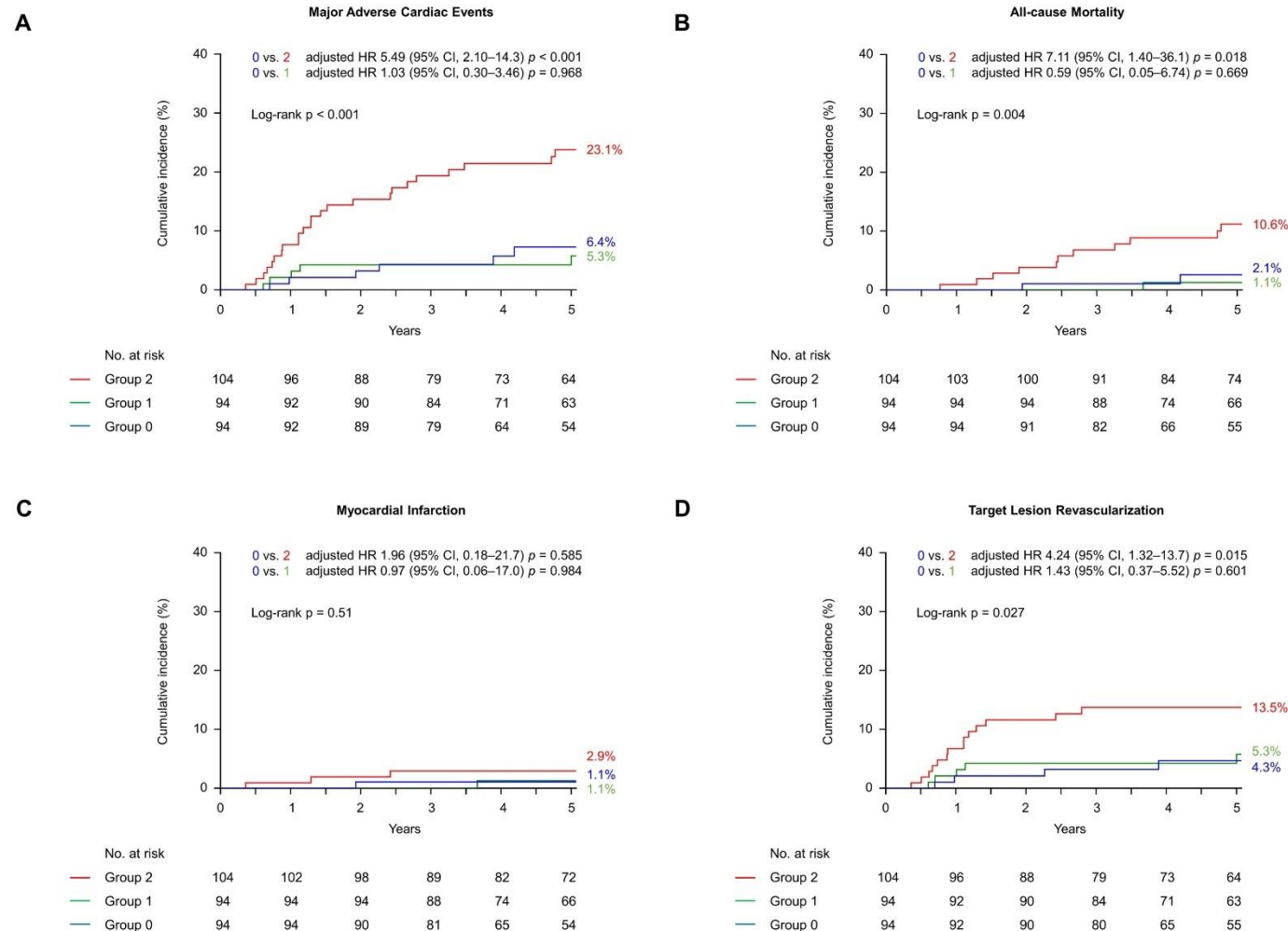
No. at risk	0	6	12	18	24
Underexpansion (+)	133	131	126	121	75
Underexpansion (-)	260	260	255	246	129

AMC Data - III

- Bigger MSA is associated with Better Clinical Outcome, Especially for LM

292 LM Crush
stenting with IVUS

Cutoff:
LM MSA 10.8 mm²
LAD 8.3 mm²
LCX 5.7 mm²



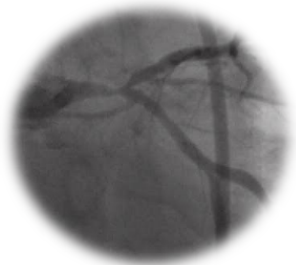
Indication for Crush Technique

- Selection of the Best Candidate guide to the Best Results
 - Diseased Side Branch
 - Relevant Side Branch with Large territory
 - : LM - LCX, the only diagonal branch
 - : Sx precipitating SB in SIHD (PCI is for Sx control in SIHD)

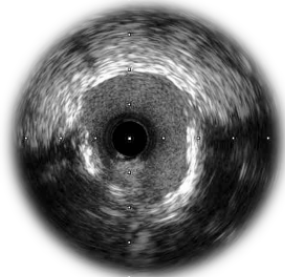
Mandatory Intravascular Imaging

- IVUS or OCT
 - IVUS preferred for LM Bifurcation
- Enables Bigger MSA with Safety, Detect Acute Complications

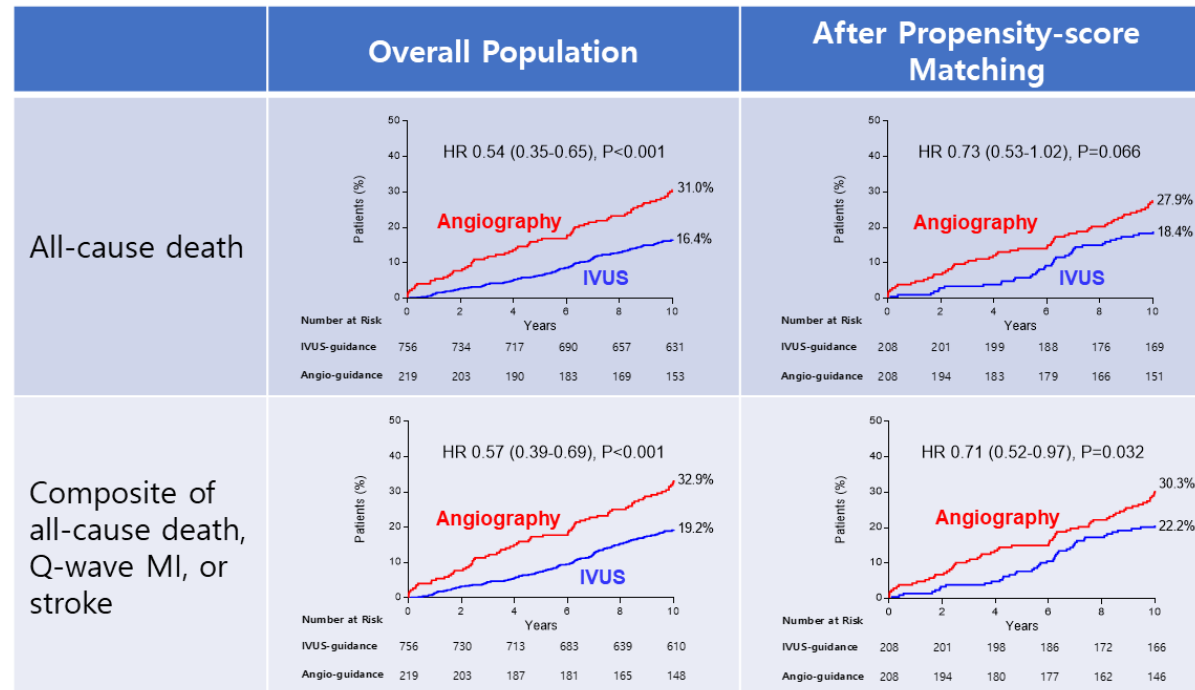
Left Main Disease



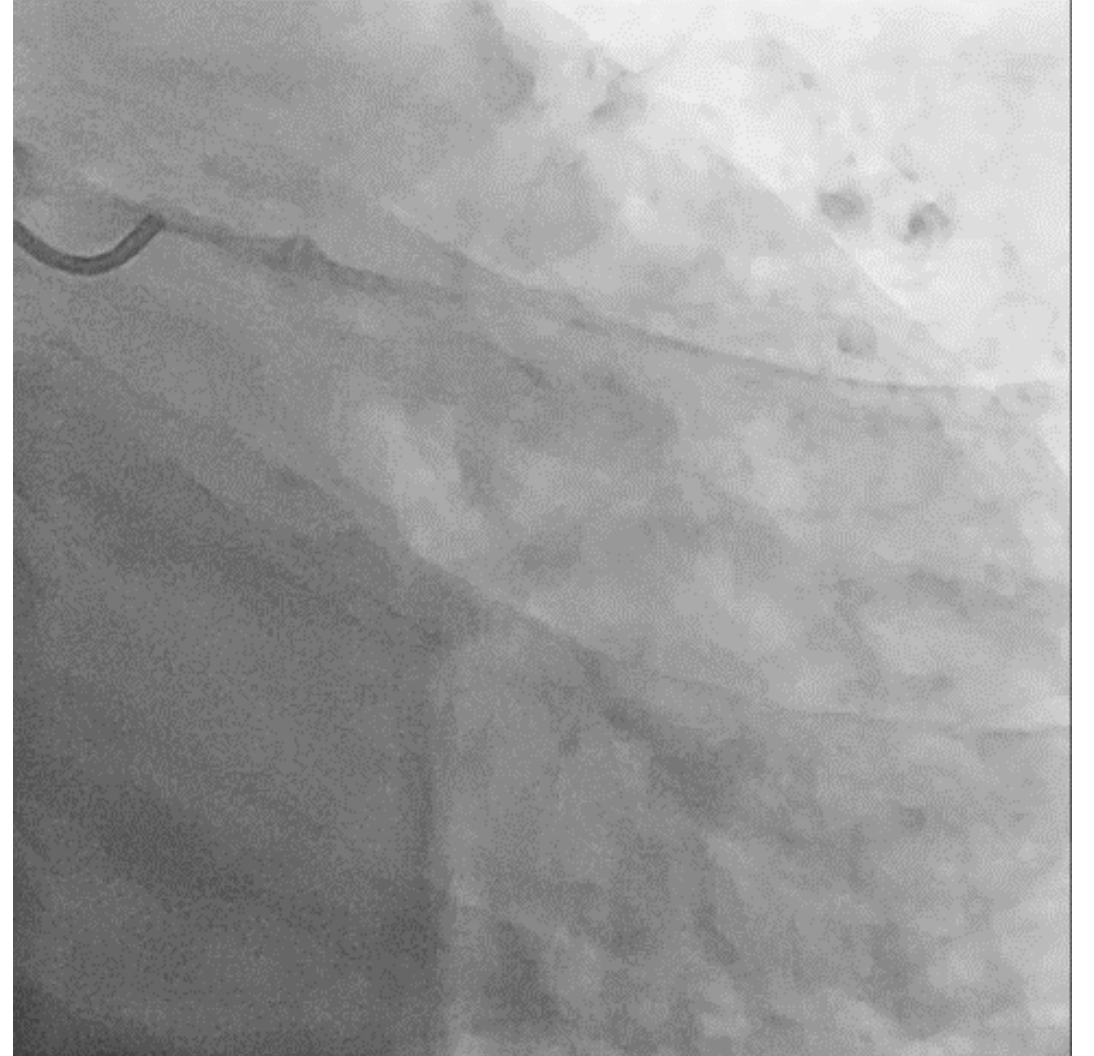
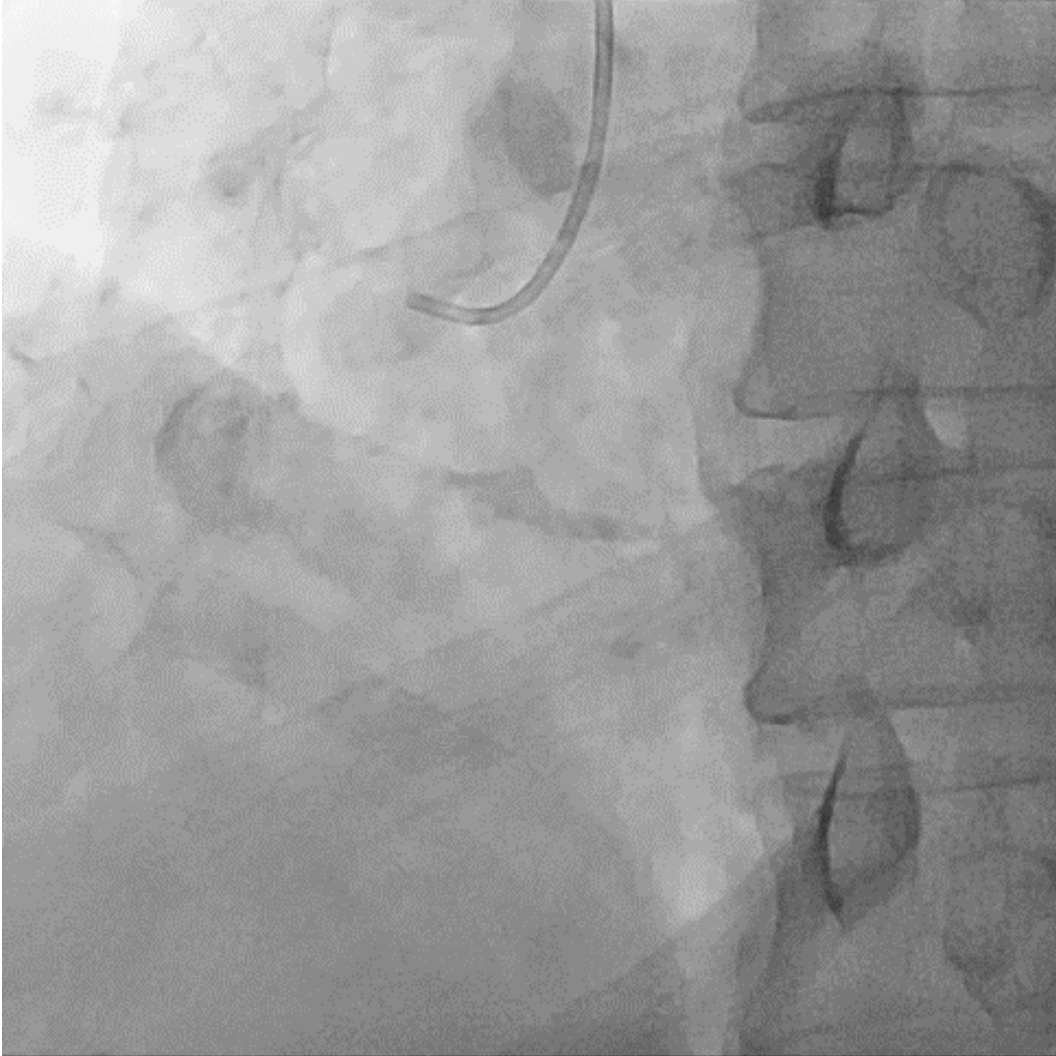
IVUS-guided PCI



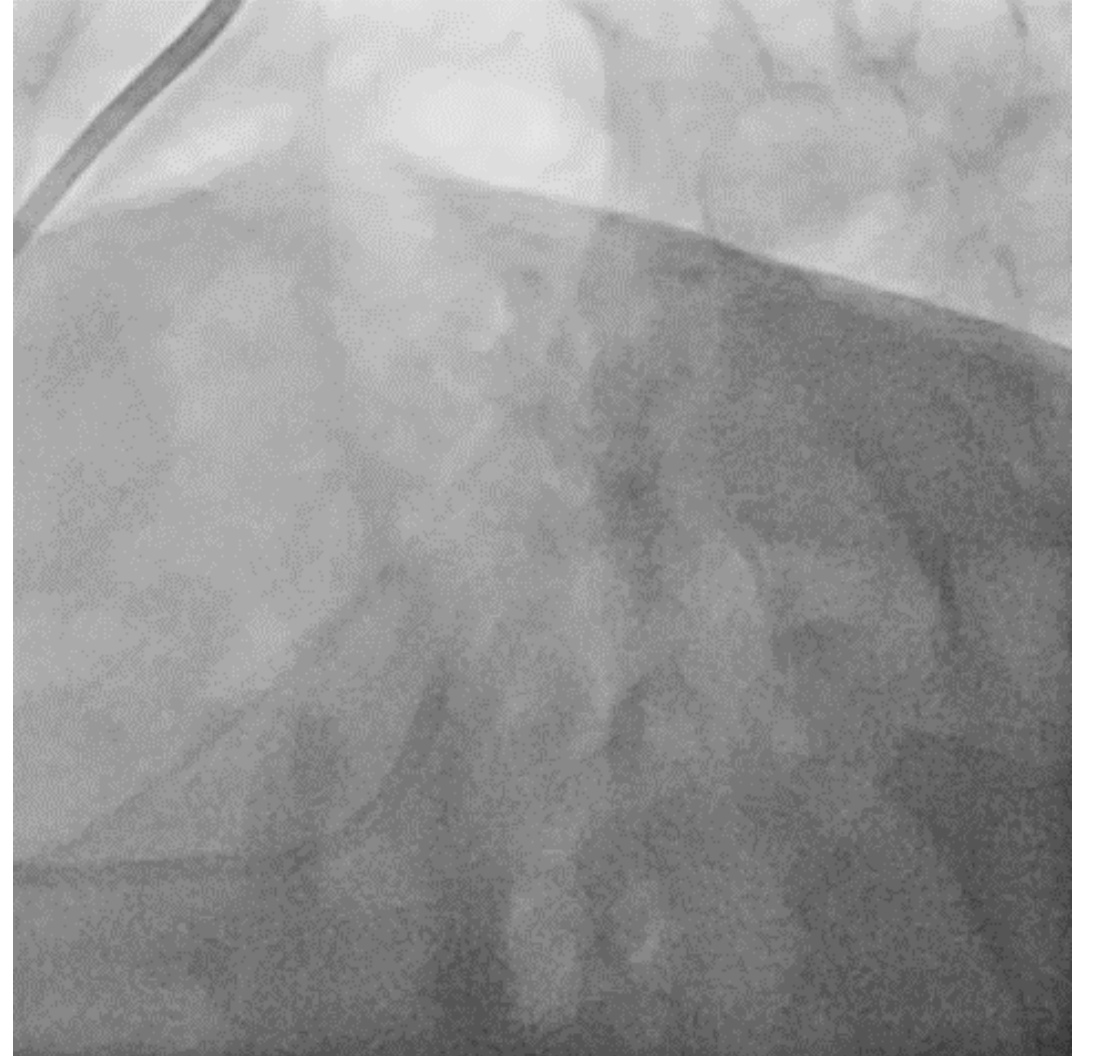
10-Year
Follow-up



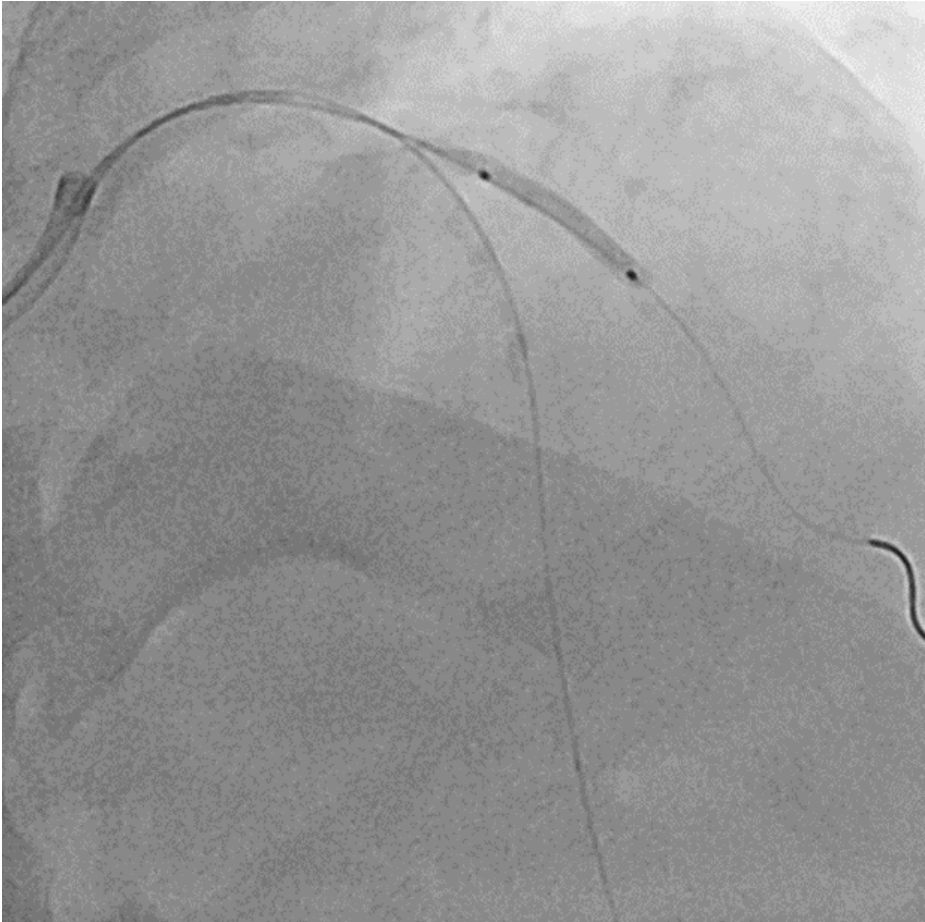
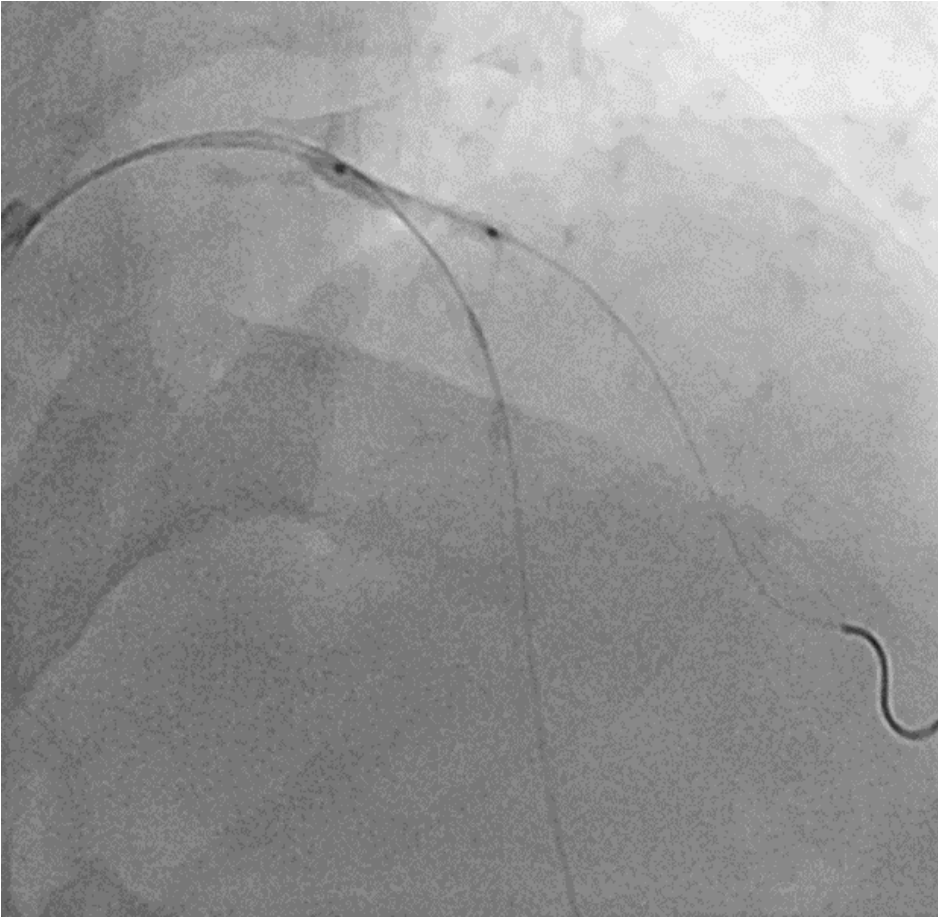
73/M, Stable Angina, DM/HT



73/M, Stable Angina, DM/HT



Aggressive Pre-Lesion Modification with NC Balloons



2.75 mm NC Balloon at SB

SB stenting with Higher-pressure at Proximal side

- Minimal Protrusion preferred
- Multiple Projection !
 - LAO Cranial for Diagonal branch

DES 2.75 x 23 mm upto 16 atm

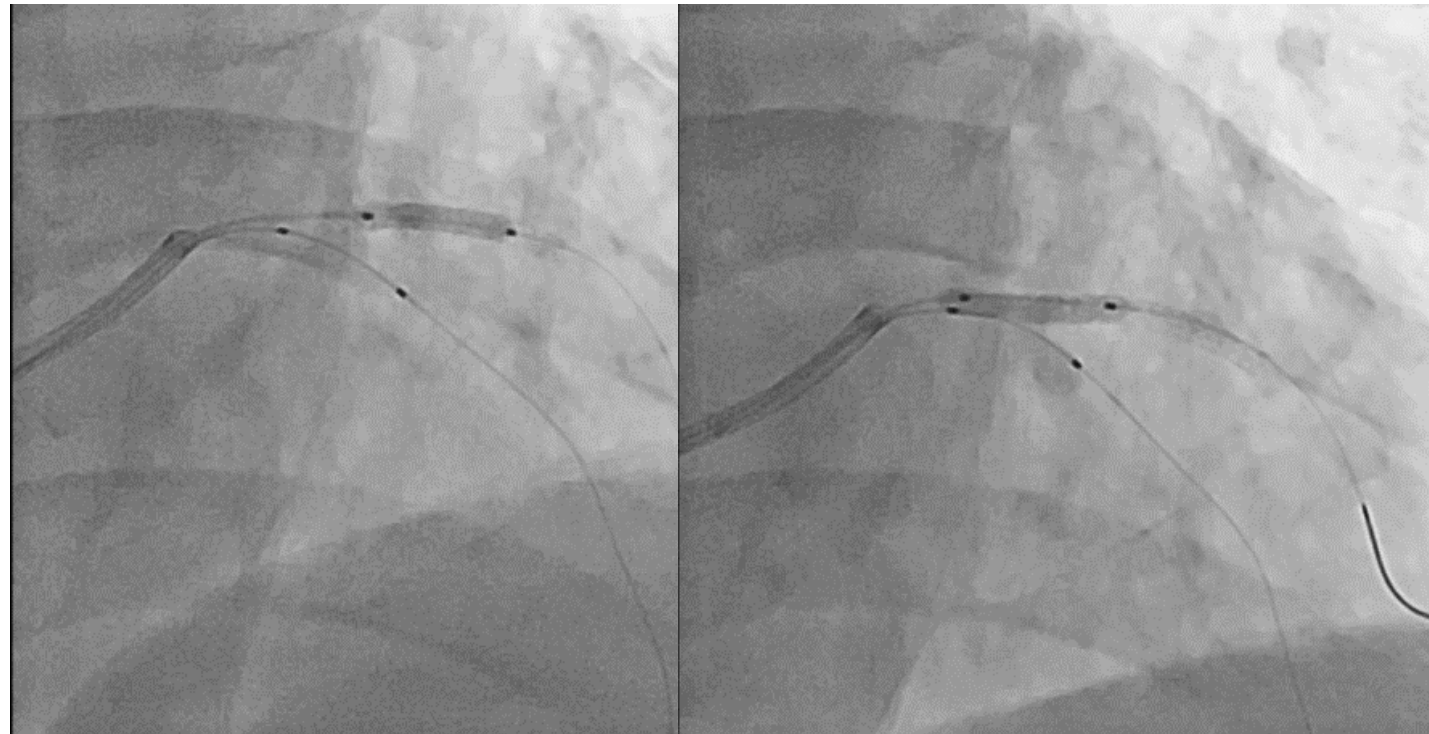
Crush Balloon : 3.5 x 15 mm NC



Aggressive SB Proximal Optimization Before Crushing

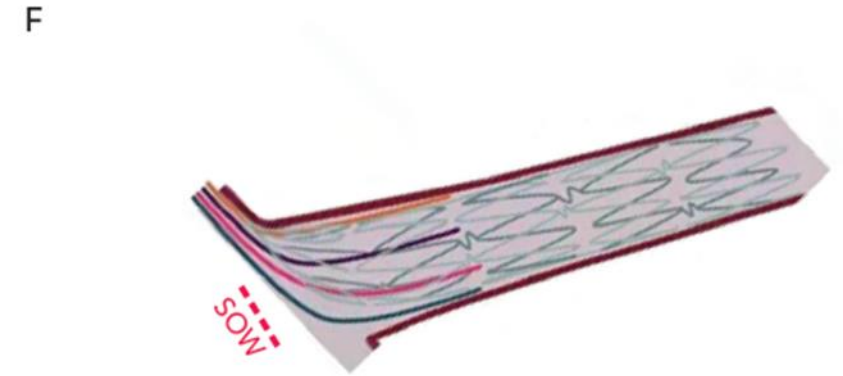
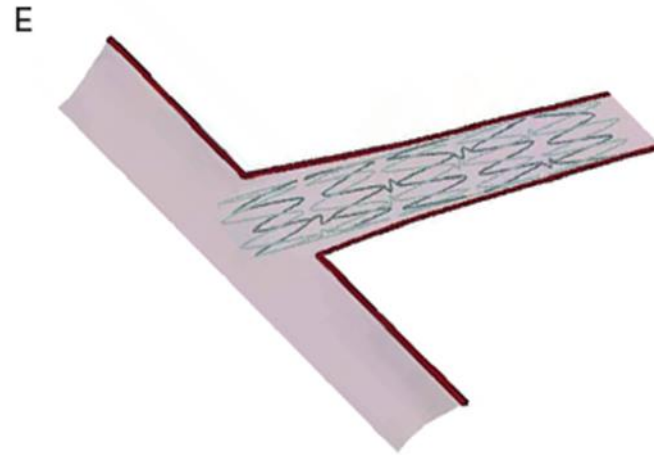
- Open SB Ostium with NC Balloon as wide as possible
 - Larger SB space for wiring
 - Easy re-wiring & balloon introduction
 - Minimize the risk of abluminal wiring
 - Minimize the risk of stent gap

2.75 x 15 mm NC upto 24 atm

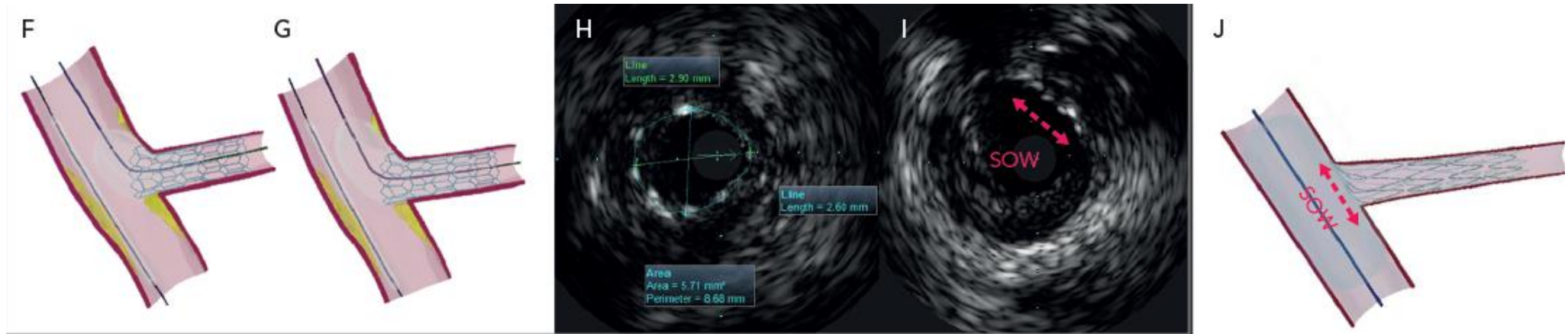


Aggressive SB Proximal Optimization Before Crushing

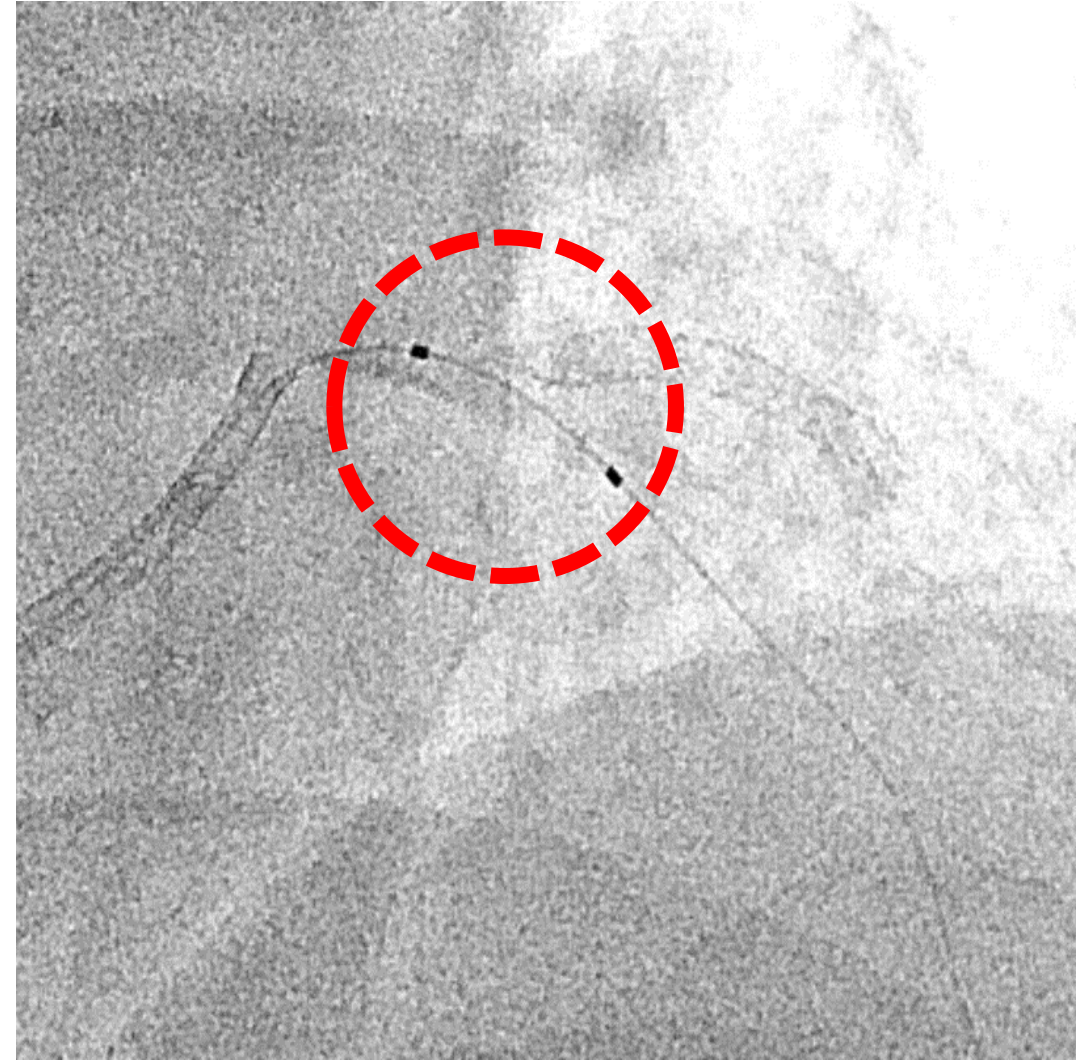
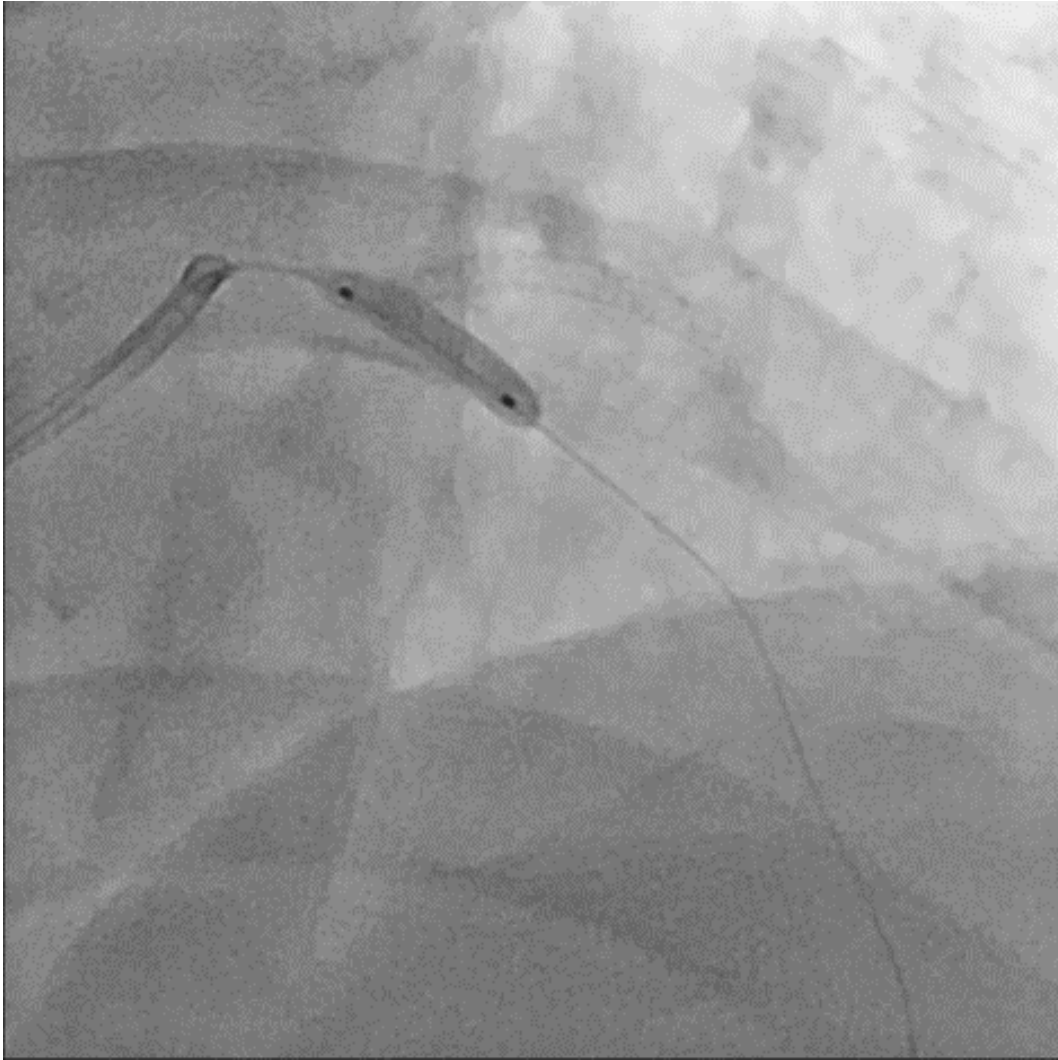
- Conventional Crush



- Proximal Side Optimization

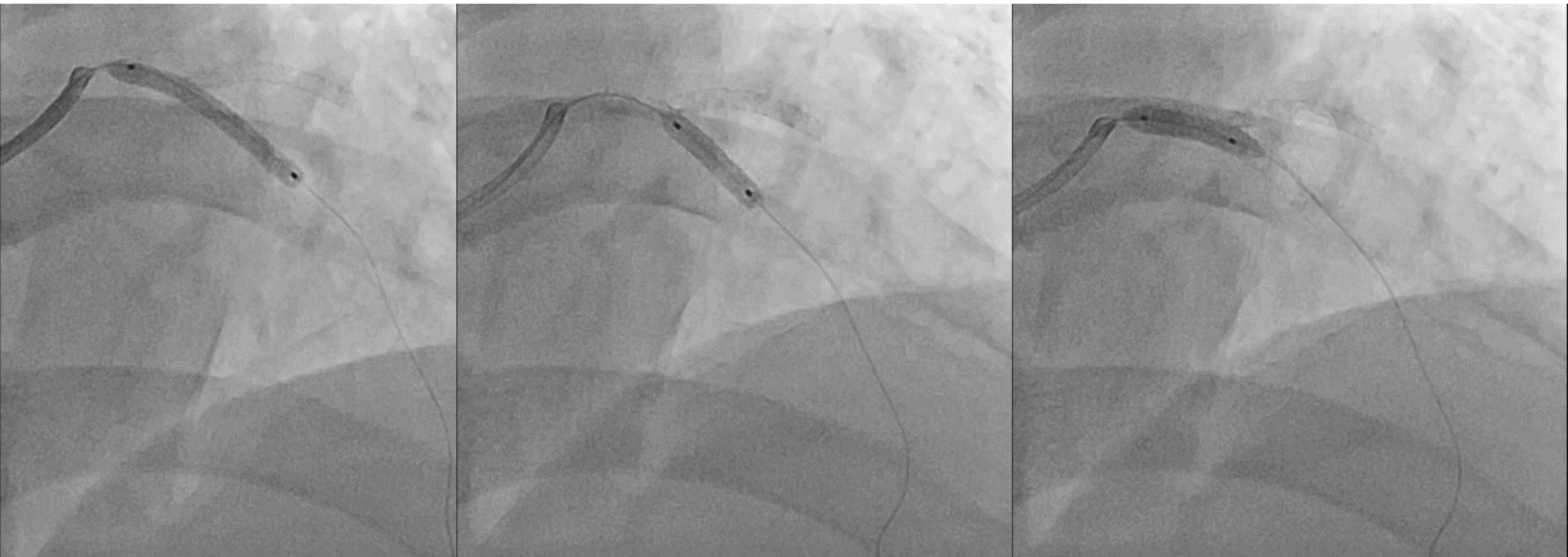


Balloon Crush with High-pressure



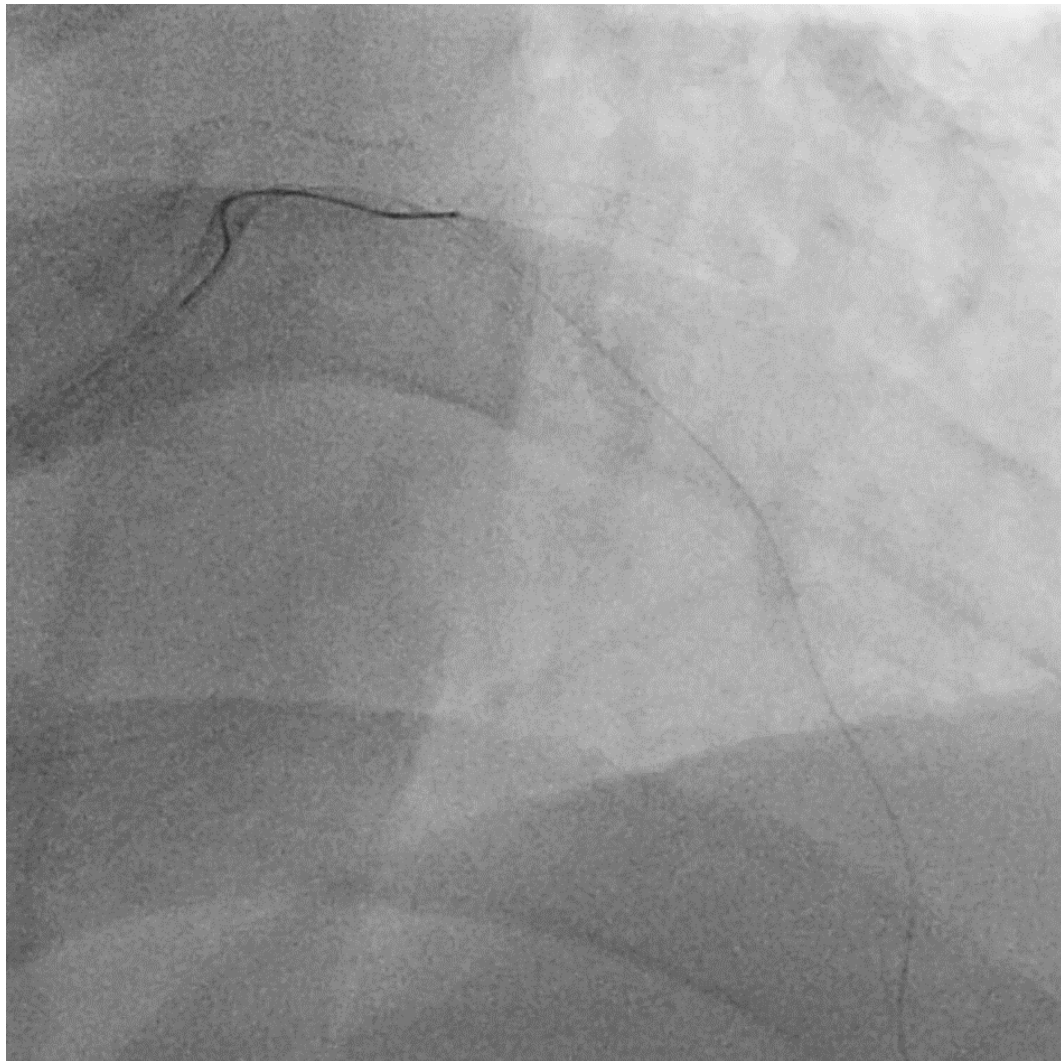
3.5 x 15 mm NC upto 18 atm

MB stenting & Optimization with NC Balloon

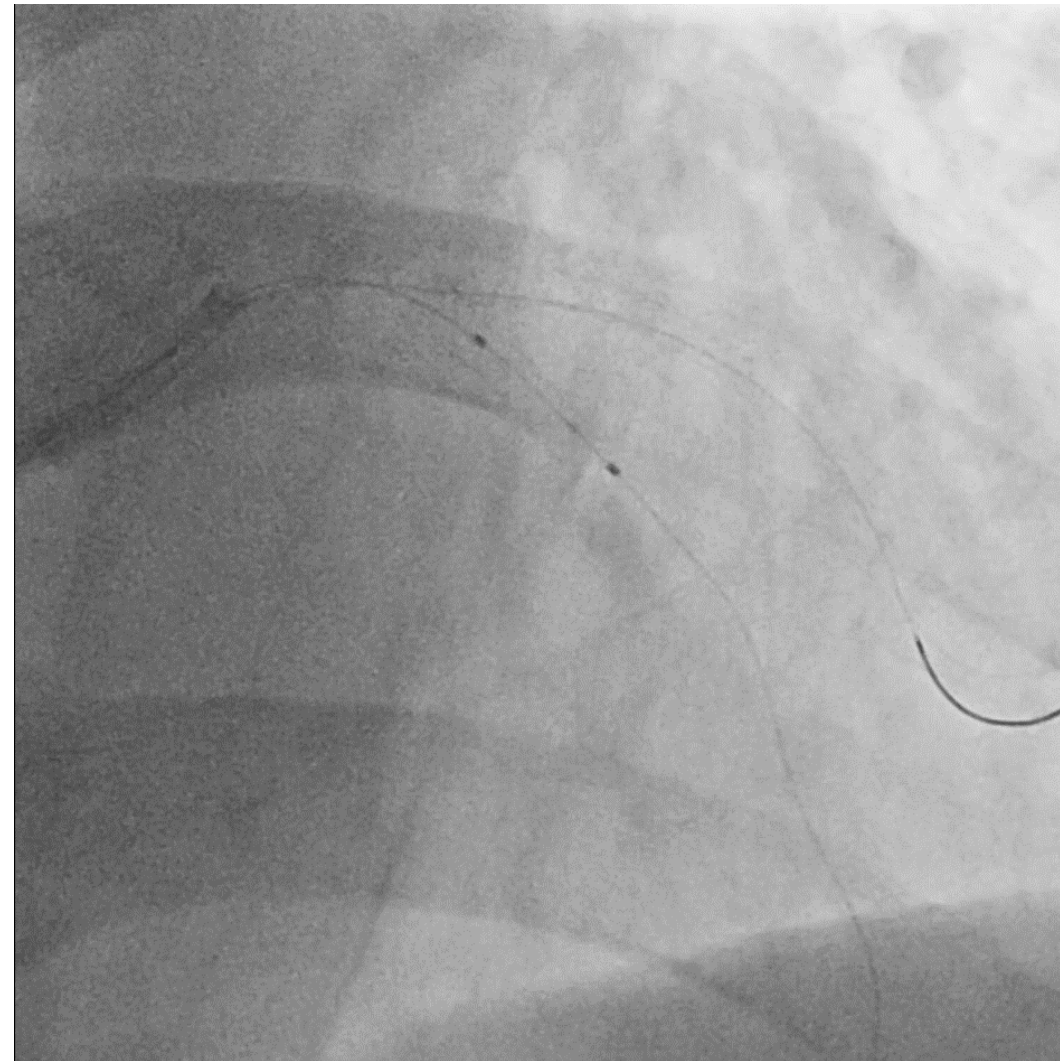


3.25 x 28 mm DES at nominal pressure
Followed by 3.5 x 15 mm NC Balloon upto 26 atm

Re-wiring & Balloon Passing



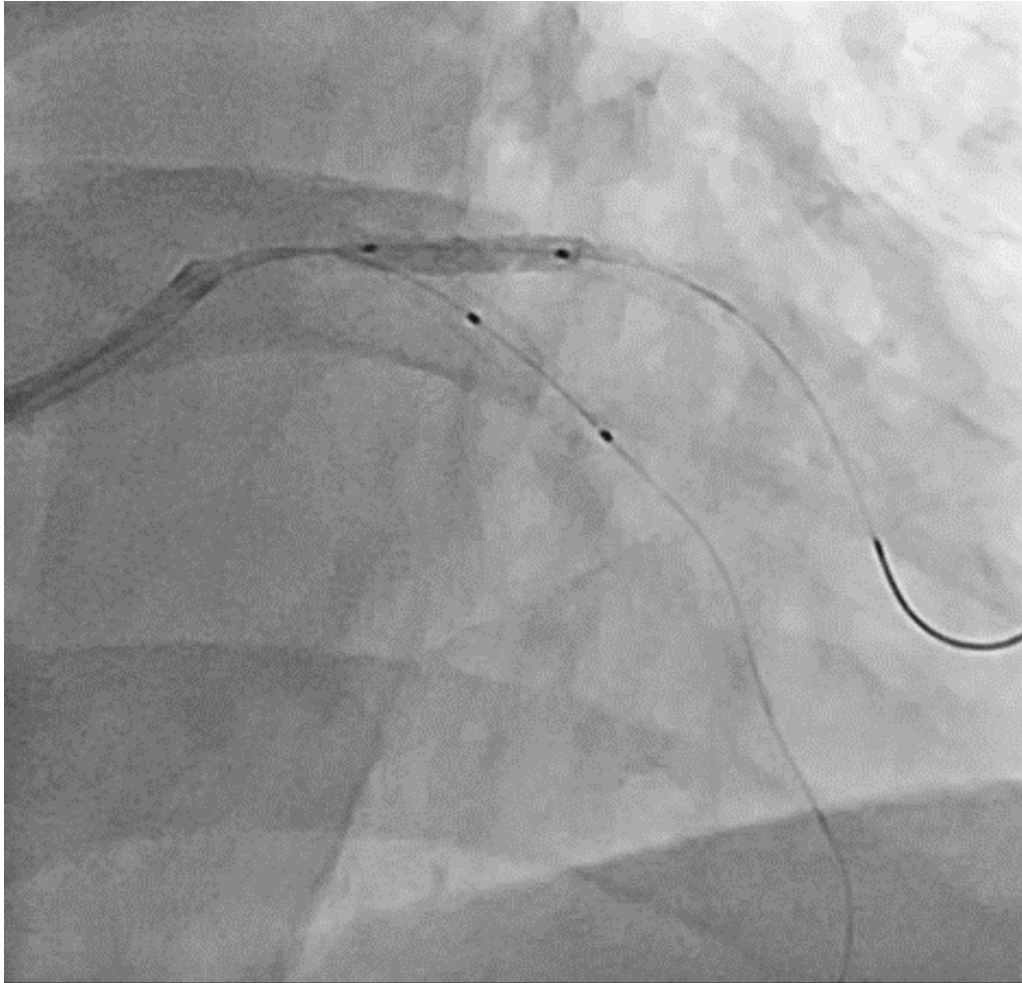
Used BMW wire



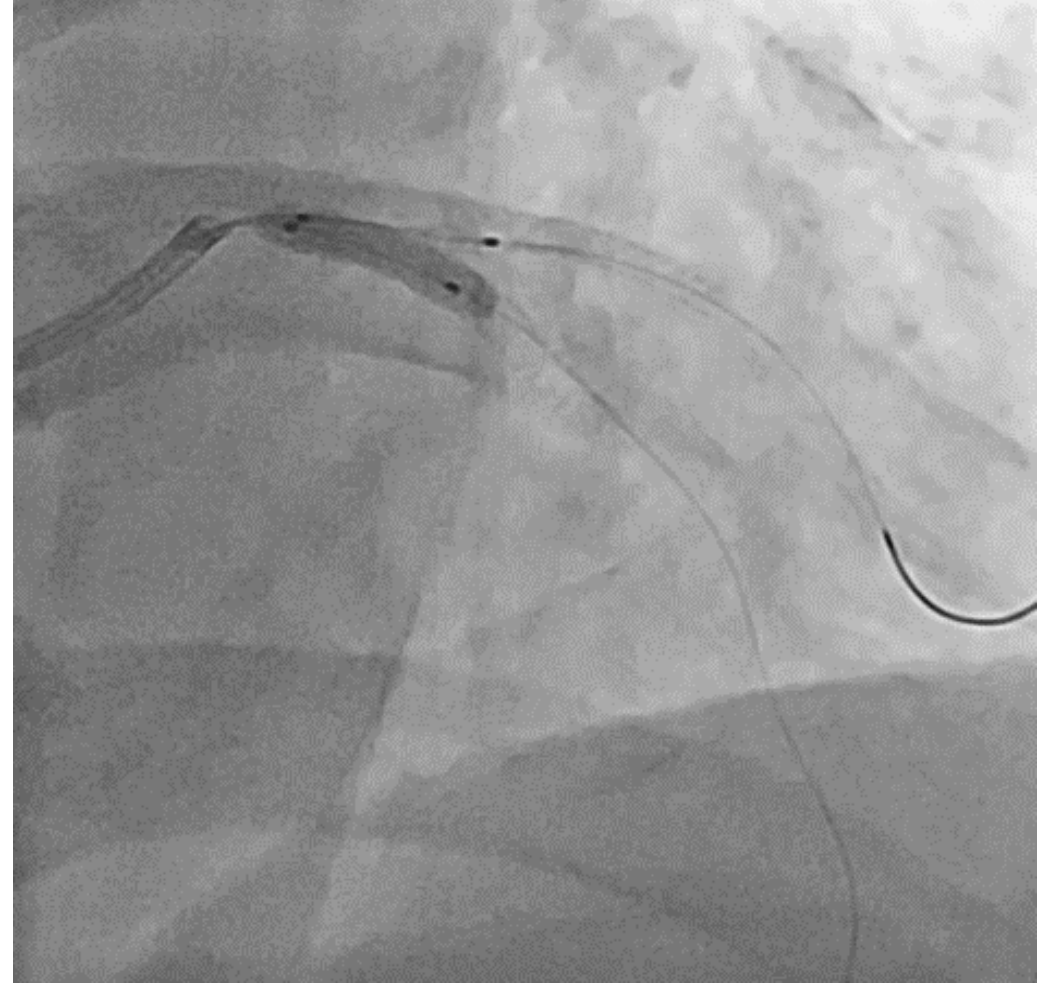
Used 2.75 mm NC balloon

Sequential High-pressure Balloon Inflation

: To Obtain Sufficient Stent Cross-sectional Area

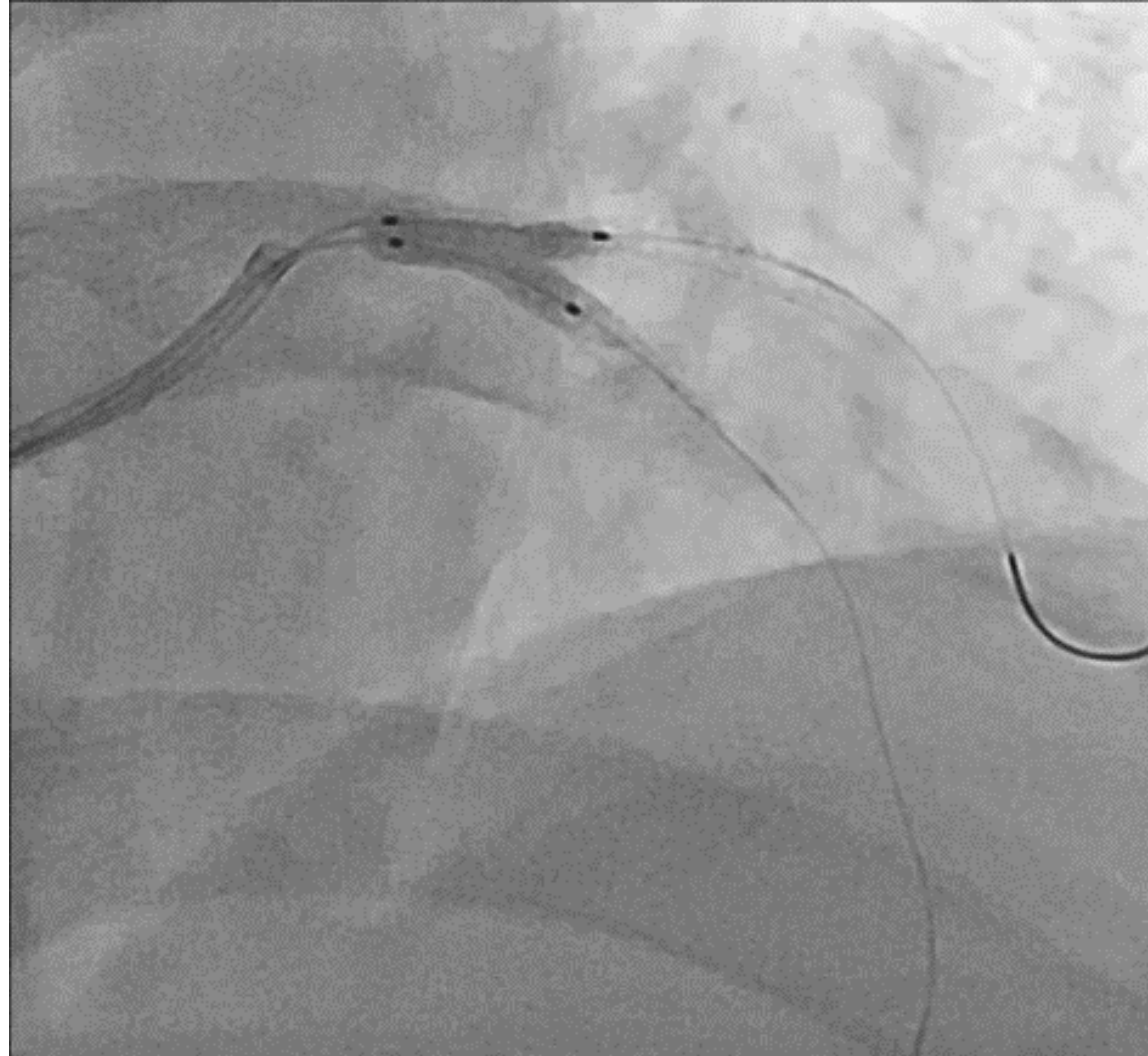


2.75 x 15 mm NC balloon upto 24 atm



3.5 x 15 mm NC balloon upto 28 atm

Final Kissing Balloon (No High Pressure Needed)



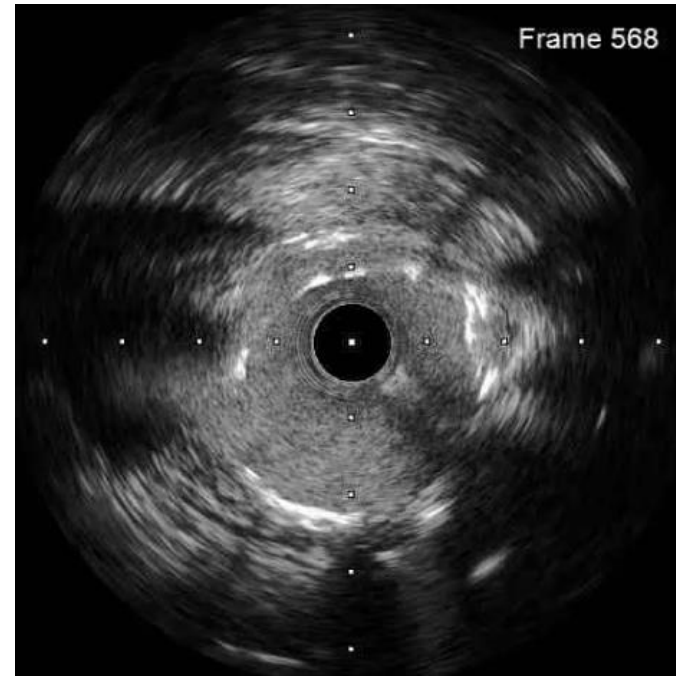
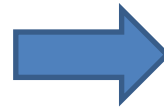
2.75 & 3.5 mm NC at 8 atm

Adequate Balloon Size is Important

- Small-sized balloons make under-expansion & malapposition, especially at POC area
- IVUS review & applying bigger NC balloons made better results

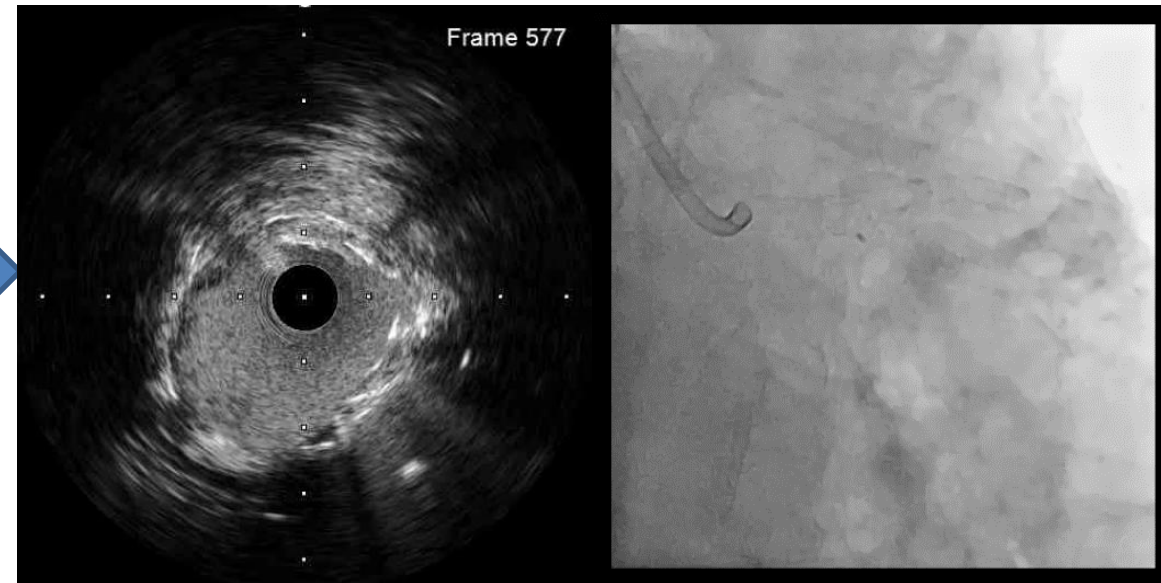
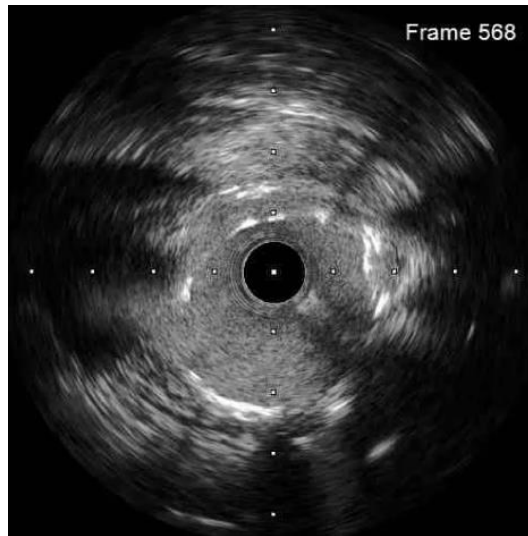


Kissing Balloon with
3.5 & 3.0 mm NC



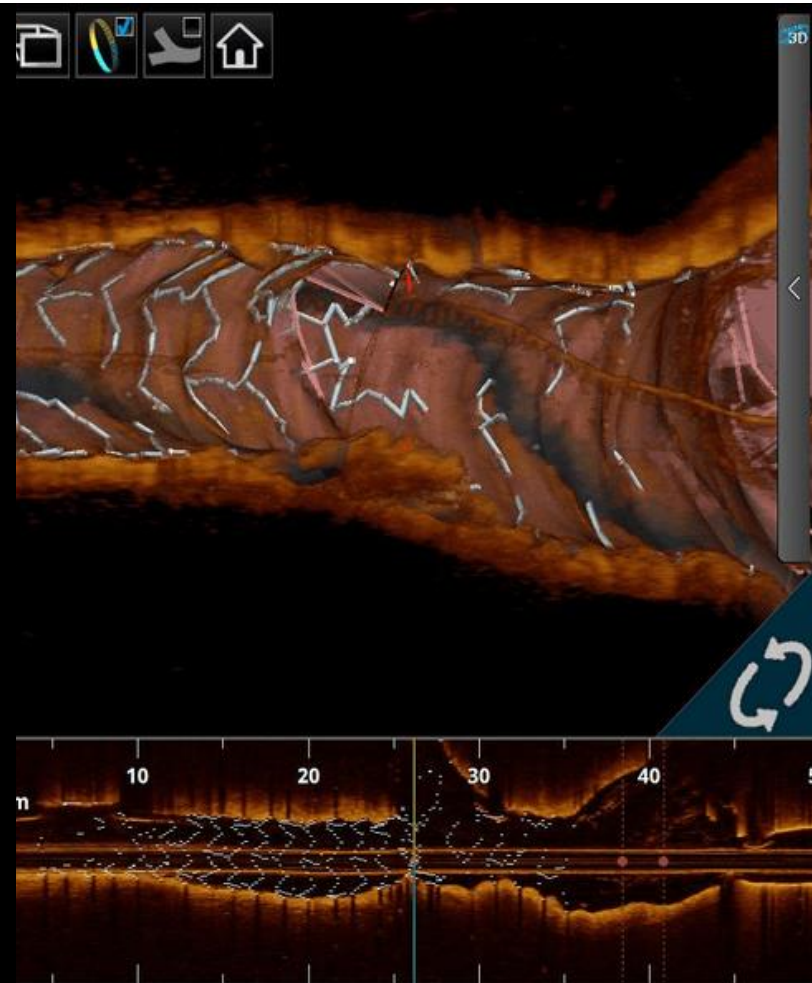
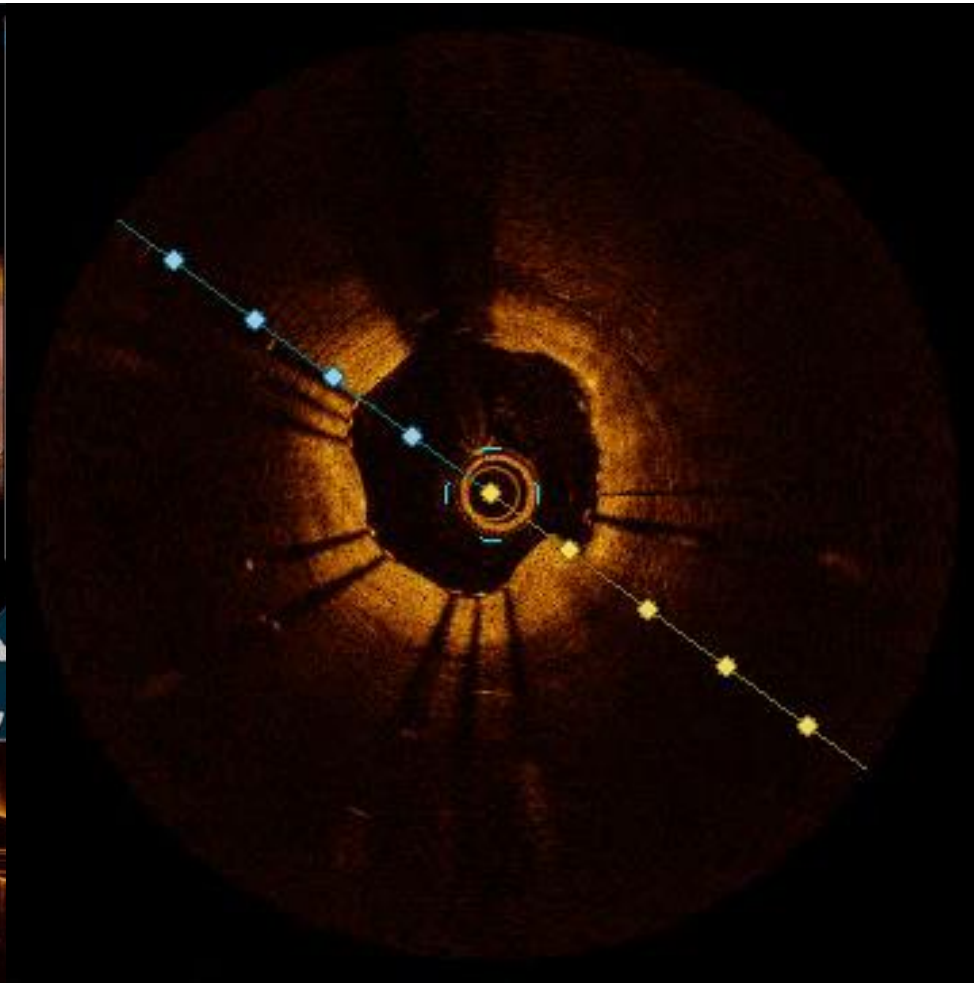
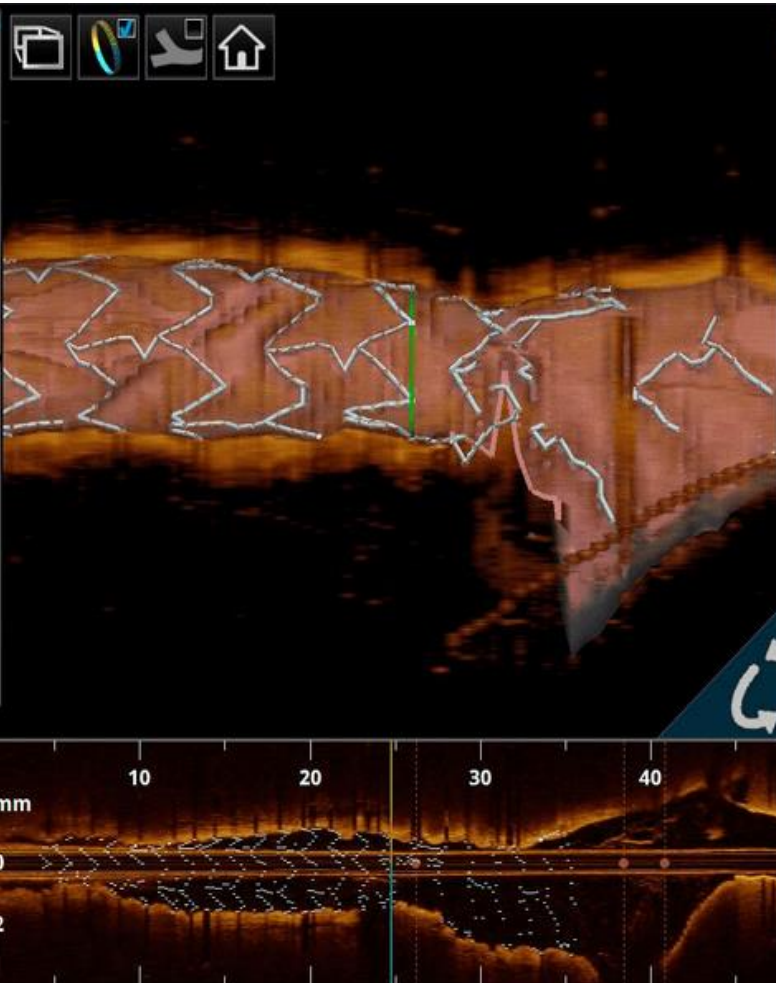
Adequate Balloon Size is Important

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Kissing Balloon with
4.0 & 3.5 mm NC

Imaging Surveillance & Further Optimization if needed



Final Angiography



Summary

- Intracoronary Imaging is the key for the successful Mini-crush technique.
- Large opening of the SB stent ostium and the MB optimization (POC area) warrant easy SB rewiring.
- Balloon anchoring is helpful for the SB balloon crossing.
- Stent area is obtained by sequential high-pressure ballooning.
- Final kissing balloon is to place the carina in the right place.
- Final imaging surveillance and correcting suboptimal results guarantee favorable long-term outcomes.