

Provisional Stenting First? Step by Step

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“...me verás volar por la ciudad de la furia, donde nadie sabe de mí, y yo soy parte de todos....”

Soda Stereo Doble Vida 1989



SODA
STEREO



DOBLE VIDA

Table 1: Randomized Controlled Trials of Predominantly Non-left Main Bifurcation Treatment Strategies

Trial and Sample Size	Comparison Arms	Non-LM Bifurcations in Study (%)	Predominant Two-stent Strategy	Primary Endpoint	Main Result
NORDIC I 2006 ²¹ n=413	Provisional versus two-stent	98%	50% crush 21% culotte	MACE: cardiac death, non-procedural MI, TVR, or stent thrombosis	No differences in 6-month MACE (2.9% versus 3.4% in provisional versus two-stent strategies; p=not significant)
BBK I 2008 ^{23,24} n=202	Routine T stenting versus provisional T stenting plus routine KBI	100%	100% T-stenting	Percent diameter stenosis of SB at 9-month angiographic follow-up	No difference in cumulative frequency of SB percent diameter stenosis at 9 months (9.4% versus 12.5%) No difference in 1-year MACE (12.9% versus 11.9%; p=0.83) or 5-year MACE (22.8% versus 22.9%; p=0.91)
CACTUS 2009 ²⁵ n=350	Provisional T versus classic crush (with KBI)	100%	100% crush	Angiographic endpoint: in-segment restenosis rate. Clinical endpoint: MACE (cardiac death, MI or TVR) at 6 months.	No differences in angiographic restenosis rates No differences in 6-month MACE (15% versus 15.8%; p=0.95)
BBC ONE 2010 ²⁶ n=500	Provisional (with optional KBI) versus two-stent (crush/culotte and mandatory KBI)	100%	68% crush 30% culotte	Composite of death, MI, and TVF at 9 months	Reduced 9-month composite of death, MI, and TLF with PS versus two-stent strategy (8% versus 15.2%; HR 2.02; 95% CI [1.17–3.47]; p=0.009)
EBC TWO 2016 ²⁸ n=200	Provisional T-stenting versus culotte for large true CBL	100%	100% culotte	Composite of death, MI, and TVR at 12 months	No difference in MACE between provisional and culotte (7.7% versus 10.3%; HR 1.02; 95% CI [0.78–1.34]; p=0.53)
NORDIC-BALTIC IV 2011 ⁹ n=404	Provisional versus two-stent in complex true CBL	98%	100% culotte	Composite of cardiac death, non-procedural MI, and TLR at 6 months	No difference in 6-month MACE (5.5% versus 2.2%) No difference in 2-year MACE (12.9% versus 8.4%; HR 0.63; p=0.12) for PS versus two-stent strategy.
DK CRUSH II 2011 ³⁰ n=370	Provisional versus DK crush in complex true CBL	83.2%	100% DK crush	MACE at 12 months: cardiac death, MI, or TVR	No significant differences in 1-year MACE (17.3% versus 10%; p=0.070) for PS versus DK crush Significantly lower 5-year MACE with DK crush (23.8% versus 15.7%; p=0.051).

De 7 estudios PS vs 2 stents:

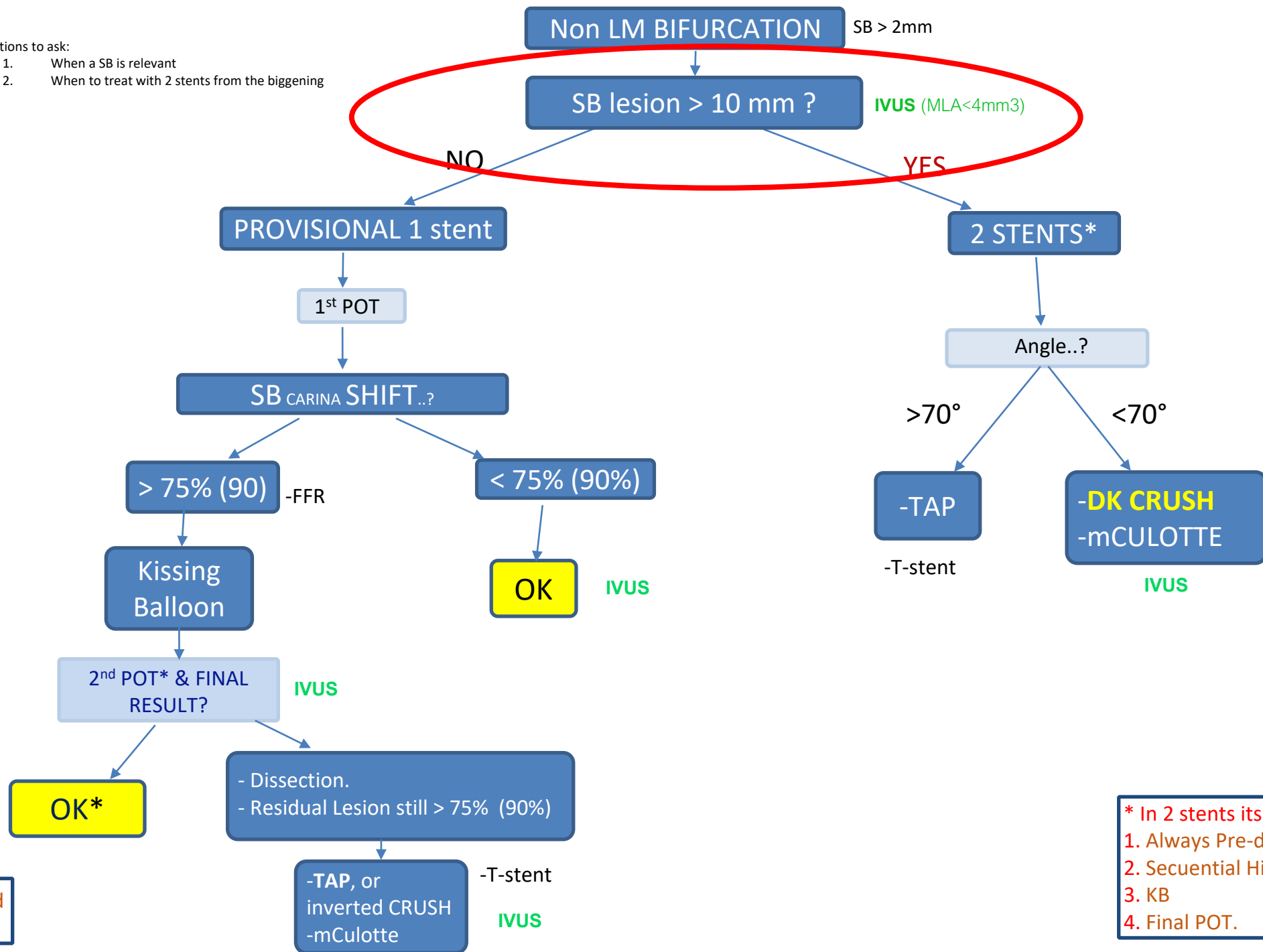
- A Favor provisional: BBC ONE
- Contra: DK-CRUSH II
- 5 estudios: No Diferencia

2 key questions to ask:

1. When a SB is relevant
2. When to treat with 2 stents from the biggingen

s i m p l e

c o m p l e x



*Mandatory 2nd POT .!!!

*** In 2 stents its Mandatory:**

1. Always Pre-dilate.
2. Secuential High Preasure Dilat.
3. KB
4. Final POT.

Provisional Pre-planning:

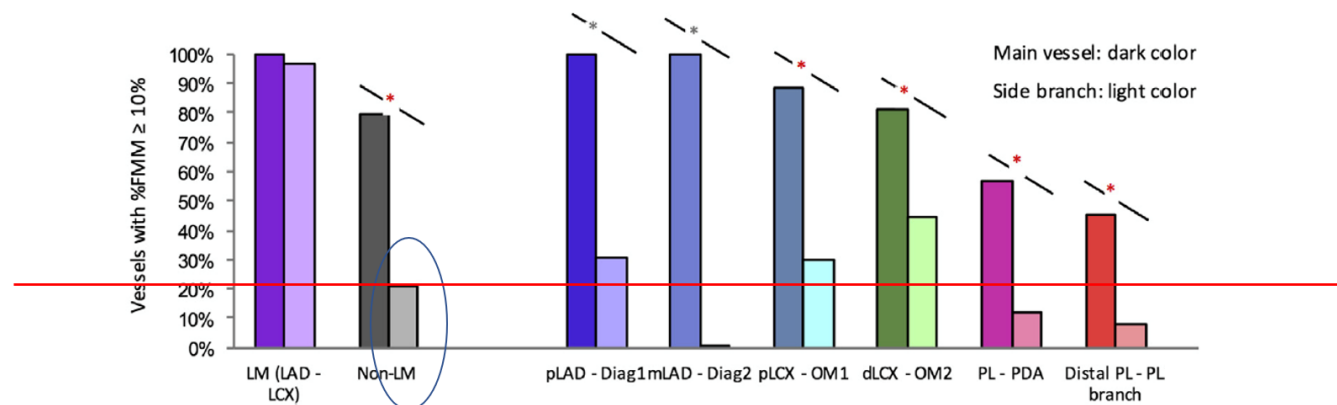
Preguntas Claves antes de hacer una Bifurcacion No-LM.

- Que tan relevante es la SB.?
- Es Simple o Compleja..?
 - Long de la lesion en SB > 10mm

Relevancia de la Rama:

- Solo el 20% de las bifurcaciones Non-LM son relevantes clínicamente.

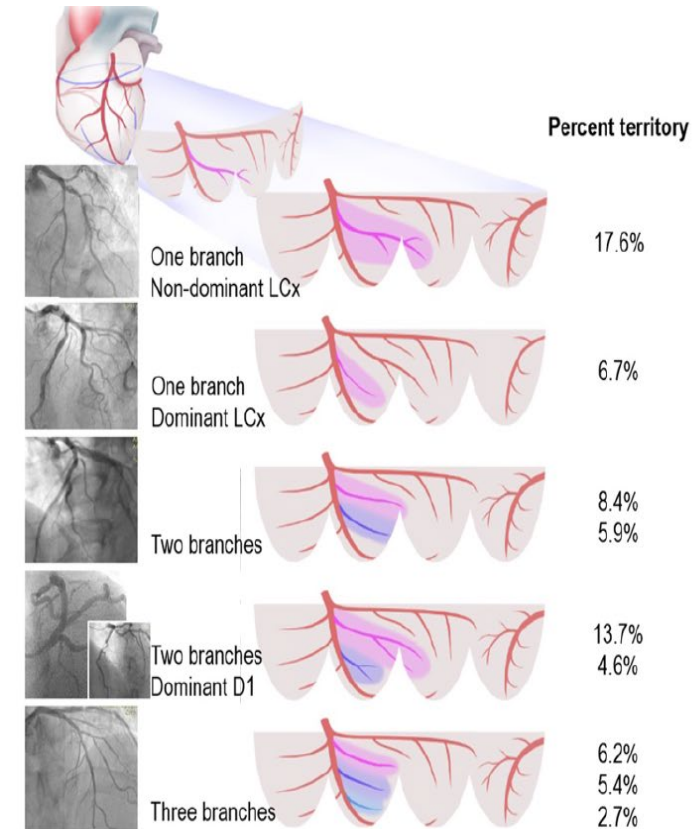
SB no siguen un comportamiento jerárquico!



Non Left Main: solo 21% con FMM > 10%

When a SB is Relevant..??

- When supplies > 10% Fractional Myocardial mass (FMM).
 - Length > 73 mm.
 - Vessel Diameter > 2,5
 - ≤ 2 SB in the territory
 - No branches below the target SB



Myocardial territory of a diagonal branch is determined by LCx dominance, number of branches and dominance among branches

..Si la SB es relevante:

Que tan probable es que se ocluya.?

- Variables COBIS II: - Lesion > 50% SB, Lesion MV proximal > 50%, Lesion larga en SB, Trombo
- Variables RESOLVE:

TABLE 4 Scores Attributed to Each Variable

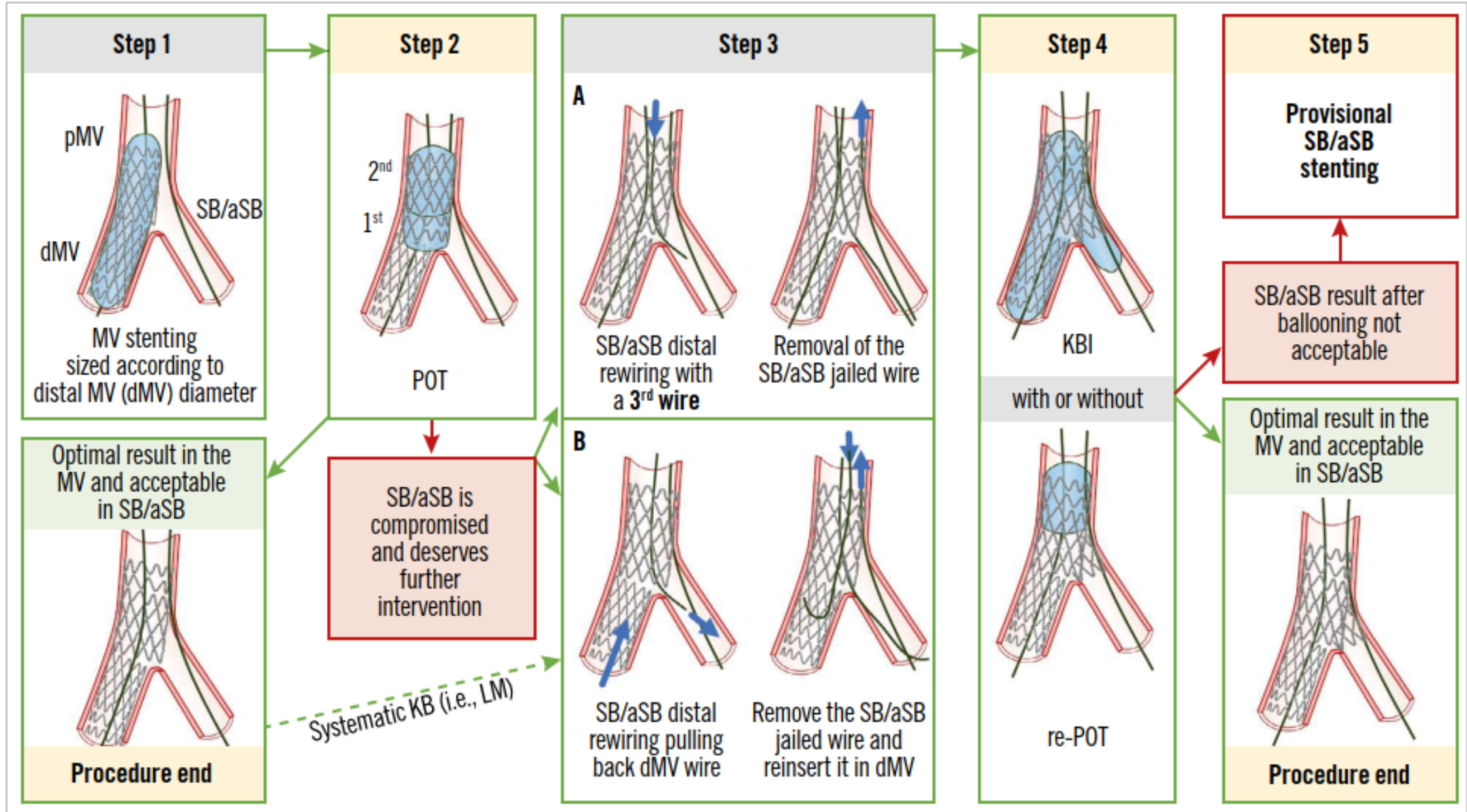
Risk Factor	Level	Point
Plaque distribution	At the opposite side of SB	0
	At the same side of SB	1
MV TIMI flow grade before stenting	TIMI 3	0
	TIMI 2	6
	TIMI 1	11
	TIMI 0	17
Pre-procedural diameter stenosis of bifurcation core (%)	<50	0
	50-<70	2
	≥70	3
Bifurcation angle (°)	<70	0
	70-<90	4
	≥90	6
Diameter ratio between MV/SB	<1.0	0
	1.0-<1.5	2
	1.5-<2.0	6
	≥2.0	9
Diameter stenosis of SB before MV stenting (%)	<50	0
	50-<70	4
	70-<90	6
	≥90	7

Abbreviations as in [Table 2](#).

* RESOLVE score system (Risk prEdiction of Side branch OccLusion in coronary bifurcation interVEntion).. JACC Cardiovasc Interv. 2015 Jan;8(1 Pt A):39-46. doi: 10.1016/j.jcin.2014.08.011. PMID: 25616815.

* Predictors and outcomes of side branch occlusion after main vessel stenting in coronary bifurcation lesions: results from the COBIS II Registry (COronary Bifurcation Stenting). J Am Coll Cardiol. 2013 Oct 29;62(18):1654-1659. doi: 10.1016/j.jacc.2013.07.041

Paso a paso...



Antes de Pensar hacer una bifurcacion PS...

Se debe utilizar guia encarcelada?

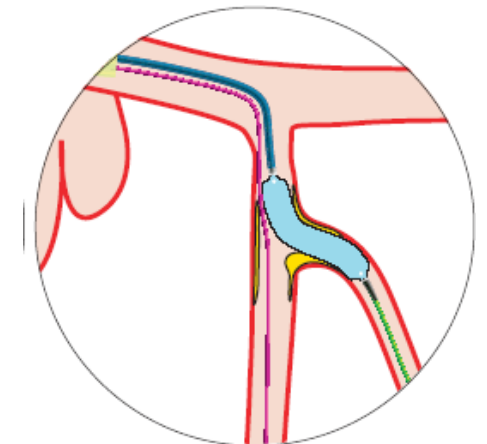
- Si

1. Modifica favorablemente el angulo entre ambas ramas
2. Mantiene la rama abierta
3. Es un buen marcador para la SB.

Como hacer la estrategia Provisional

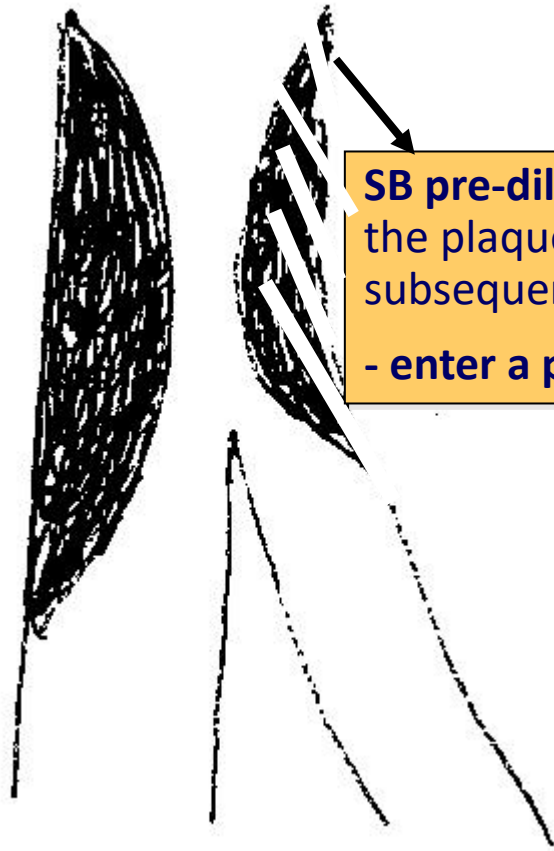
Debemos predilatar la SB?

- No
- Unicamente cuando la SB tenga lesion de $>$ de 10 mms.
- No hacer predilatacion con kissing balloon de Rutina
- Solo alguna excepciones: lesiones en SB muy severas, angulaciones muy extremas, trombo.



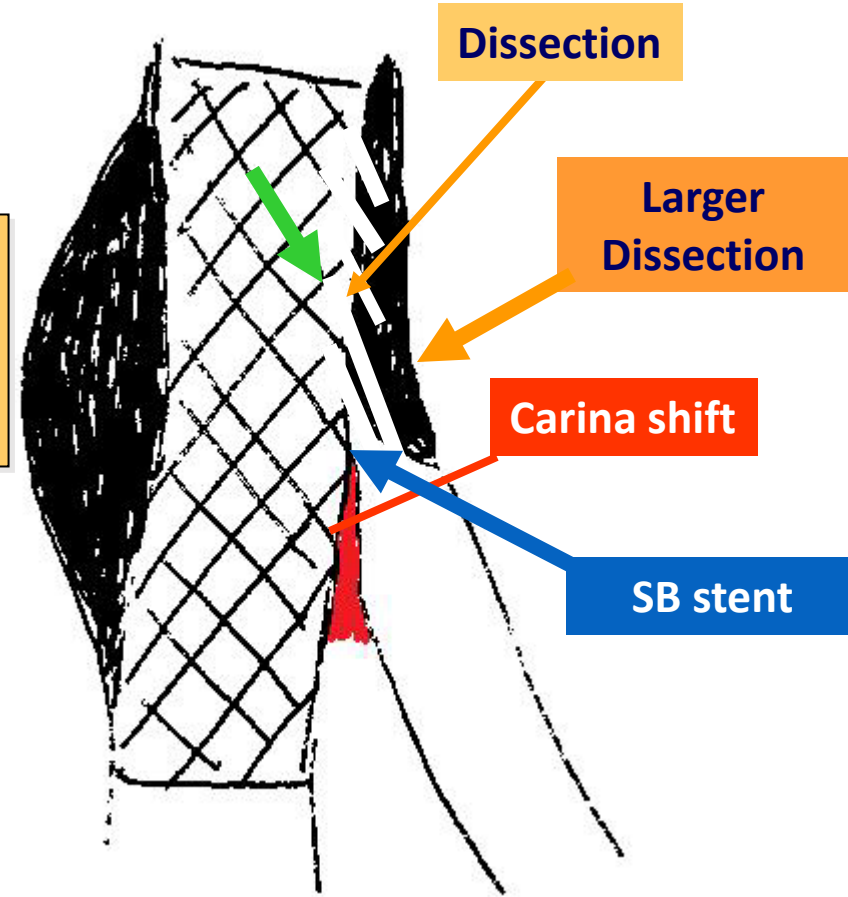
Porque NO predilatar (< de 10 mms de SB)

Pre-dilatation->Dissection



Pre

SB pre-dilation will dissect the plaque creating the subsequent possibility to:
- enter a proximal strut

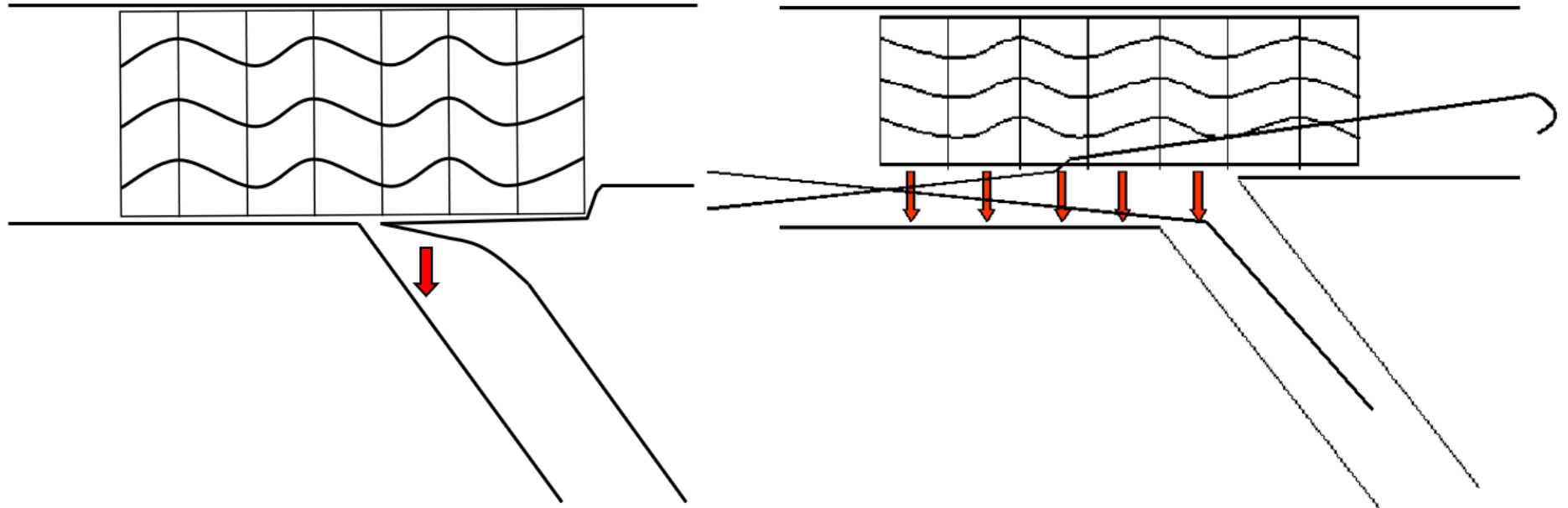
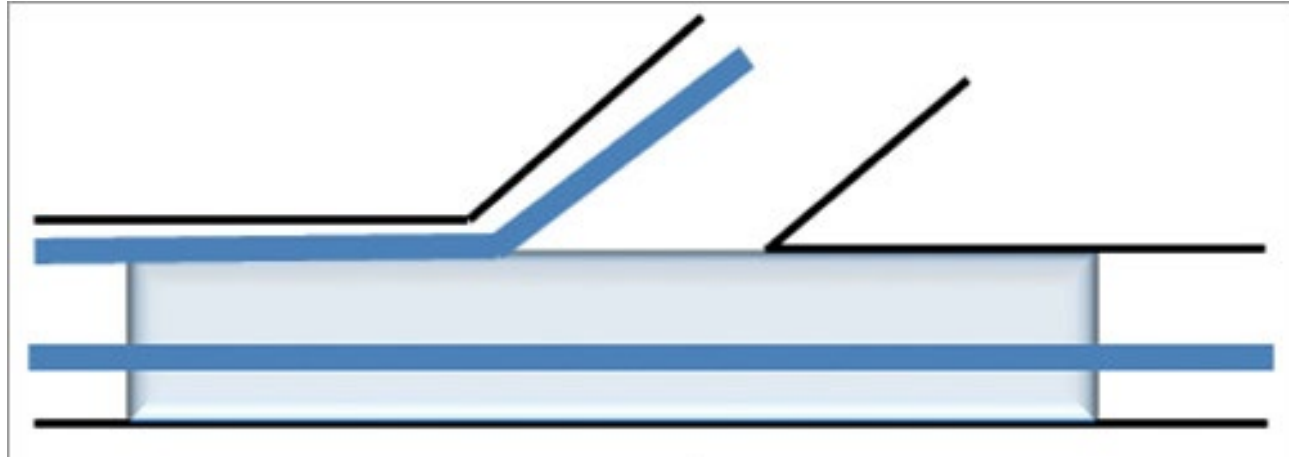


Post MB stenting

Stent sizing

Concepto de los 3 diametros:

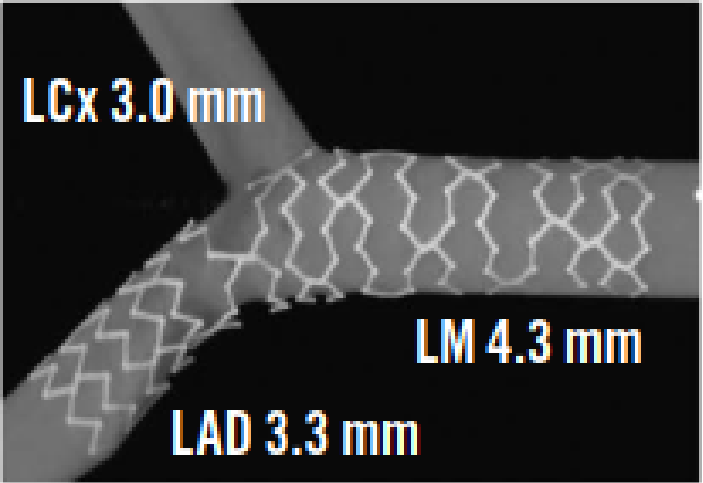
- MVd debe ser el diametro que dicta la escogencia del stent.
- Respetar la anatomia fractal.



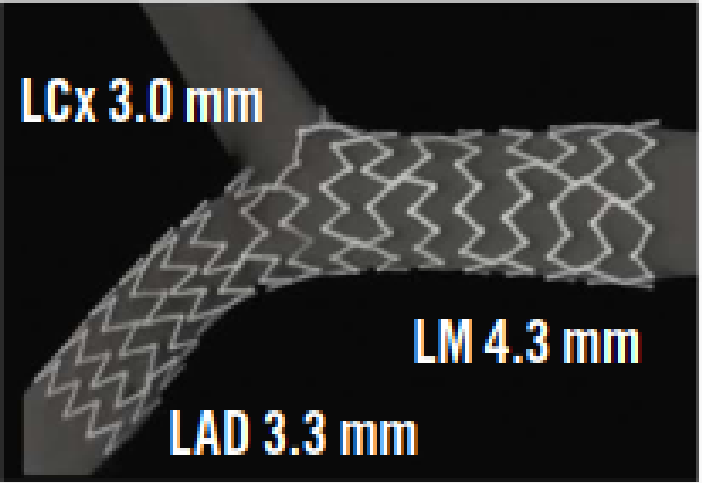
Excepciones:
Mismatch importante.

DES Type	Nominal Diameters	Maximal Expansion According to Manufacturer
Xcience Skypoint	2.0-3.25 mm	3.75 mm
	3.5-5 mm	5.75 mm
Resolute Onyx	2.0-2.5 mm	3.25 mm
	2.75-3 mm	3.75 mm
	3.5-4 mm	4.75 mm
	4.5-5 mm	5.75 mm
Onyx Frontier	2.0-2.5 mm	3 mm
	2.75-3 mm	4 mm
	3.5-4 mm	5 mm
	4.5-5 mm	6 mm
Synergy	2.25-2.75 mm	3.5 mm
	3-3.5 mm	4.25 mm
	4-5 mm	5.75 mm
Megatron	3.5-5 mm	6 mm
Ultimaster Tansei	2.25-3 mm	4.5 mm
	3.5-4 mm	5.5 mm label (5.8 mm)
Ultimaster Nagomi	2-2.5 mm	3.5 mm
	2.75-3 mm	4.5 mm
	3.5-4.5 mm	6.25 mm
Orsiro	3.5-3.75 mm	4.5 mm

Pt-Cr stent: 3.5 mm

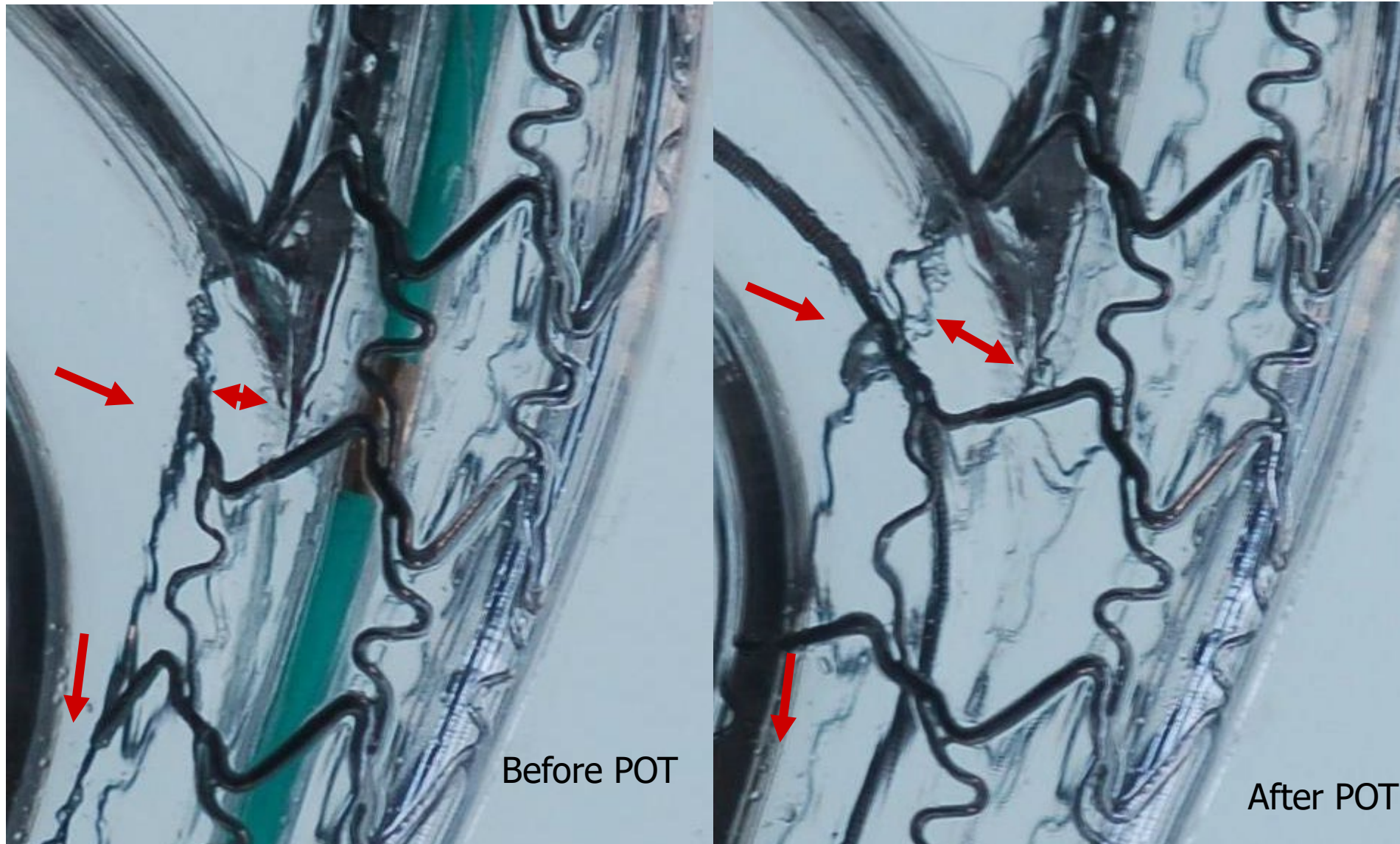


Pt-Cr stent: 4.0 mm



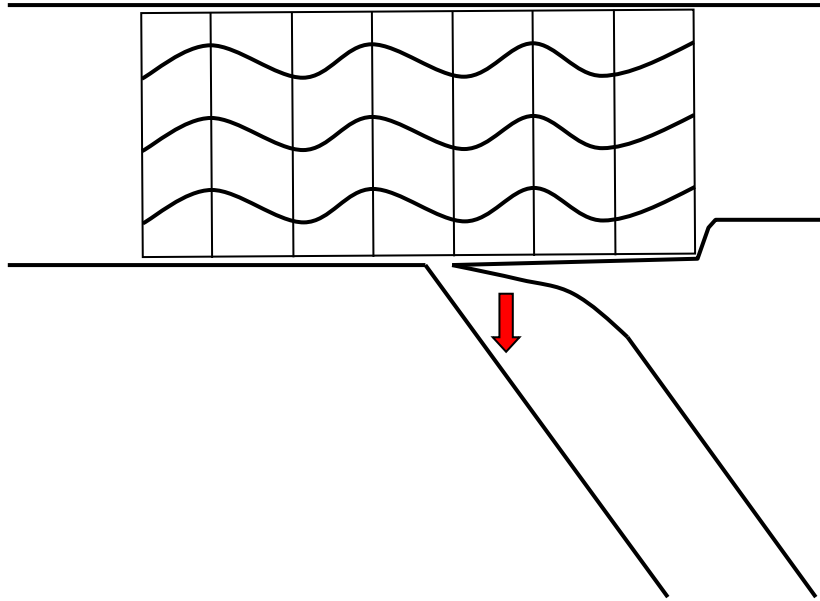
POT: Porque es importante.?

La Técnica de POT

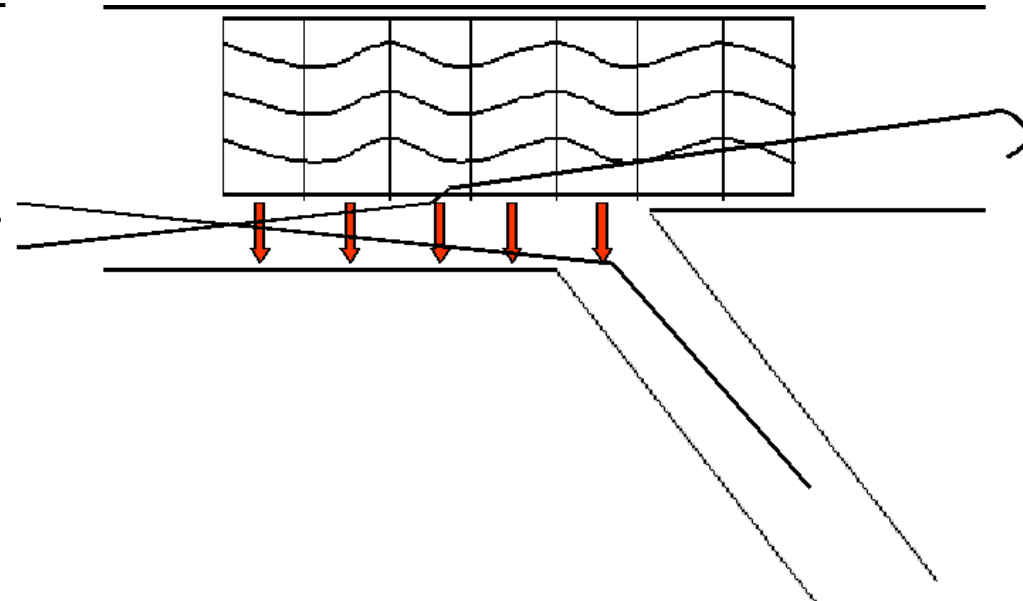


Courtesy of Olivier Darremont

POT ayuda cuando hay dificultad recruzando la SB con la guía.



El stent de la MV debe ser escogido de acuerdo al diametro del MV distal.



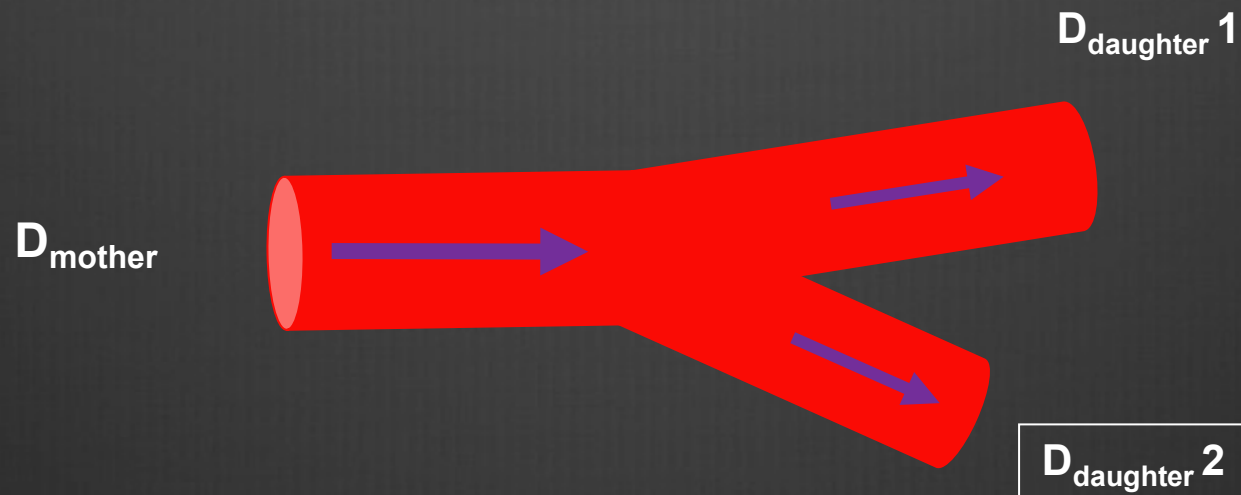
La Postdilatación (POT) son mandatorias para optimizar el diametro proximal del stent.

Como calcular el tamaño del Balón del MV para hacer el POT...?

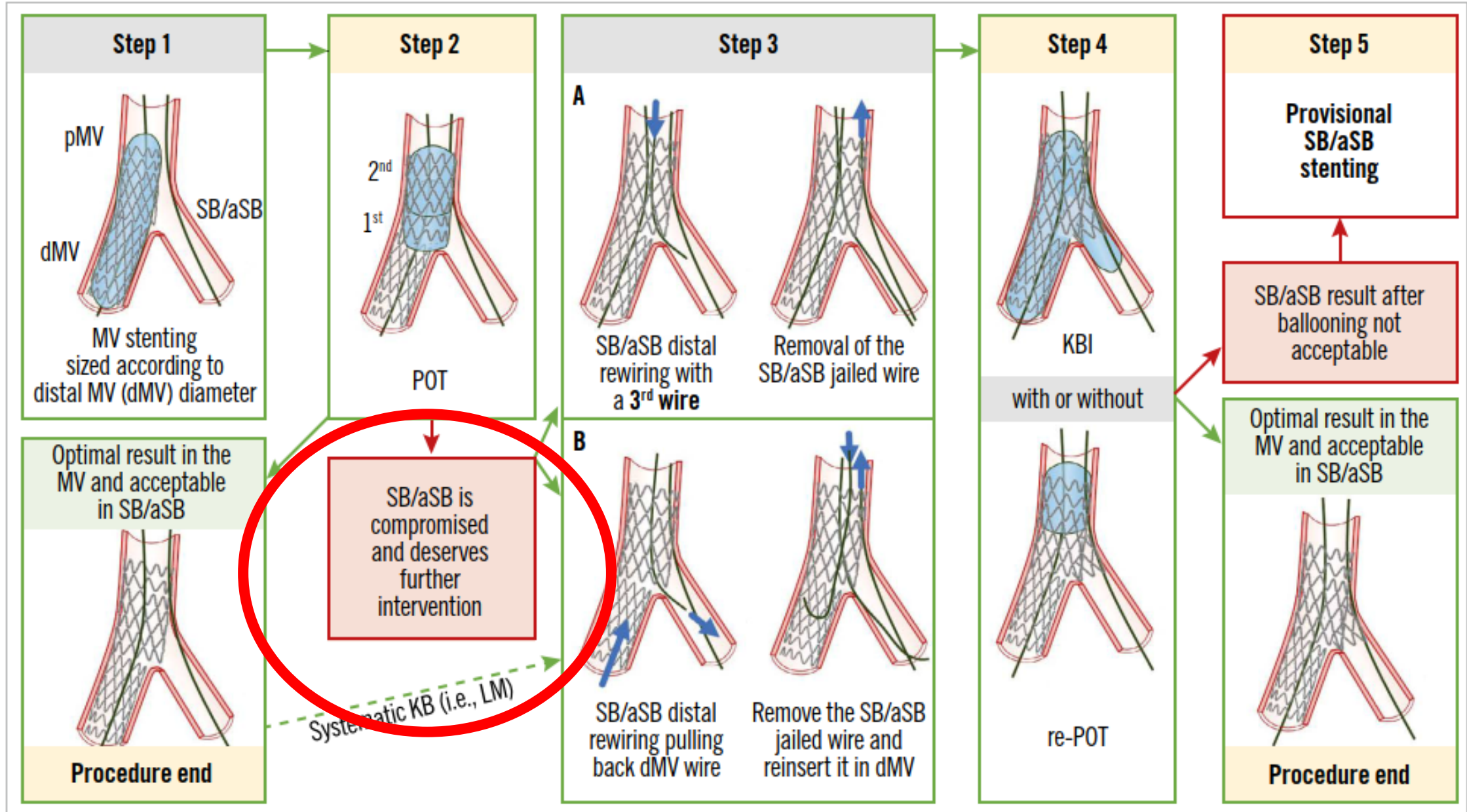
- Hay 4 maneras:
 - La Ley de Finnet-Murray
 - La Tabla de Huo y Kassab
 - Estimacion Angiografica (QCA)
 - Estimacion Rapida.

Ley de Murray / Finet

$$D_{\text{mother}} = 0.678 \times (D_{\text{daughter 1}} + D_{\text{daughter 2}})$$



Paso a paso...



When and How to treat the SB in provisional (simple lesions).?

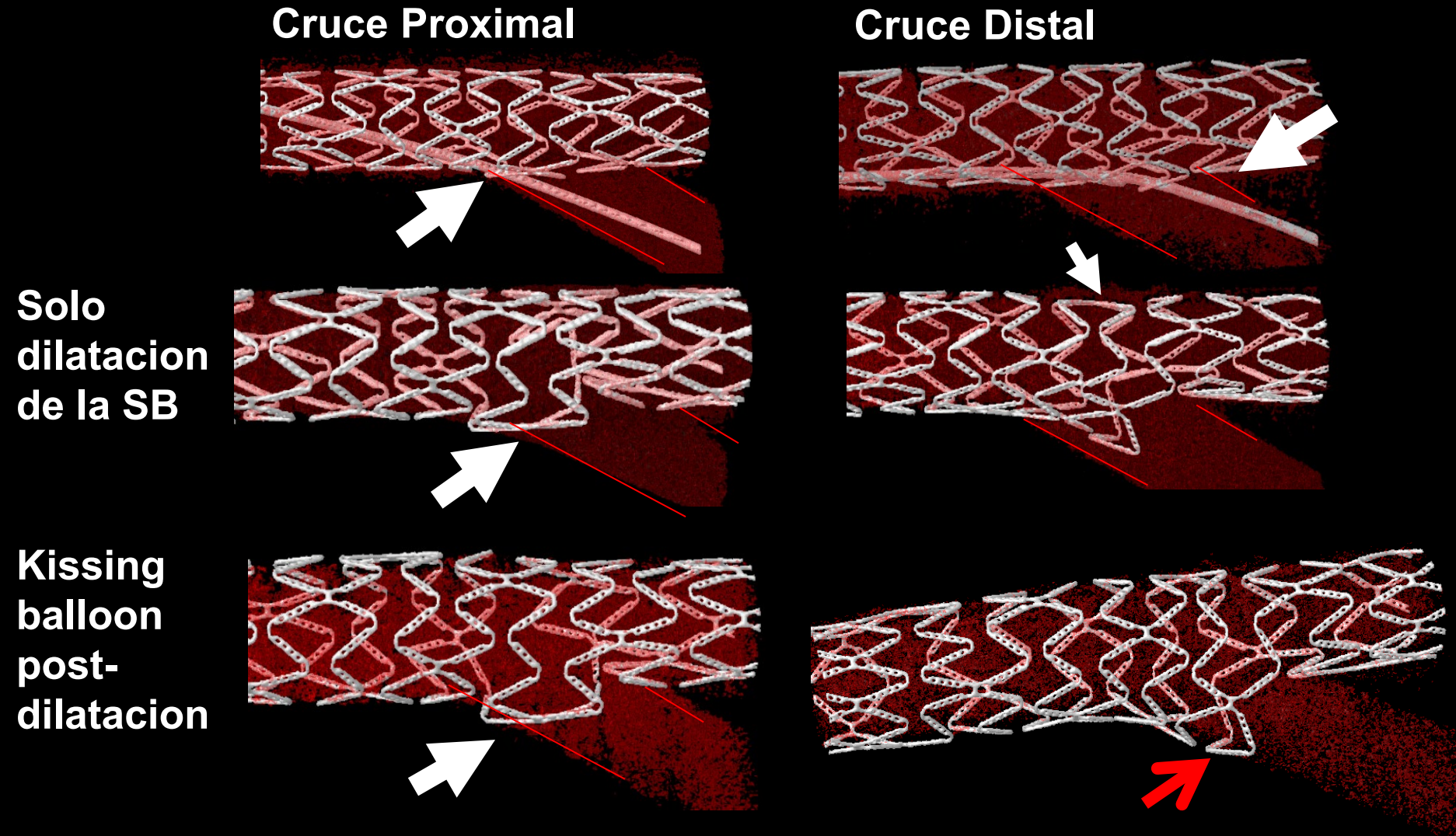
When to treat the SB.?:

1. Residual Lesion > 75% (90%) (carina shift). SUBOPTIMAL RESULT
2. Timi flow < 3.

How to treat the SB.?

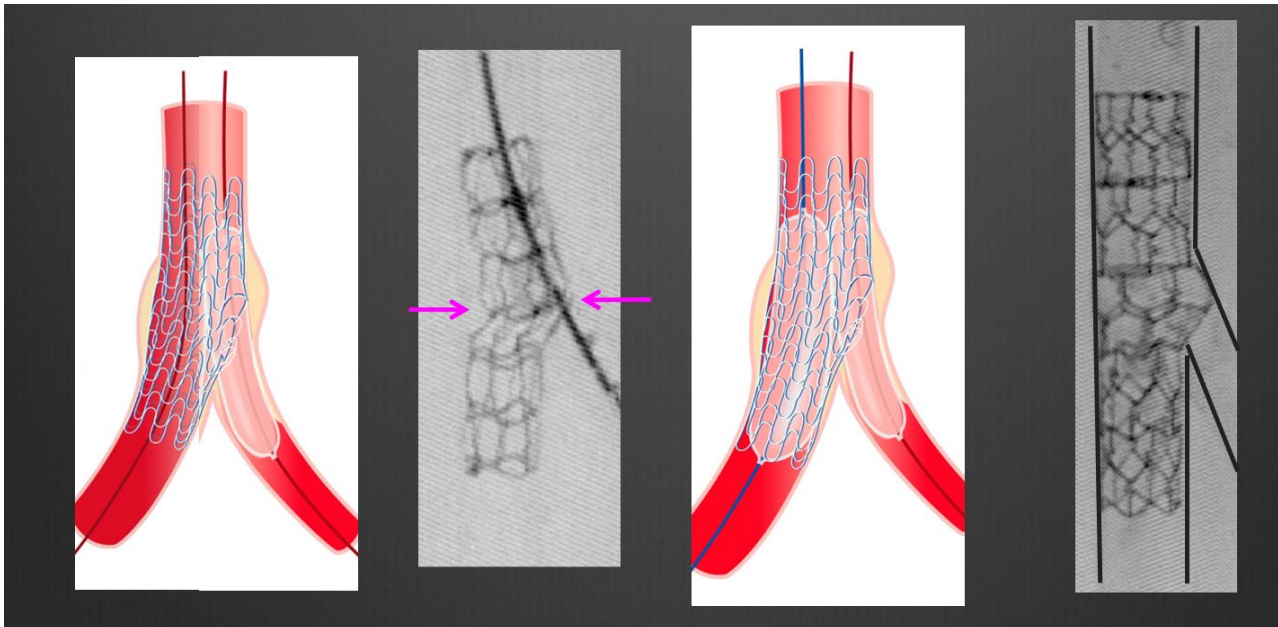
- 1st option to treat the SB in provisional is with Balloon Strategies:
 - Kissing Balloon
 - POT-SIDE-POT

Provisional. Cruce de la Guia Distal crea mejor SB scaffolding que el cruce proximal



- Porque se debe hacer KB y no solo dilatación de la SB únicamente ???

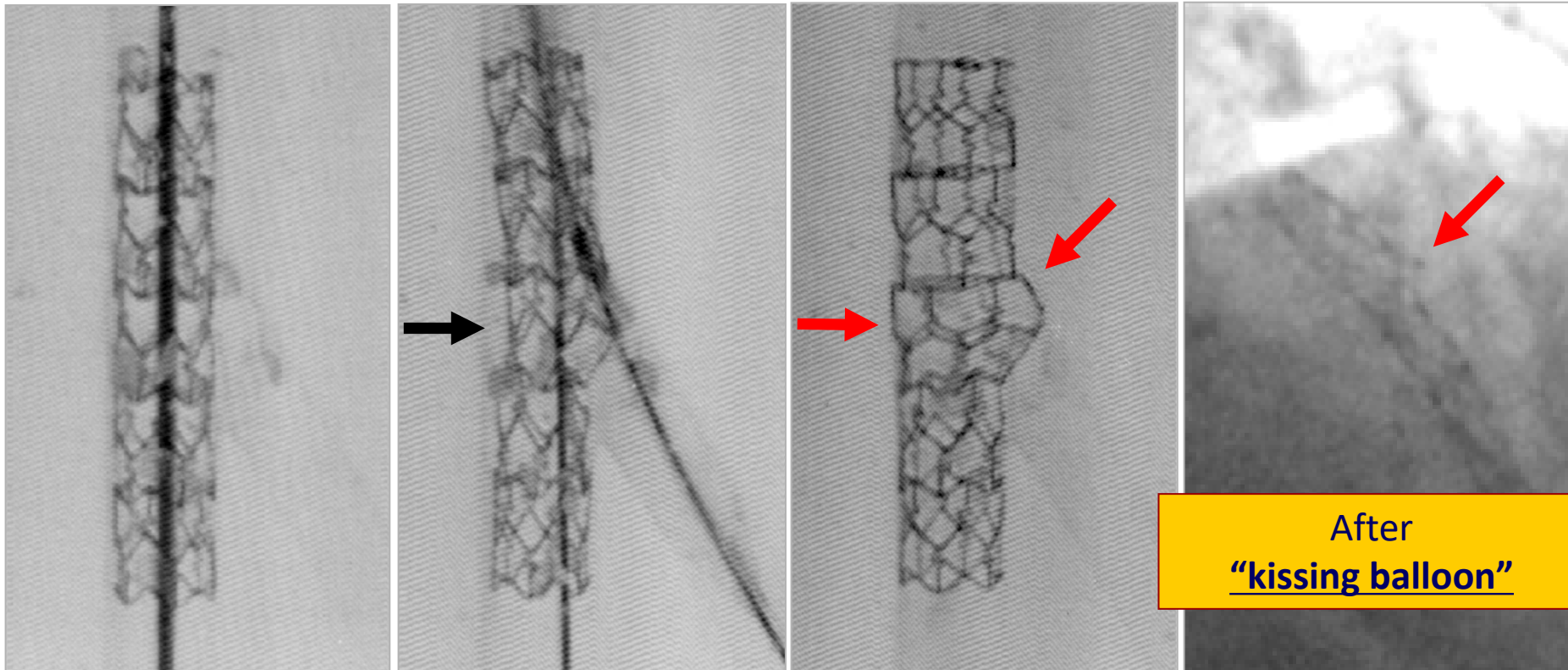
Concepto de la deformación del MV por la dilatación sola de la SB



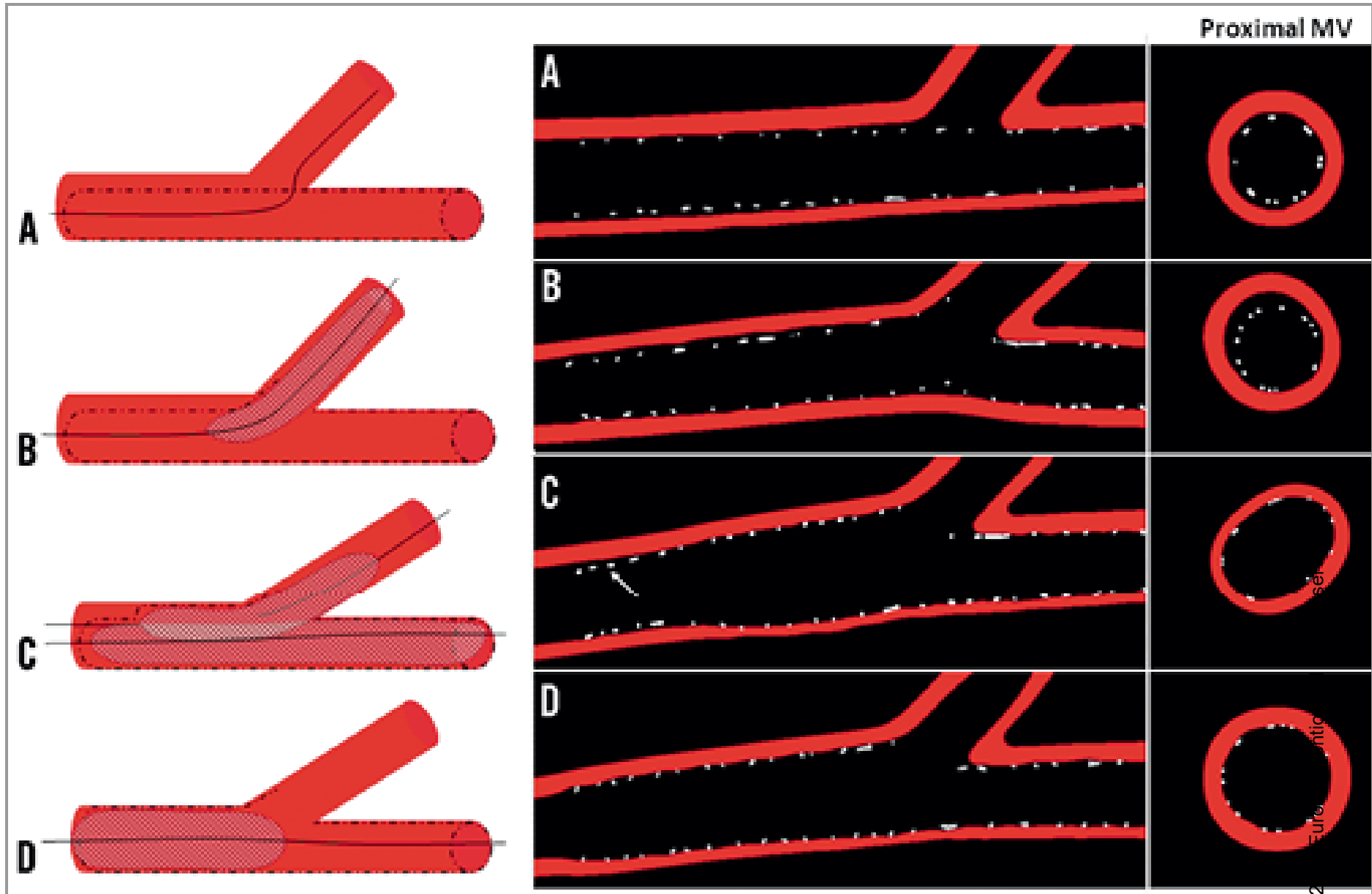
Ormiston 1999

El rol del kissing balloon

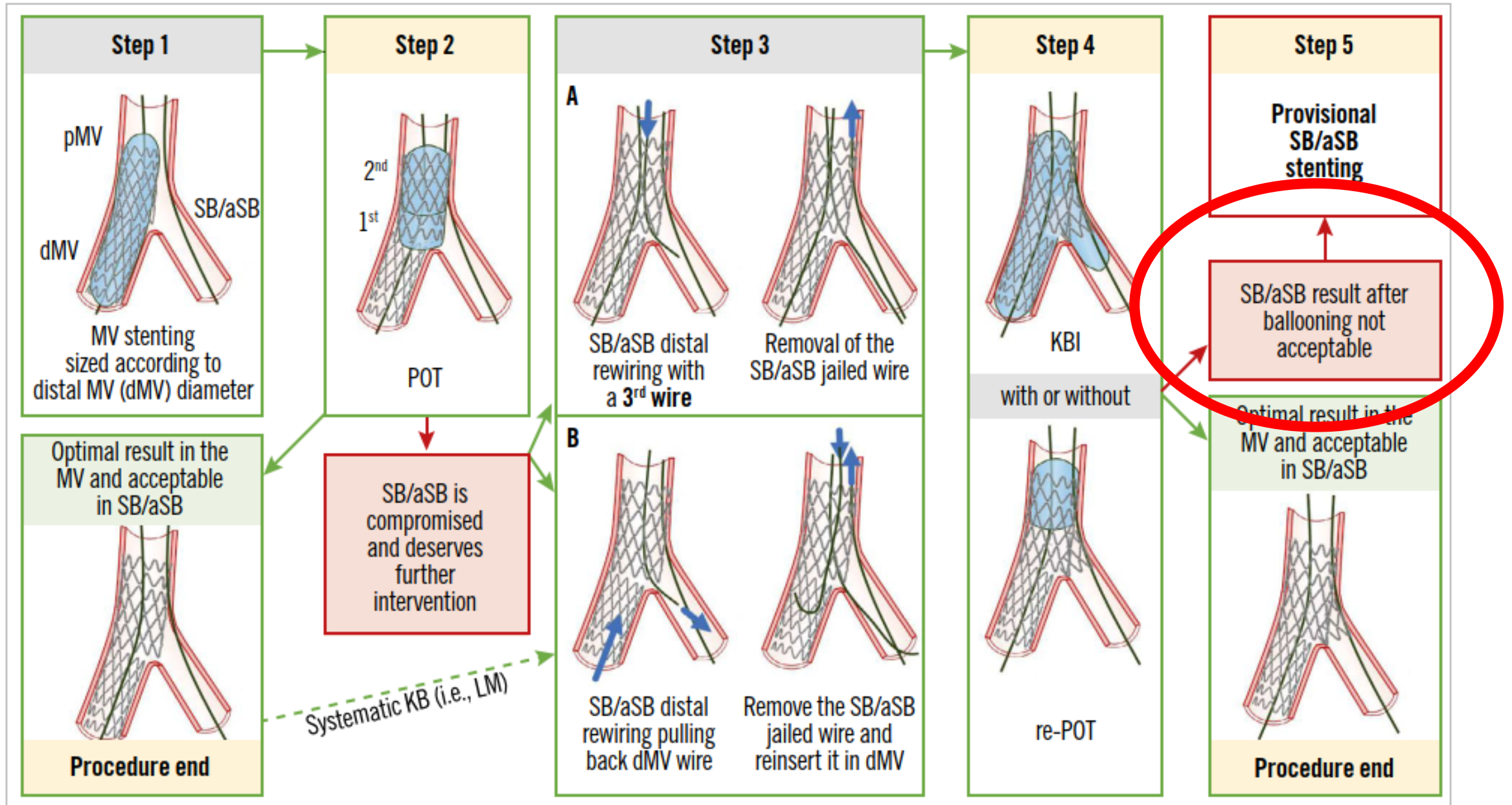
- 1) Corrige la deformacion del stent
- 2) Cubre el ostium de la SB
- 3) Regresa la carina a su lugar



EuroIntervention Porque hacer POT después de KB..?



Paso a paso...



Cuando implantar stent en la SB o stent de “rescate”

- Disección significativa luego de KB.
- Cuando Luego de hacer KB permanece lesión de mas del 75% (90%) en múltiples proyecciones.
- O cuando sea significativa el FFR (< 0.8).*
- Utilizar TAP, “T stent”, internal crush, o culotte.

Gracias



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A large, prospective, multicentre study of left main PCI using a latest-generation zotarolimus-eluting stent: the ROLEX study

Giuseppe Tarantini^{1*}, MD, PhD; Luca Nai Fovino¹, MD, PhD; Ferdinando Varbella², MD; Daniela Trabattoni³, MD, PhD; Giuseppe Caramanno⁴, MD; Carlo Trani⁵, MD, PhD; Nicoletta De Cesare⁶, MD; Giovanni Esposito⁷, MD, PhD; Matteo Montorfano⁸, MD, PhD; Carmine Musto⁹, MD; Andrea Picchi¹⁰, MD; Imad Sheiban¹¹, MD; Valeria Gasparetto¹¹, MD; Flavio L. Ribichini¹², MD; Francesco Cardaioli¹, MD; Salvatore Saccà¹³, MD; Enrico Cerrato¹⁴, MD, PhD; Massimo Napodano¹, MD, PhD; Matteo Martinato¹⁵, MSc, PhD; Danila Azzolina¹⁵, MSc, PhD; Giuseppe Andò¹⁶, MD; Antonio Mugnolo¹⁷, MD; Marco Caruso¹⁸, MD; Roberta Rossini¹⁹, MD, PhD; Enrico Passamonti²⁰, MD; Rui Campante Teles²¹, MD; Stefano Rigattieri²², MD, PhD; Dario Gregori¹⁵, MSc, PhD; Corrado Tamburino²³, MD, PhD; Francesco Burzotta⁵, MD

Clinical outcomes following different stenting techniques for coronary bifurcation lesions: a systematic review and network meta-analysis of randomised controlled trials

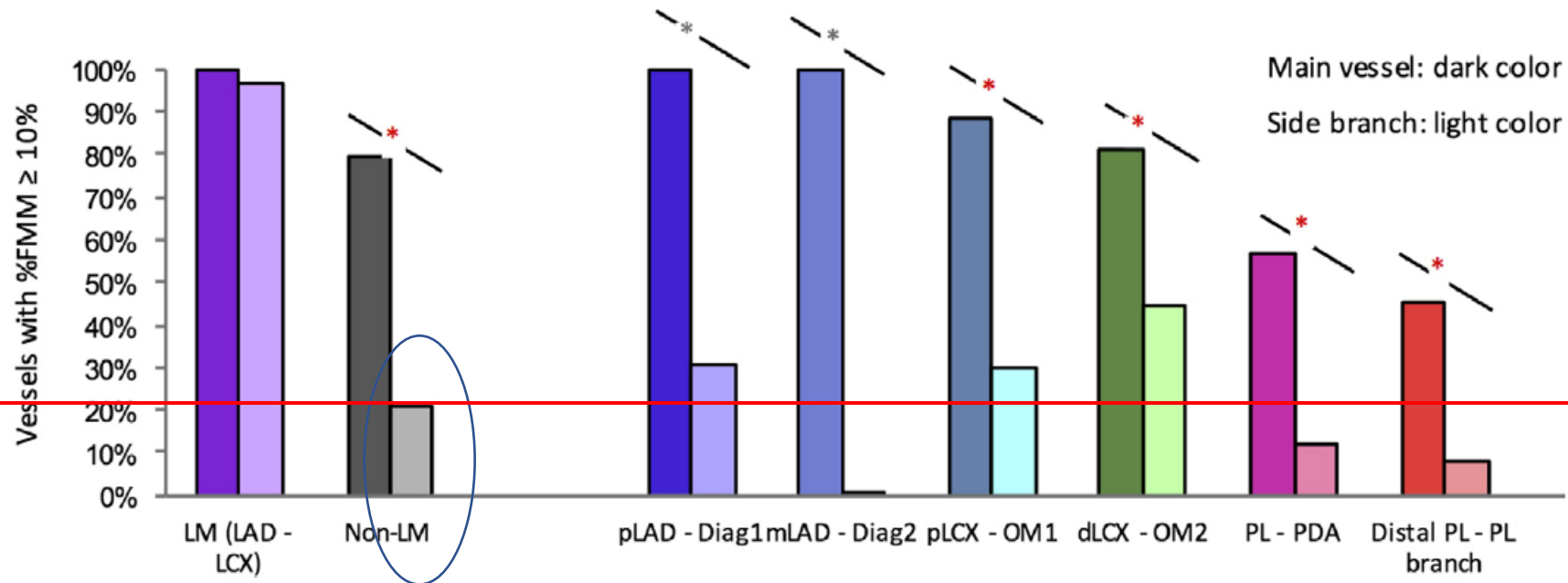
Kamil Bujak^{1,2}, MD; Filippo Maria Verardi^{1,3}, MD; Victor Arevalos¹, MD; Rami Gabani¹, MD; Francesco Spione^{1,4}, MD; Pawel Rajwa⁵, MD, PhD; Dejan Milasinovic^{6,7}, MD, PhD; Goran Stankovic^{6,7}, MD, PhD; Mariusz Gasior², MD, PhD; Manel Sabaté¹, MD, PhD; Salvatore Brugaletta¹, MD, PhD;

Conclusions: Overall, 2-stent techniques were not significantly better than PS in terms of clinical outcomes. However, the results of the sensitivity analysis suggested that there might be a benefit of a 2-stent approach in selected patients with true bifurcation lesions, especially in the case of long side branch lesions. An NMA revealed that DK-crush was associated with the lowest event rates when compared with other techniques.

Cambios y tendencias nuevas en Non-LM bifurcations 2024.

1. Clasificación se ha movido de solo Medina o “true” bifurcation a Simple vs Compleja.
 - El indicador mas importante de compleja es: SB length > 10 mm.
2. Relevancia de la SB es cada vez mas importante tener en cuenta en Bifurcaciones Non-LM provisional.
 - Estrategia de pensamiento clave para saber como actuar.

SB no siguen un comportamiento jerarquico!



Non Left Main: solo 21% con FMM > 10%