

Top 10 Tips on Bifurcation PCI

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Top Ten Tricks for Bifurcation PCI

1. Consider anatomic variability and dynamic change of bifurcation lesion → Individualized approach

- Why an individualized approach?

- Variations in Anatomy

- Left main bifurcation disease
- Plaque burden & location of plaque
- Angle between MB and SB

- Dynamic changes in anatomy during treatment

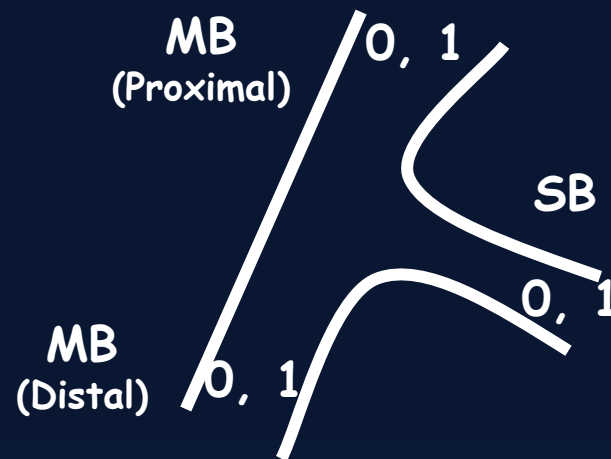
- Plaque shift
- Dissection

No two bifurcations are identical

- An appropriate strategy from the outset saves time and minimizes complication.

Medina Classification

Variations in Anatomy



1,1,1



1,1,0



1,0,1



0,1,1



1,0,0



0,1,0



0,0,1

Top Ten Tricks for Bifurcation PCI

2. Assess SB feature and relevance

- The provisional approach is the default approach in most bifurcations lesions
- **The approach is dictated by the SB:**
 - True vs. Non-true
 - Size of SB
 - Angle from MB
 - Extent and distribution of SB disease
 - How important the SB is for that patient and for that specific anatomy

Top Ten Tricks for Bifurcation PCI

3. Decide 1 vs. 2 stent strategy: General Rule

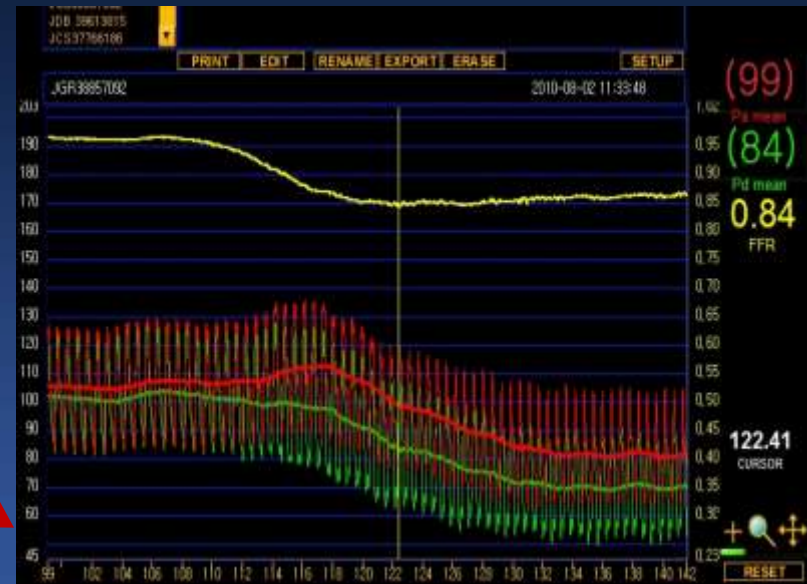
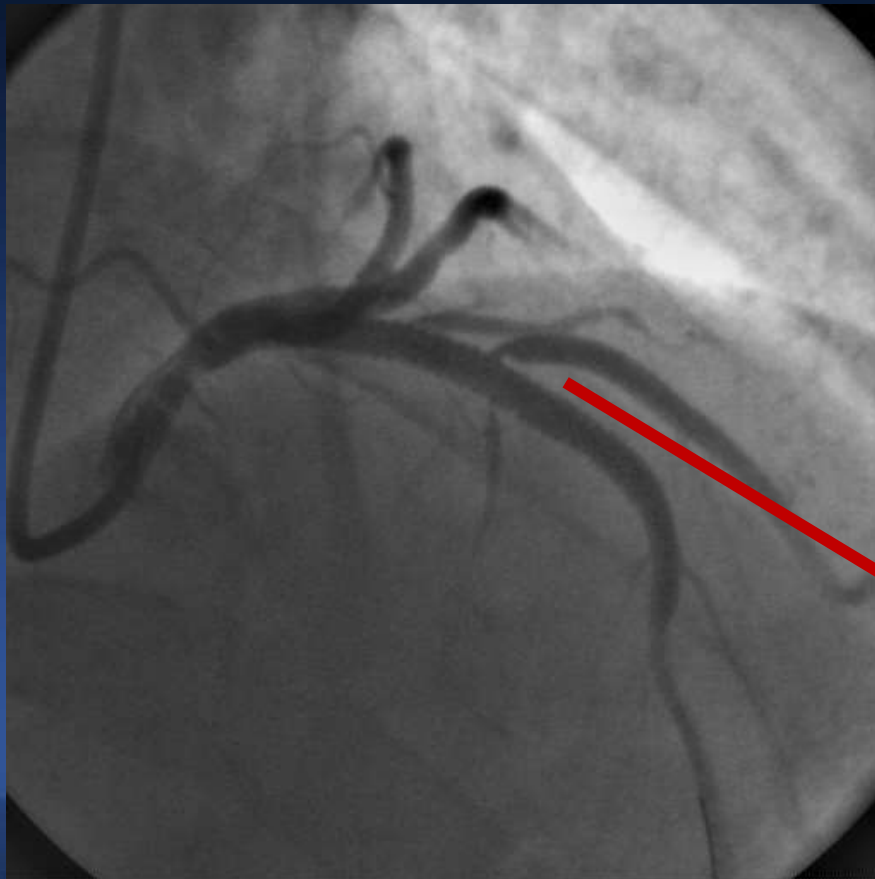
1 Stent Provisional (>70%)	Normal SB, Whatever Size Is, (Medina 1.1.0., 1.0.0), or Focal Diseased SB
2 Stent Technique	Large SB (≥ 2.5 mm) → Large amount of myocardium Diffusely Diseased Side Branch (Medina 1.1.1., 1.0.1)

Top Ten Tricks for Bifurcation PCI

4. Consider functional concept

Jailed Side Branches

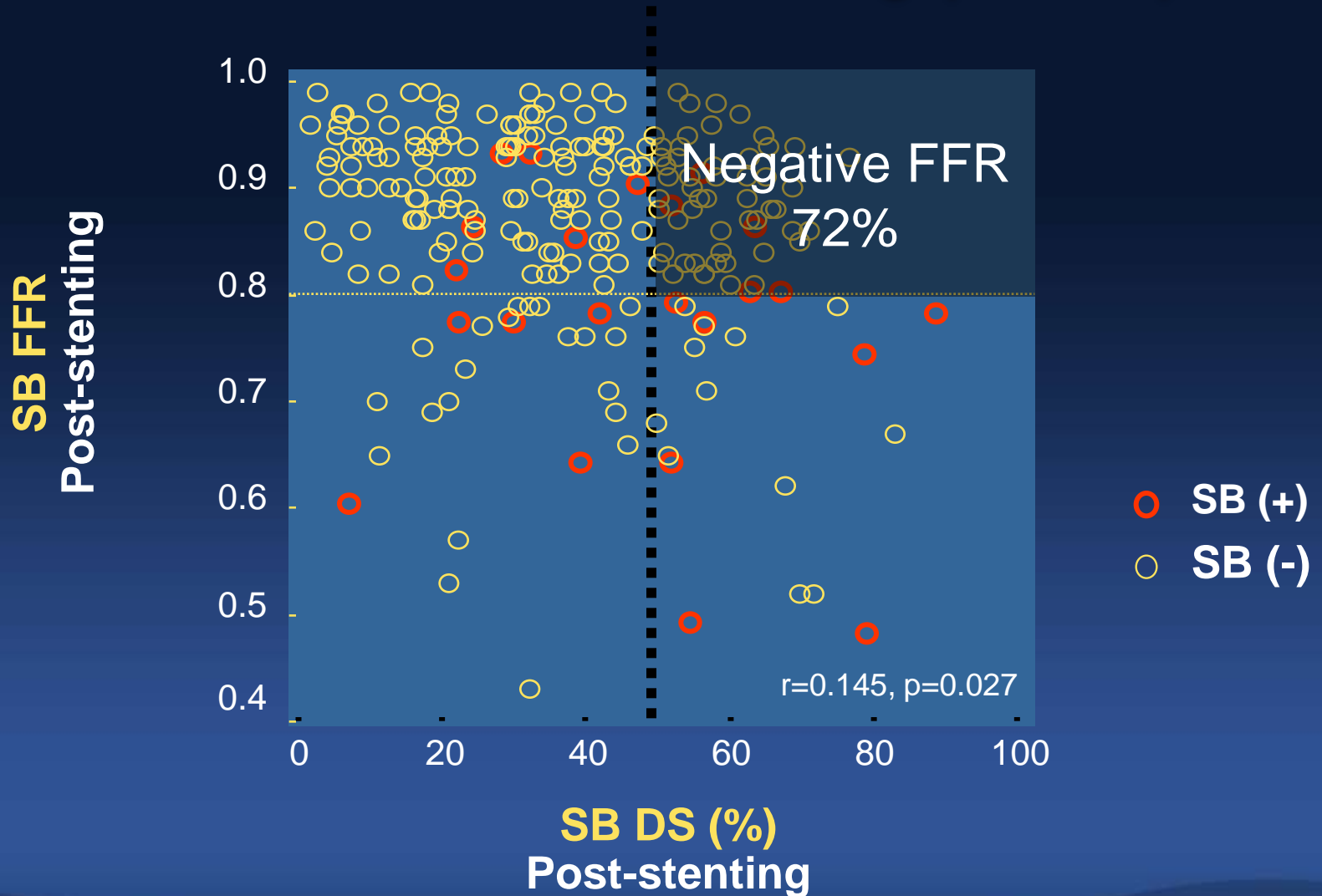
Angiographic severity \neq Functional significance



FFR 0.84

Side Branch FFR

After Main Vessel Stenting (n=232)



Top Ten Tricks for Bifurcation PCI

5. Use IVUS commonly for bifurcation PCI, especially both MB and SB.

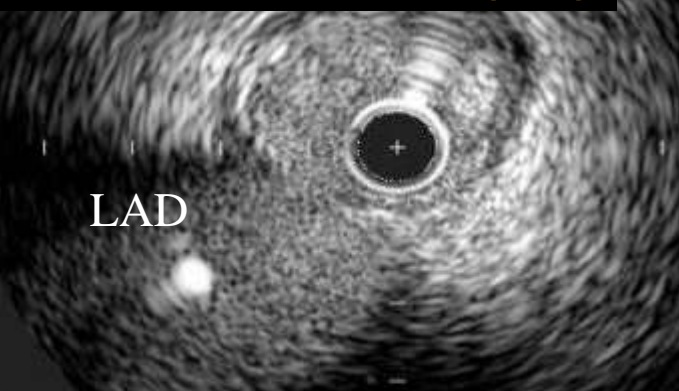
➤ Direct imaging and indirect imaging can be different.

An Important Principle of IVUS Imaging

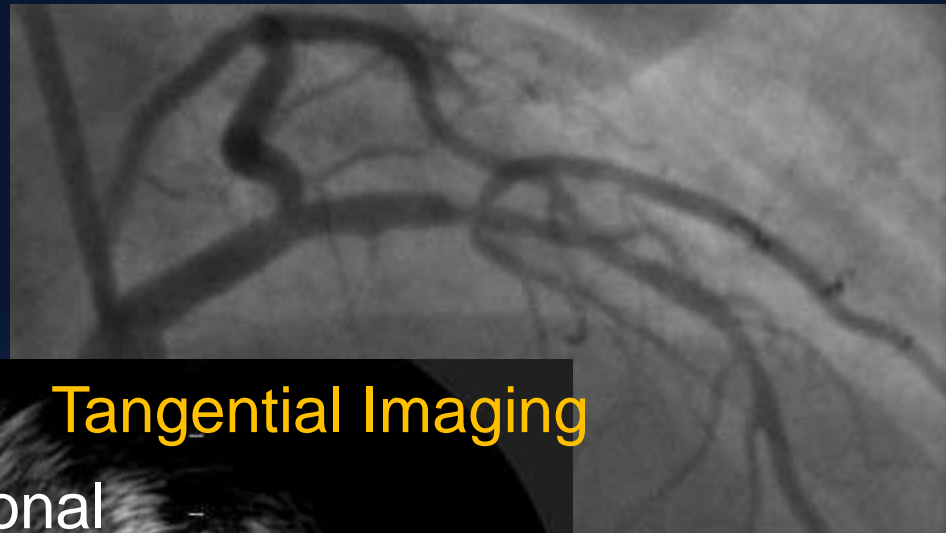
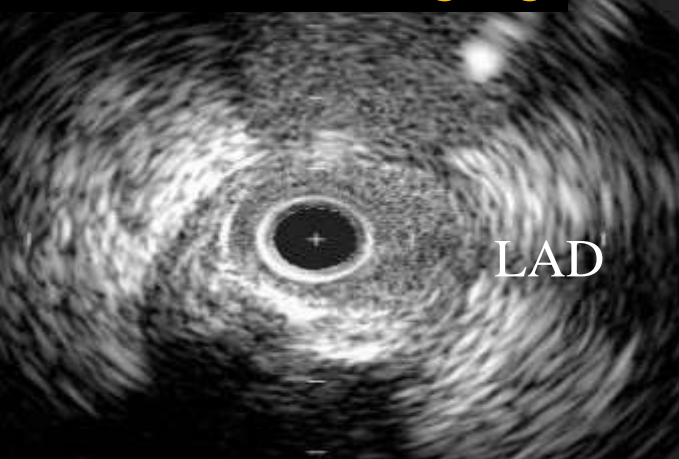
Direct Imaging of Both Parent & Daughter Vessel



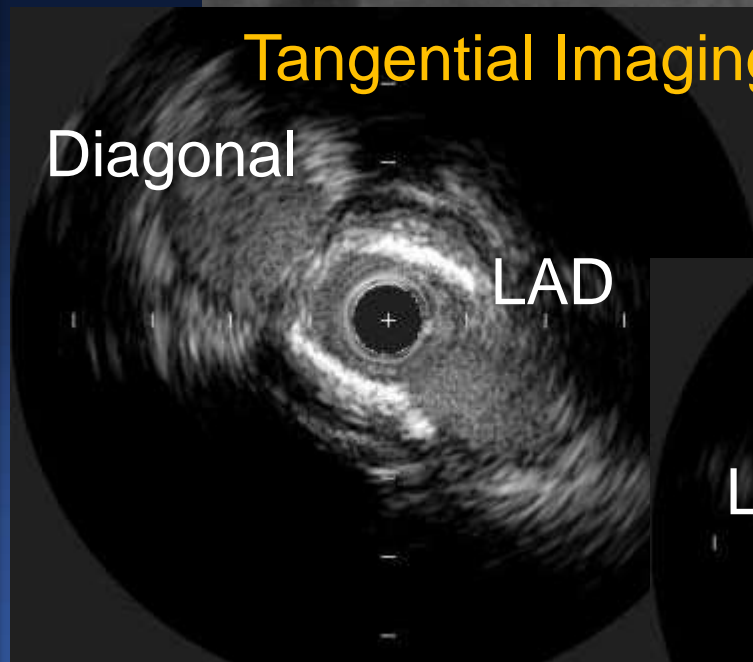
Indirect LAD imaging



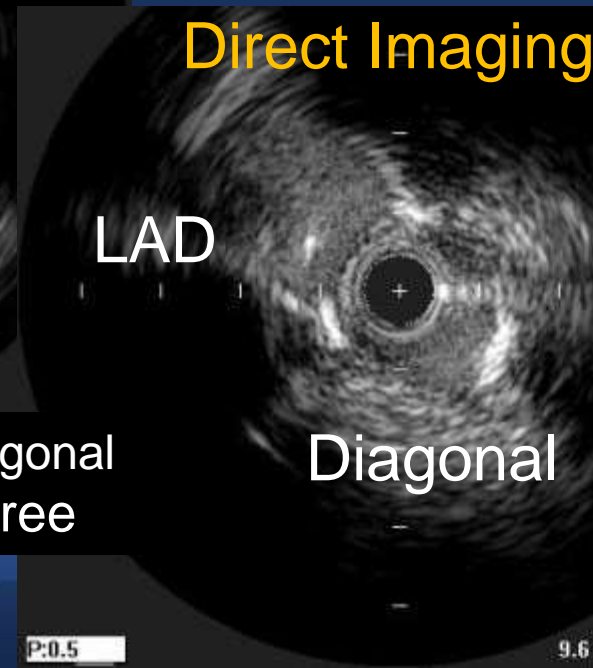
Direct LAD imaging



Tangential Imaging

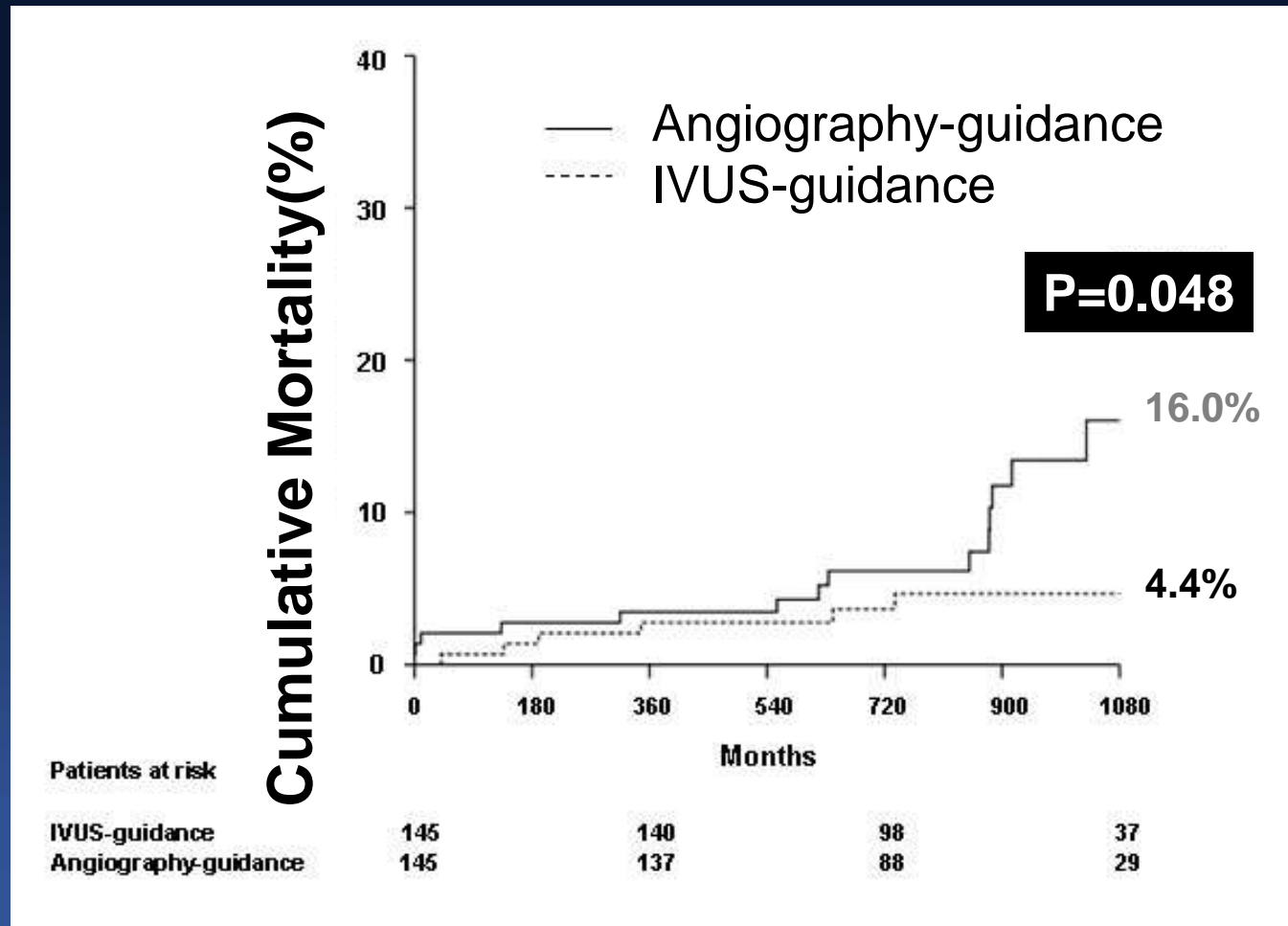


Direct Imaging



On indirect imaging the Diagonal branch appears disease free

IVUS Guidance Saves Lives in UPLM PCI



Top Ten Tricks for Bifurcation PCI

6. Keep wire both branches in Provisional Stenting

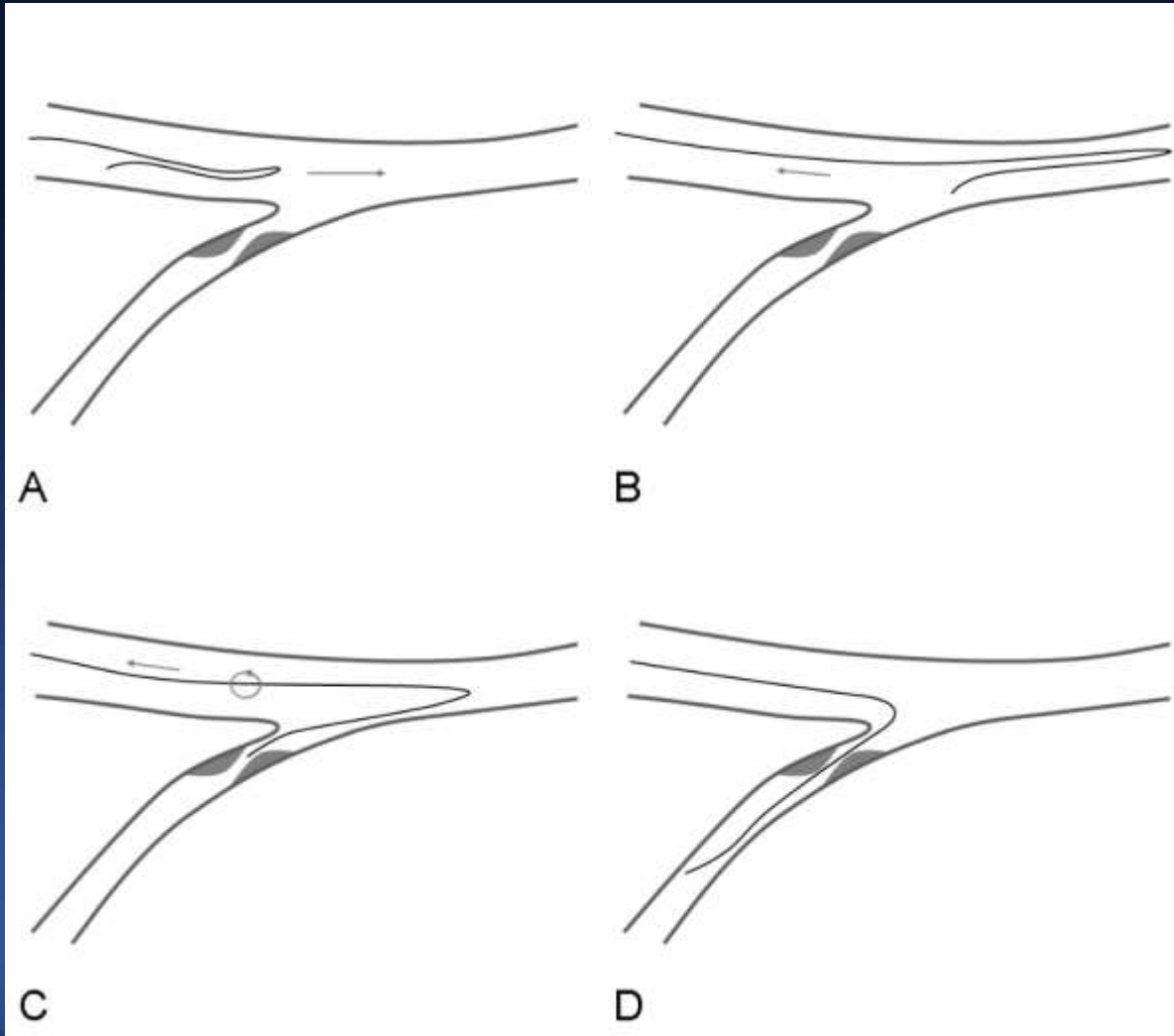
- Protects SB from closure due to plaque shift and/or stent struts during MB stenting
- Jailed SB wire facilitates re-wiring of the SB:
 - widening the angle between the MB and SB
 - by acting as a marker for the SB ostium if SB occludes
 - changing the angle of SB take-off
- In the Tulipe multicenter study, absence of this jailed wire was associated with a higher rate of re-interventions (OR:4.26; 1.27–14.35) during follow-up
- **CAUTION WHEN REMOVING JAILED WIRES!**

Top Ten Tricks for Bifurcation PCI

6-1. General rules to facilitate wiring for difficult case

- Review baseline CAG carefully:
 - Plan your case
 - Choose one or two “good view”
- Start with a good backup support:
 - Sometimes prefer XB, EBU, AL, 3DR

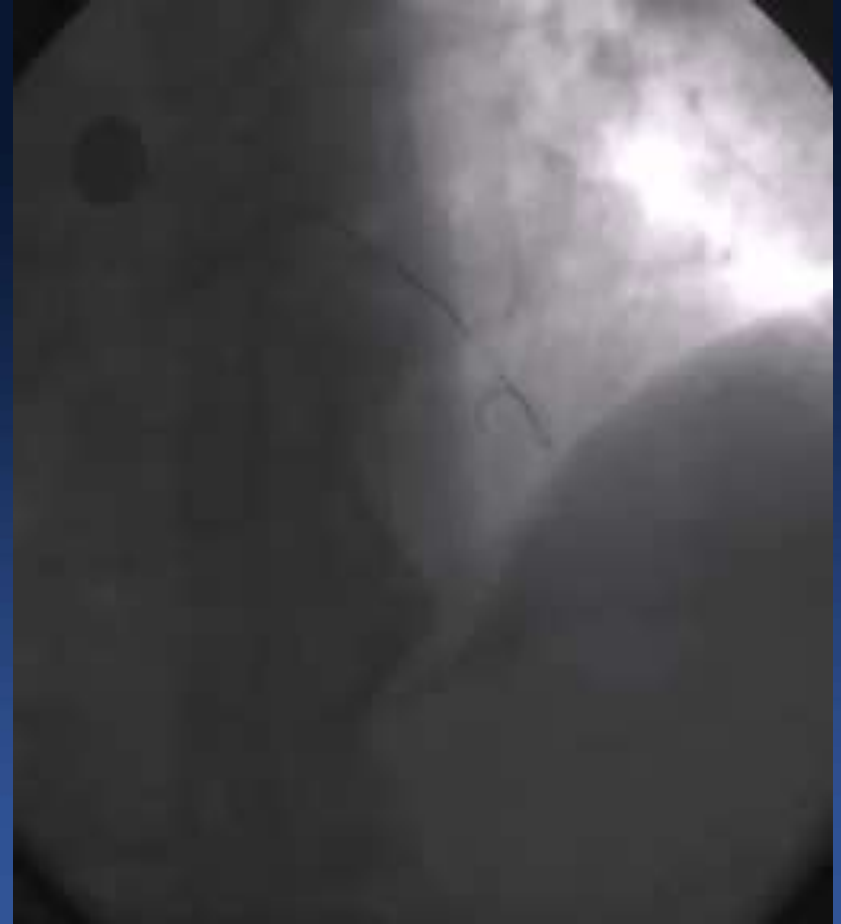
Uncommon shape - planning different wiring technique (long U-shape Technique)



Uncommon shape: Long U-shape Technique



U-shape passing



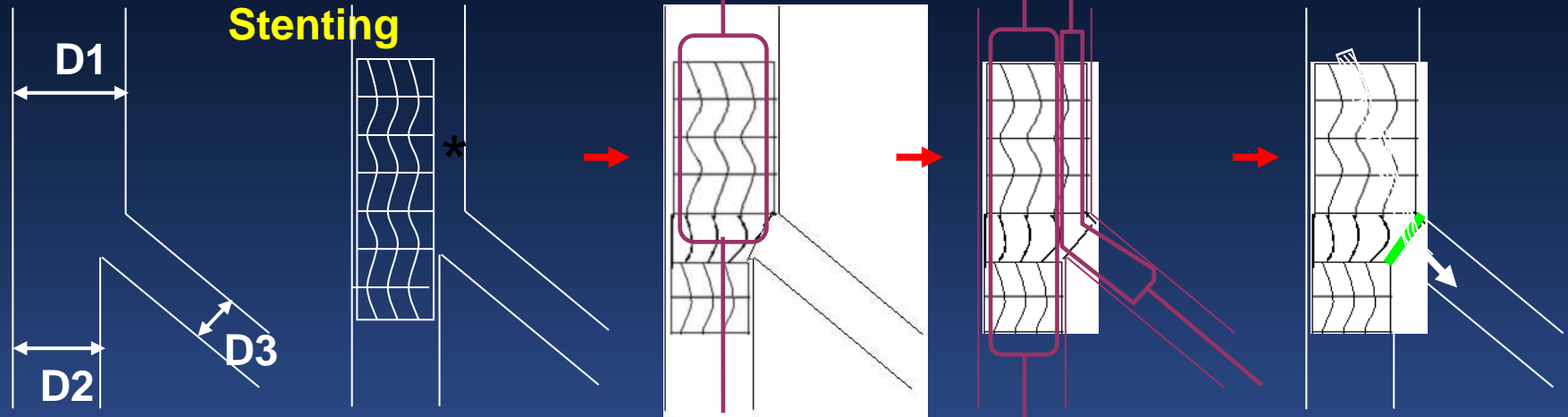
Wire pullback

Top Ten Tricks for Bifurcation PCI

6-2. Difficulty SB recrossing → consider

Proximal Optimization Technique (POT)

Optimal
Provisional SB
Stenting



$$D1 = 0.67 * (D2 + D3)$$

POT

FKB

- Expansion of the stent at the carina, using a short oversized balloon
- Produces curved expansion of the stent into the bifurcation point and facilitates recrossing, distal recrossing, kissing inflations and ostial stent coverage of the side branch

Top Ten Tricks for Bifurcation PCI

7. Understand and familiar with advantage/disadvantage of complex 2-stent techniques

- T-stent, modified T-stent or TAP
- Mini-crush (or step crush), DKCRUSH
- Culotte
- V-stent
- Y-stent (SKS-simultaneous kissing stents)
- Dedicated Bifurcation Stent



	Prov. T	TAP	Culotte	V-SKS	Mini-Crush
Guiding Catheter	5-6	6	6	7	7
Provisional	Yes	Yes	Possible	No	No
Access MV	Yes	Protrusion	No	Yes	Protrusion
Full coverage	Possible	Yes	Yes	Yes	Yes
Rewiring	only if needed	Yes	Yes (multiple)	No	Yes (multiple layers)
Nb Steps	1-5	5	7	1	3 (6 if DKC)
Shallow Angle	Suitable	Not ideal	Suitable	Suitable	Suitable
Wide Angle	Ideal	Suitable	Not ideal	Not ideal	Not above 60°
Small SB	Ideal	Suitable	Not ideal	Not ideal	Suitable
Limitations	Gap in scaffolding	Protrusion	Multiple rewiring	Neo-carina	Crushed stent layer

Many Factors Influencing 2 Stent Techniques

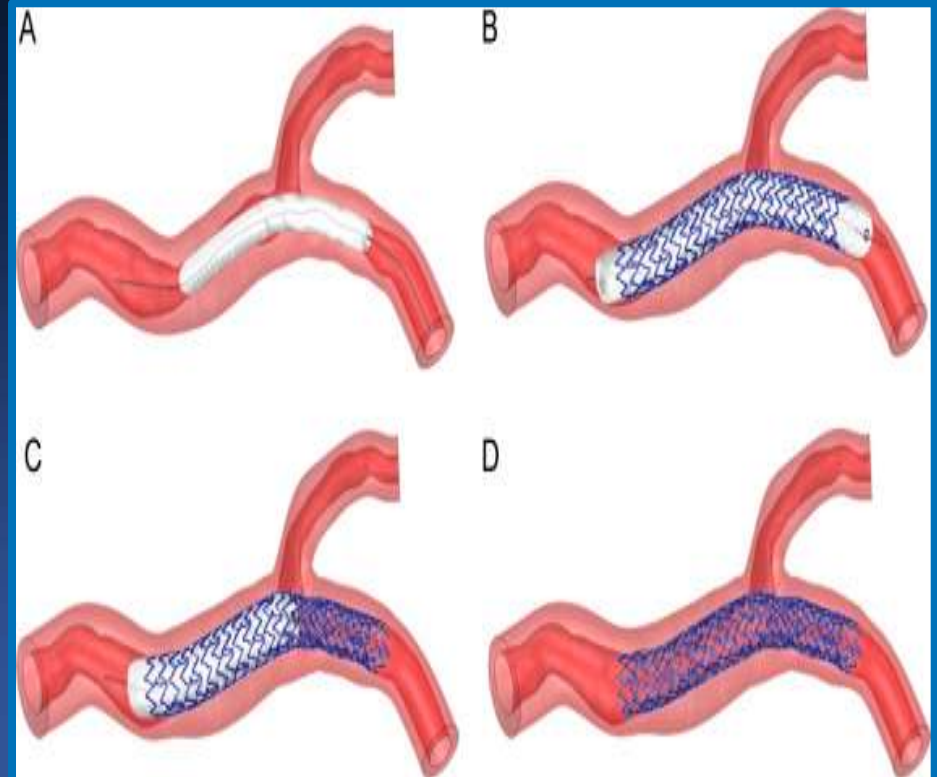
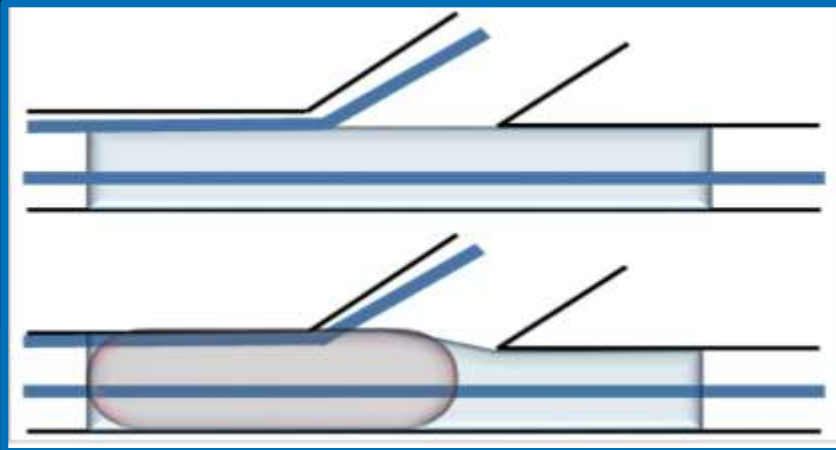
- MB and SB size
- Bifurcation angle
- Plaque distribution and location
- Operator experience and expertise
(most comfortable techniques)

Why Not, Any Different Outcomes ? with Different 2 Stent Techniques

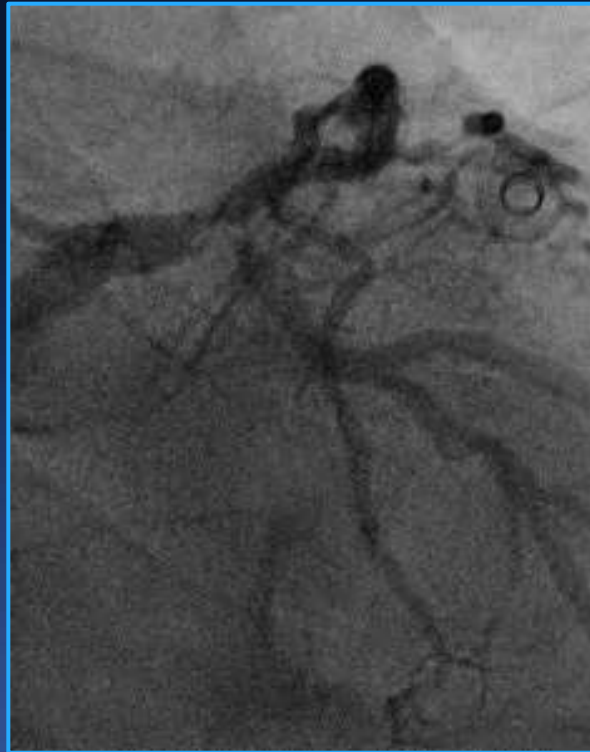
- Different Indications,
- Very Limited Data,
- *Small Ischemic Myocardium of SB* Can Not Make an Any Hard Endpoint Difference (Death and MI). Only Difference would be in *Soft End Point* (TLR).

Top Ten Tricks for Bifurcation PCI

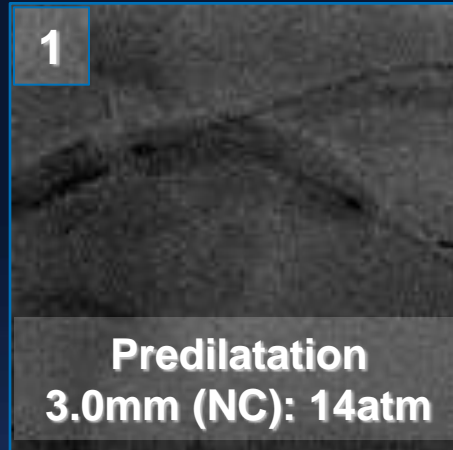
8. Consider the Trend “POT (Proximal Optimization Technique)” after bifurcation stenting.



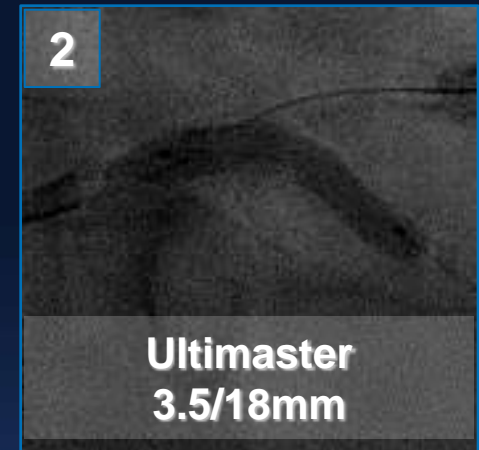
True Left Main bifurcation Culottes stenting



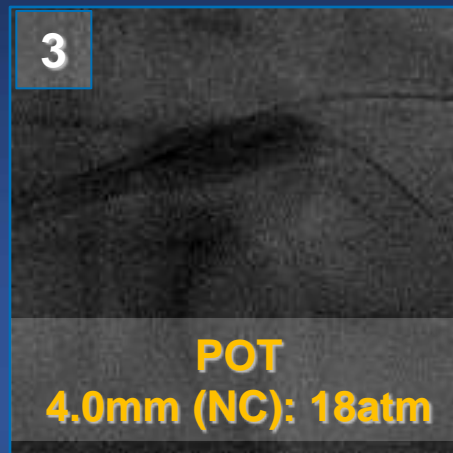
Systemic double
stenting (culottes
stenting)



1
Predilatation
3.0mm (NC): 14atm



2
Ultimaster
3.5/18mm



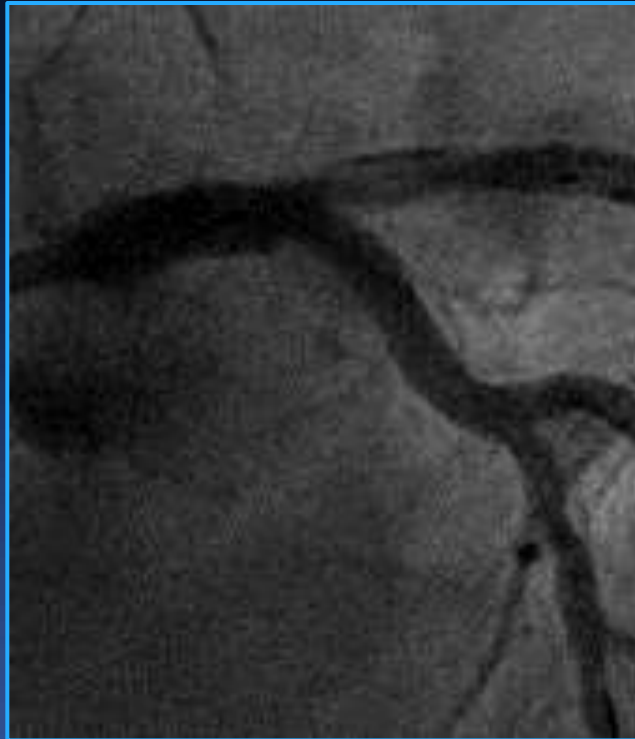
3
POT
4.0mm (NC): 18atm



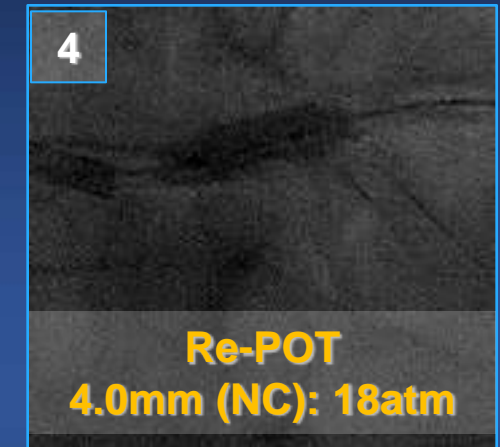
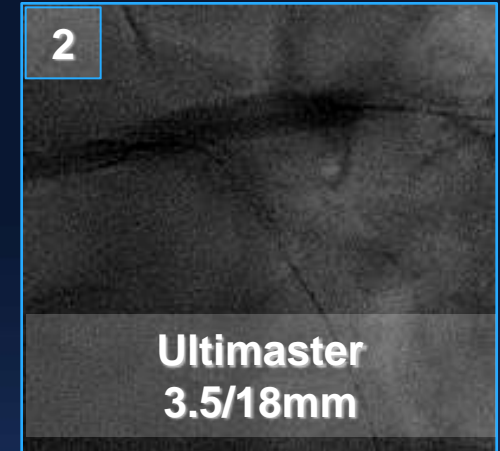
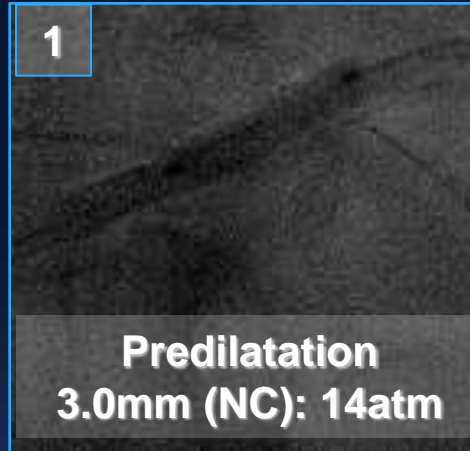
4
After POT
→ Re-crossing LAD

POT (Proximal Optimization Technique)

True Left Main bifurcation Culottes stenting



Systemic double stenting
(culottes stenting)



POT (Proximal Optimization Technique)

True Left Main bifurcation Culottes stenting



Excellent final results

POT (Proximal Optimization Technique)

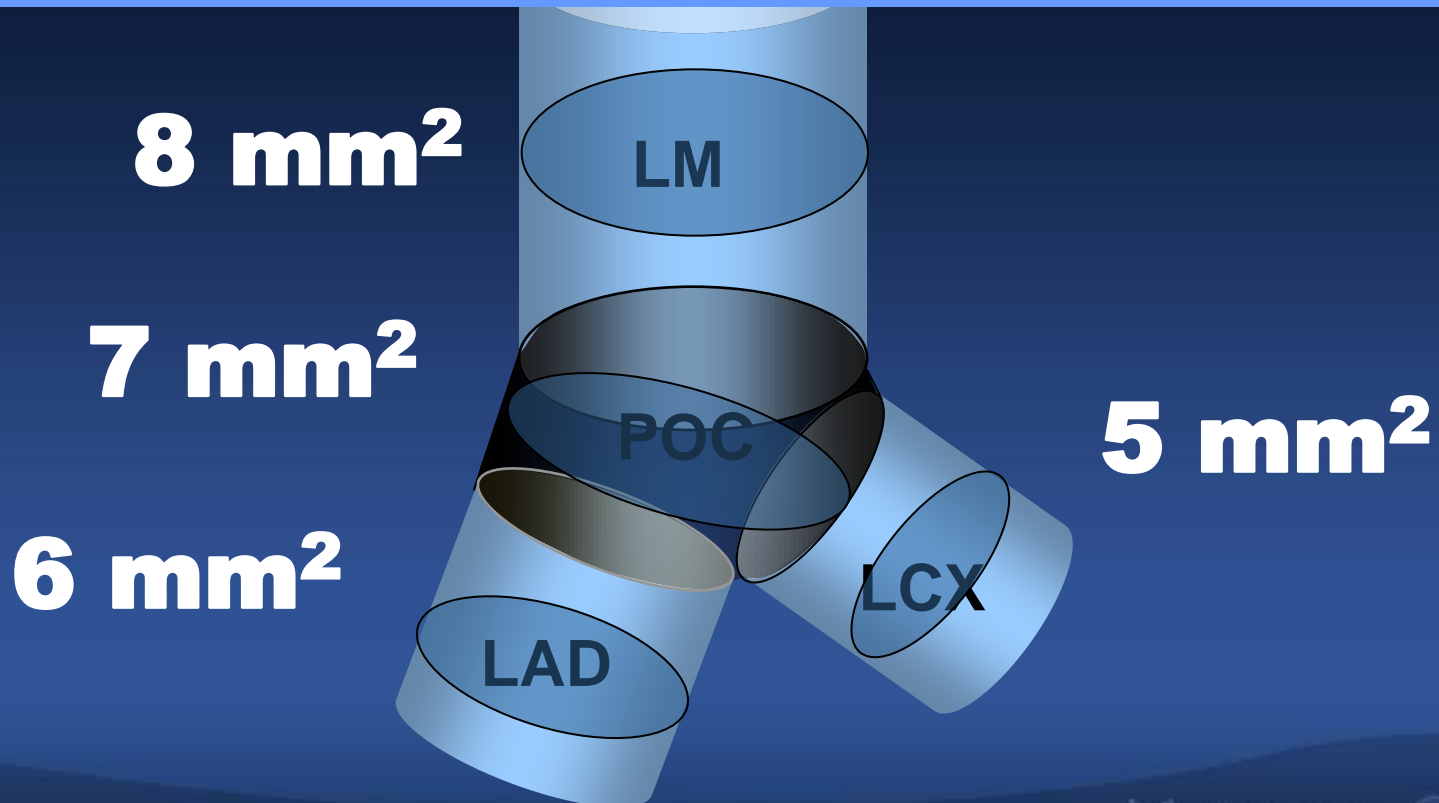
- Several recent bench models of bifurcations demonstrated that POT expanded the proximal segment of the stent symmetrically and opened the SB struts
- **However, the role of POT on stent expansion and SB hemodynamics in patients with complex bifurcation lesions has not been studied**
- **Randomized trials of POT vs. KBI are needed to show the impact of POT on clinical outcomes**

Top Ten Tricks for Bifurcation PCI

9. Keep-in-mind “5-6-7-8” rule for complex left main stenting

Effective Stent Area (Rule of 5,6,7,8 mm²)

Restenosis Rate < 5% and TLR < 2%



Top Ten Tricks for Bifurcation PCI

10. Concept is important rather than technique.

- Both strategy (1 or any 2 stent techniques) would be OK in the era of 2nd DES. Side branch treatment with FFR guided or FFR trained concept can make a good clinical outcomes.
- *Whatever you used 2 stent technique, IVUS optimization (effective stent area, 5.6.7.8 mm²) can make a good clinical outcomes.*

What Really Matters in Bifurcation PCI ?

Conceptual Key Message

*FFR Guided or FFR-Trained
Concept Is Crucial for Bifurcation PCI !*

*by the Status of MB rather than Angiographic
Appearance of the SB.*

What Really Matters in Bifurcation PCI ?

***It's a Matter of Concept
rather than Technique !***