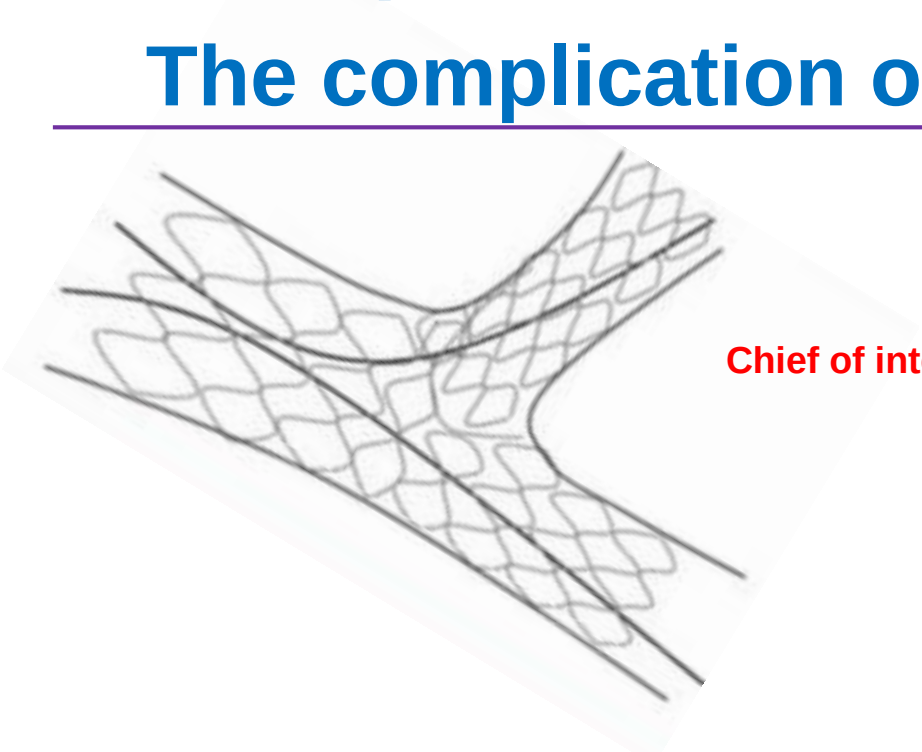
# Case presentation

# The complication of bifurcation PCI



**Ho Van Phuoc**

**MD, MSc, 2nd grade specialist,**

**Chief of interventional Cardiology Dept, Da Nang Hospital**

# Outlines

- Overview on bifurcation PCI
- Disadvances of some bifurcation PCI techniques
- Learning by sharing complication – my case

# OVERVIEW

## Incidence

- Account for 16-20% PCI
- Procedural complications 9%
- Restenosis as high as 36%

## Possible locations

- LMCA bifurcation
- Non-LMCA bifurcation: + LAD – diagonal
  + LCX – obtuse marginal
  + RCA – PDA

# Overview

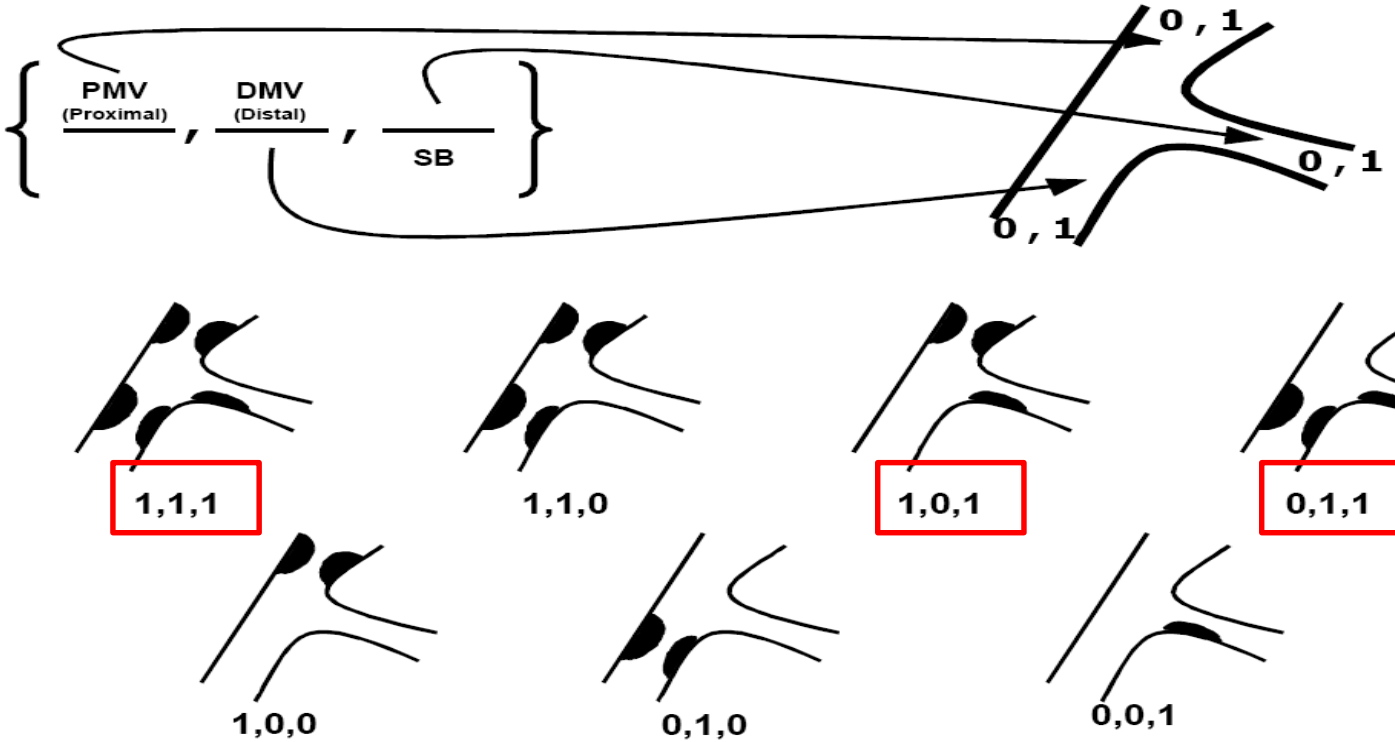
## Technical problems

- Difficulty in access to the side branch
- Risk of side branch occlusion
- Plaque shift
- Lesion recoil
- Ineffective lumen expansion
- …

# Classification of bifurcation lesions

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sanborn | Type I  | Type II  | Type III  | Type IV  | Type V  | | |
| Safian | Type IA  | Type IB  | Type IIA  | Type IIB  | Type IIIA  | Type IIIB  | Type IV  |
| Duke | Type A  | Type B  | Type C  | Type D  | Type E  | Type F  | |
| Lefevre | Type 1  | Type 2  | Type 3  | Type 4  | Type 4a  | Type 4b  | |
| Medina | 1,1,1  | 1,1,0  | 1,0,1  | 0,1,1  | 0,1,0  | 0,0,1  | 1,0,0  |
| Movahed | BL2V  | BS2T  | BL1mT  | BS1mV  | BS1sT  | BL1sV  | |

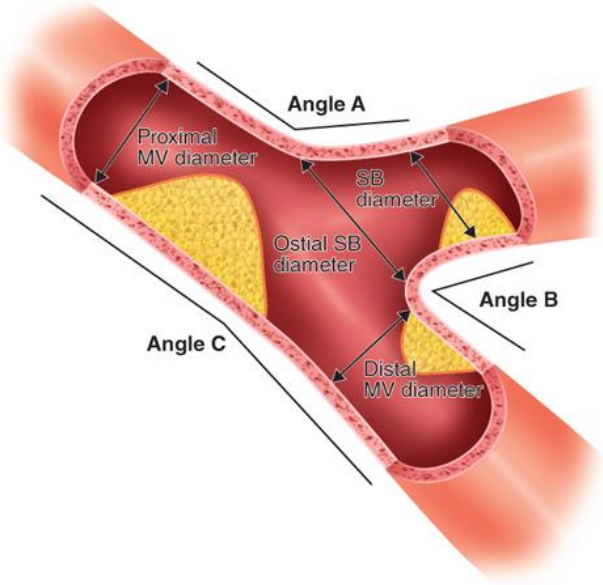
# Medina Classification




Medina A, Rev Esp Cardiol.2006 Feb;59(2):183

# Bifurcation lesion- 3 main basic assessments

1. Three diameters: pMB, dMB, SB
2. Length and plaque distribution.
3. Angle btw MB-SB and SB ostium.



# Please keep in mind …

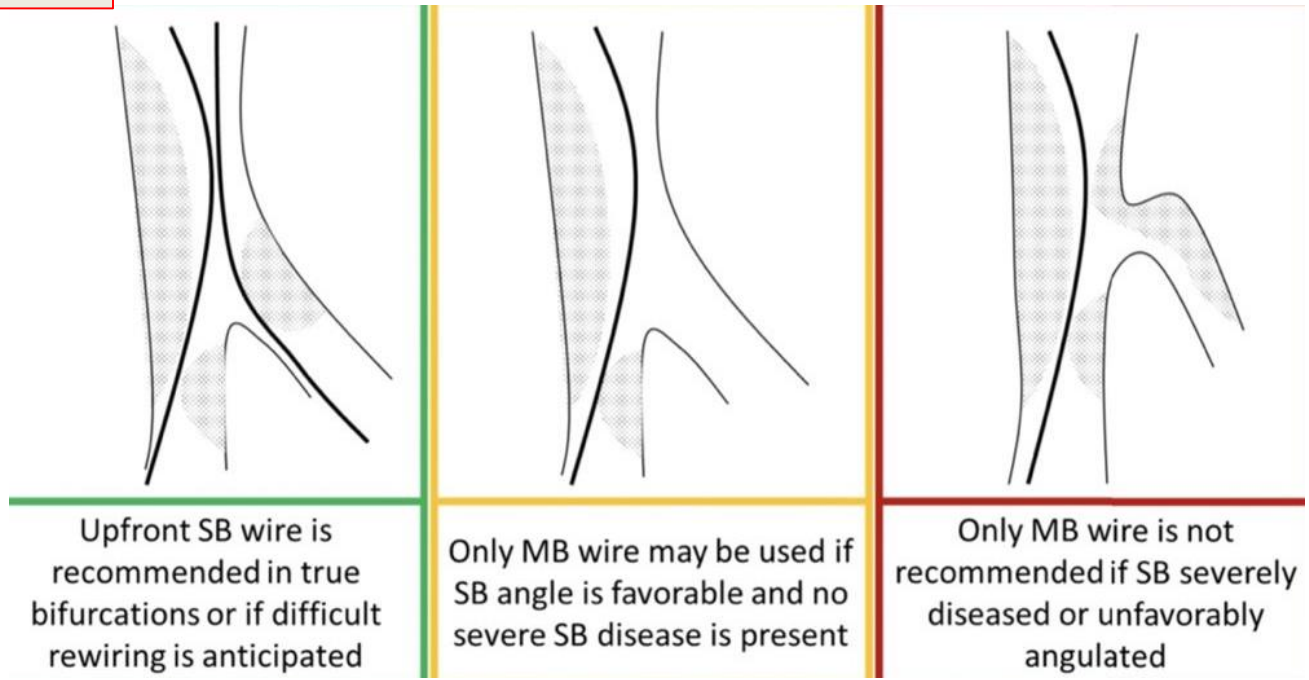
The SB is not only >2 mm in diameter

but also is what you don’t want to loose

- Long-term clinical outcomes mainly depend on the success of MB stenting
- Well-prepared lesions before stenting is imperative

**Main points in bifurcation PCI technique**

# Wiring

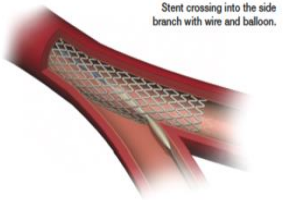


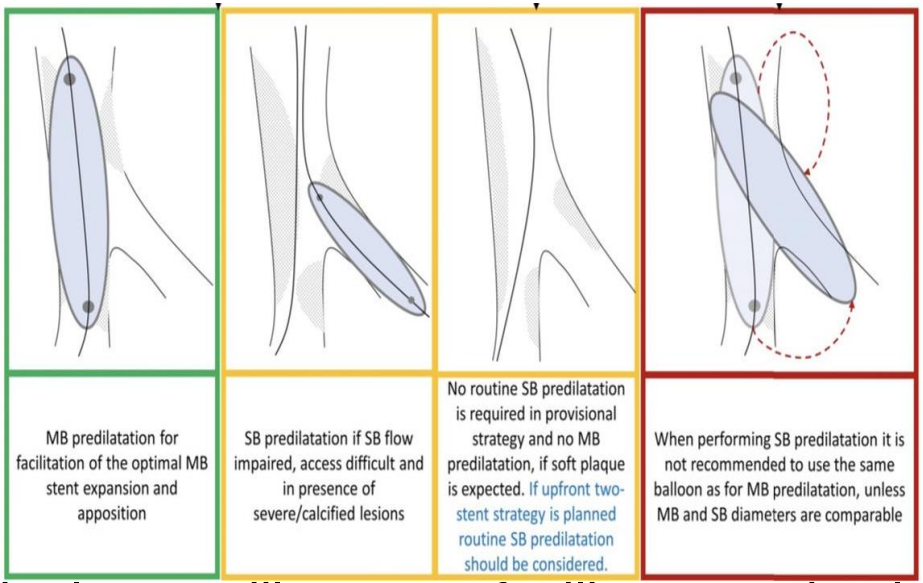

- SB wiring is  always recommended in true bifurcation lesions.
- The most angulated branch should be wired first to avoid wire wrap.

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

**Main points in bifurcation PCI technique**

# Predilatation



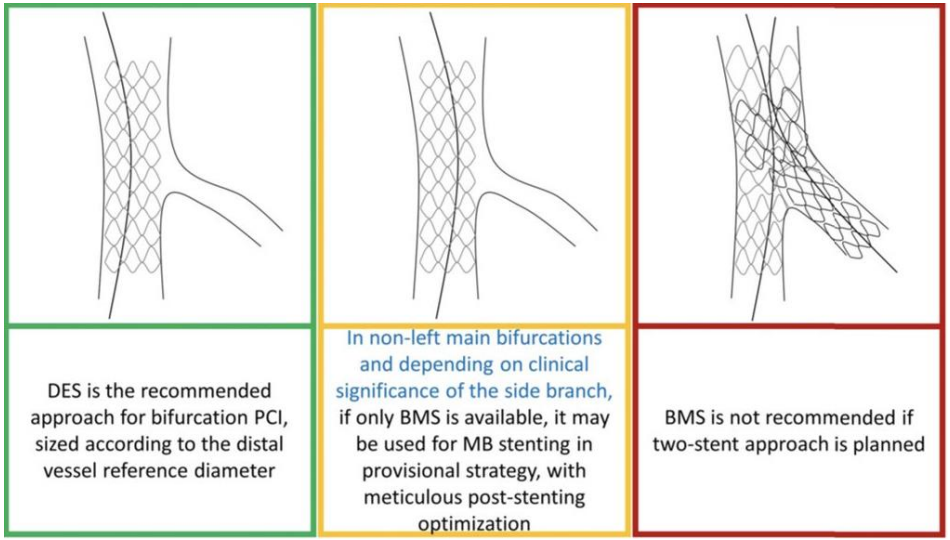




- MB should routinely predilate to facilitate optimal MB stent expansion and apposition.
- Direct stenting if the lesions are soft & no signs of fibrotic/calcified.
- SB predilatation if It is severe,calcified or difficult to access.

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

**Main points in bifurcation PCI technique**

# MB stenting

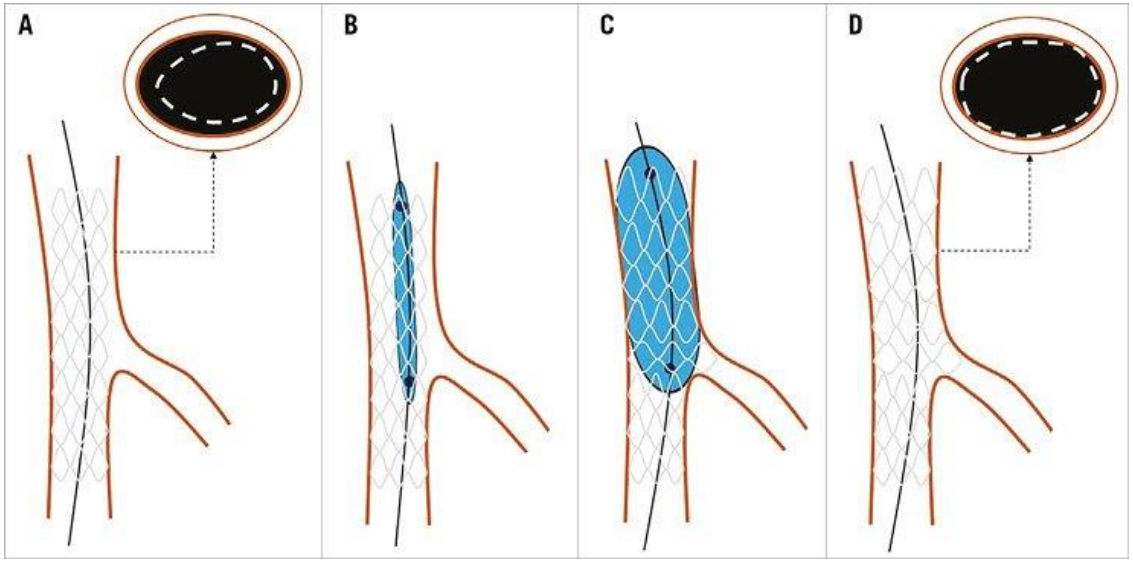



- DES not BMS is recommended.
- MB stent diameter is the reference diameter of the dMB.
- MB stent should extend at least 8-10 mm proximal to the carina.
- Oversizing the MB stent increase the SB occlusion.

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

Main points in bifurcation PCI technique

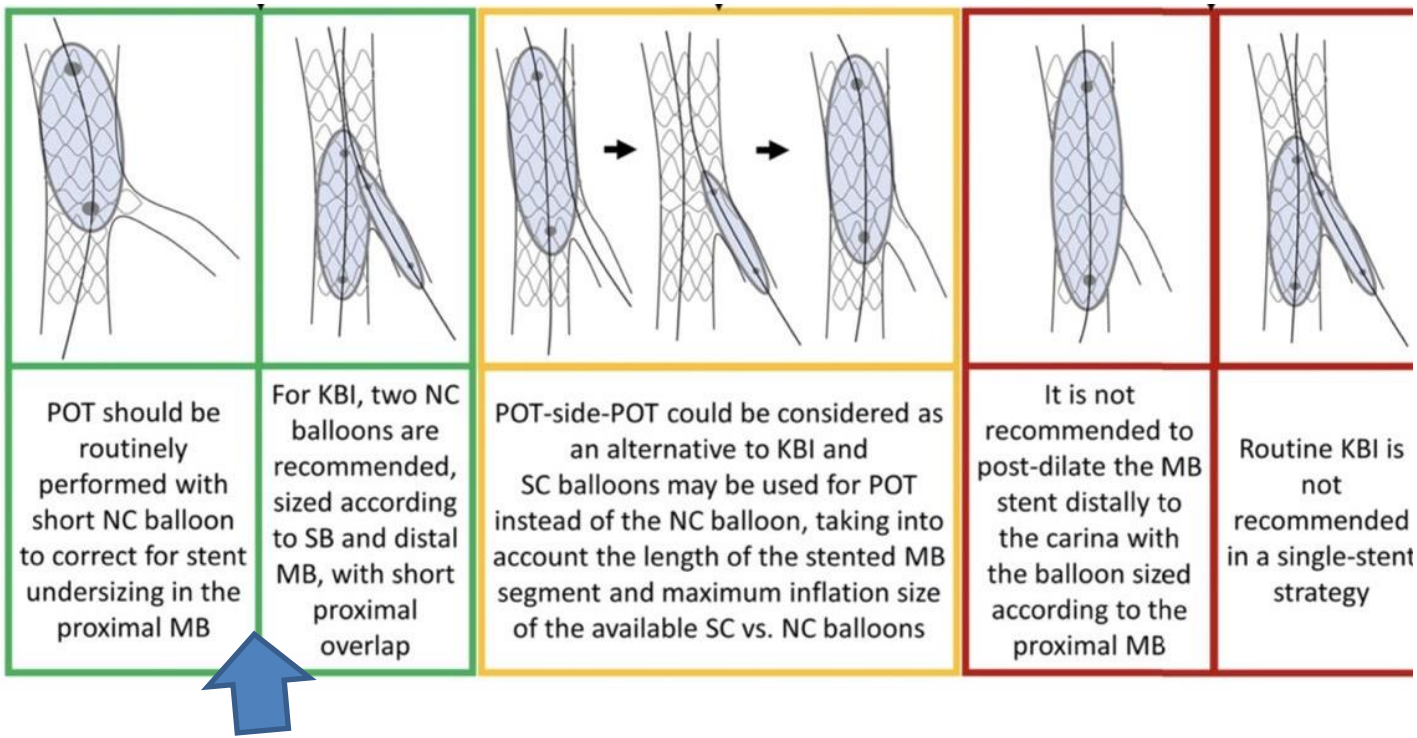
# MB stent optimisation- POT's aims:




- Correct the malapposition in pMB.
- Facilitate to rewire to SB by modifying the orientation of the ostium
- Facilitate the SB ostium scaffolding.

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

# MB stent optimization: POT, Kissing ballon & SB dilatation




The lesion >75% or TIMI flow <3 SB, ostium lesion should be reopen and KB may restore normal flow of the SB

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

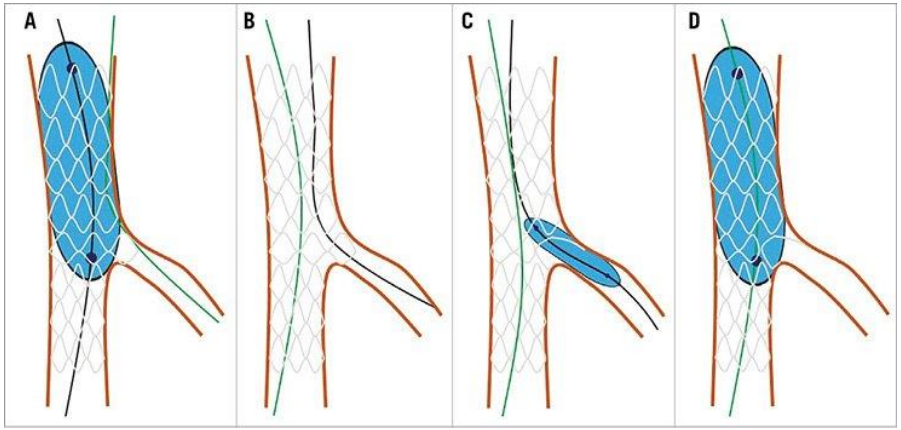
**Main points in bifurcation PCI technique**

# Optimisation after MB stenting:

## KB & SB dilatation: POT-side-POT

POT-side-POT could be considered as an alternative to KB

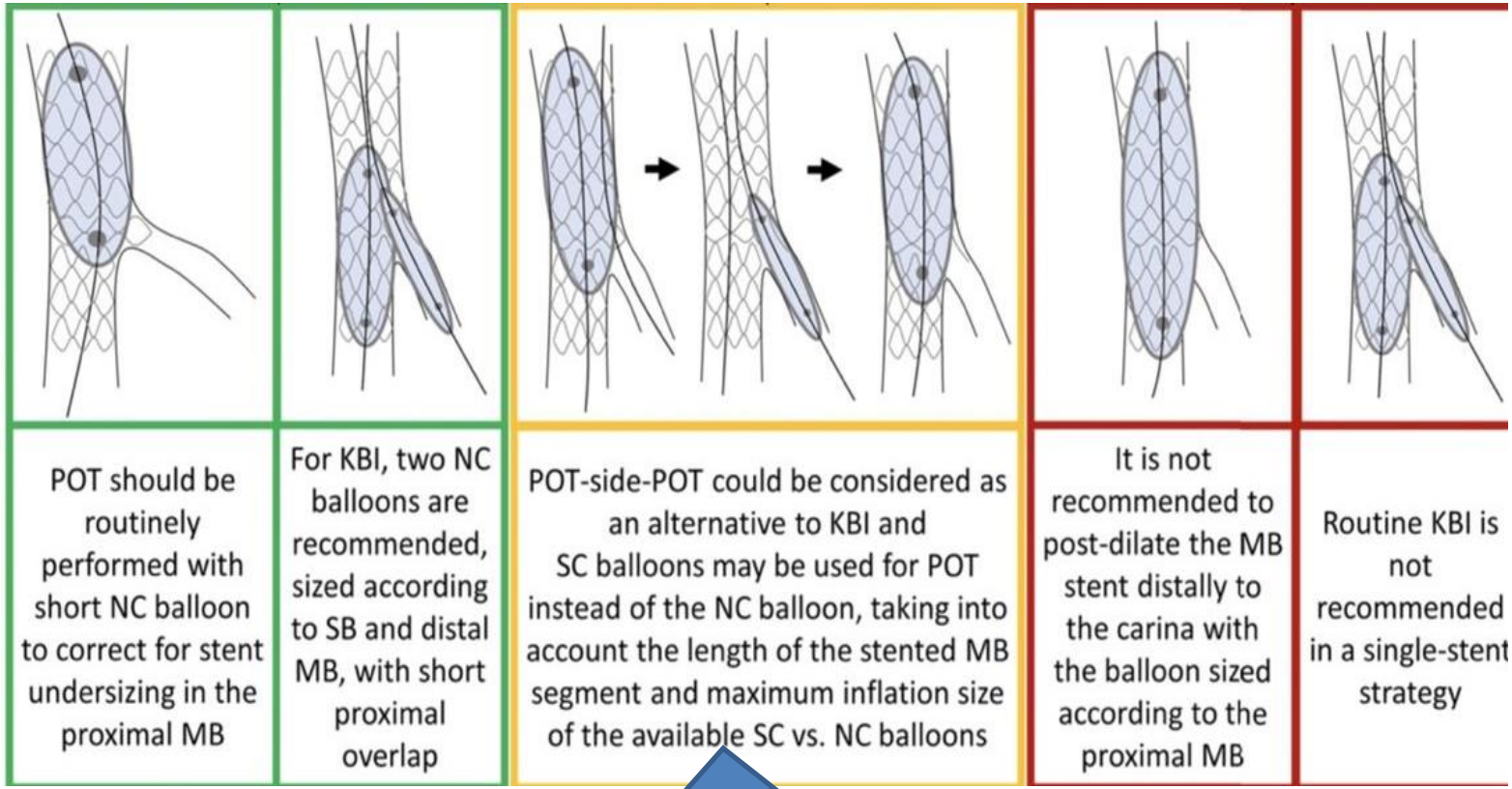
- First POT after MB stenting with a short NC or SC balloon.
- Wire exchange.
- SB dilatation with an NC or SC balloon.
- Second/final POT with the same short NC or SC balloon as the first POT.




Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

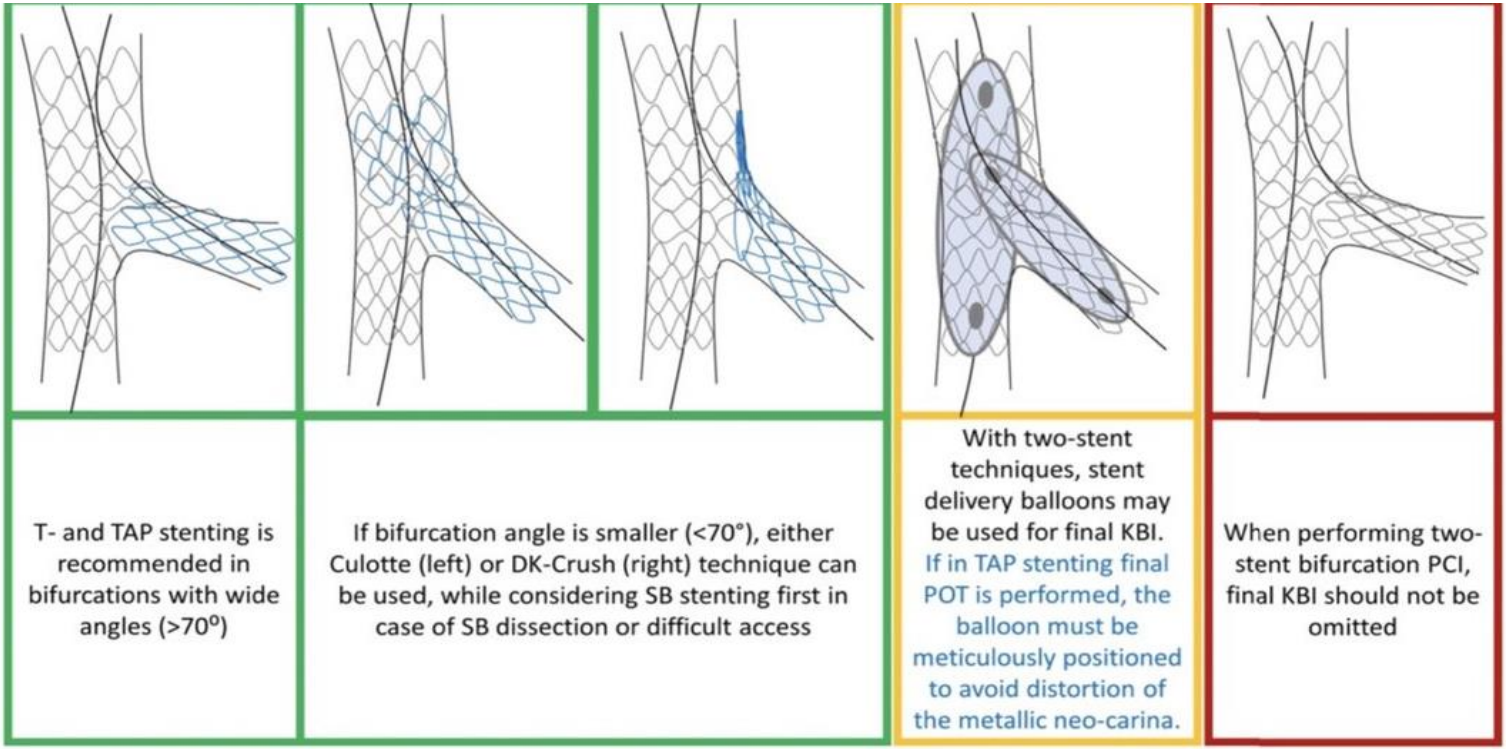
**Main points in bifurcation PCI technique**

# Optimisation after MB stenting




Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

# Second stent in a provisional single-stent strategy




Final KB and POT must not be skipped in two-stent bifurcation PCI

Dejan Milasinovic, EuroIntervention 2018;13:e1804-e1811

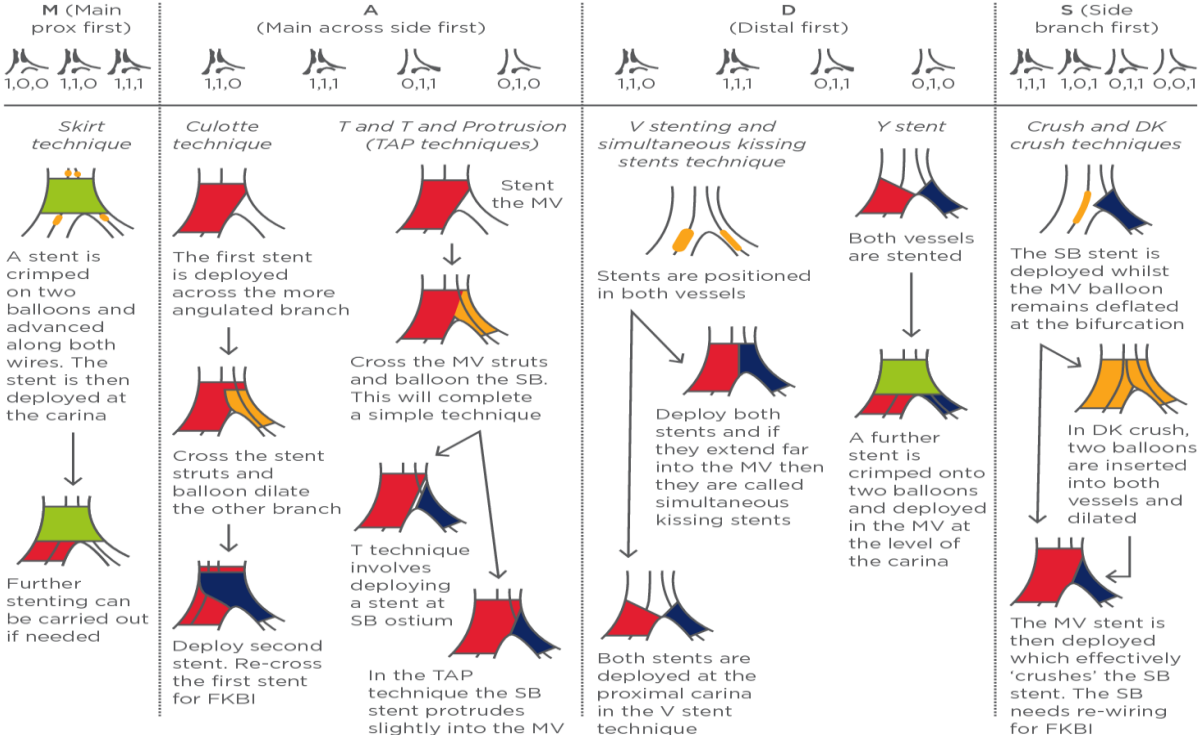
# LIMITATIONS OF BIFURCATION PCI

- Procedural complications 9%
- Restenosis as high as 36%
- MB stent distortion by side access
- Side branch and wire jailing

# Limitations of bifurcation PCI

- Limitations in re-wiring, re-ballooning and stenting of SB
- First kissing with danger of dissection
- Incomplete coverage of bifurcational area
- Complexity, duration, contrast and X ray exposure

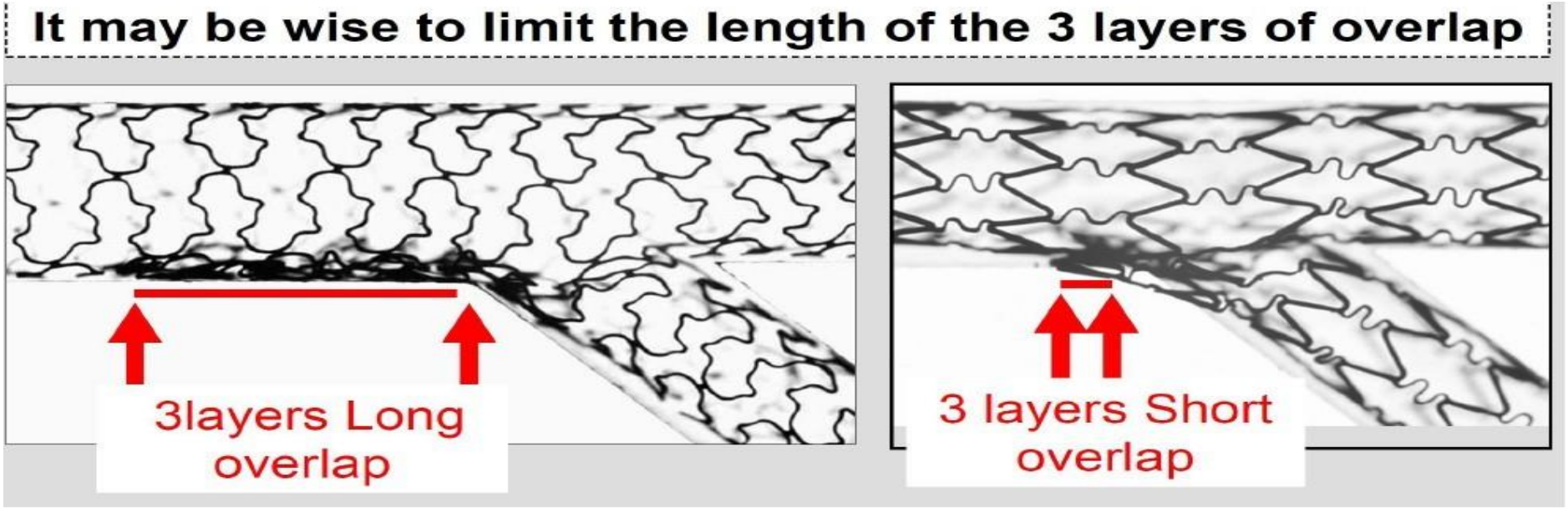
# Different complex technique procedures according to MADS (Main, Across, Distal, Side)




→ **Do the technique you usually do**

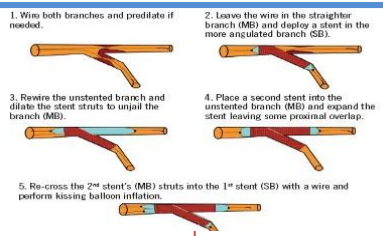
Baldeep S. Sidhu EMJ Int Cardiol. 2016;4[1]:44-54.

# The Crush technique



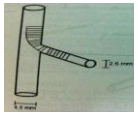

- ✓ Inability to wire the SB
- ✓ Inability to pass balloon into SB

# The culotte technique




## Advantages

- ✓ It provides near-perfect coverage of the carina & SB ostium
- ✓ Best immediate angiographic result
- ✓ Indication in all bifurcation lesions irrespective of angle.
- ✓ Open-cell stents are preferred when SB diameter is >3 mm.



## Disadvantages

- ➢ Complexity in rewiring through the stent struts in both branches
- ➢ Not advisable if both branches are dissected after predilatation
- ➢ Can not attain good apposition if diameter of pMB>>>SB

# LEARNING BY SHARING COMPLICATION – MY CASE

## Brief Case Summary

**VAN HONG H** , male, 61 Yo

Hospitalized for typical angina

Medical history

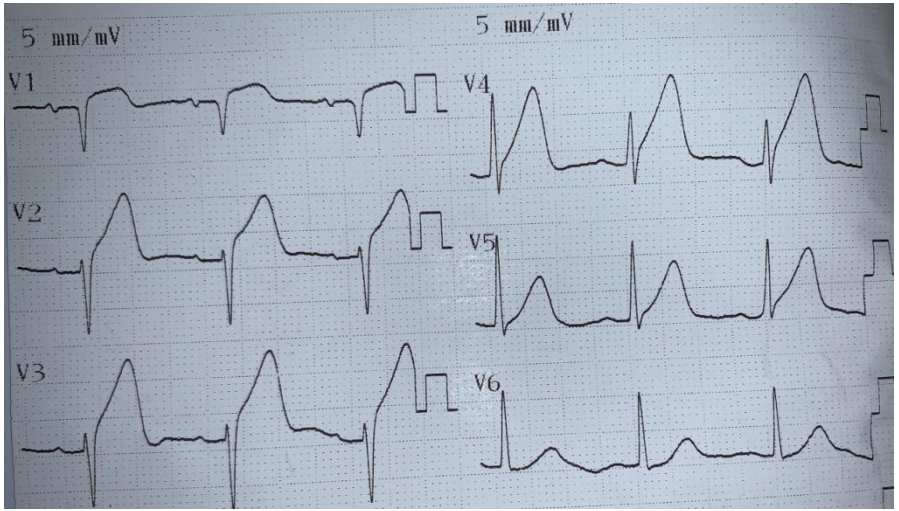
- No previous MI, PCI, CABG, Diabetes
- Hypertension: Y
- Hyperlipidemia:Y
- Curent smoking : Y
- Family history: N

# Brief Case Summary

## Clinical presentation:

Typical angina, BP 150/80 , Heart rate 79, No arrhythmia

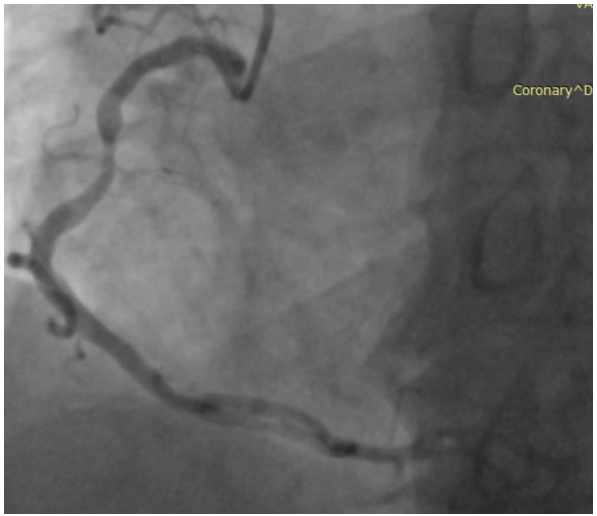
**Rest ECG:**

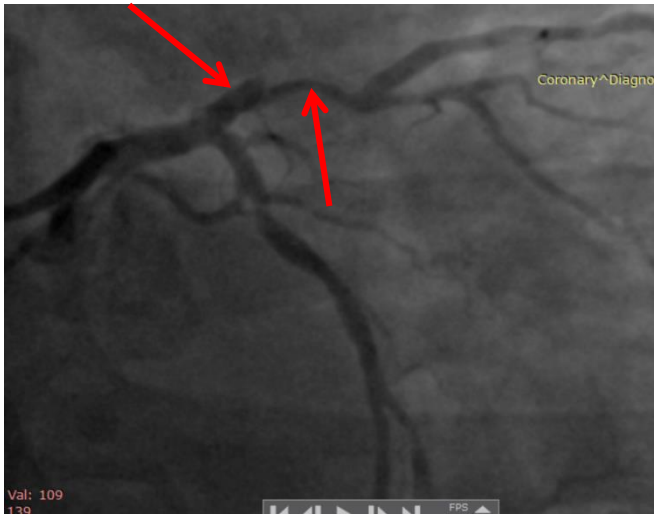


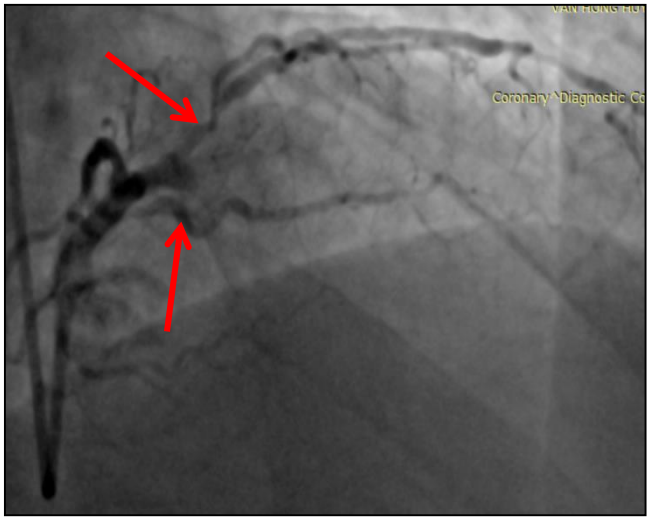

**Echo:** LV hypertrophy, LVEF: 47%, IVS motionn disorder

**Troponin hs :** 0,03 → >10ng/ml

# Angiogram



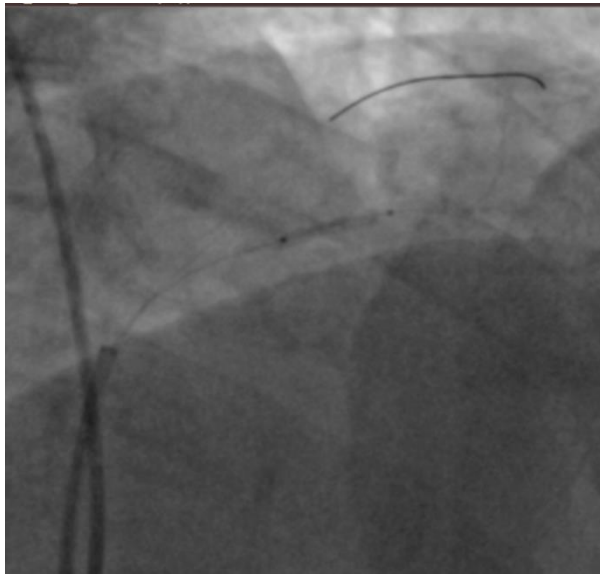


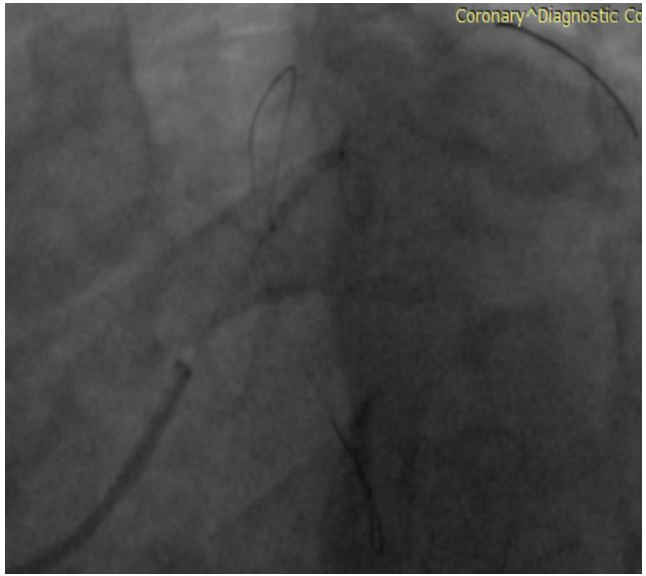




**Note 1: The bifurcation lession angiogram image must be clearly**

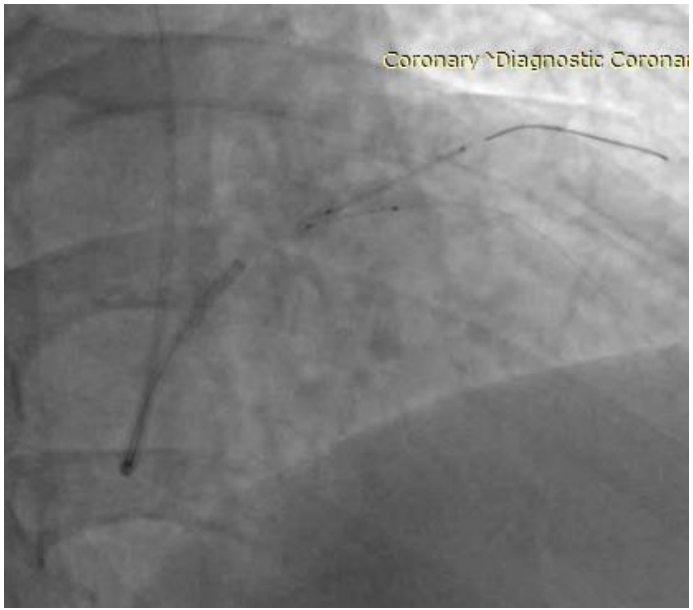
# Mini Crush technique

Wire and predialate both SB,MB





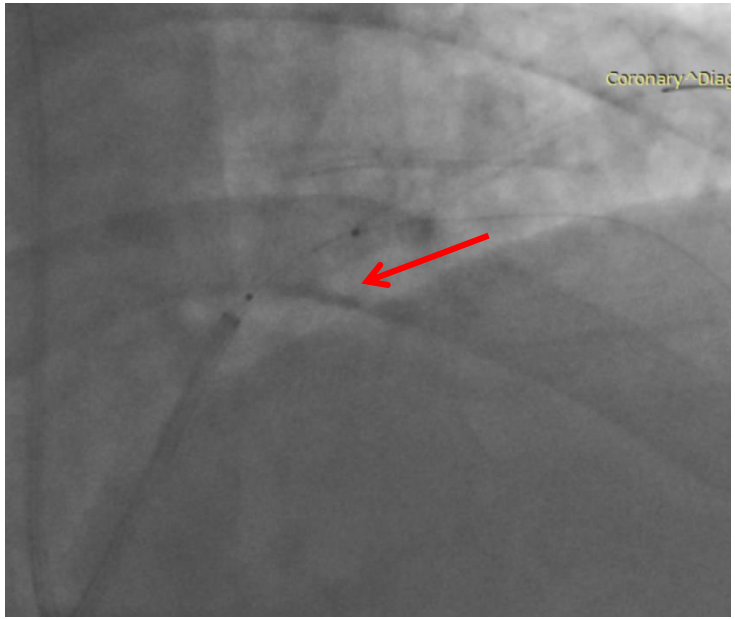
# Stenting for SB




clip

# What happened…

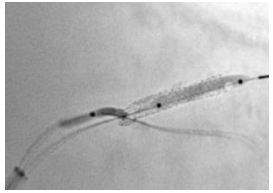
NC balloon slips out of position after pt cough

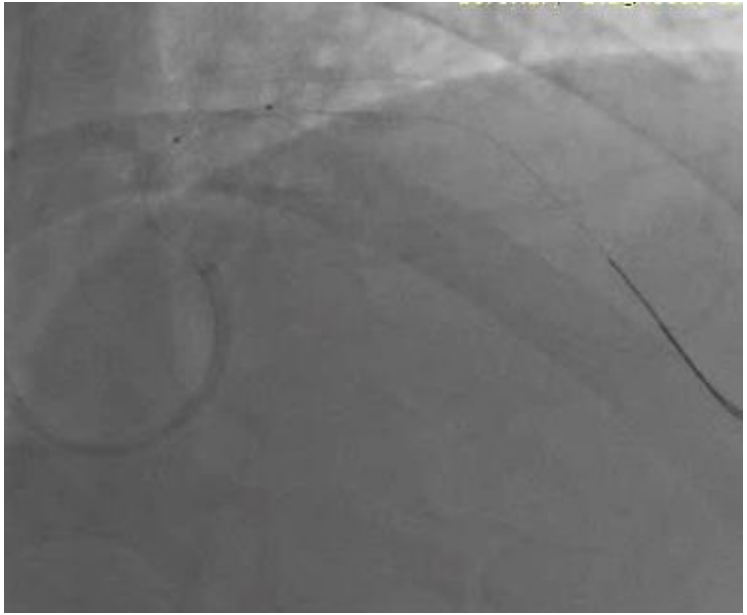


**Note 2: Fit all tools in their position**

# What happened…

Fail to reaccess the balloon





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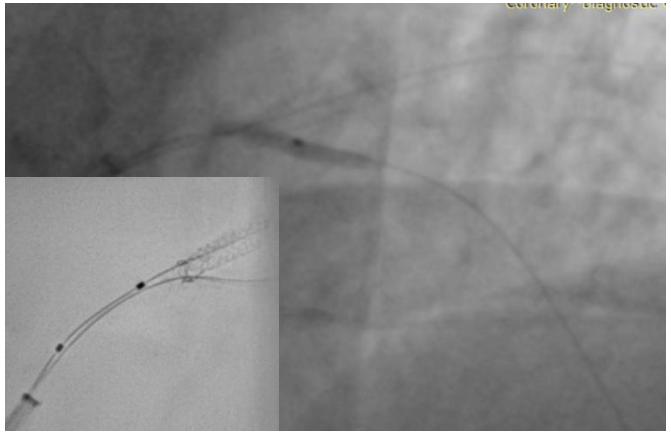
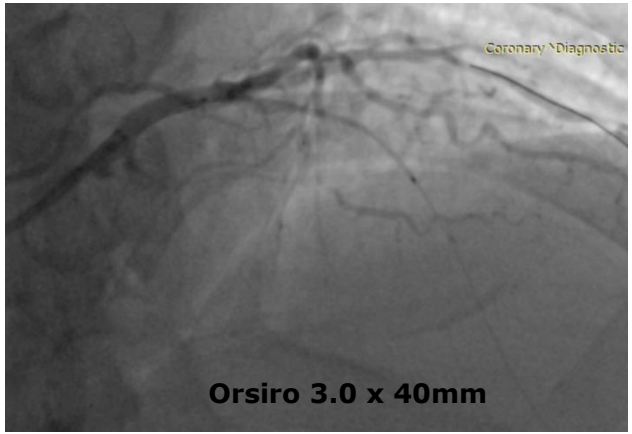
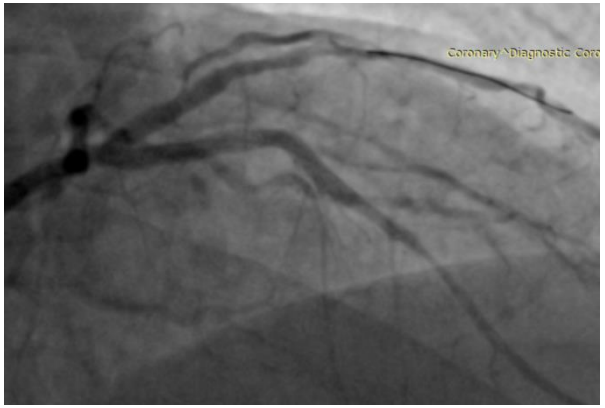
# What happened…

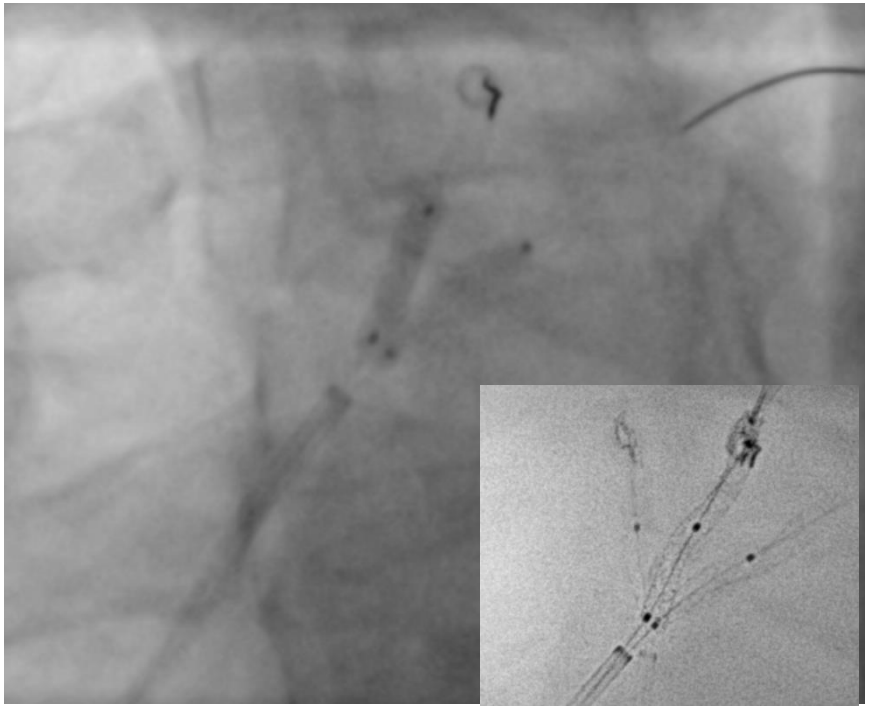


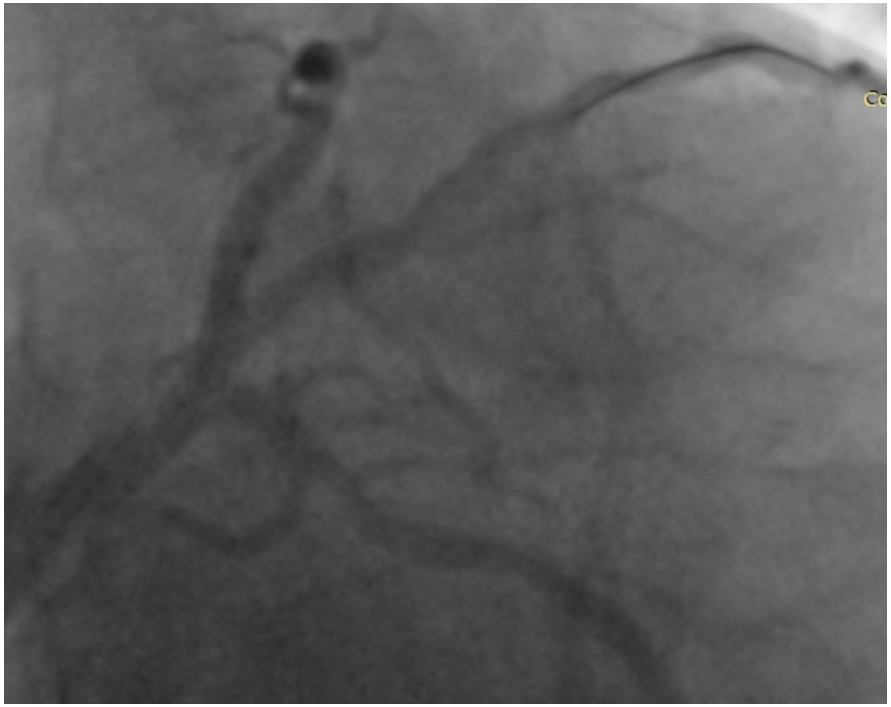


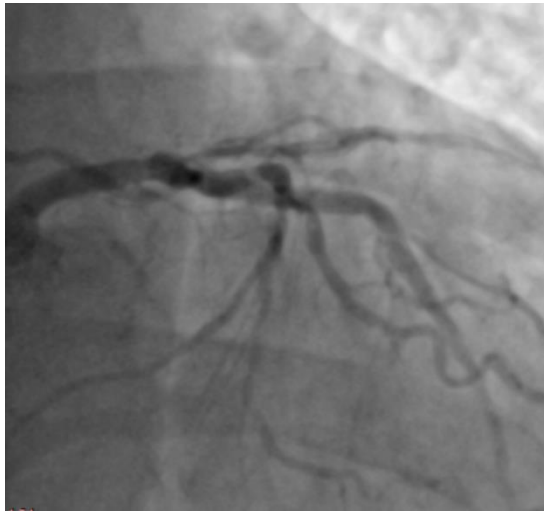

**Note 3: keep calm anytime and make the stratery flexible- Change to culotte techniqe**

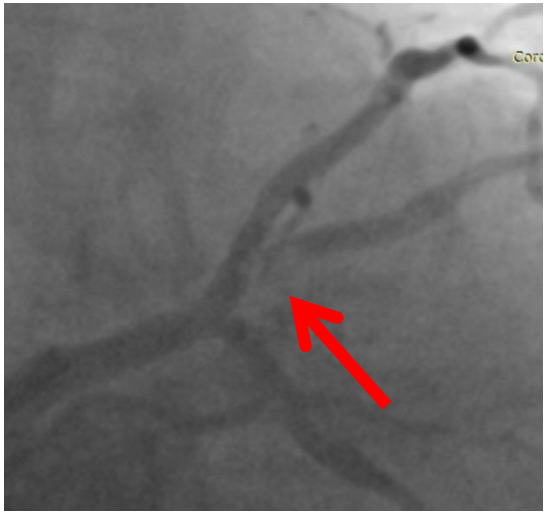
# Kissing balloons

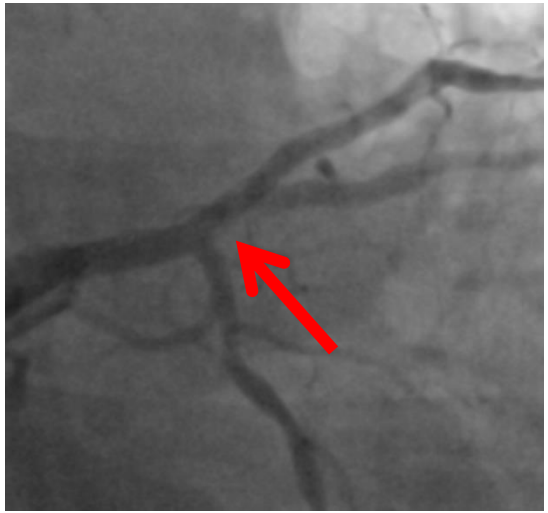




# What happened…….thrombosis







# And…

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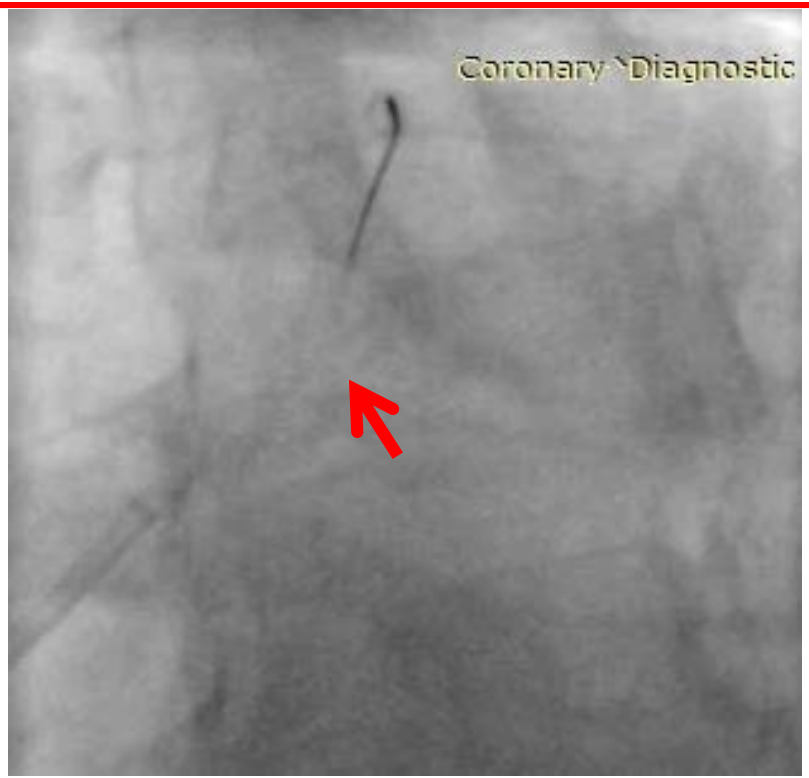
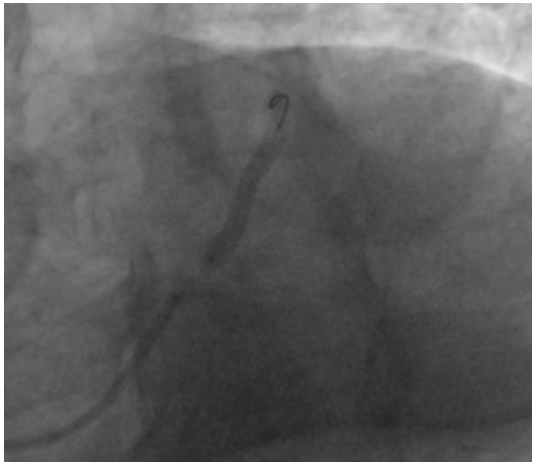


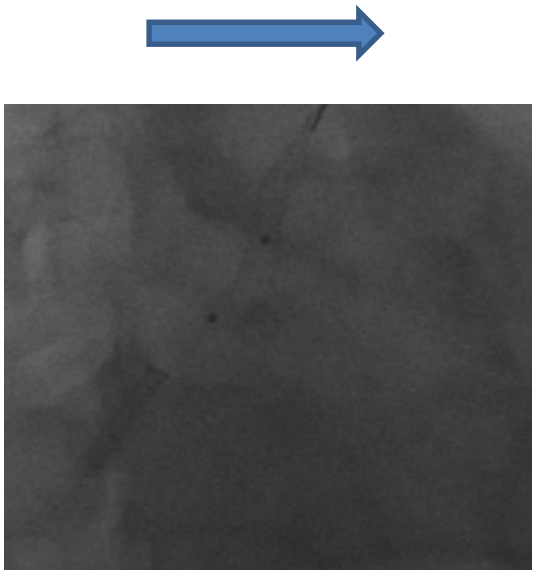

**Note 4: do strictly all steps and requirements of the selected technique**

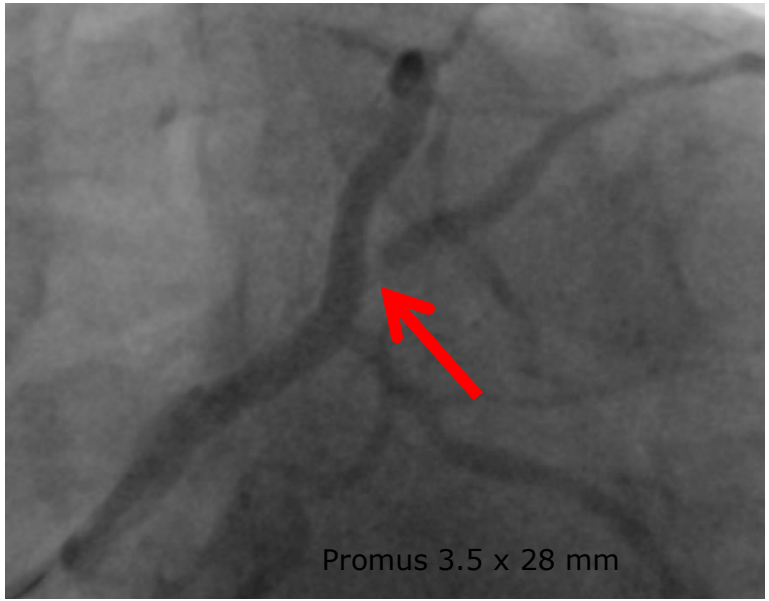
(not enough 8-10mm proximal to carina)

# …Finally

One more stent LM-LAD to cover the thrombosis, dissection








**Note 5: Let the MB flow**

# Take home messages

- ✓ Clearly, obviously bifurcation lesion angiogram image is necessary
- ✓ Having enough DES, short NC/SC balloon, 7Fcatheter…
- ✓ Performing bifurcation PCI technique step by step. Final kissing balloons and final POT are obligatory
- ✓ Long- term outcome mainly bases on the MB, not SB flow→ Get the MB flow as soon as possible.
- ✓ The simpler is the better in chosing bifurcation PCI strategy.


Thank
you