How to Perform the Optimal Provisional Stenting in Non-LM Bifurcation?

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Disclosure

- None to disclose potential conflicts of interest

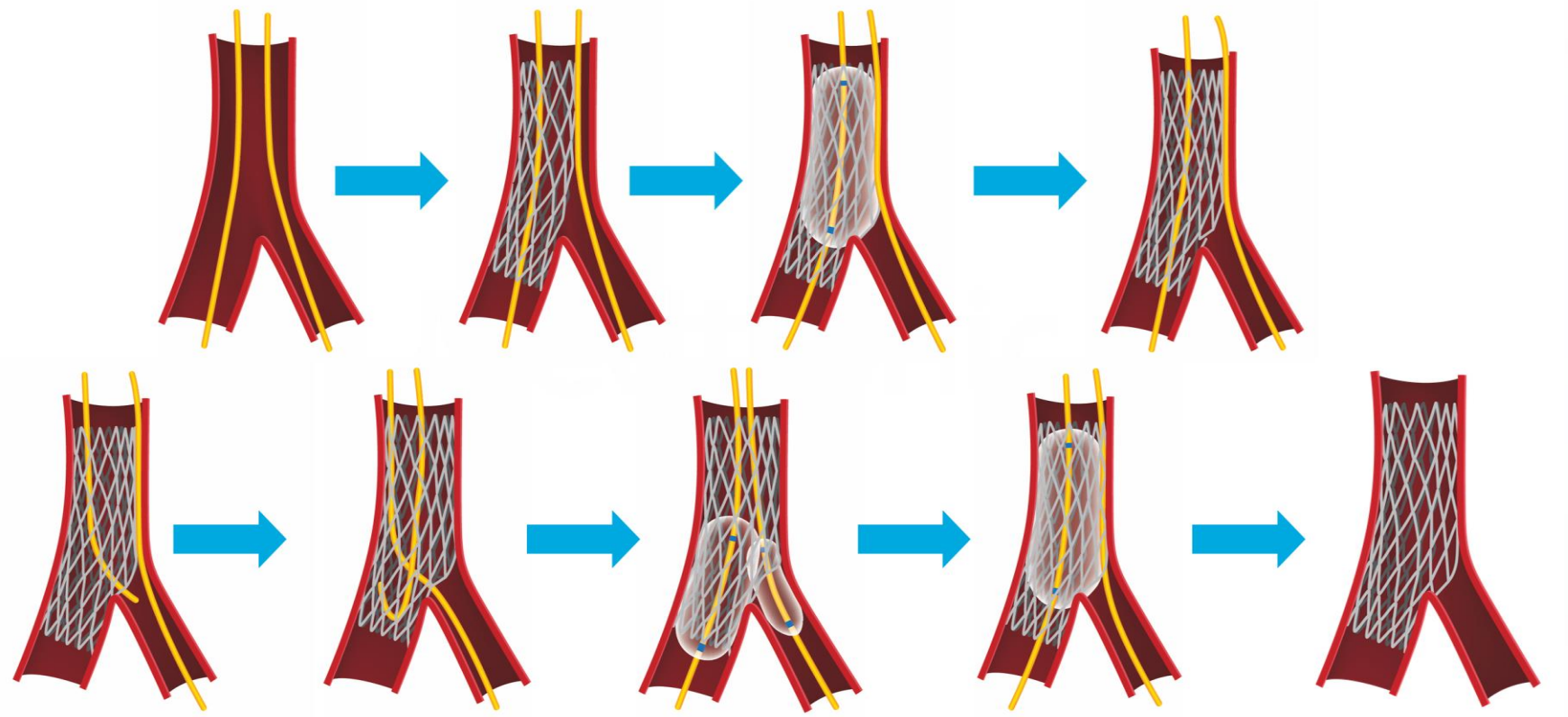
Provisional Approach for Non-LM Bifurcation Lesion

- Definition
  - Starting with stent implantation in one branch and implantation of a second stent in the other branch **only when required**
  - The adjustment of the procedure plan according to the CBL complexity

- Focus on
  - Optimal indication of SB treatment during provisional approach
  - Importance of Intravascular Imaging

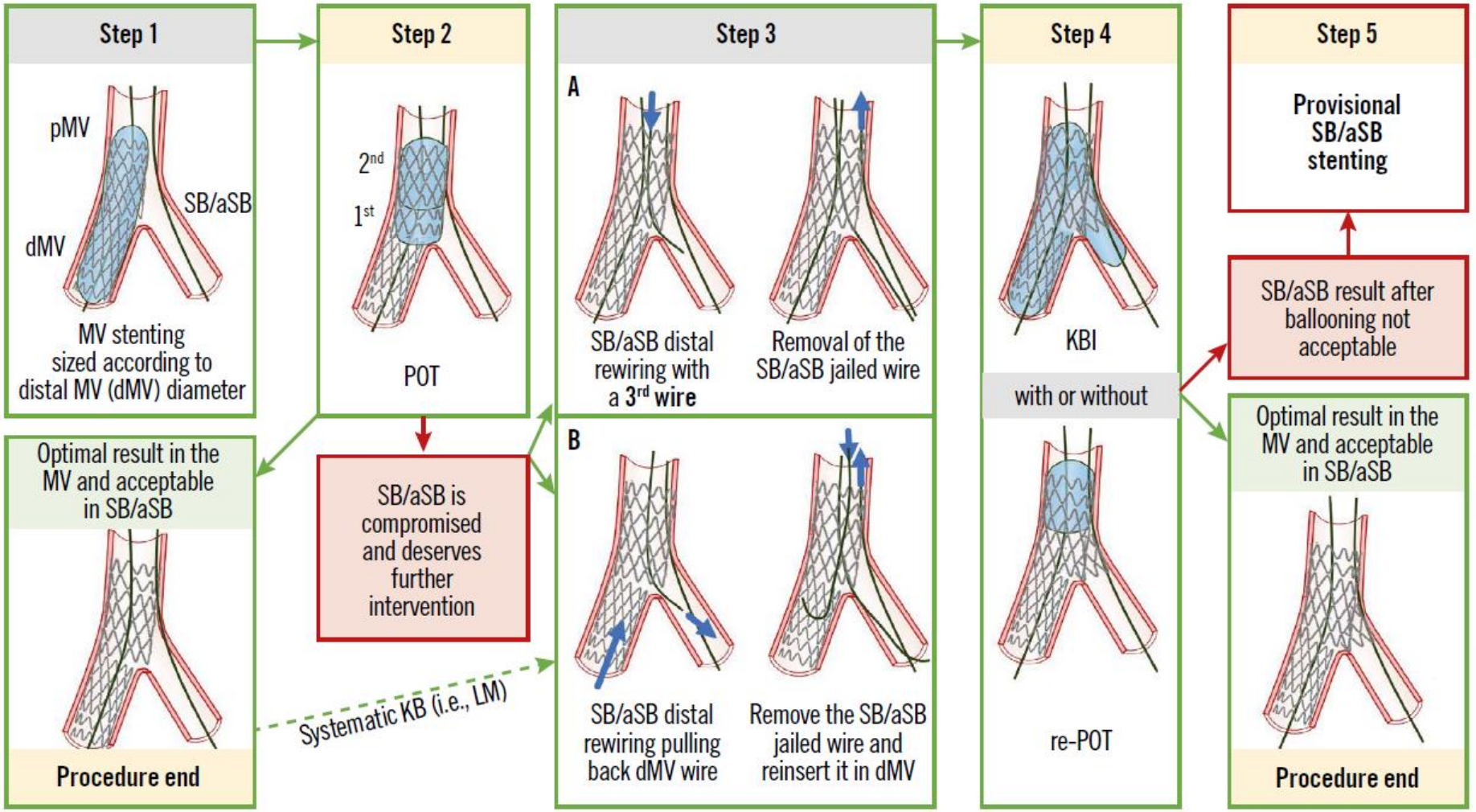
Provisional Approach for Most Bifurcation Lesion

Keep It Simple !!



Next Question is …

Optimal Indication of SB treatment during Provisional Approach



Remo Albiero et al, EuroIntervention 2022;18:e362-e376

Definitions of sub-optimal SB result during provisional stenting approach in recent study protocols

Assessment methodology	Sub-optimal side-branch result definition	Reference (doi)
Visual angiography	TIMI flow < 3	10.1161/CIRCULATIONAHA.106.664920 **NORDIC**
	TIMI flow <3 or DS> 75%	10.1136/openhrt-2018-000947 **Nordic-Baltic Bifurcation Study IV**
	DS>50% or dissection of type B or worse	10.1161/CIRCULATIONAHA.108.808402 **CACTUS**
	TIMI flow <3 or DS>70% or threatened SB closure, or dissection type >A	10.1161/CIRCULATIONAHA.109.888297 **BBC ONE**
	decreased TIMI flow or DS >50%, or dissection type >B	10.1016/j.jacc.2010.10.023 **DKCRUSH-II**
	TIMI< 3 (non-LM bifurcations)	10.1016/j.jcin.2015.11.037 **SMART-STRATEGY**
	DS >75% (non-LM bifurcations)	10.1016/j.jcin.2015.11.037 **SMART-STRATEGY**
	DS >75% (LM bifurcations)	10.1016/j.jcin.2015.11.037 **SMART-STRATEGY**
	DS>50% (LM bifurcations)	10.1016/j.jcin.2015.11.037 **SMART-STRATEGY**
	TIMI <3, DS >70%, or dissection type >A	10.1016/j.jcin.2014.12.221 **DKCRUSH-VI**
	TIMI flow <3 or DS>90% or threatened SB closure, or dissection type >A (LM bifurcations)	10.4244/EIJV12I1A8 **EBC MAIN** 10.1161/CIRCINTERVENTIONS.115.003643 **EBC TWO**
	TIMI flow <3 or DS >75% or dissection type >B	10.1016/j.jacc.2017.09.1066 **DKCRUSH-V**
3D-quantitative coronary analysis	SB lumen area <50 % of SB reference area	10.1002/ccd.23218 **SEASIDE**
Fractional flow reserve (FFR)	FFR <0.75	10.1093/eurheartj/ehn045 **SNU registry**
	FFR <0.80	10.1016/j.jcin.2014.12.221 **DKCRUSH-VI** 10.1016/j.jcin.2019.02.037 **Korean Multicenter Registry**
Instantaneous wave-free ratio (iFR)	iFR ≤ 0.89	10.1016/j.ihj.2018.01.028 **Saudi Arabian Multicenter Registry**
Optical Coherence Tomography	SB minimal diameter < 50 % of SB reference diameter	10.1016/j.ahj.2018.08.003 **OCTOBER**
Intracoronary ECG	ST-segment elevation >1 mm	10.4244/EIJ-D-17-00189 **FIESTA**

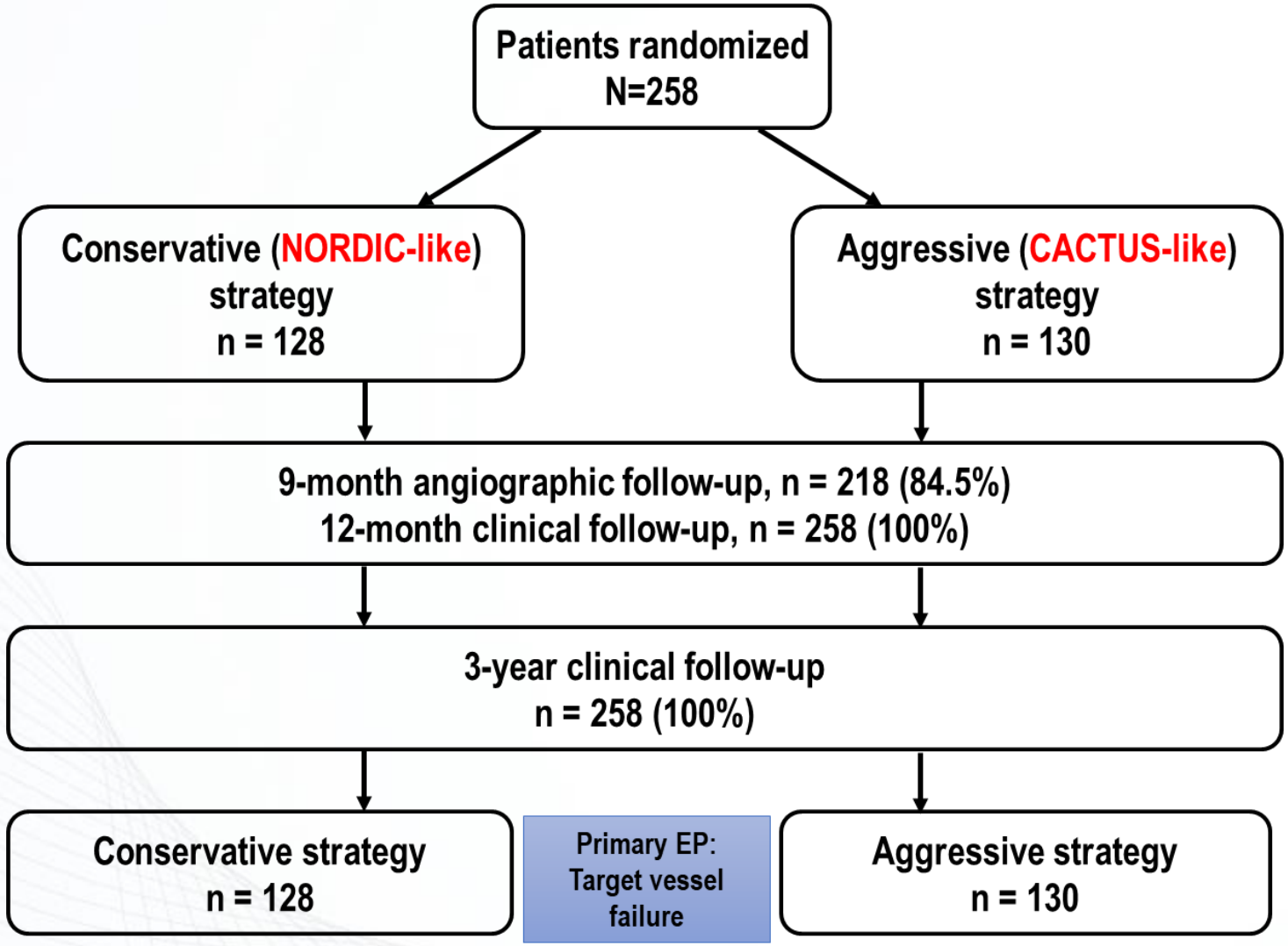
When to treat side branch?

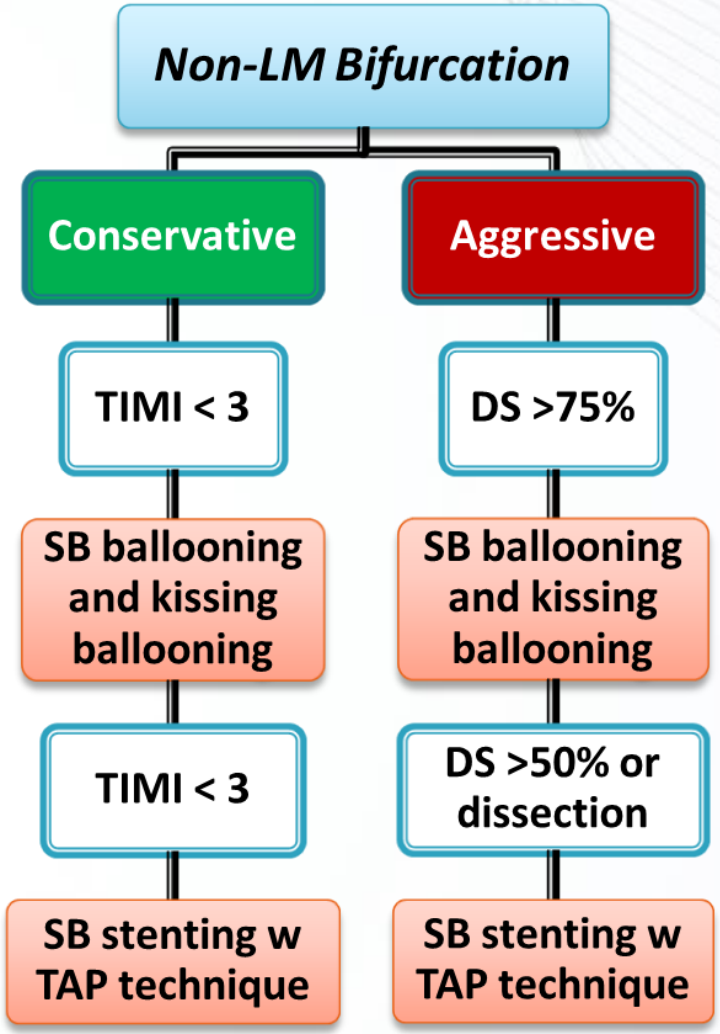
Rate of crossover to SB stenting is highly variable

		Indication of SB Stenting in 1-stent group	SB stenting % in 1-stent group
Non-Left Main Bifurcation lesion	DK-CRUSH II	Decreased TIMI flow or Residual stenosis >50%, or SB dissection > type B	28.6%
	CACTUS	TIMI < 3, Residual stenosis > 50% SB dissection > type B	31%
	NORDIC	TIMI 0 after ballooning	4.3%
	BBC-ONE	TIMI < 3, Residual stenosis > 70% Threatened SB closure, SB dissection > type A	1.4%
Left Main Bifurcation lesion	SMART-STRATEGY Conservative arm	TIMI flow <3 or DS >50% or SB dissection > type B	13%
	SMART-STRATEGY Aggressive arm	TIMI flow <3 or DS >30% or SB dissection > type B	36%
	DK-CRUSH V	TIMI flow <3 or DS >75% or dissection > type B	38%
	EBC-MAIN	TIMI flow <3 or DS>90% or threatened SB closure, or dissection > type A (LM bifurcations)	22%

Optimal indications for SB ballooning/stenting after MV stenting

SMART-STRATEGY Trial

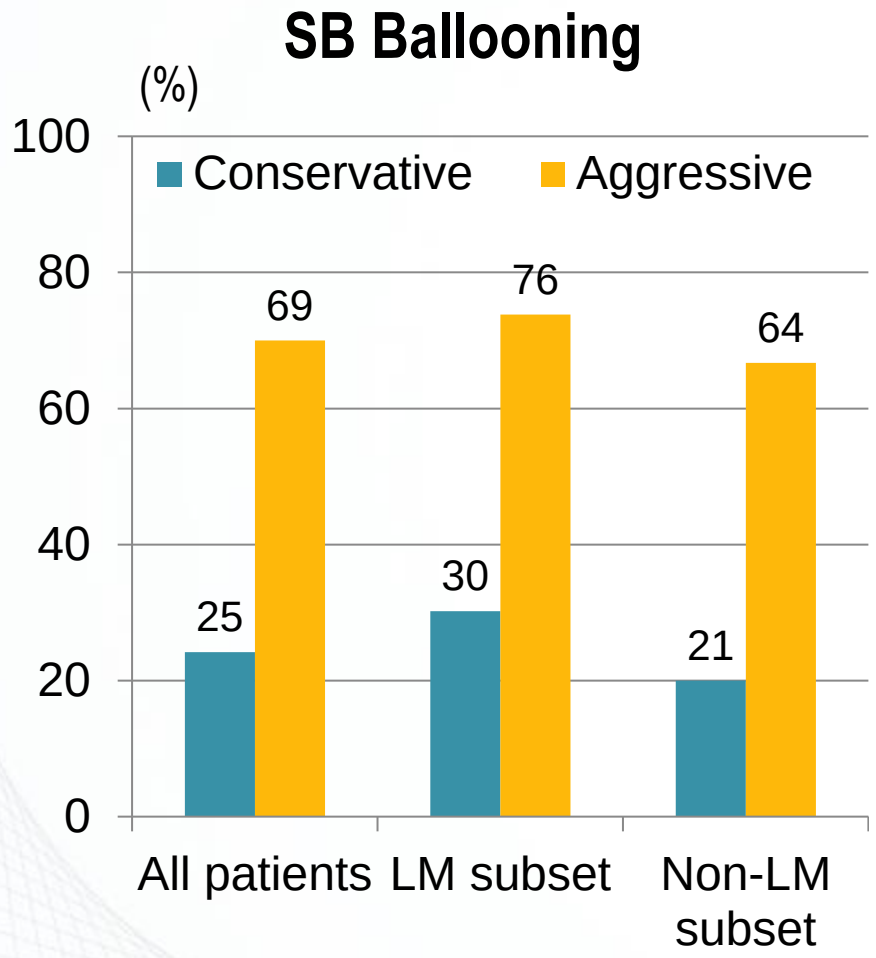


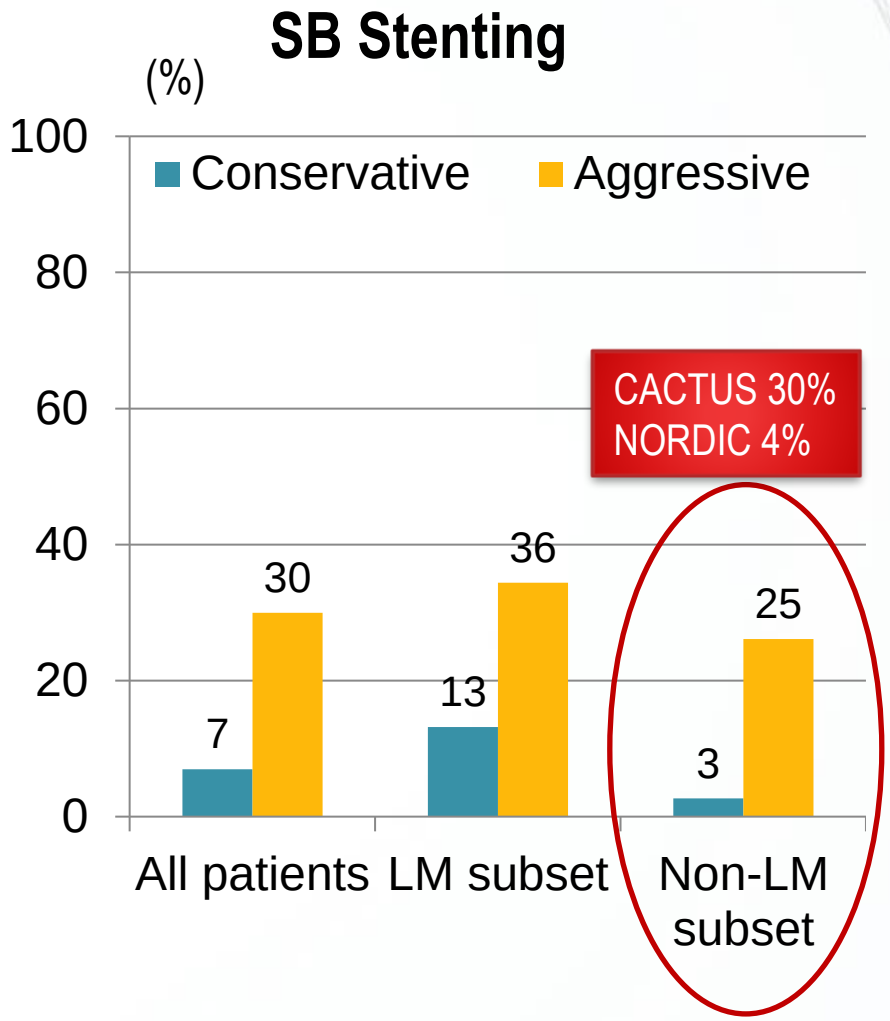


Song YB, Gwon HC, JACC CVI 2012

SMART-STRATEGY Trial

Side branch treatment



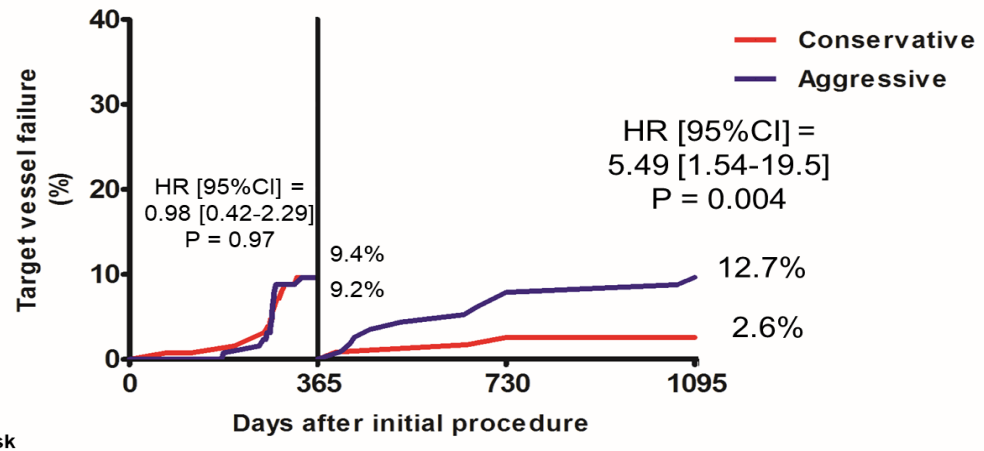


Song YB, Gwon HC, JACC CVI 2012

SMART-STRATEGY Trial

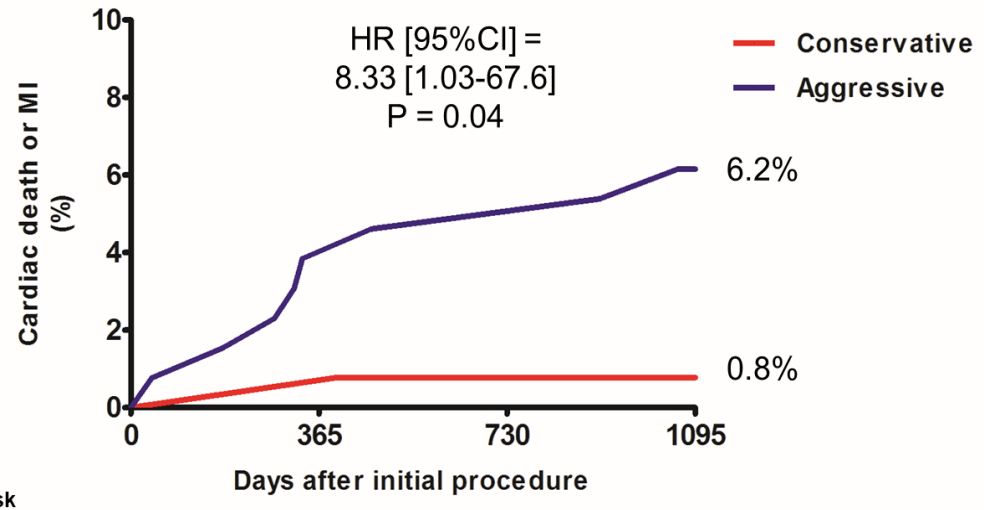
Conservative strategy for provisional SB intervention with long-term benefits for patients with a large bifurcation lesion.

TVF through 1 year and from 1 year through 3 years (landmark analysis)



Numbers at Risk				
Conservative Group	128	117	115	113
Aggressive Group	130	118	107	104

Cardiac death or MI through 3 years

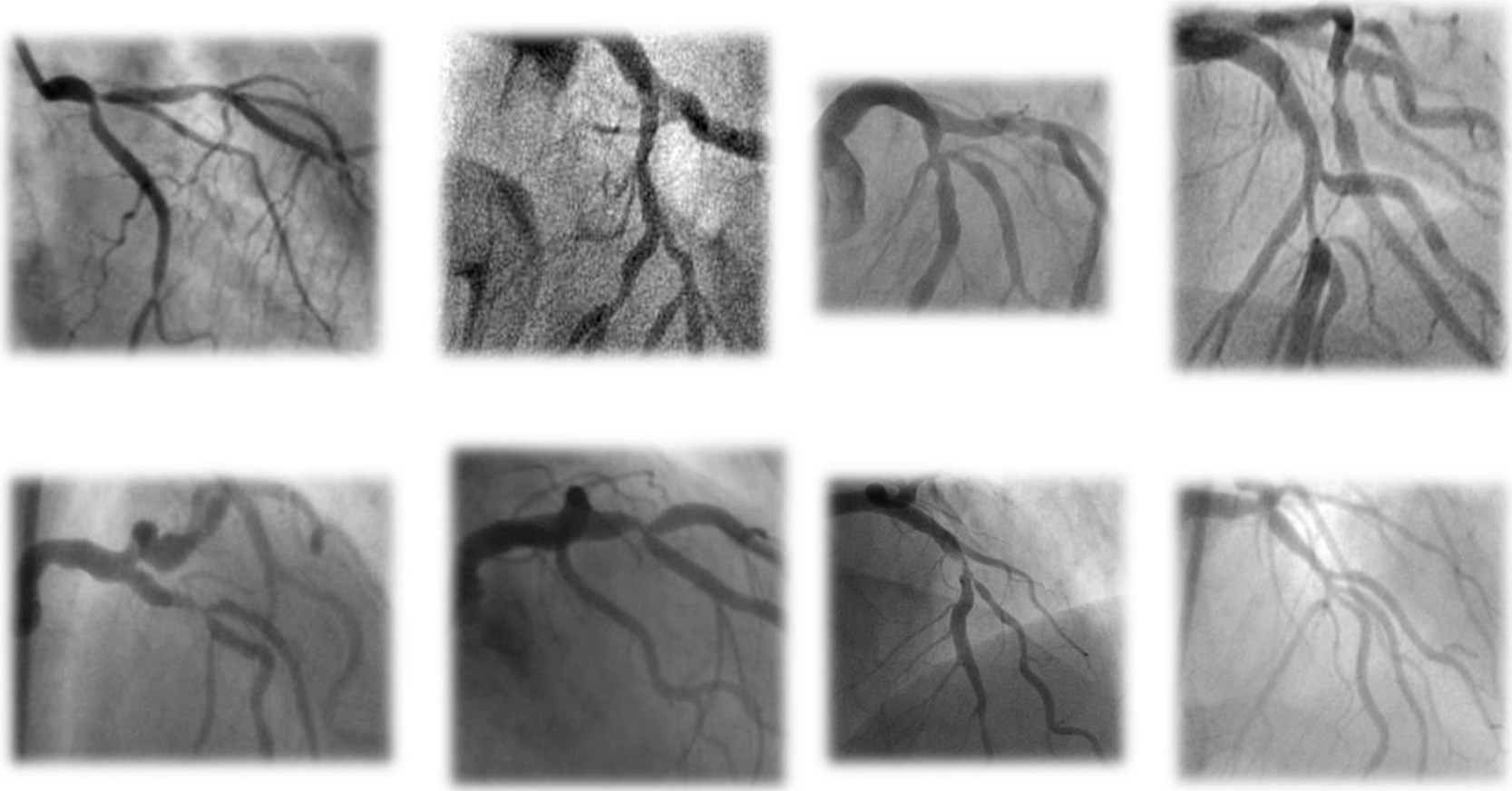


Numbers at Risk				
Conservative Group	128	127	127	127
Aggressive Group	130	126	125	122

Song YB, Gwon HC, JACC CVI 2012; Song YB, Gwon HC, JACC CVI 2016

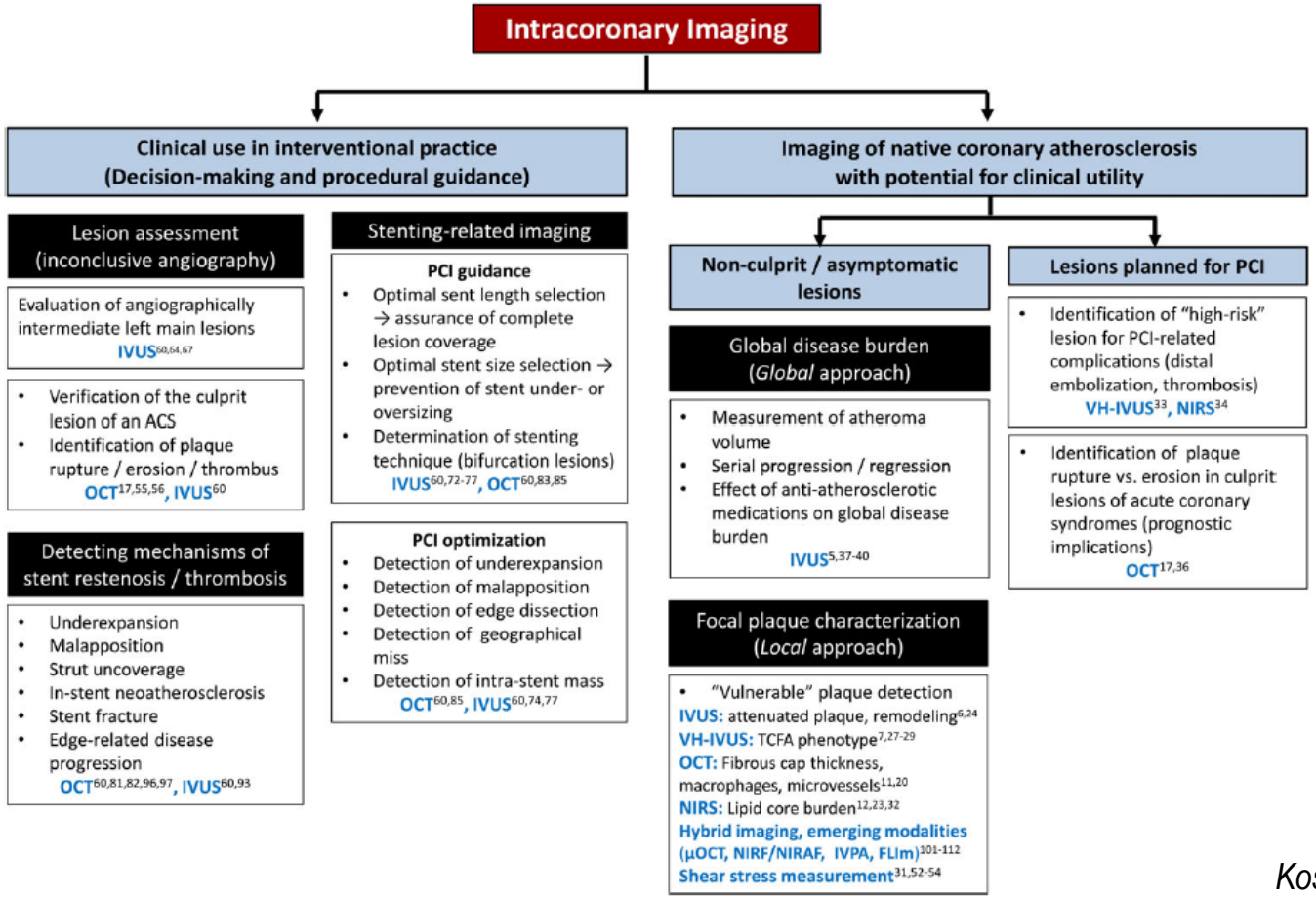
Limitation of angiographic assessment in Bifurcation lesions

Overlapping mother and daughter vessel
→ Obscure the lesion and carina



What can be guided by IVI (intravascular imaging)?

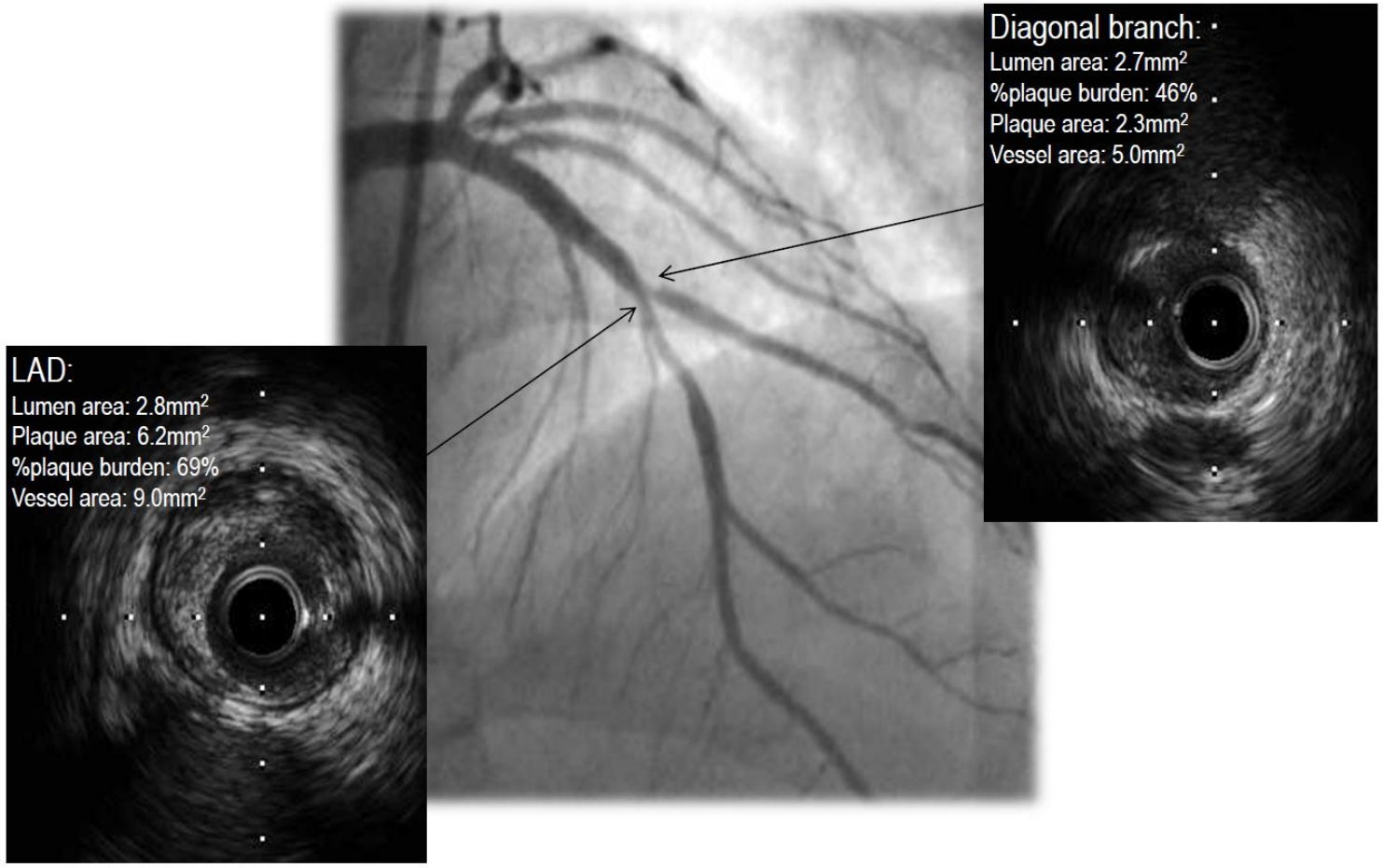
- **Key factors in bifurcation lesion treatment**
  - Determining anatomical configuration
  - Selecting Strategy
  - Assessing the final results



Koskinas, et al. Eur Heart J, 2016

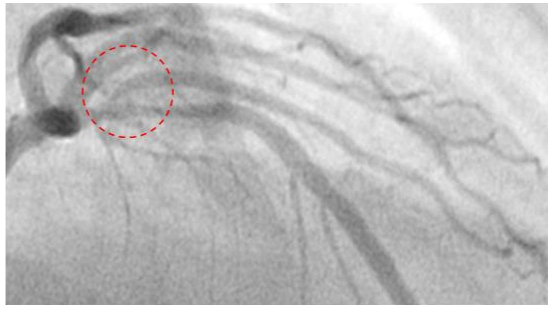
Pre-procedural IVUS assessment of the bifurcation lesion

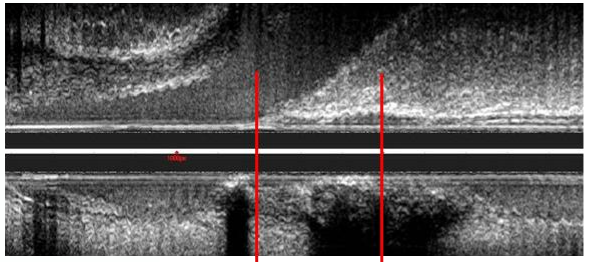
Precise anatomical lesion assessment

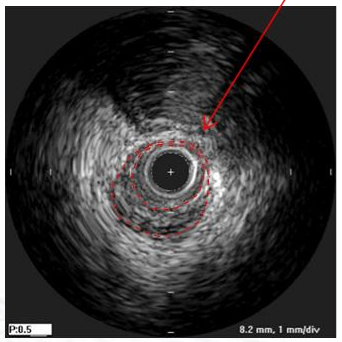


Pre-procedural IVUS assessment of the bifurcation lesion

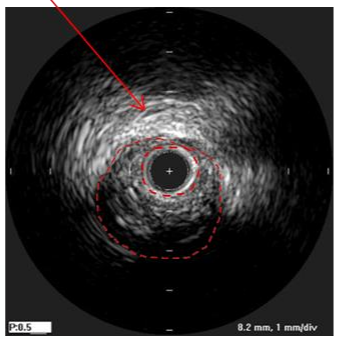
Mechanism of side branch stenosis



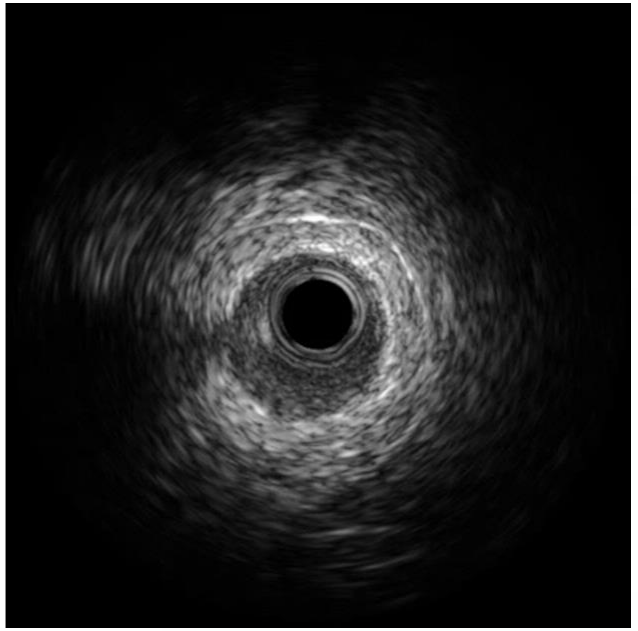




Plaque + Negative remodeling



Plaque

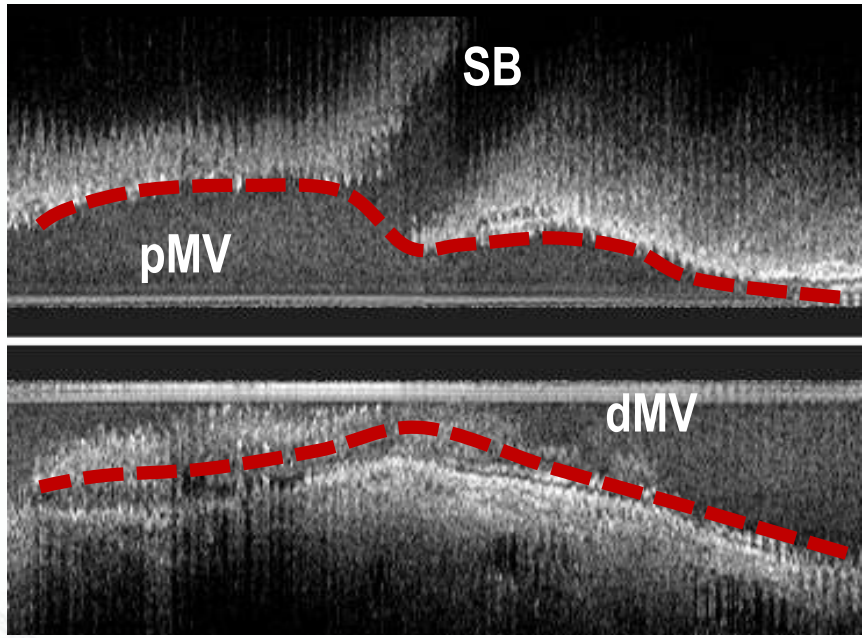


Procedural IVUS assessment

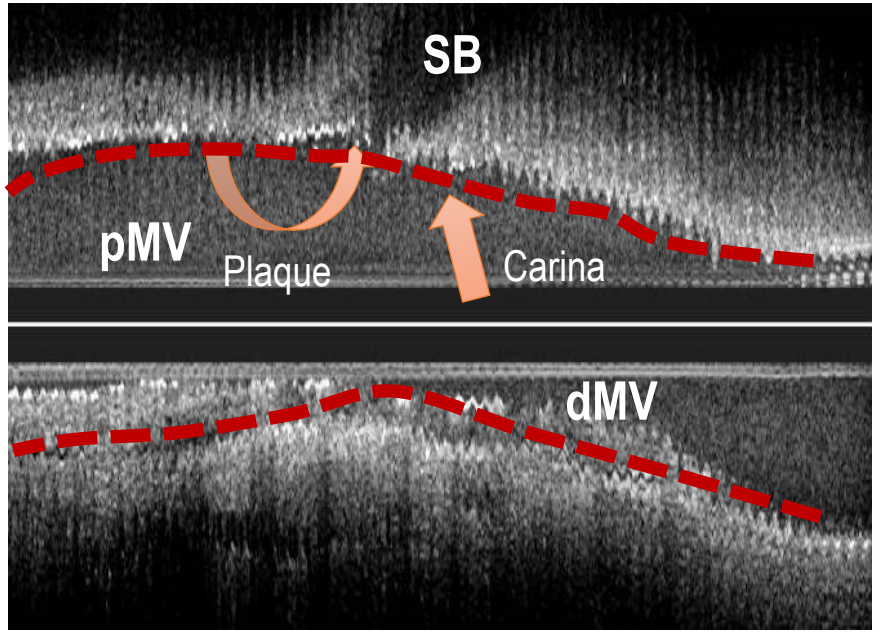
Mechanism of SB jailing

Simple stent cross-over is associated with
proximal stent under-sizing and distal stent over-sizing

Optimal stenting



Stent overexpansion

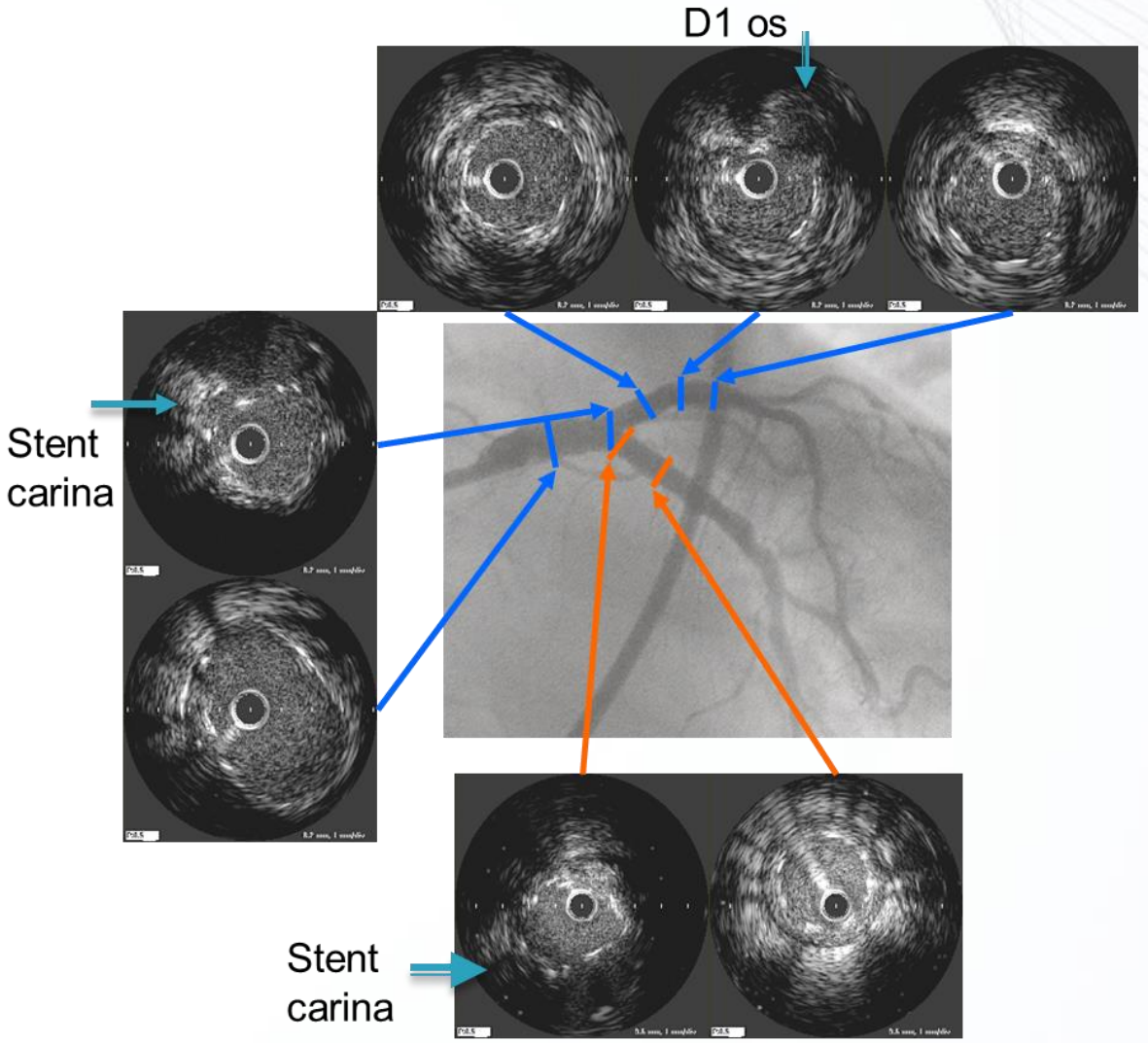


pMV = proximal main vessel, dMV = distal main vessel, main branch, SB = side branch

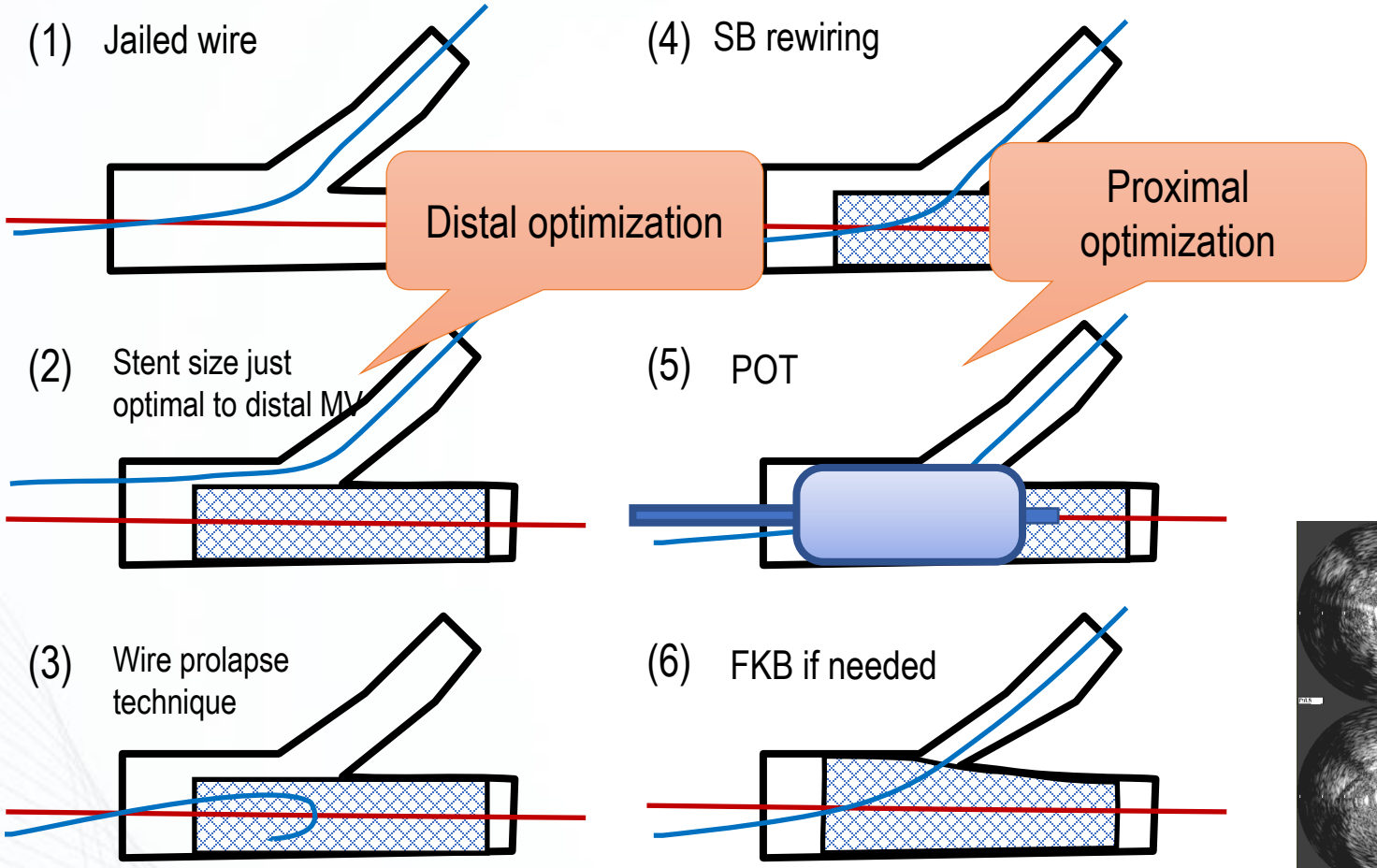
Images by the courtesy of Koo BK

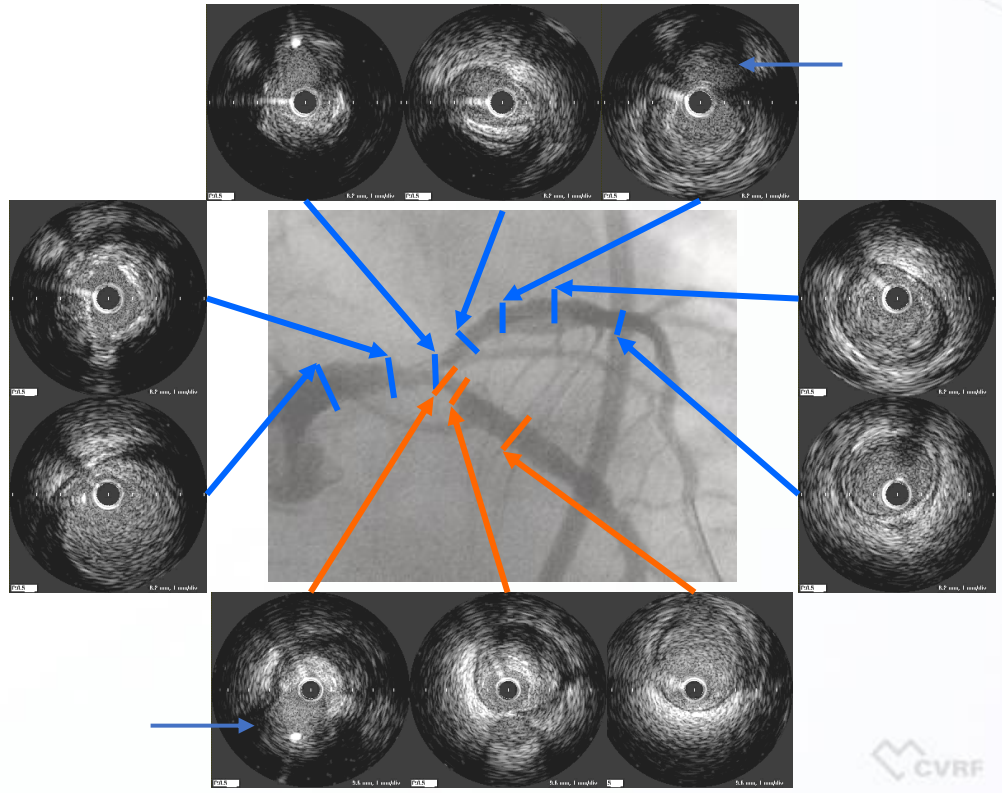
Post-procedural IVUS assessment of the bifurcation lesion

- Assessment and optimization of stent apposition and expansion
- Assessment of full lesion coverage by the stent
- Diagnosis and treatment of stent edge problems



Technical tips to avoid SB compromise using IVI





Concept by the courtesy of Gwon HC

Conclusion

- Most of the non-LM bifurcation lesions can be effectively treated with a **provisional conservative strategy.**
- **Intravascular imaging** provides a precise characterization of the extension and morphology of bifurcation lesions.

  → Allows a proper planification of the PCI strategy including selection of stent size.

  → Facilitates the final optimization of the PCI results.

Thank you for your attention.