When two stents? Definition of complete bifurcation and results of bifurcation stent

Dr. Nicolás Zaderenko

Sanatorio Allende

Córdoba-Argentina

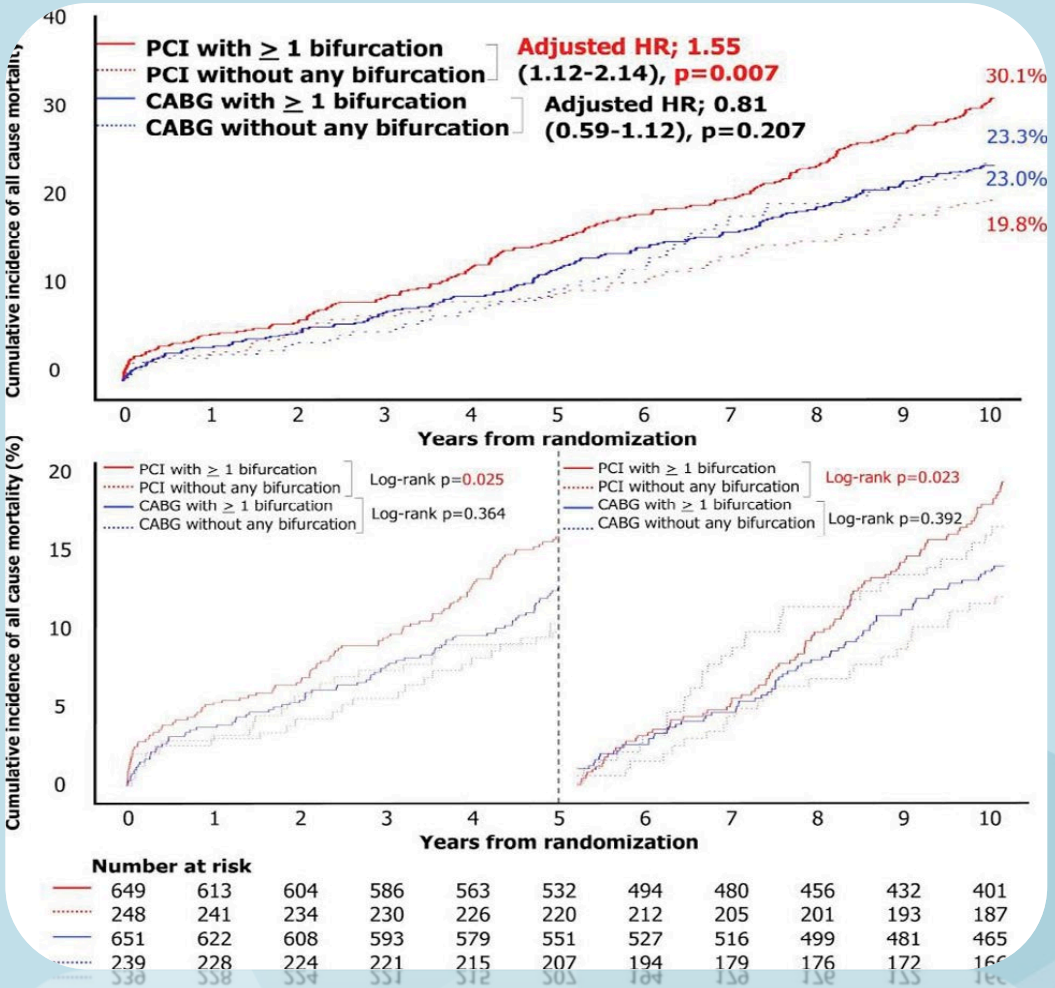
- No conflicts to declare

Dr. Antonio Colombo 1995.

- The first case of T-stenting **Palmaz-Schatz** stent implantation through the stent struts of a previously deployed stent.

Introduction

- Bifurcation lesions comprise up to 20% of lesions treated with PCI
- Associated with higher risks of major cardiac events and restenosis after PCI.
- **Treatment requires understanding of lesion characteristics, stent design and therapeutic options.**



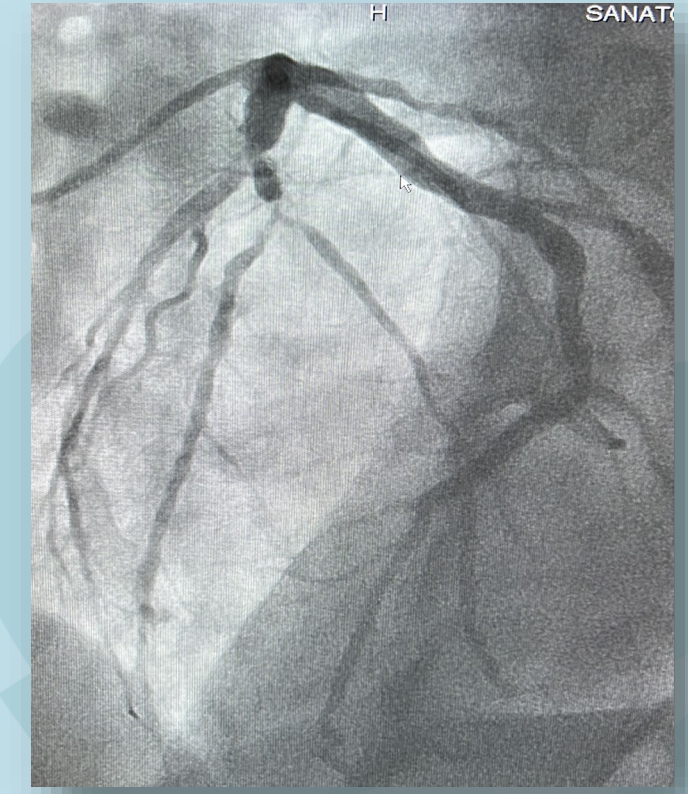
Impact of bifurcation lesion on 10-year mortality in the SYNTAX trial

ESC Congress 2022 – Barcelona, Spain

How to define a CBL?

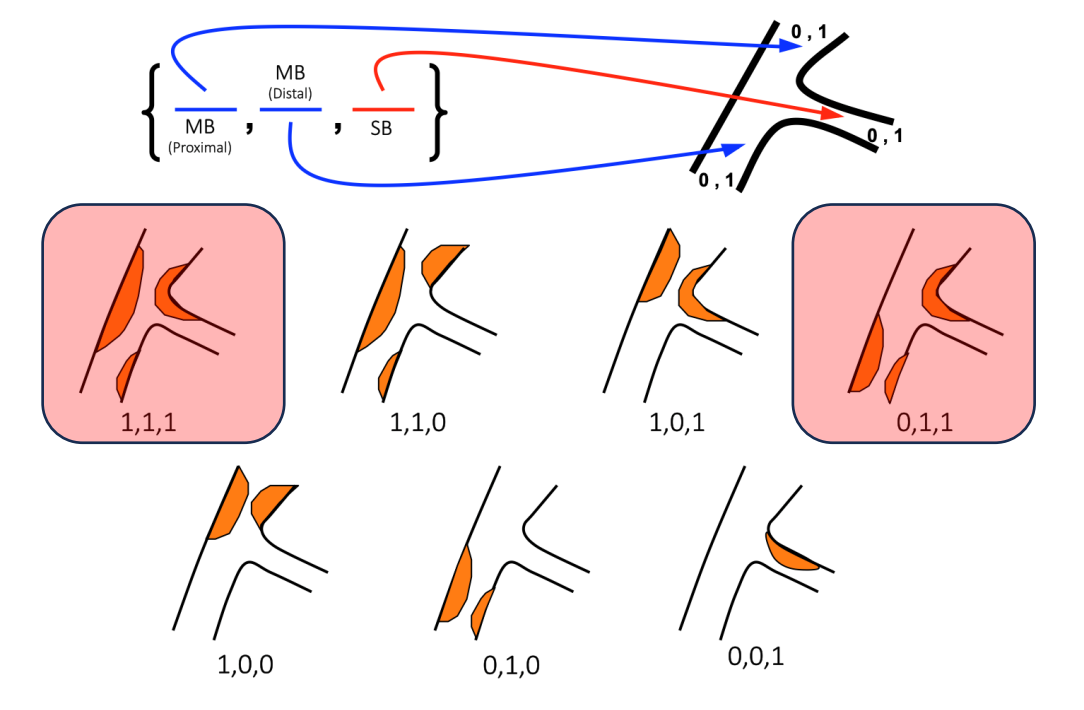
Is a coronary narrowing occurring adjacent to, and/or involving the origin of a significant SB

"A significant SB is a branch that you do not want to lose in the global context of a particular patient (symptoms, location of ischemia, branch responsible for symptoms or ischemia, viability, collateral vessel, and left ventricular function)"



Classification

Medinas's Classification

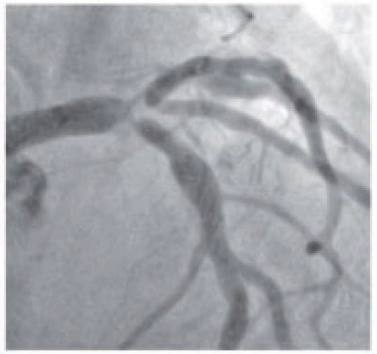


Limitations

- Presence or absence of calcifications?
- Thrombus?
- SB size?
- SB lesión length?
- Angulation?
- Diameters?

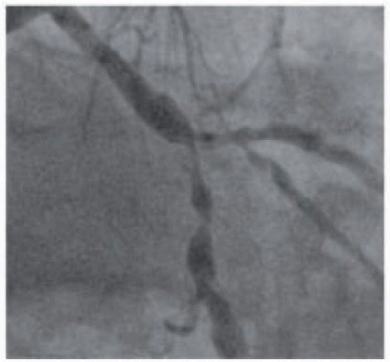
DEFINITION'S CRITERIA

LMS lesion with SB ≥70% and ≥10mm



or

Non - LMS lesion with SB ≥90% and ≥10mm



+

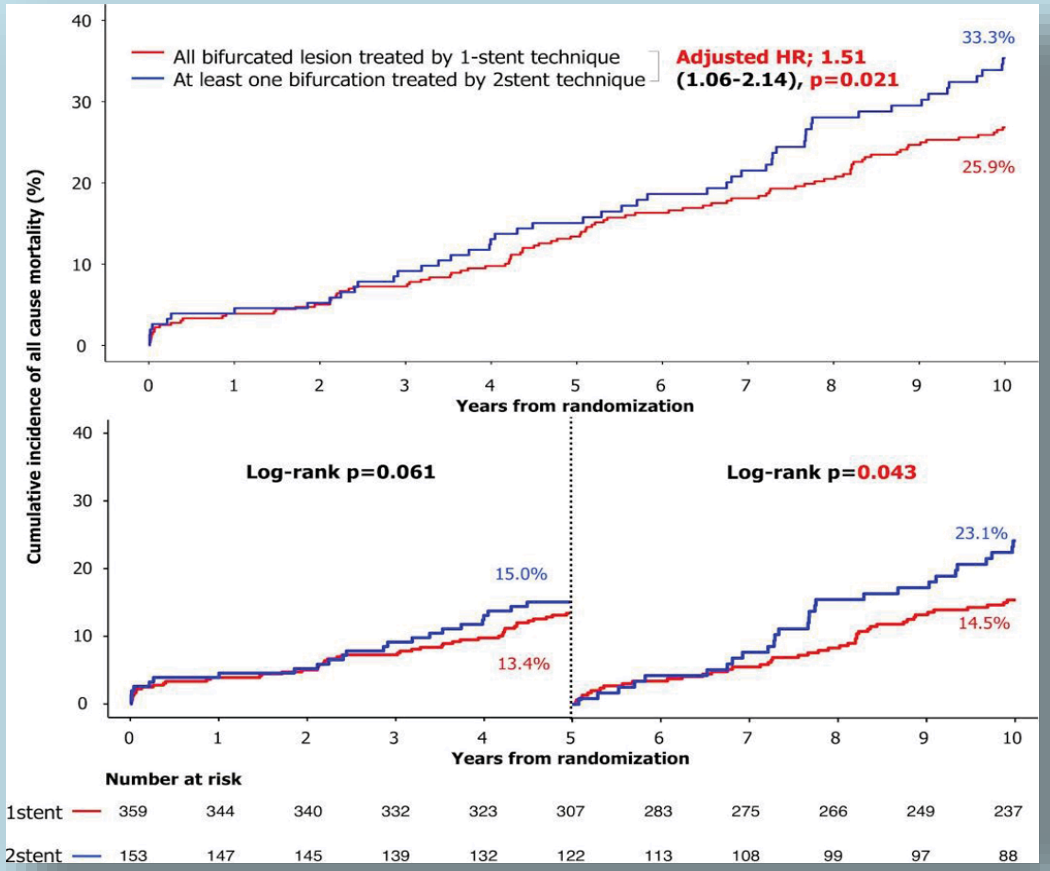
Any two of:

- ❑ Moderate to severe calcification
- ❑ Multiple lesions
- ❑ Active thrombus
- ❑ Bifurcation angle <45°
- ❑ MB reference diameter <2.5mm
- ❑ MB lesion >25mm length

Chen et al. Criteria of Complex Bifurcations. JACC 2014

- When two stents?

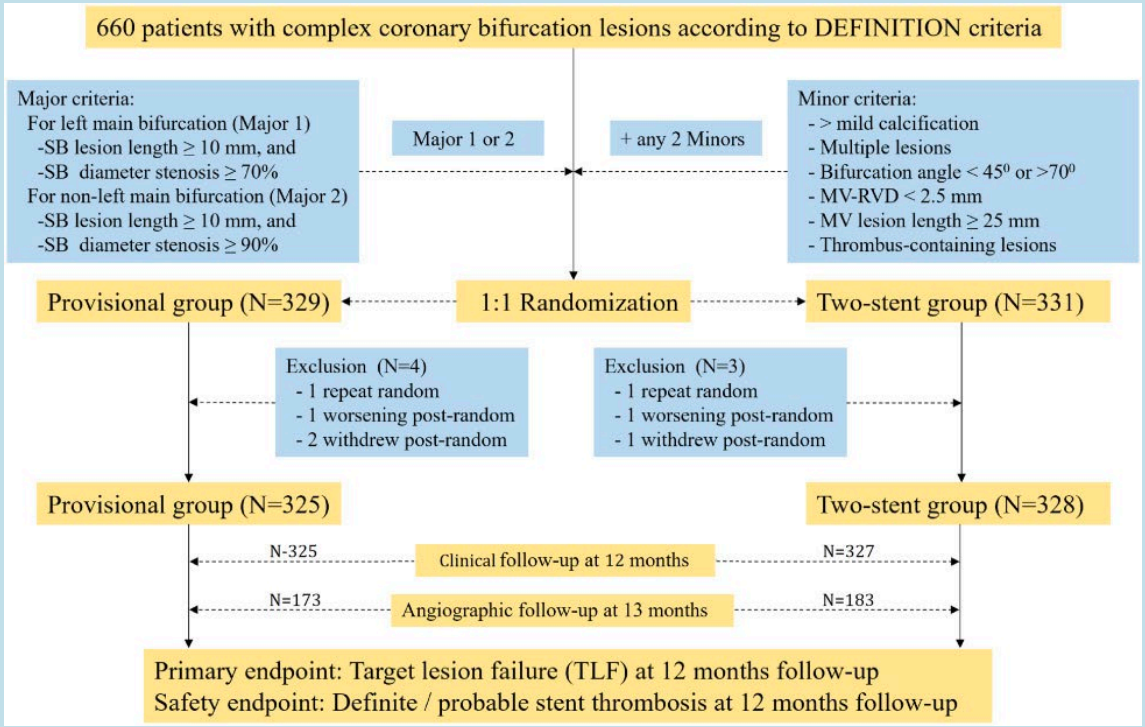
Impact of bifurcation lesion on 10-year mortality in the SYNTAX trial

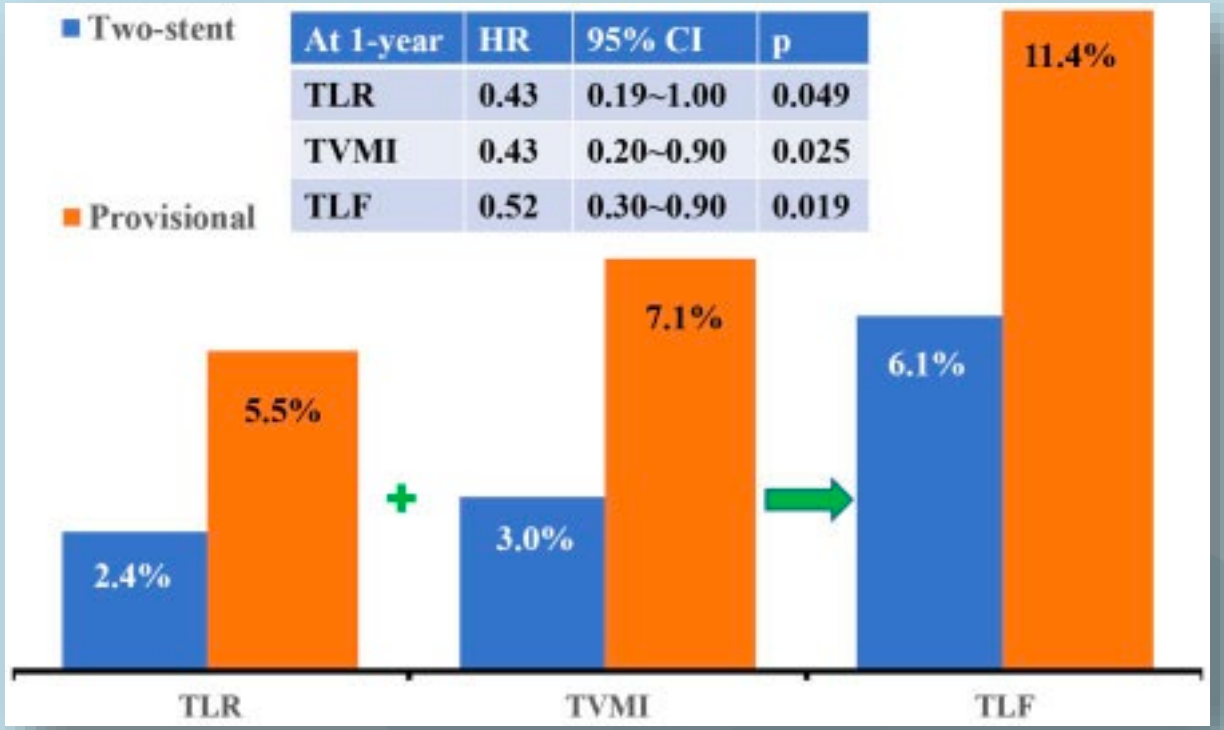


- NORDIC, BBC ONE, BBK, CACTUS
- EBC TWO

P. Serruys et al JACC 2022

DEFINITION II

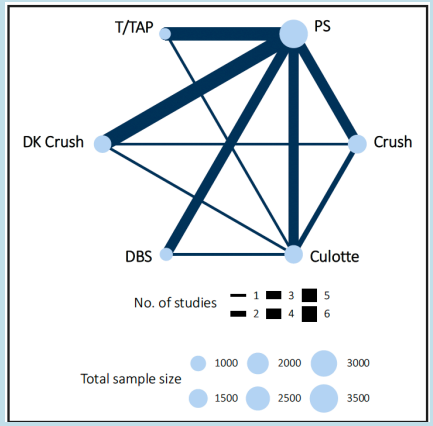


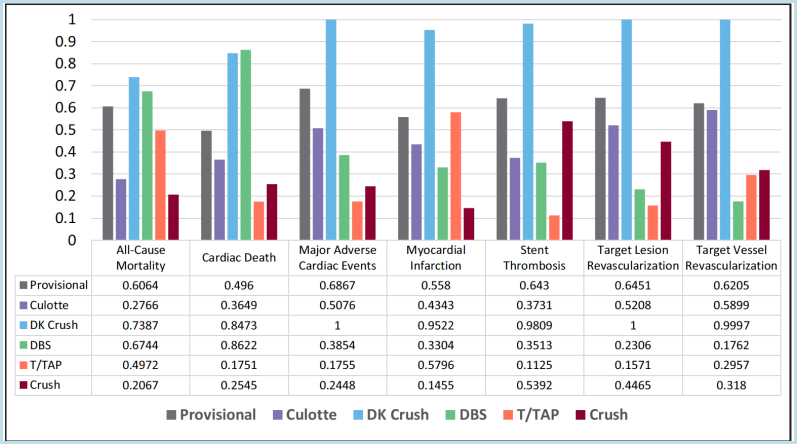


In complex bifurcation lesions defined by the DEFINITION criteria, systematic two-stent approaches were associated with a significant reduction of target lesion failure, compared with provisional stenting strategies

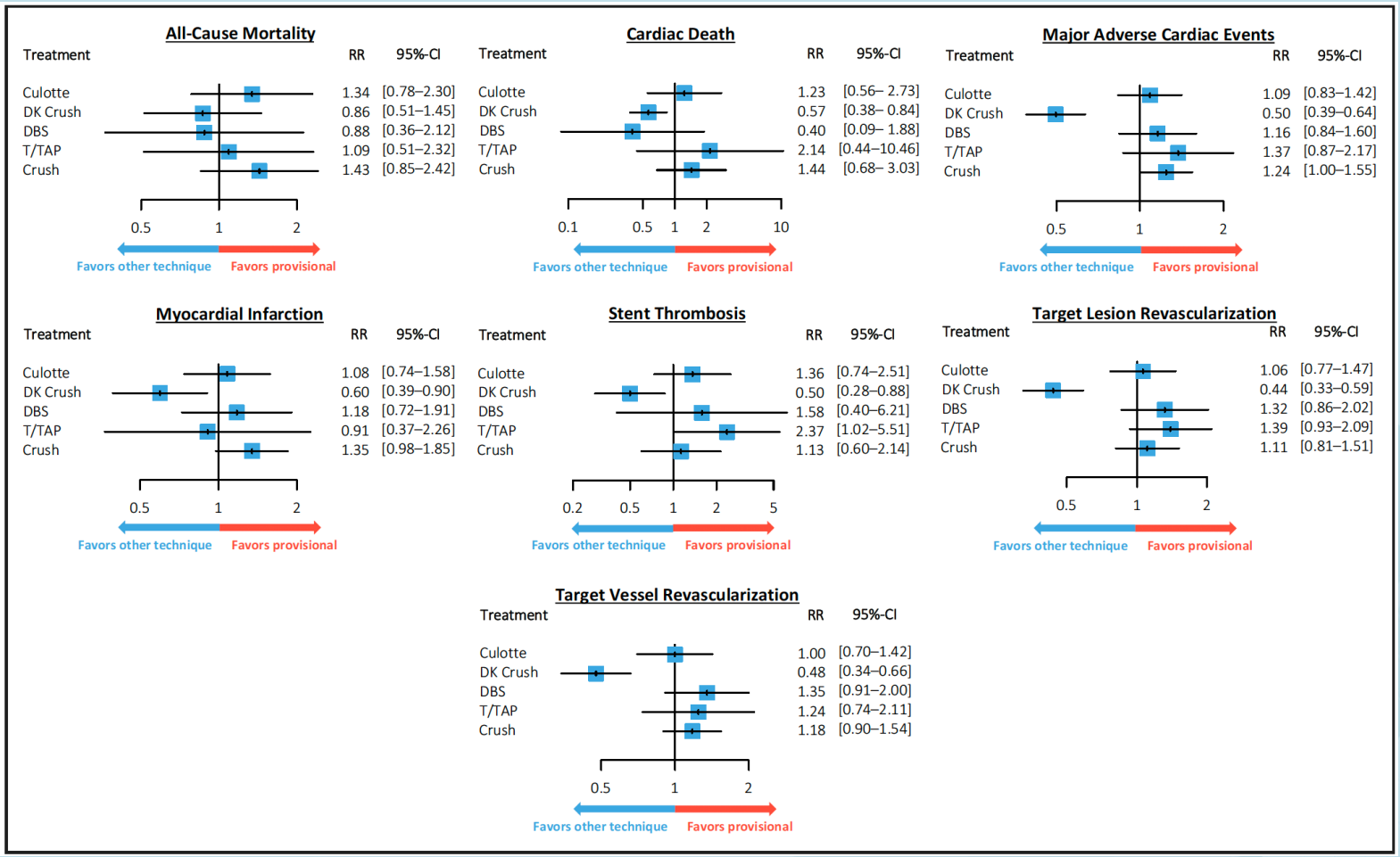
Jun-Jie Zhang. European Heart Journal (2020) 41, 2523–2536

Systematic Review and Network Meta-Analysis Comparing Bifurcation Techniques





	All-Cause Mortality	Cardiac Death	Major Adverse Cardiac Events	Myocardial Infarction	Stent Thrombosis	Target Lesion Revascularization	Target Vessel Revascularization
Provisional	0.6064	0.496	0.6867	0.558	0.643	0.6451	0.6205
Culotte	0.2766	0.3649	0.5076	0.4343	0.3731	0.5208	0.5899
DK Crush	0.7387	0.8473	1	0.9522	0.9809	1	0.9997
DBS	0.6744	0.8622	0.3854	0.3304	0.3513	0.2306	0.1762
T/TAP	0.4972	0.1751	0.1755	0.5796	0.1125	0.1571	0.2957
Crush	0.2067	0.2545	0.2448	0.1455	0.5392	0.4465	0.318



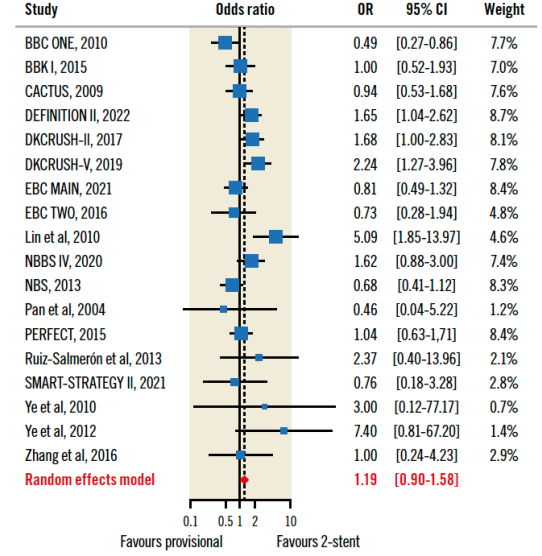
Y. Park et al J Am Heart Assoc. 2022;11:e025394

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

EuroIntervention

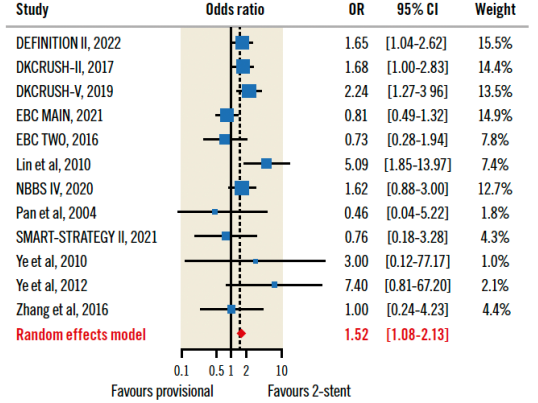
CENTRAL **ILLUSTRATION** Primary endpoints: major adverse cardiac events at the longest-follow-up.

A Pairwise meta-analysis of 18 RCTs (5,022 patients)



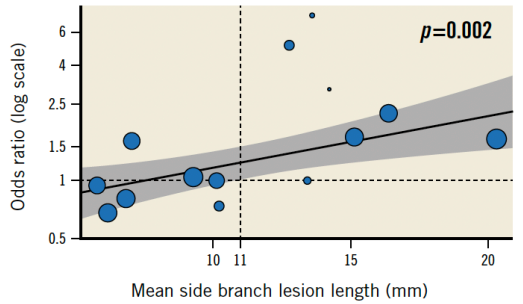
Heterogeneity: I^2=58% [29%; 75%], τ^2=0.1874, χ^2_{17}=40.41 (p<0.01)
Test for overall effect: z=1.20 (p=0.23)

B Sensitivity analysis of true bifurcations (3,082 patients)

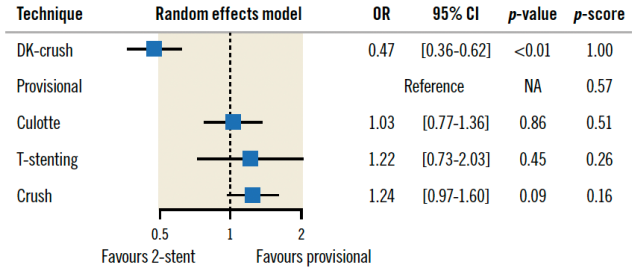


Heterogeneity: I^2=46% [0%; 72%], τ^2=0.1370, χ^2_{17}=20.37 (p<0.04)
Test for overall effect: z=2.40 (p=0.02)

C Meta-regression by mean side branch lesion length



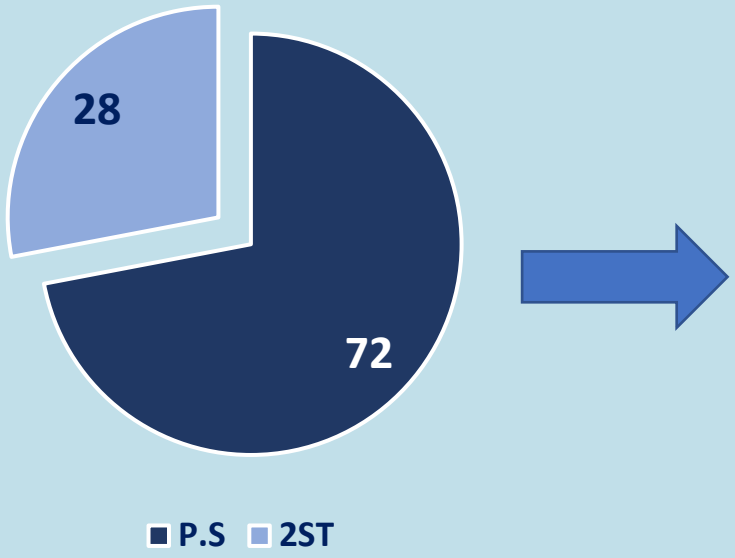
D Network meta-analysis of 22 RCTs (6,726 patients)

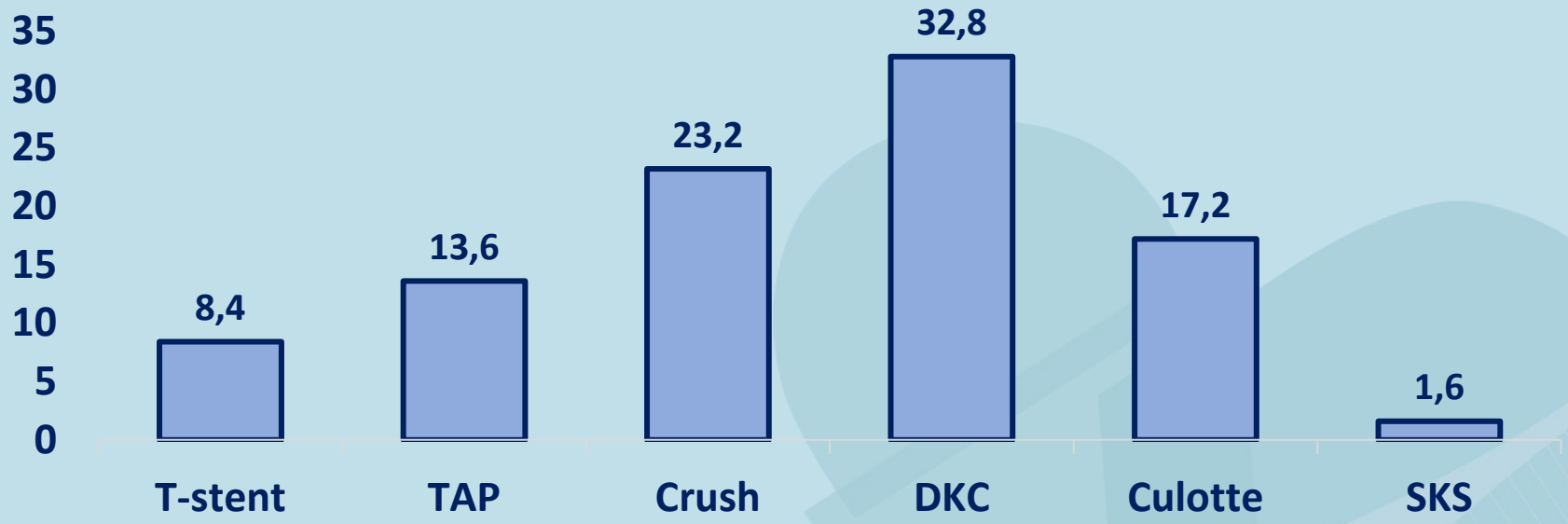


- ✓ No advantage of the routine use of 2-stent techniques
- ✓ Benefit of a 2-stent approach in selected patients with **true bifurcation lesions**, especially in the case of **long side branch** lesions.
- ✓ **DK-crush is associated with the lowest event rates compared to all other techniques**

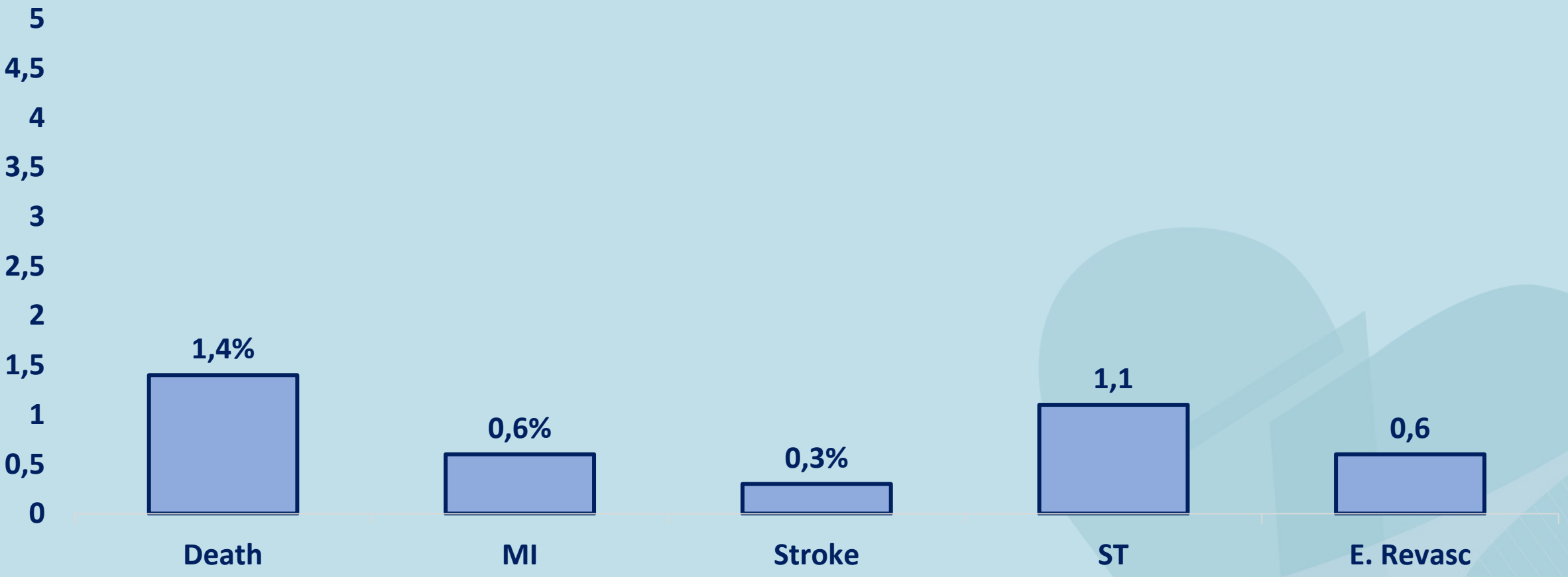
K. Bujak et al. EuroIntervention 2023;19

Initial strategy – 2ST upfront



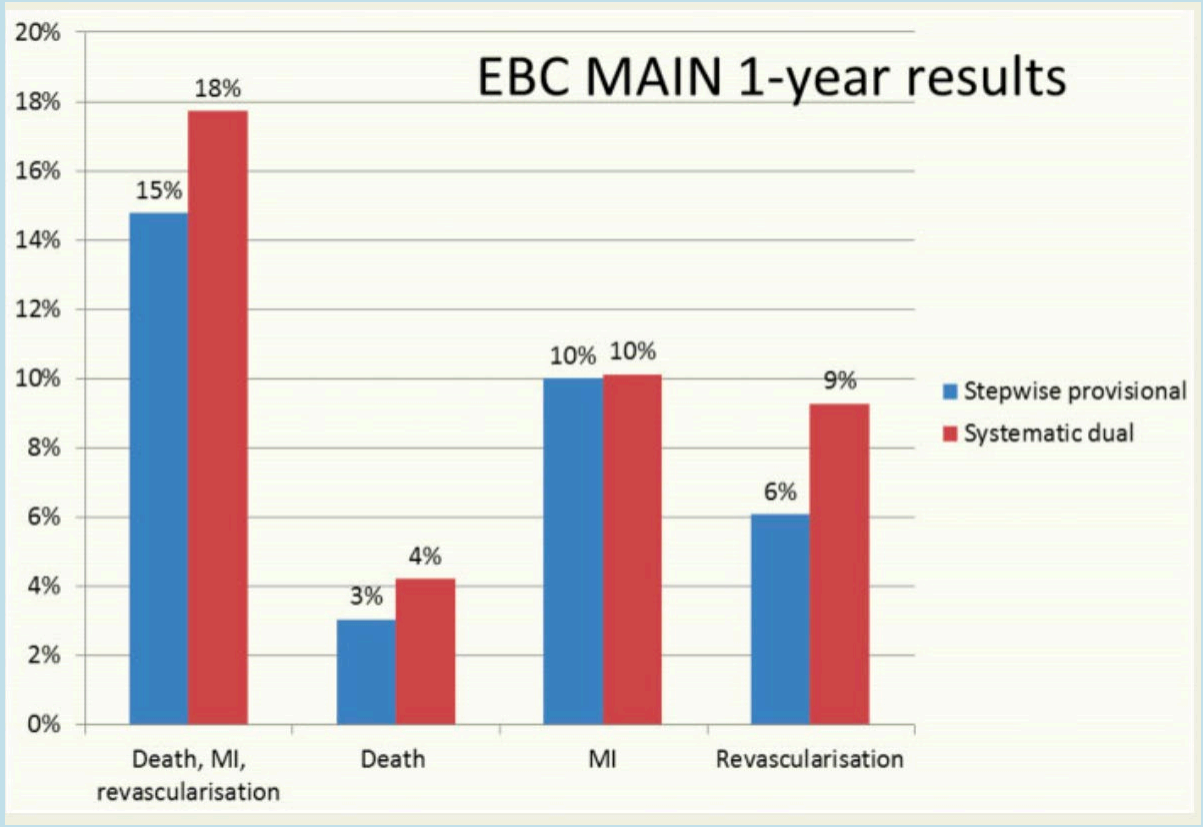


In-hospital events



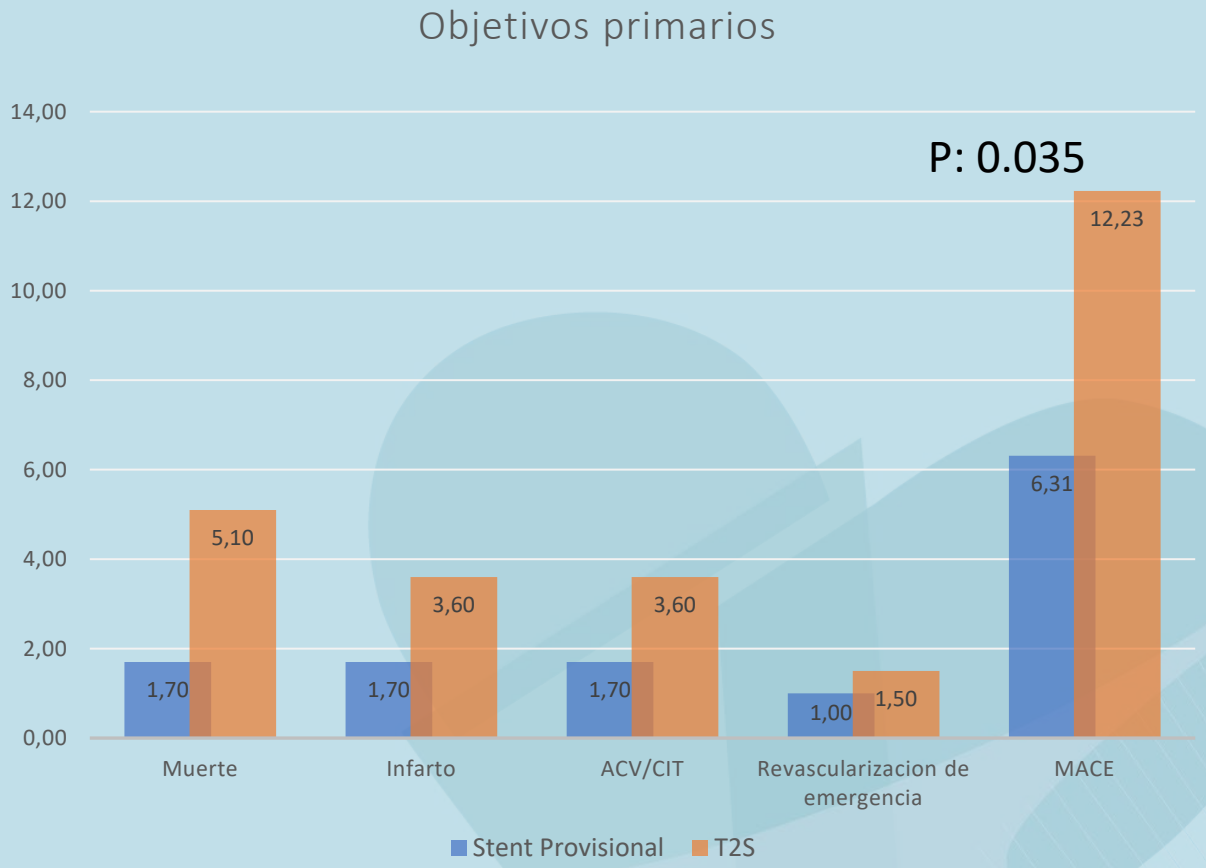
EBC MAIN - LATAM Bif.

EBC MAIN



D. Hildick-Smith et al.

LATAM Bif



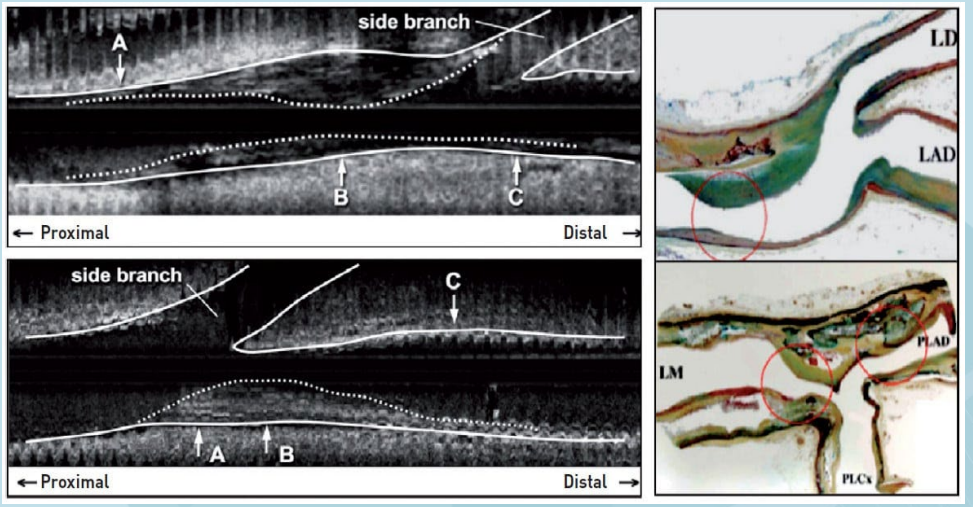
N. Zaderenko, G. Pacheco y cols

Choosing a strategy for bifurcation treatment

THE PATIENT

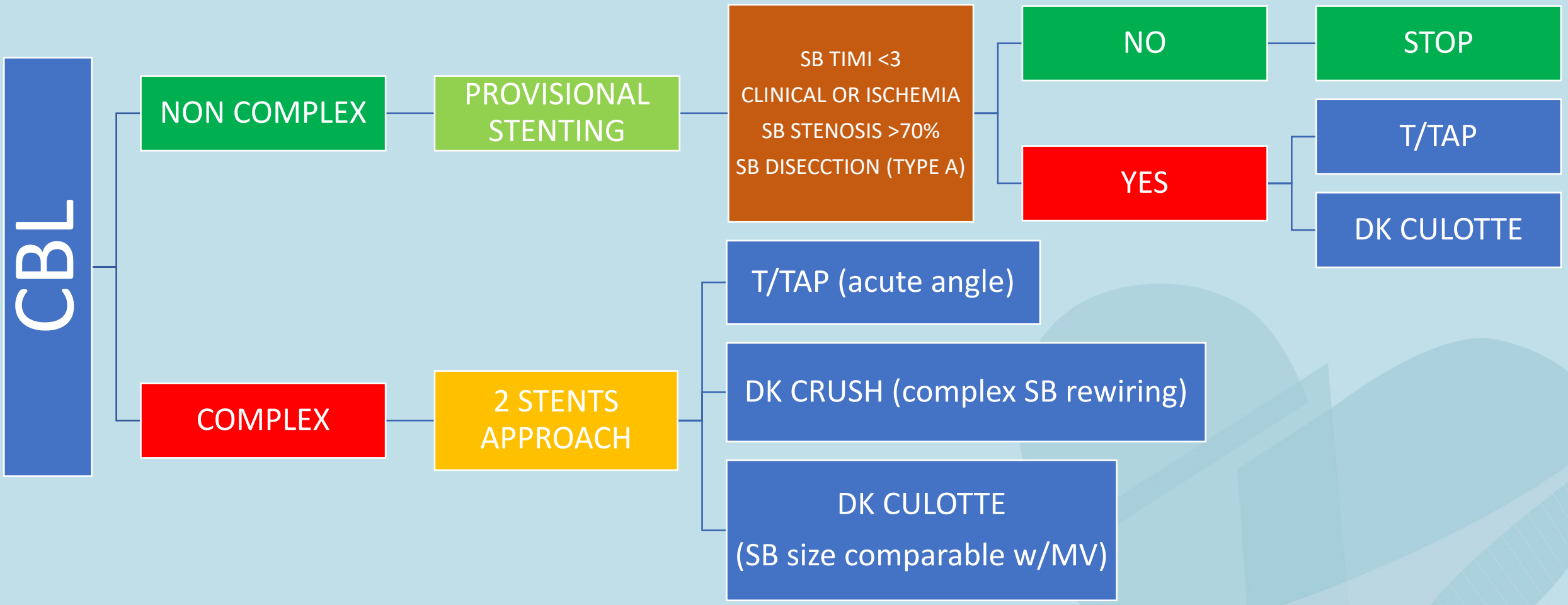
THE ANATOMIC CHARACTERISTICS

THE OPERATOR EXPERIENCIE



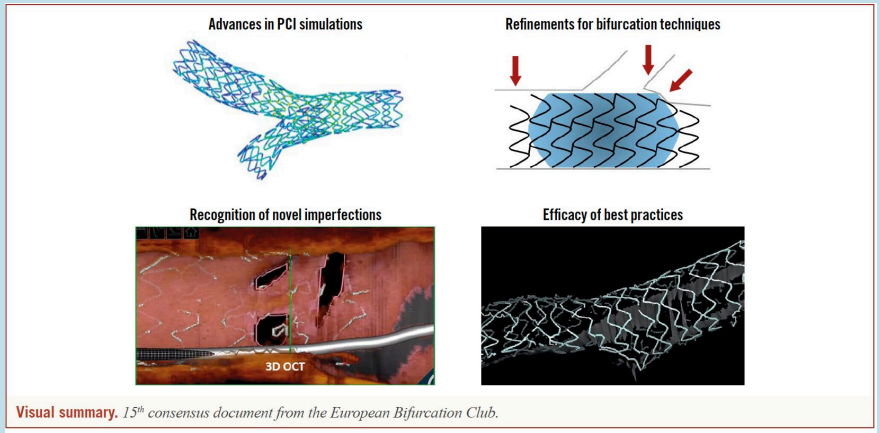
PROVITIONAL OR NOT PROVITIONAL???

THAT'S THE QUESTION…

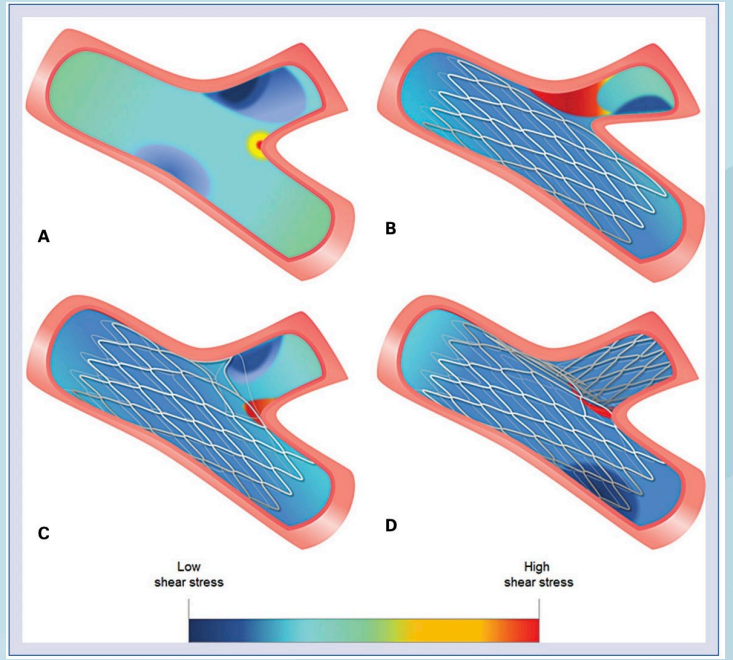

CBL
NON COMPLEX
PROVISIONAL STENTING
SB TIMI <3
CLINICAL OR ISCHEMIA
SB STENOSIS >70%
SB DISECCTION (TYPE A)
NO
STOP
YES
T/TAP
DK CULOTTE
COMPLEX
2 STENTS APPROACH
T/TAP (acute angle)
DK CRUSH (complex SB rewiring)
DK CULOTTE
(SB size comparable w/MV)

RECOMENDATIONS

- **Meticulous lesión preparation**
- ***The use of POT*** *(one, two or even three times) is part of an optimal 2-stent technique.*
- **FKB** might be regarded as a measure of procedural quality
- Use imaging



Visual summary. *15th consensus document from the European Bifurcation Club.*

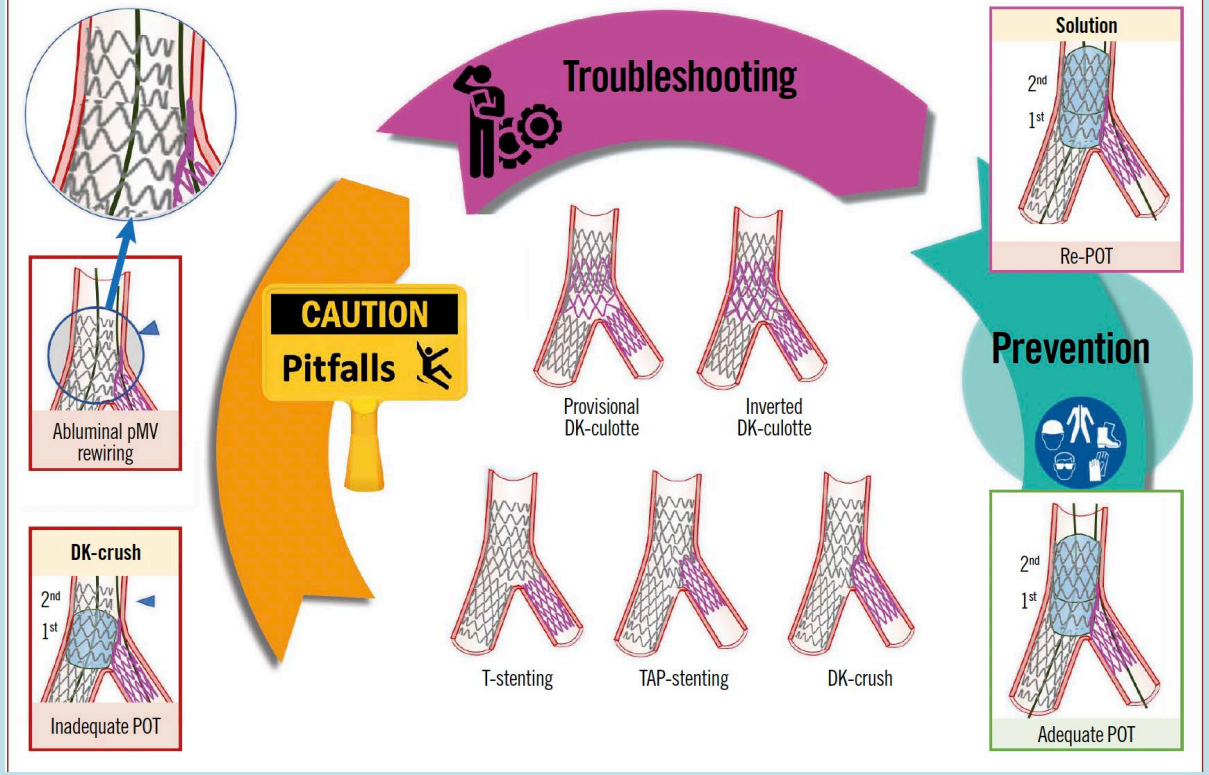


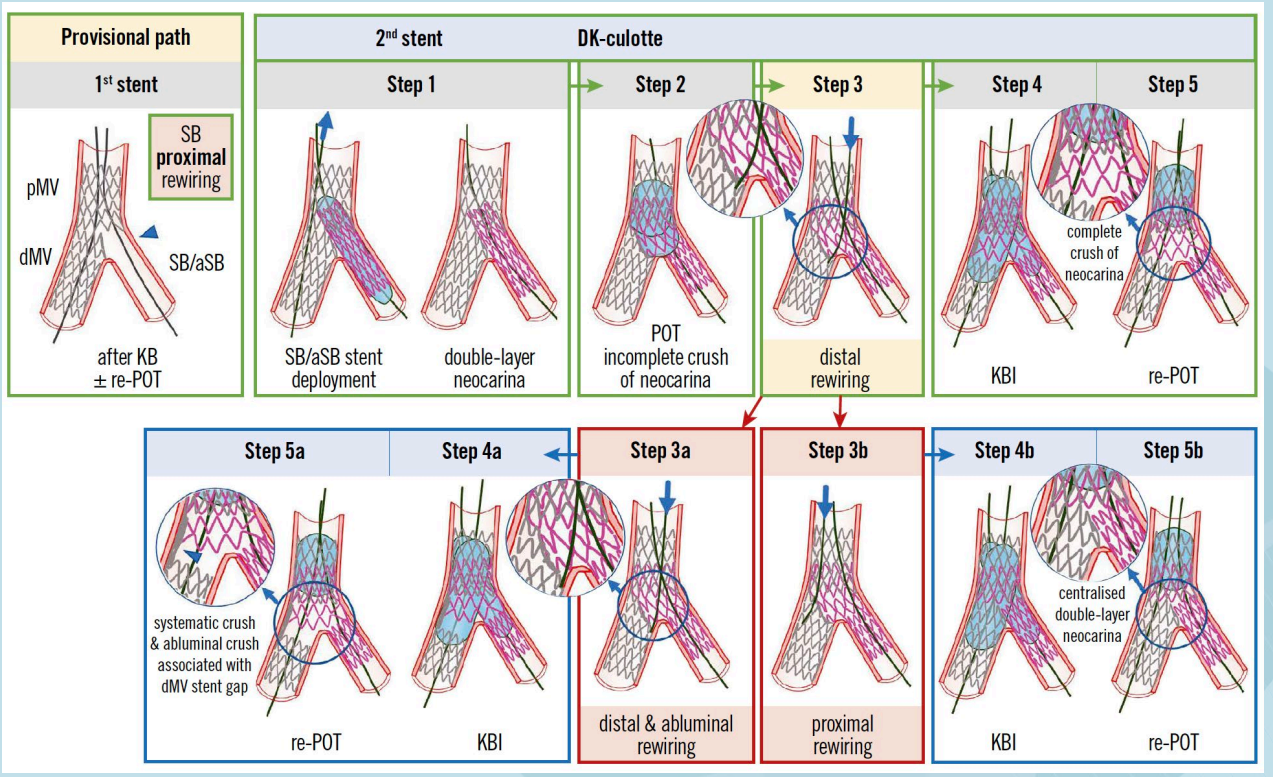
Lorenzo Genuardi et al., Fluid dynamics in coronary bifurcations Cardiology Journal 2021, Vol. 28, No. 2

The 16th expert consensus document of the European Bifurcation Club

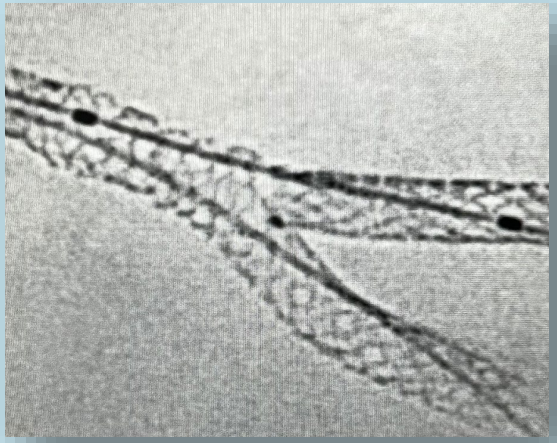
EuroIntervention

CENTRAL **ILLUSTRATION** Step-by-step two-stent implantation according to provisional or DK-crush.



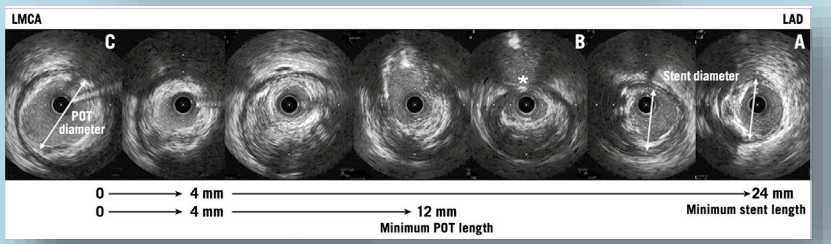


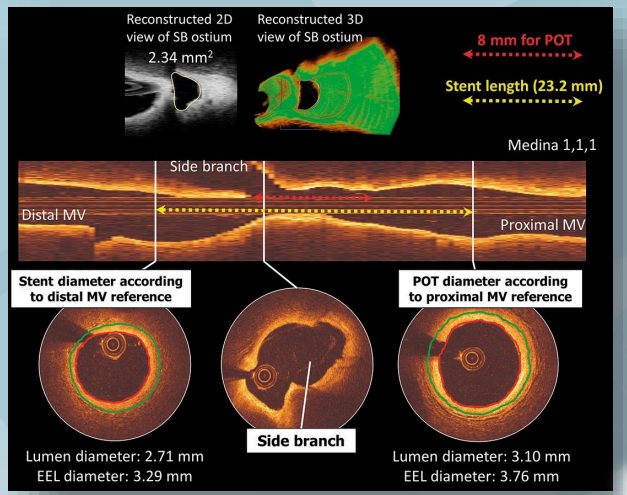
IVUS, OCT and angiographic guidance



Key points

- ✓ **Keep the procedure simple and safe**
- ✓ **Do not stent the SB by default**
- ✓ **Respect the original bifurcation anatomy and physiology and aim to reproduce it**
- ✓ Limit the number of stents
- ✓ Limit the metal overlap
- ✓ Achieve sufficient stent expansion
- ✓ Avoid major stent malapposition





EBC consensus. OCT, IVUS and angiografic
the 18th consensus document from the EBC

Takehome messages

Elective two-stent strategies may be considered for long SB lesions, high risk of SB compromise or difficult Access.

Stent technique should depend on individual anatomical characteristics and the operator skills

POT should be used routinely for all bifurcation lesions

DK-Crush is a valuable option for complex CBL and LM bifurcation lesions

Use of imaging decide the appropriate stenting strategy and optimize the result

Muchas gracias

Dr. Guillermo Pacheco
Dra. María Jose Cabrera
Dr. Hugo J. Londero
Dr. Nicolas Zaderenko

nicolas.zaderenko@gmail.com