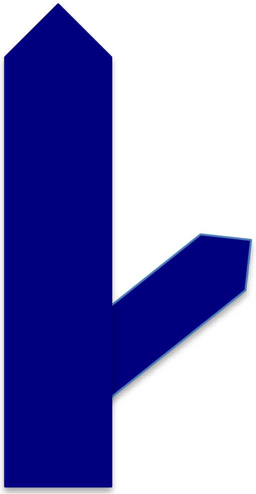
Collège
National des
Cardiologues des
Hôpitaux

Les WEBINARS du CNCH

"Quid de l'angioplastie coronaire d'une bifurcation à deux stents »



Avec le soutien institutionnel de "TERUMO"

17 Décembre 2020

Grégoire Rangé, Pascal Motreff

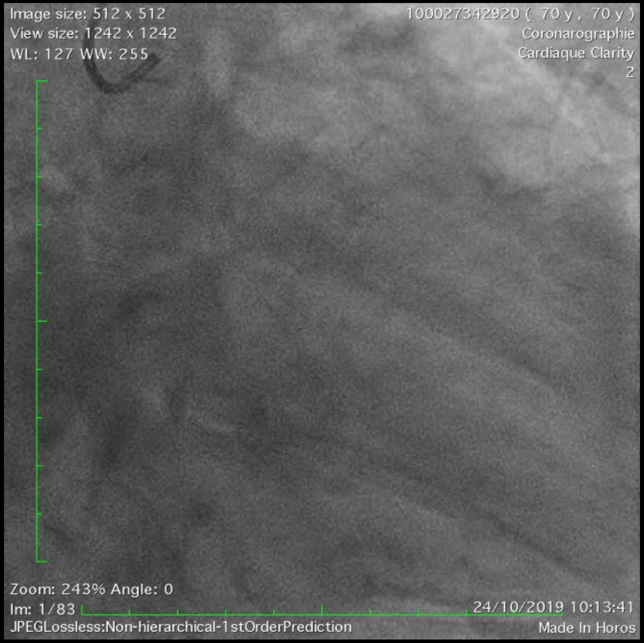
Collège
National des
Cardiologues des
Hôpitaux

Cas clinique

- Homme 70 ans
- FDRCV : Diabète, HTA, Dyslipidémie, Surpoids

- Antécédents :
  - ✓ AC/FA sous Apixaban
  - ✓ AVCI multiples (hémiparésie et dysarthrie séquellaire)
  - ✓ AOMI : ATL FS, poplitée et tronc tibio-péronier, amputation cuisse gauche, amputation 2 orteils pied droit
  - ✓ IRC (DFG 45ml/mn)

- Hospitalisé pour insuffisance cardiaque, Troponine +
- FEVG 50%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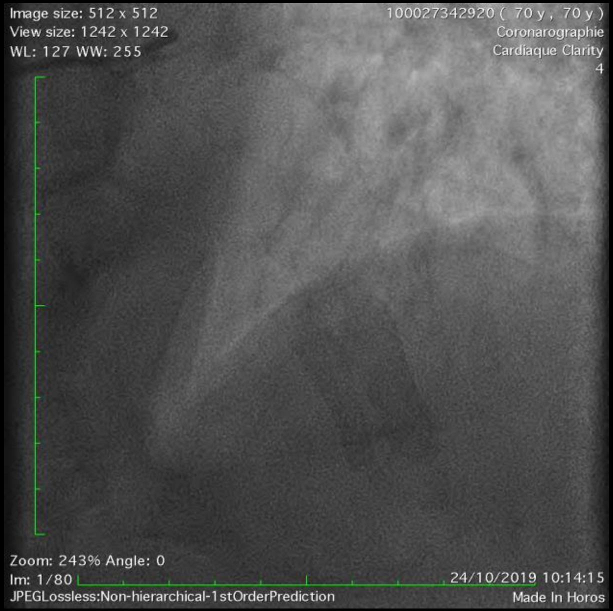
WL: 127 WW: 255
100027342920 (70 y , 70 y)
Coronarographie
Cardiaque Clarity
2
Zoom: 243% Angle: 0
Im: 1/83
24/10/2019 10:13:41
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos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WL: 127 WW: 255
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Coronarographie
Cardiaque Clarity
4
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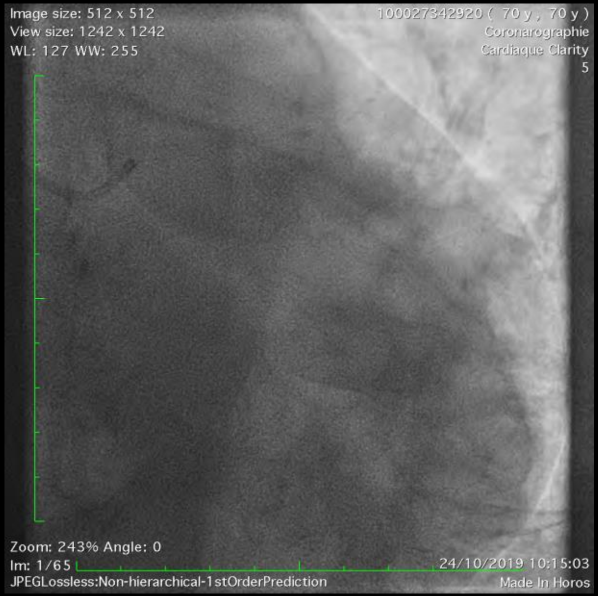
Im: 1/80
24/10/2019 10:14:15
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos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100027342920 (70 y , 70 y)
Coronarographie
Cardiaque Clarity
5
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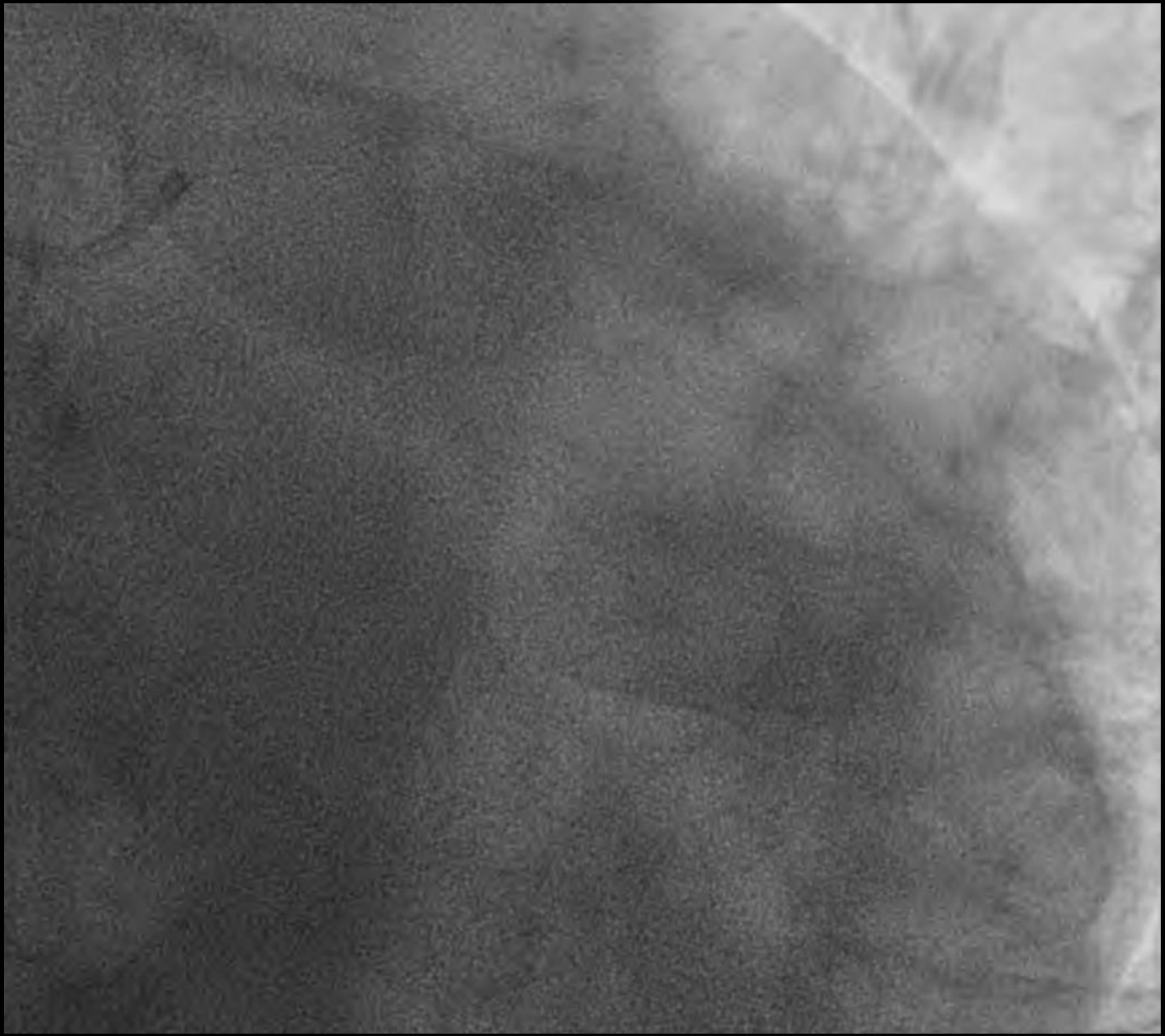
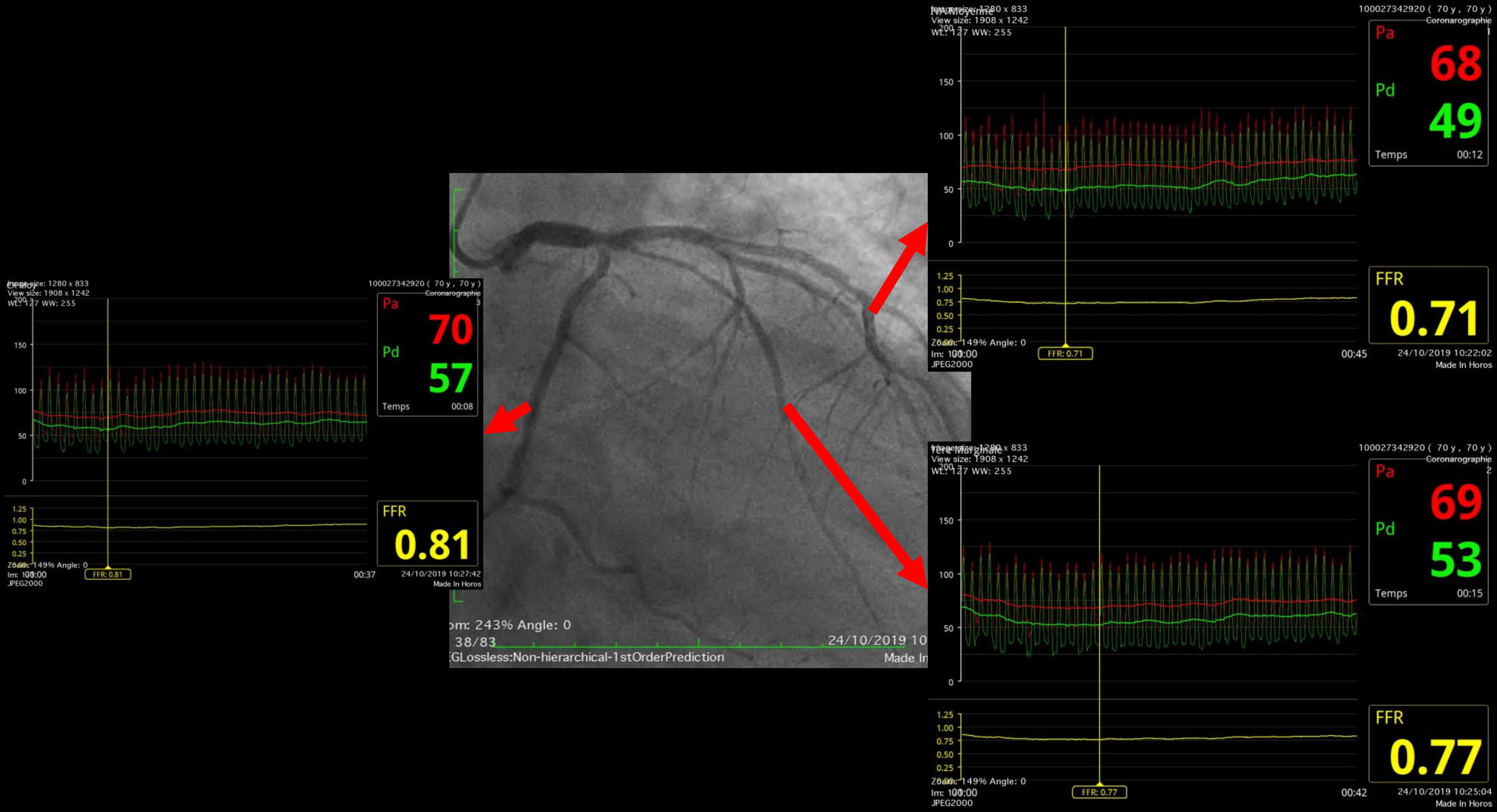
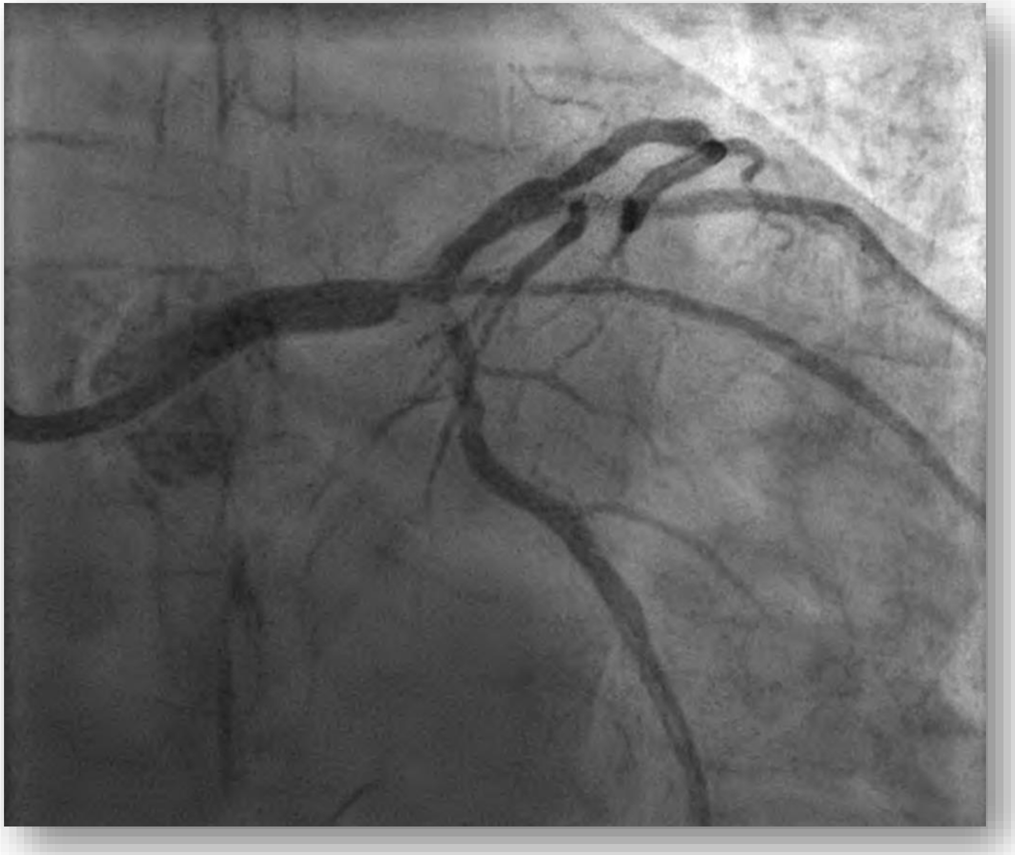
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos




IVA Moyenne
Image size: 1280 x 833
View size: 1908 x 1242
WL: 127 WW: 255
100027342920 (70 y , 70 y)
Coronarographie
Pa
68
Pd
49
Temps 00:12
FFR
0.71
FFR: 0.71
Zoom: 149% Angle: 0
Im: 1/1 00:00
JPEG2000
00:45
24/10/2019 10:22:02
Made In Horos
1ere Marginale
Image size: 1280 x 833
View size: 1908 x 1242
WL: 127 WW: 255
100027342920 (70 y , 70 y)
Coronarographie
Pa
69
Pd
53
Temps 00:15
FFR
0.77
FFR: 0.77
Zoom: 149% Angle: 0
Im: 1/1 00:00
JPEG2000
00:42
24/10/2019 10:25:04
Made In Horos
Cx moy
Image size: 1280 x 833
View size: 1908 x 1242
WL: 127 WW: 255
100027342920 (70 y , 70 y)
Coronarographie
Pa
70
Pd
57
Temps 00:08
FFR
0.81
FFR: 0.81
Zoom: 149% Angle: 0
Im: 1/1 00:00
JPEG2000
00:37
24/10/2019 10:27:42
Made In Horos
om: 243% Angle: 0
38/83
EGLossless:Non-hierarchical-1stOrderPrediction
24/10/2019 10
Made In

Décision ?

- -Medina 1/1/1
- -Score SYNTAX: 24
- -Euroscore : 5,1%
- -Comorbidités



Problématique

Angioplastie de bifurcation coronaire à 2 stents

- A réserver aux bifurcations complexes,
  aux bifurcations à grosses branches
  80-90% des bifurcations sont traitées avec un seul stent
  Moins il y a de stents, meilleur est le pronostic…

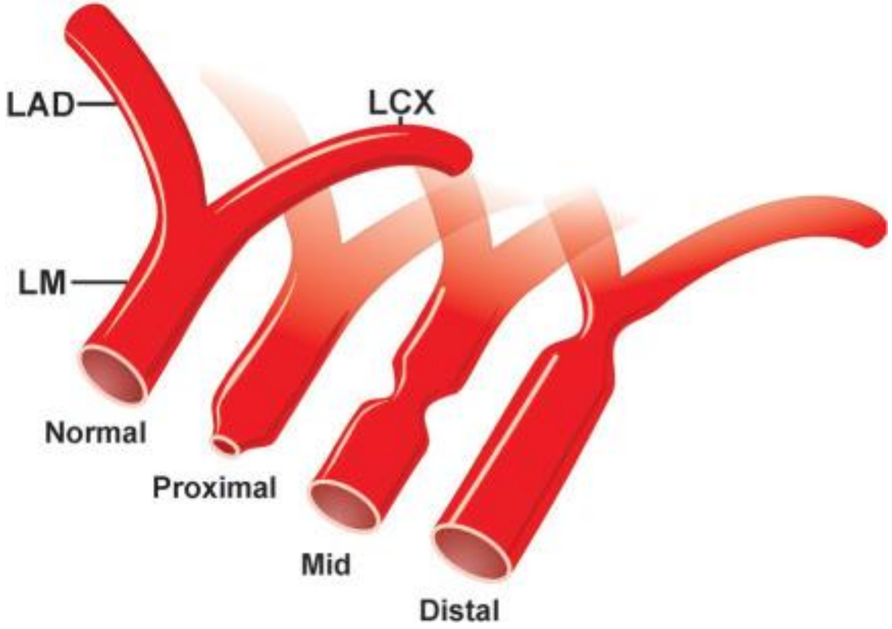
- Parfaitement analyser la lésion et prédéfinir une stratégie

- Connaître toutes les techniques disponibles, limites et avantages
- Connaître son matériel
- Tirer enseignement des études sur Banc
- Profiter de l’imagerie endocoronaire

Angioplastie du Tronc Commun

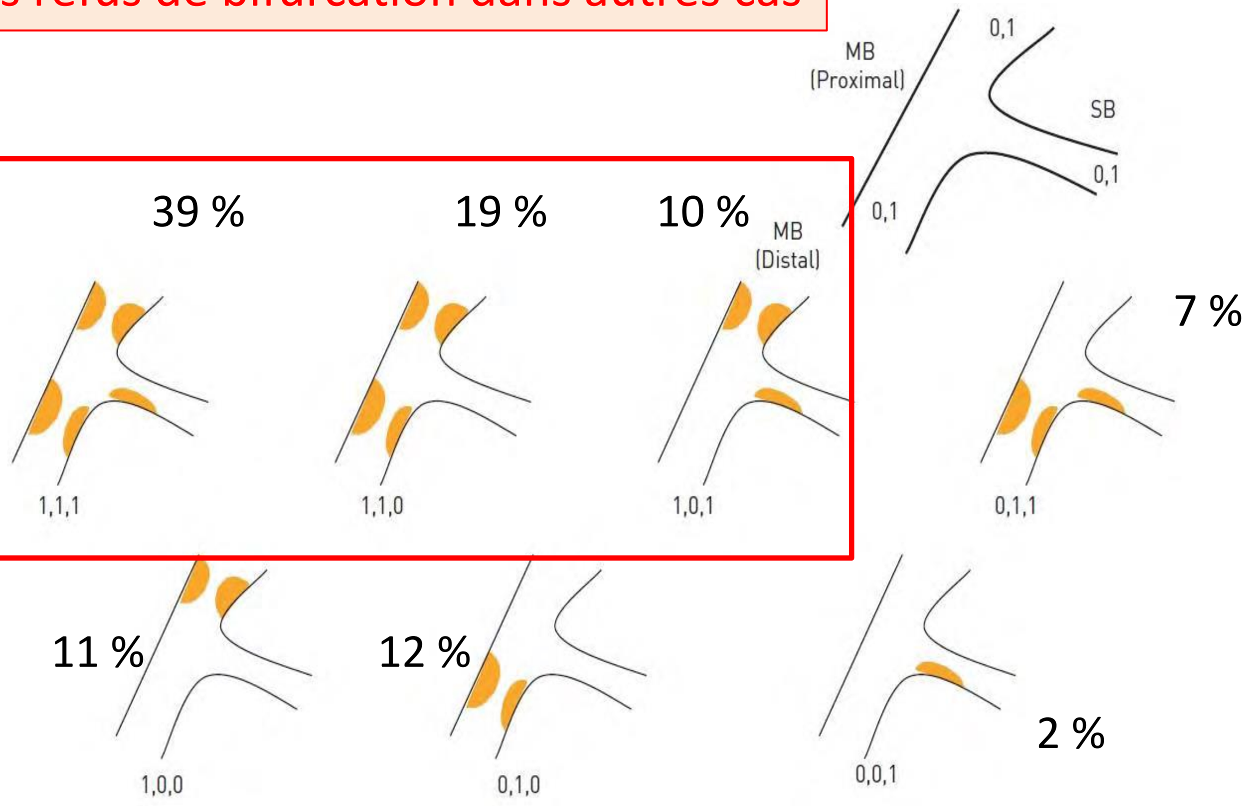
Périlleuse, niveau d’exigence maximal
Lésions complexes, difficile à analyser
Souvent distale, **Bifurcation dans 80 %**
Gros diamètres, discparités de calibres

TC = 5,3 % des ATL


LAD
LCX
LM
Normal
Proximal
Mid
Distal

Classification Medina

68% fin de TC + au moins un ostium
Se méfier des refus de bifurcation dans autres cas


MB
(Proximal)
0,1
SB
0,1
0,1
MB
(Distal)
39 %
19 %
10 %
1,1,1
1,1,0
1,0,1
7 %
0,1,1
11 %
12 %
1,0,0
0,1,0
0,0,1
2 %

ABCD classification for coronary artery bifurcation disease

Disparités de calibre susceptibles d’infléchir la stratégie

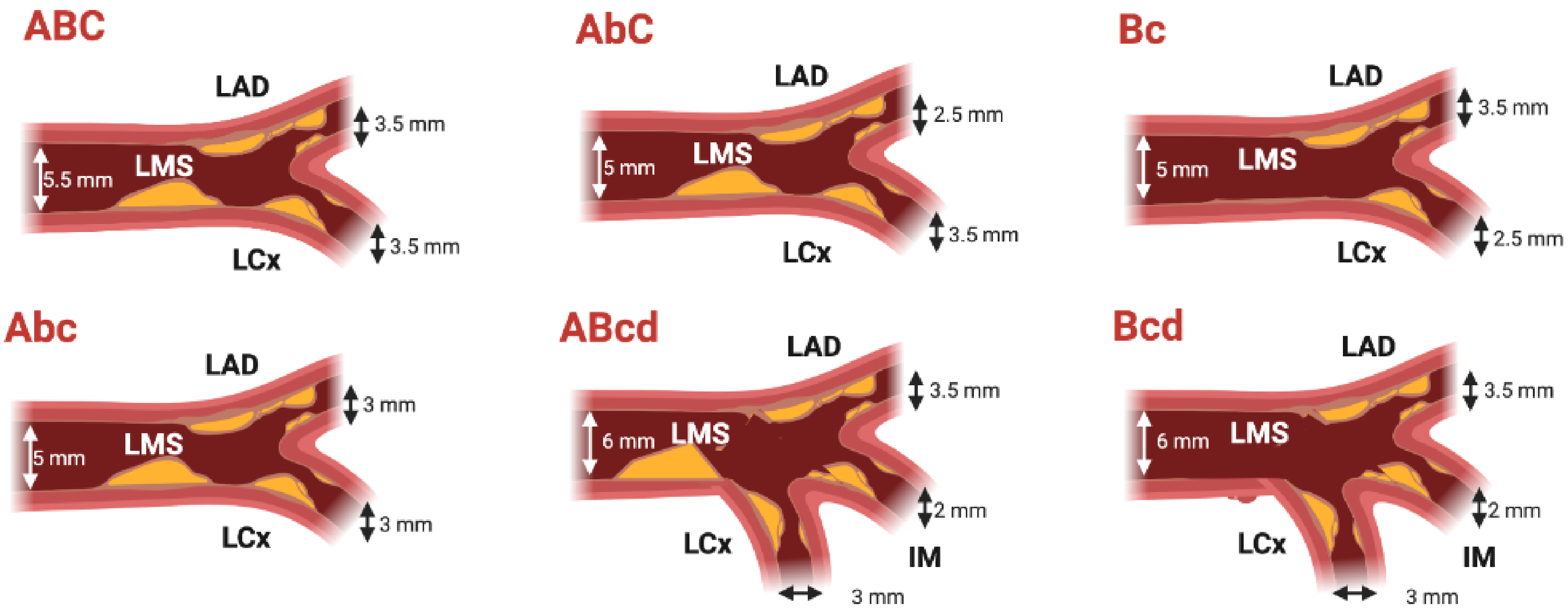
Significant lesion?*

A/a=Left main stem (LMS)
B/b=Left Anterior Descending (LAD)
C/c=Left Circumflex artery (LCx)
D/d=Intermediate branch (IM)

Vessel diameter

≥3.5mm: Upper case (e.g. A)

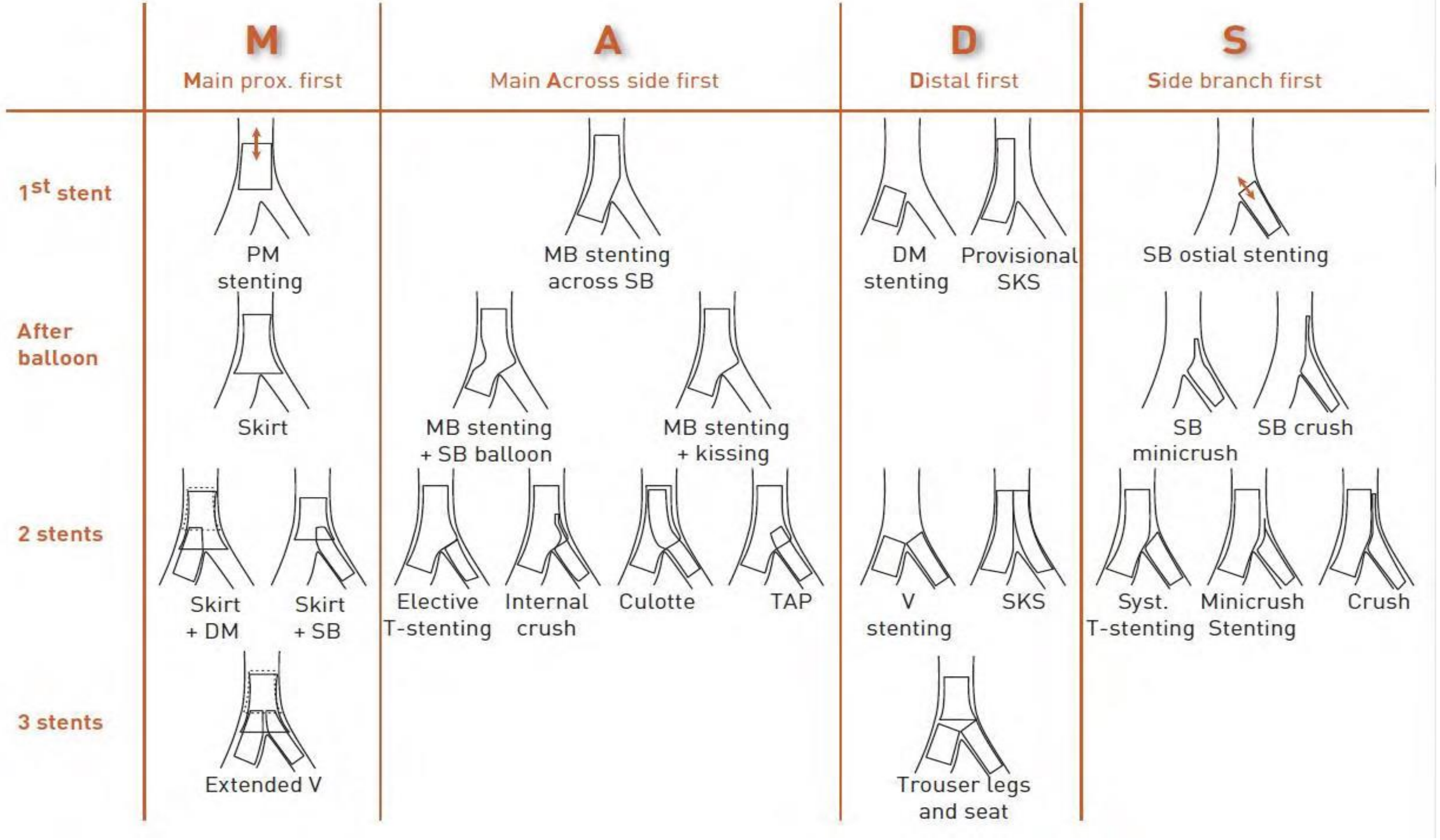
<3.5mm: Lower case (e.g. a)



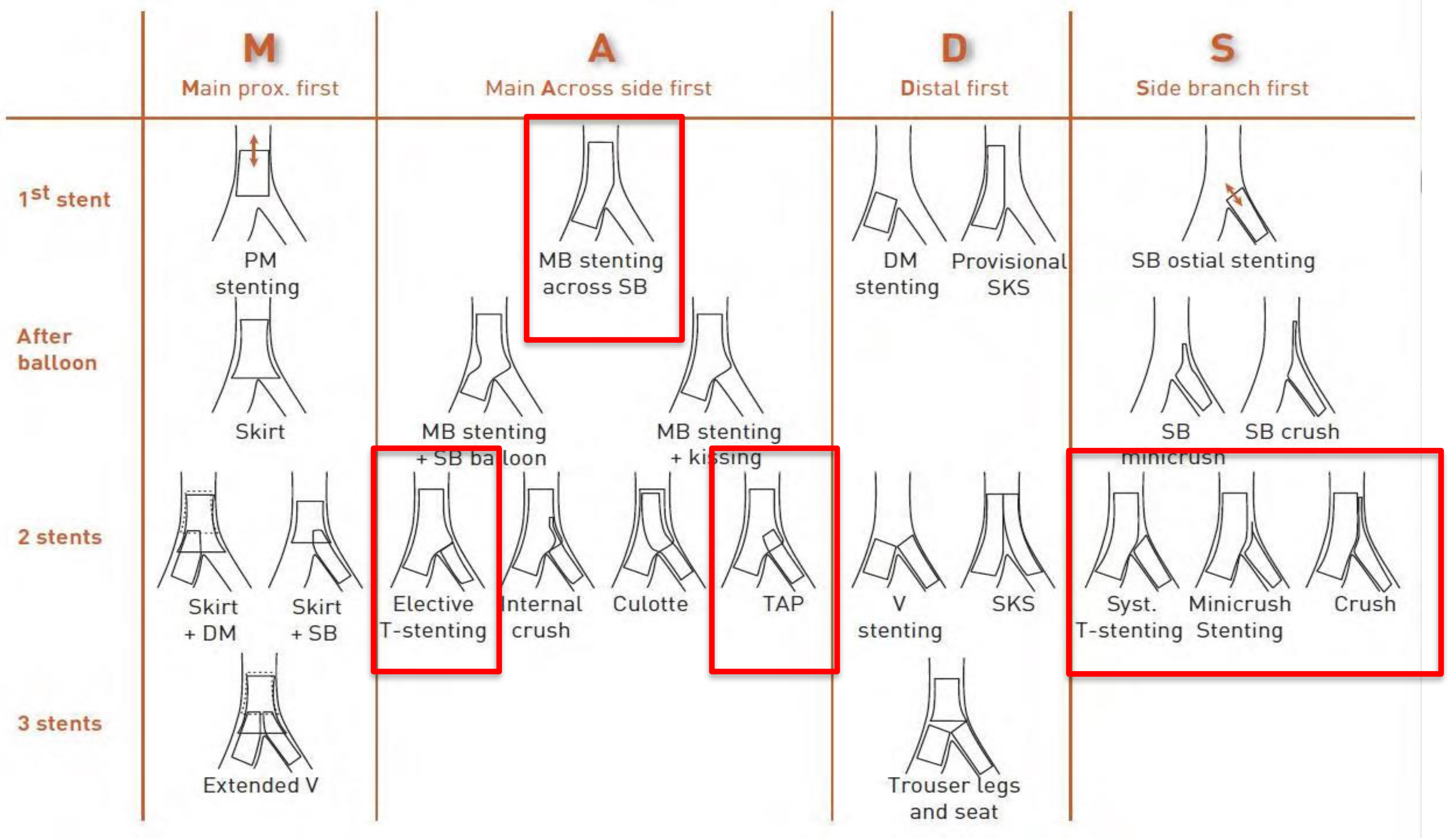
ABC
LAD
3.5 mm
5.5 mm
LMS
LCx
3.5 mm
AbC
LAD
2.5 mm
5 mm
LMS
LCx
3.5 mm
Bc
LAD
3.5 mm
5 mm
LMS
LCx
2.5 mm
Abc
LAD
3 mm
5 mm
LMS
LCx
3 mm
ABcd
LAD
3.5 mm
6 mm
LMS
2 mm
LCx
IM
3 mm
Bcd
LAD
3.5 mm
6 mm
LMS
2 mm
LCx
IM
3 mm

* ≥70% reduction in lumen or according to FFR or other resting indices, cCT-cFFR, IVUS, OCT

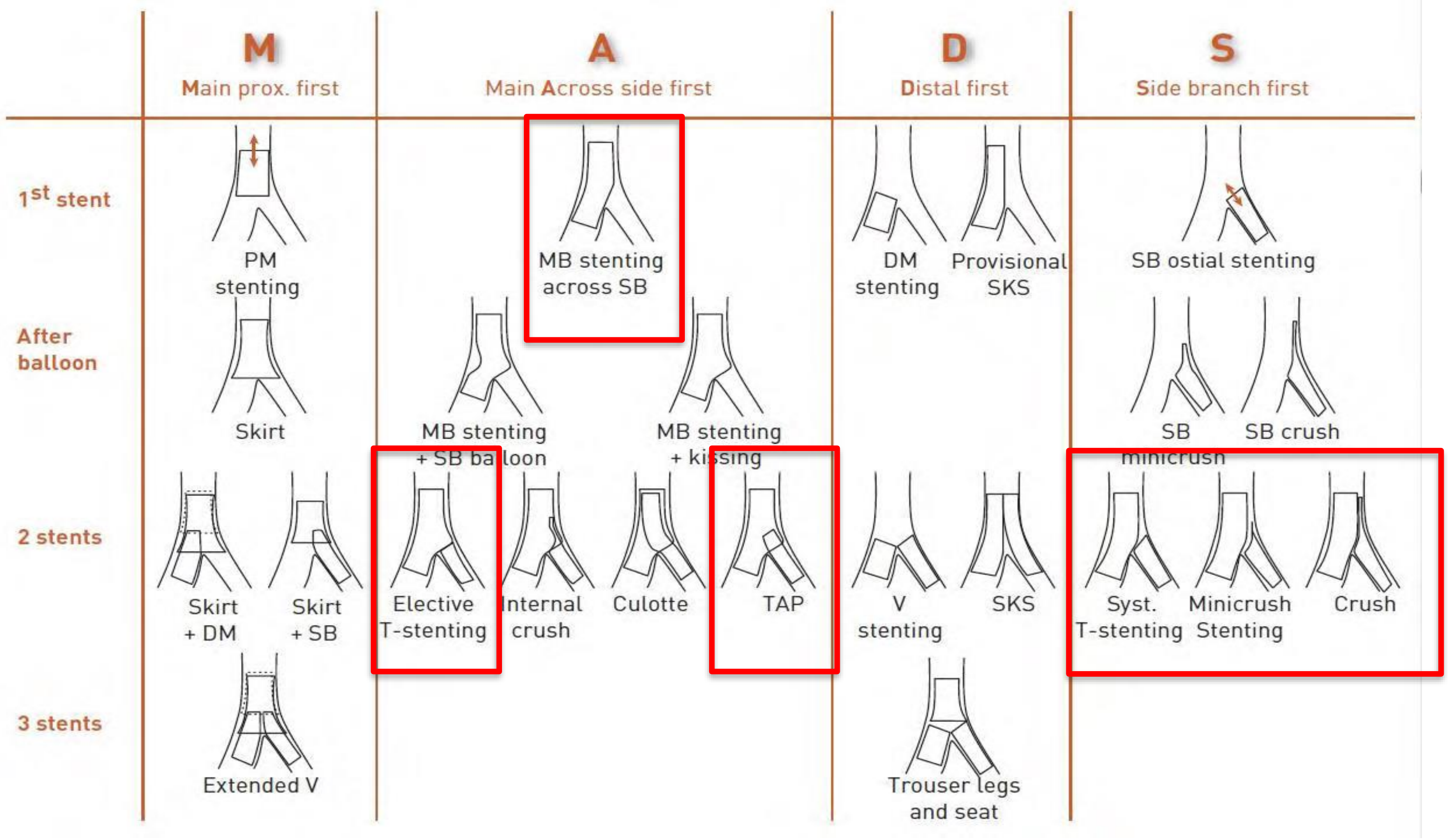
Classification MADS
de quoi devenir fou ?


M
Main prox. first
A
Main Across side first
D
Distal first
S
Side branch first
1st stent
After balloon
2 stents
3 stents
PM stenting
MB stenting across SB
DM stenting
Provisional SKS
SB ostial stenting
Skirt
MB stenting + SB balloon
MB stenting + kissing
SB minicrush
SB crush
Skirt + DM
Skirt + SB
Elective T-stenting
Internal crush
Culotte
TAP
V stenting
SKS
Syst. T-stenting
Minicrush Stenting
Crush
Extended V
Trouser legs and seat

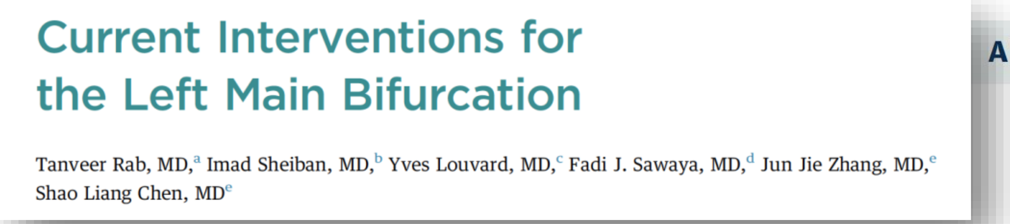
Classification MADS
techniques les plus utilisées


M
Main prox. first
A
Main Across side first
D
Distal first
S
Side branch first
1st stent
After balloon
2 stents
3 stents
PM stenting
MB stenting across SB
DM stenting
Provisional SKS
SB ostial stenting
Skirt
MB stenting + SB balloon
MB stenting + kissing
SB minicrush
SB crush
Skirt + DM
Skirt + SB
Elective T-stenting
Internal crush
Culotte
TAP
V stenting
SKS
Syst. T-stenting
Minicrush Stenting
Crush
Extended V
Trouser legs and seat

Classification MADS
techniques les plus utilisées

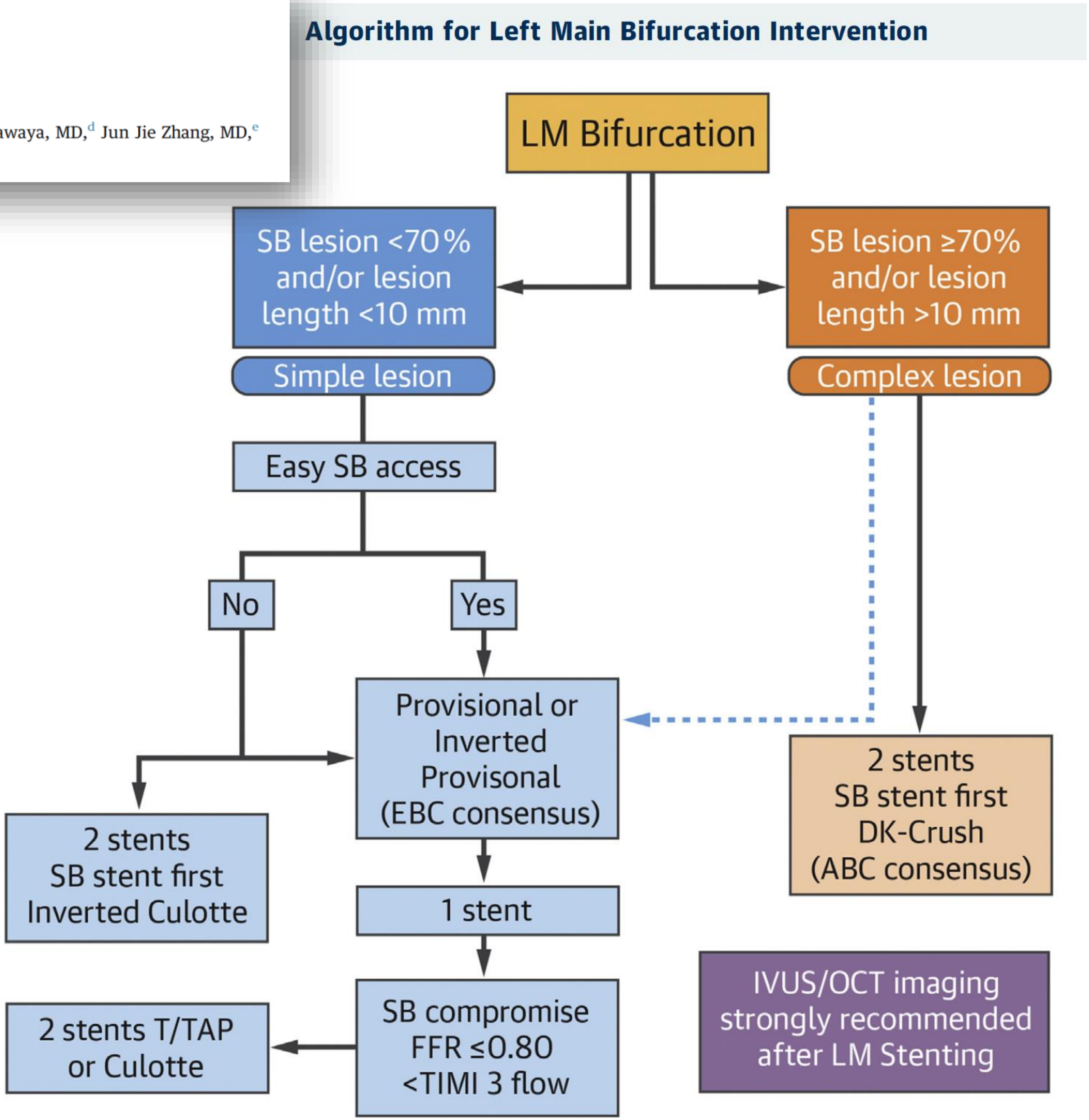

M
Main prox. first
A
Main Across side first
D
Distal first
S
Side branch first
1st stent
After balloon
2 stents
3 stents
PM stenting
MB stenting across SB
DM stenting
Provisional SKS
SB ostial stenting
Skirt
MB stenting + SB balloon
MB stenting + kissing
SB minicrush
SB crush
Skirt + DM
Skirt + SB
Elective T-stenting
Internal crush
Culotte
TAP
V stenting
SKS
Syst. T-stenting
Minicrush Stenting
Crush
Extended V
Trouser legs and seat

Toujours finir par un kissing quand il y a deux stents



Current Interventions for the Left Main Bifurcation

Tanveer Rab, MD,[a] Imad Sheiban, MD,[b] Yves Louvard, MD,[c] Fadi J. Sawaya, MD,[d] Jun Jie Zhang, MD,[e]
Shao Liang Chen, MD[e]



Algorithm for Left Main Bifurcation Intervention

LM Bifurcation

SB lesion <70% and/or lesion length <10 mm

Simple lesion

Easy SB access

No

Yes

Provisional or Inverted Provisonal (EBC consensus)

1 stent

SB compromise
FFR ≤0.80
<TIMI 3 flow

2 stents T/TAP or Culotte

2 stents
SB stent first
Inverted Culotte

SB lesion ≥70% and/or lesion length >10 mm

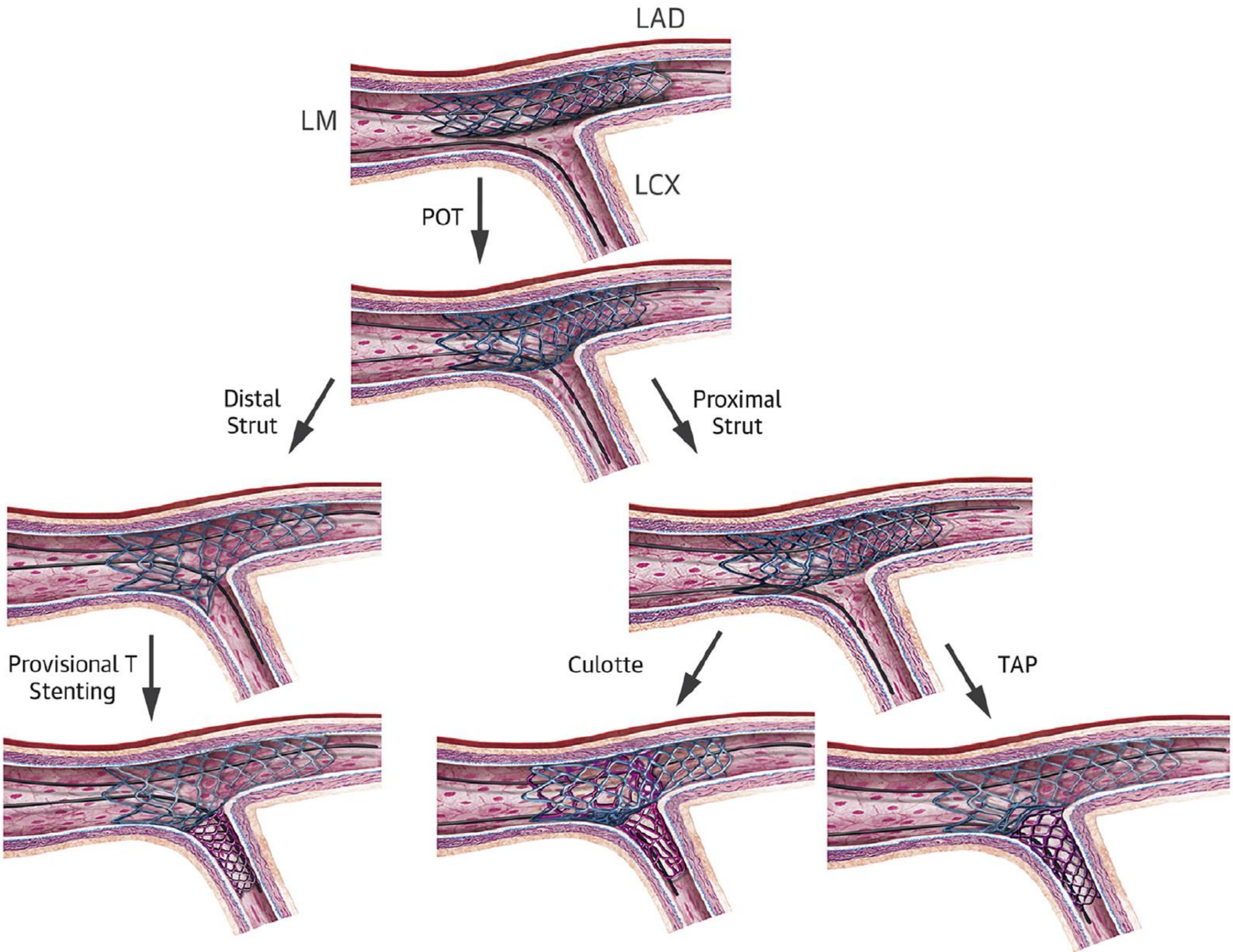
Complex lesion

2 stents
SB stent first
DK-Crush
(ABC consensus)

IVUS/OCT imaging strongly recommended after LM Stenting

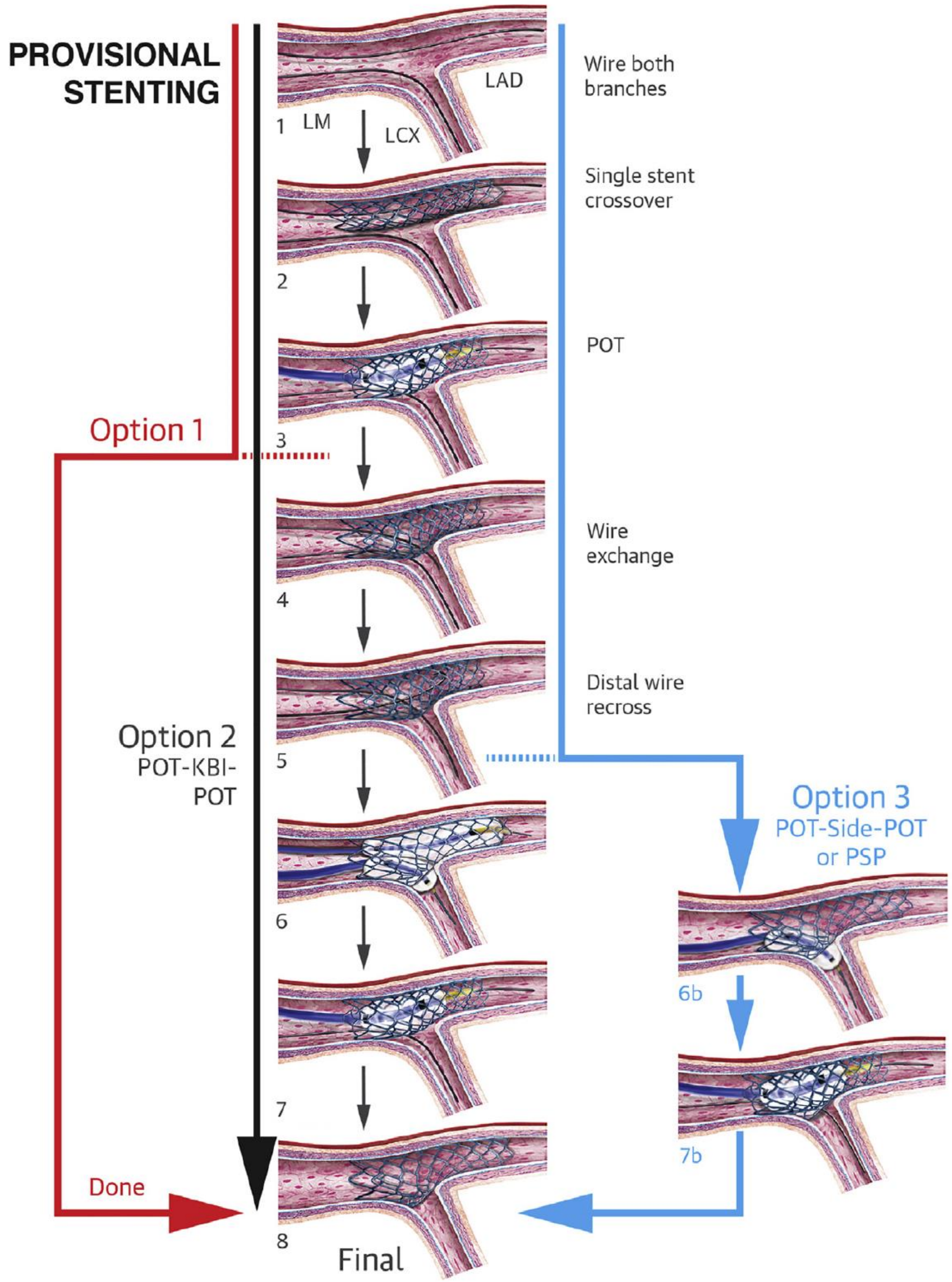
J Am Coll Cardiol Intv. 2017

FIGURE 4 Choices for Second Stent in Provisional Stenting


LAD
LM
LCX
POT
Distal Strut
Proximal Strut
Provisional T Stenting
Culotte
TAP

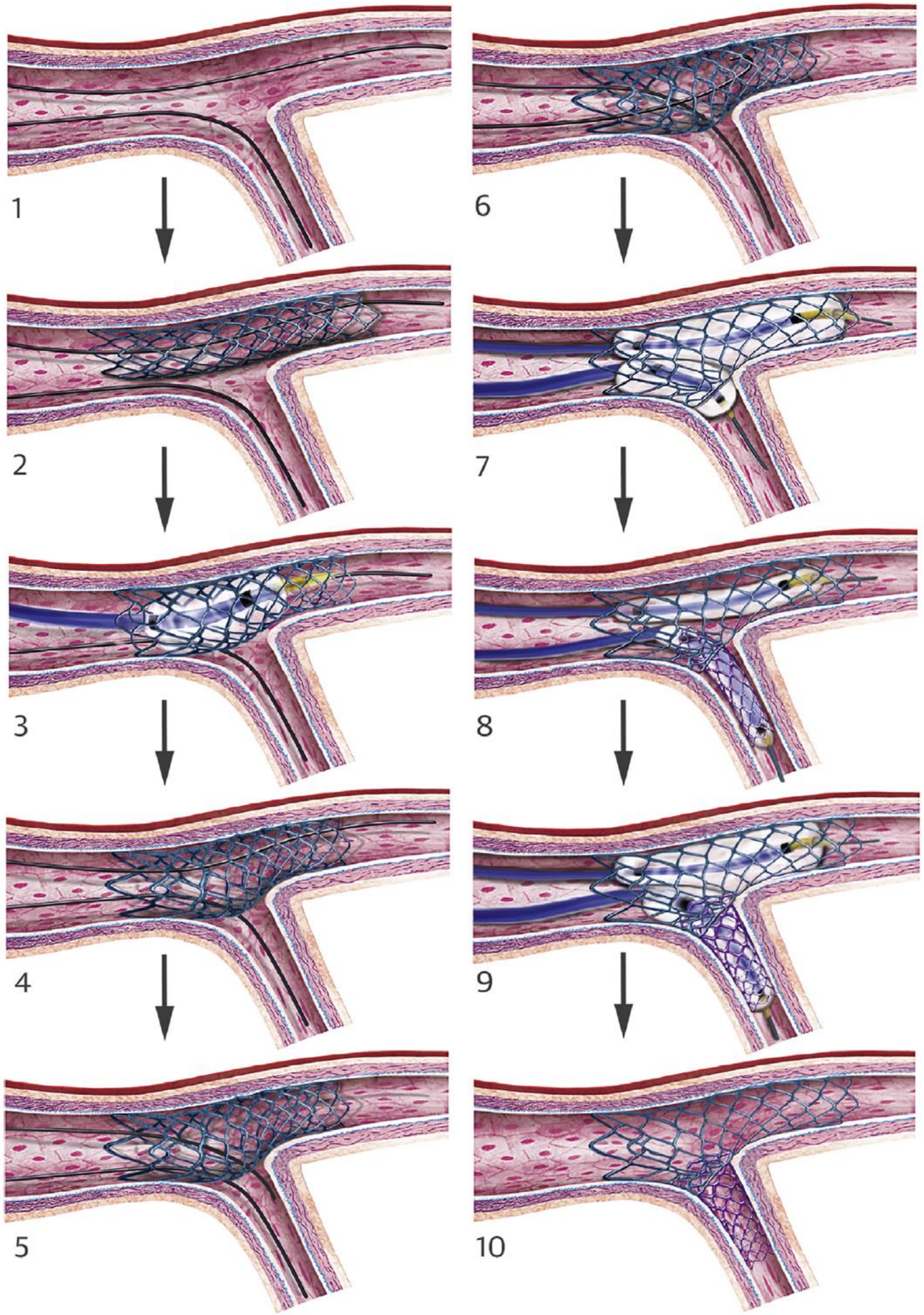
T-Stenting

FIGURE 2 **Provisional Stenting With Single Stent Crossover**


PROVISIONAL STENTING
1
LM
LCX
LAD
Wire both branches
2
Single stent crossover
3
POT
Option 1
4
Wire exchange
5
Distal wire recross
Option 2
POT-KBI-POT
6
7
Option 3
POT-Side-POT or PSP
6b
7b
Done
8
Final

Am Coll Cardiol Intv. 2017

FIGURE 3 T-Stenting and Minimal Protrusion

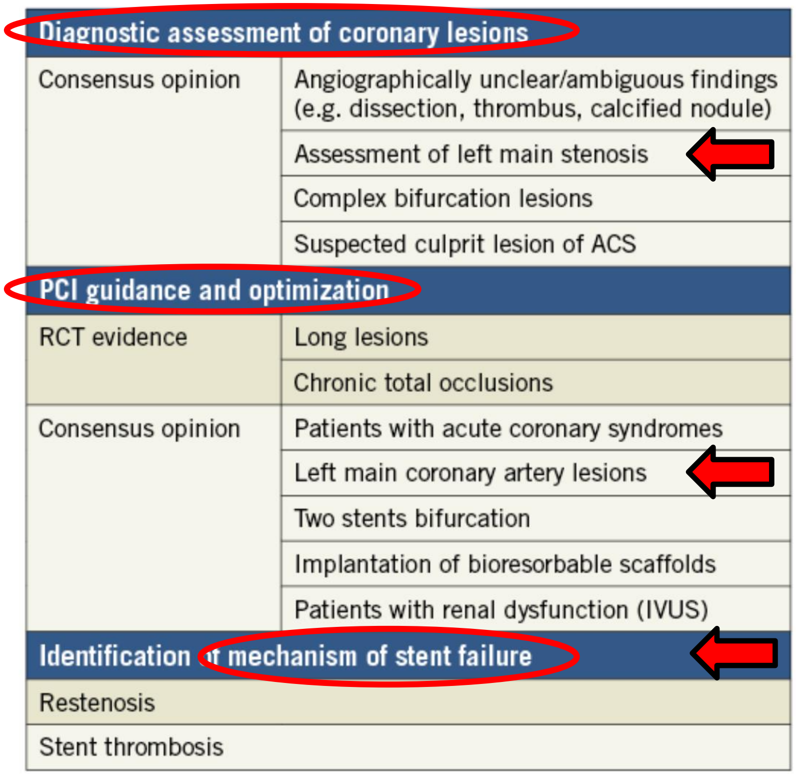

1
2
3
4
5
6
7
8
9
10

TAP

J Am Coll Cardiol Intv. 2017

Impact de l’imagerie sur le pronostic

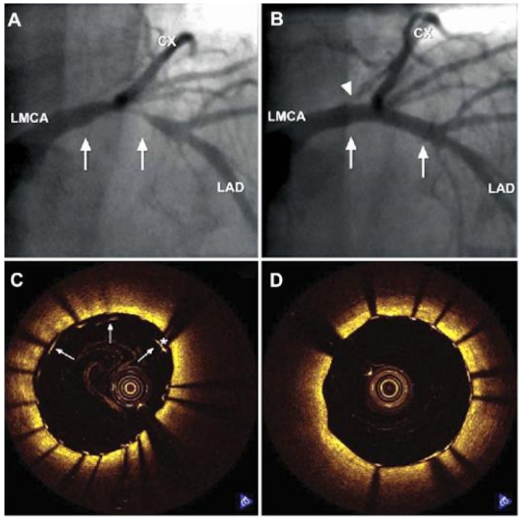
Recommandations of the adjunctive use of intravascular imaging for diagnostic evaluation of coronary artery disease, guidance and optimization of PCIs



Diagnostic assessment of coronary lesions	
Consensus opinion	Angiographically unclear/ambiguous findings (e.g. dissection, thrombus, calcified nodule)
	Assessment of left main stenosis
	Complex bifurcation lesions
	Suspected culprit lesion of ACS
PCI guidance and optimization	
RCT evidence	Long lesions
	Chronic total occlusions
Consensus opinion	Patients with acute coronary syndromes
	Left main coronary artery lesions
	Two stents bifurcation
	Implantation of bioresorbable scaffolds
	Patients with renal dysfunction (IVUS)
Identification of mechanism of stent failure	
Restenosis	
Stent thrombosis	

An expert consensus document of the EAPCI

L. Raber, Eurointervention 2018

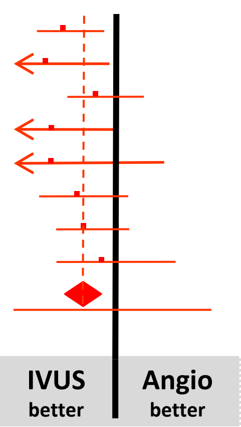


R. Bing, JACC Cardiovasc Interv 2015

Impact de l'imagerie sur le pronostic

Intravascular Imaging improves long term prognosis

Meta-analysis of 8 Randomized Trials of IVUS vs Angio-Guided DES Implantation



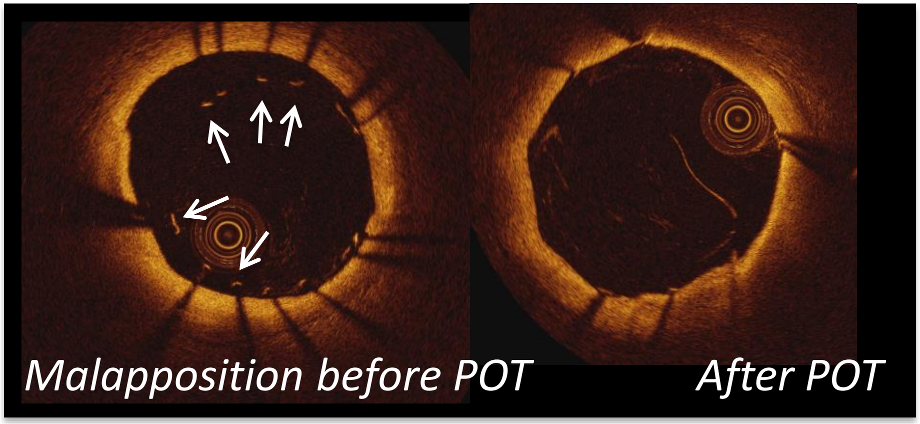
Study	Year	#	OR	IVUS MACE	Angio MACE
IVUS-XLP	2015	1400	0.49	19/700	39/700
CTO-IVUS	2015	402	0.37	5/201	14/201
AIR-CTO	2015	230	0.82	25/115	29/115
Tan-LM	2015	123	0.42	8/61	17/62
MOZART	2014	83	0.41	2/41	5/42
RESET	2013	543	0.60	12/269	20/274
AVIO	2013	284	0.67	24/142	33/142
Home-DES	2010	210	0.91	11/105	12/105
OVERALL		3275	0.59	106/1634	169/1641
				6.5%	**10.3%**

Events	IVUS events	Angio events	OR	95% CI	P-value
MACE	**6.5%**	**10.3%**	**0.59**	**0.46-0.76**	**<0.0001**
CV mortality	**0.5%**	**1.2%**	**0.46**	**0.21-1.00**	**0.05**
MI	0.9%	1.6%	0.58	0.30-1.11	0.10
TLR	**4.1%**	**6.6%**	**0.60**	**0.43-0.84**	**0.003**
TVR	**5.5%**	**8.7%**	**0.61**	**0.41-0.91**	**0.02**
ST	**0.6%**	**1.3%**	**0.49**	**0.24-0.99**	**0.04**

MACE
Mortality **÷2**
Stent Thrombosis

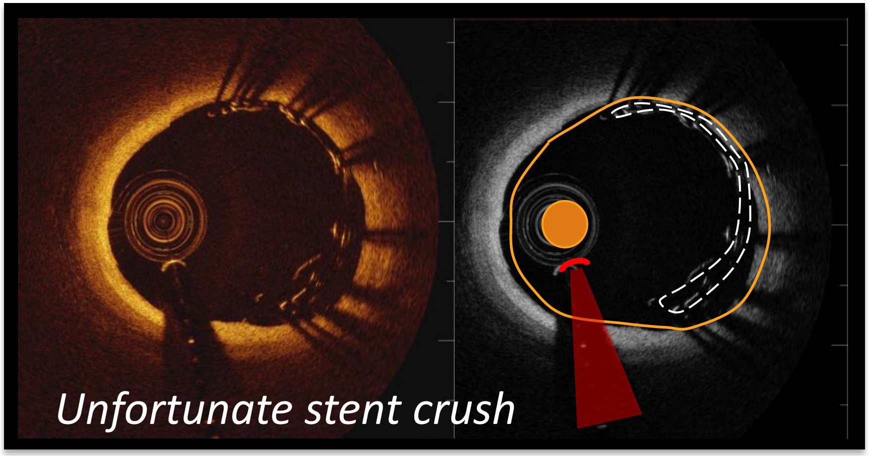
Elgendy et al. Circ Cardiovasc Interv 2016

Impact de l’imagerie sur le pronostic

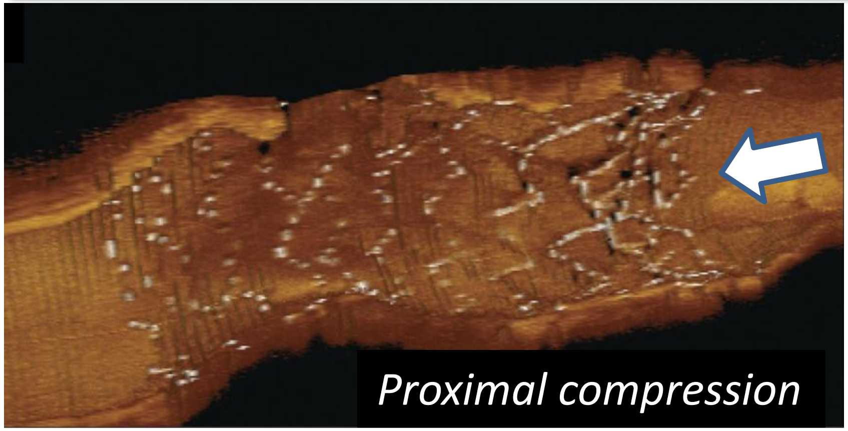


Malapposition before POT

After POT

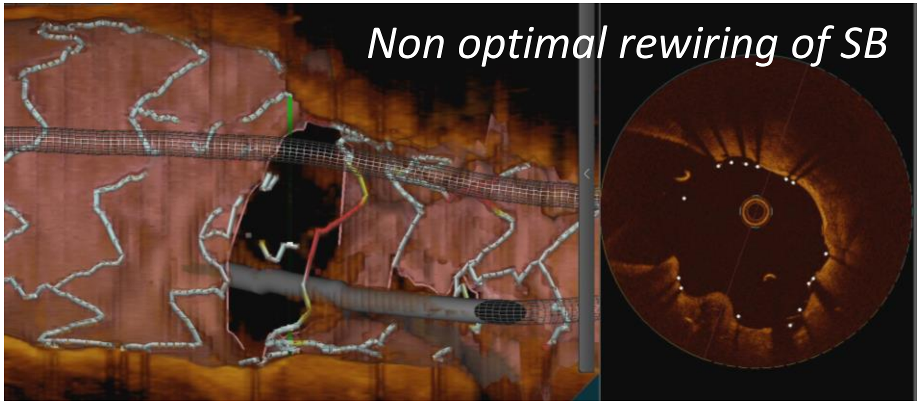


Unfortunate stent crush



Proximal compression

Foerst J. JCIN 2012

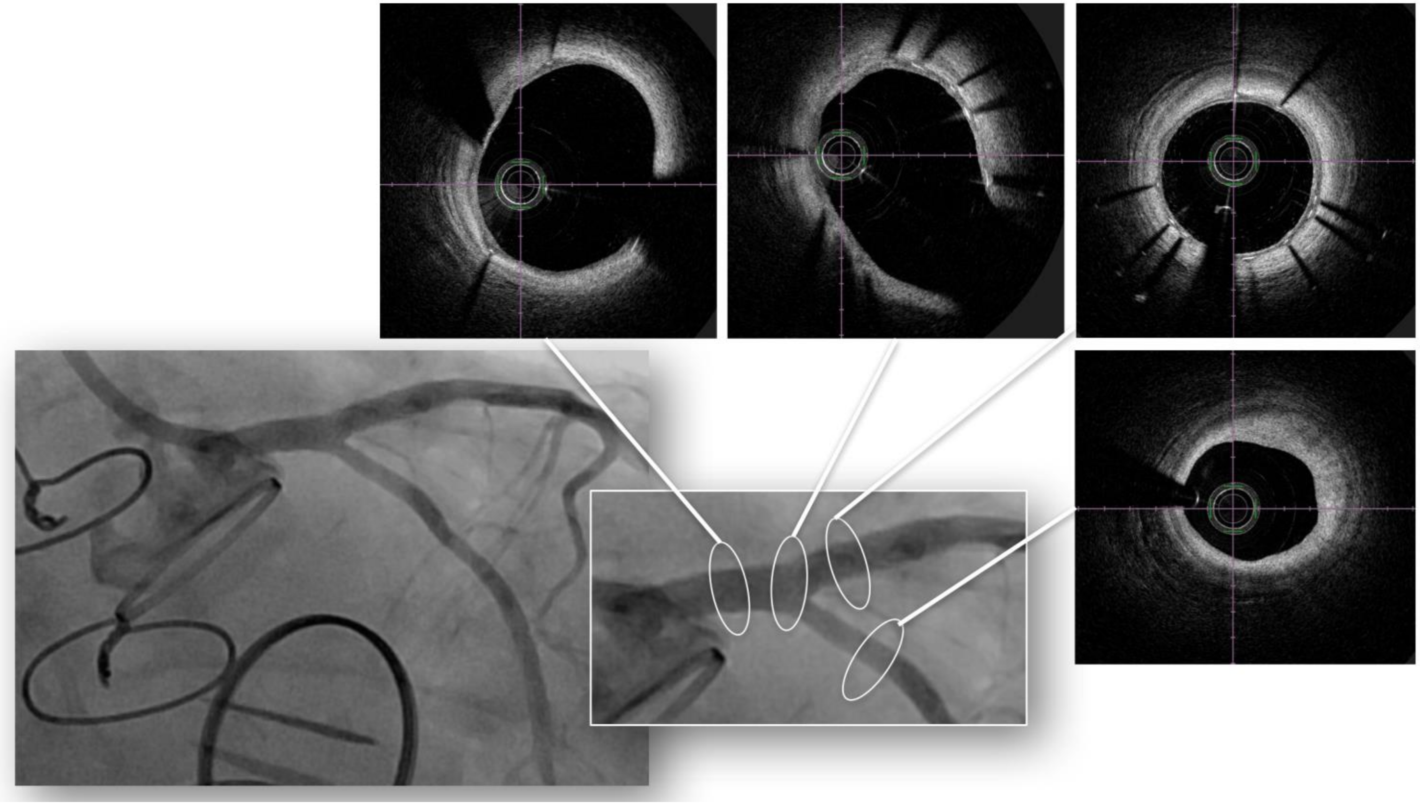


Non optimal rewiring of SB

PCI Strategy & PCI Guiding

Impact de l'imagerie sur le pronostic

DES follow-up @ 3 months (under DAPT + oral anticoagulant)



Post-PCI & Follow-up

LEMON

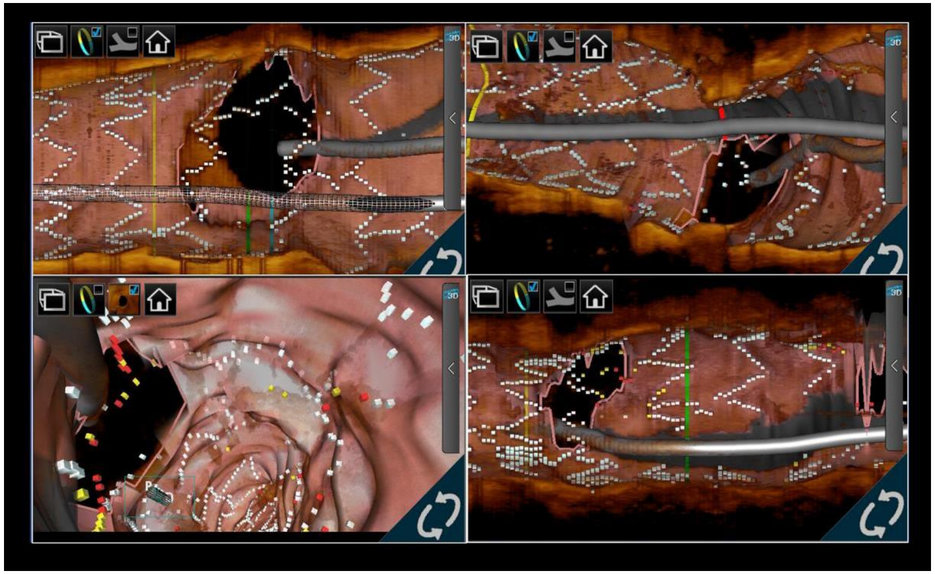
LEft **M**ain **O**ct-guided i**N**terventions

- **OCT-guided LM PCI using Xience EES (n=70)**
- Standardized OCT analysis plan
- **Bifurcation technique** (1 vs. 2 stents , POT/Side/RePOT vs. POT/Kiss, compliant vs. non compliant balloons …) **was left at the discretion of the operator**

Influence of OCT analysis on PCI flow

Wire repositioning after run#2	**15 %**
PCI optimization (Post dilation, etc..) after run#3	**26 %**

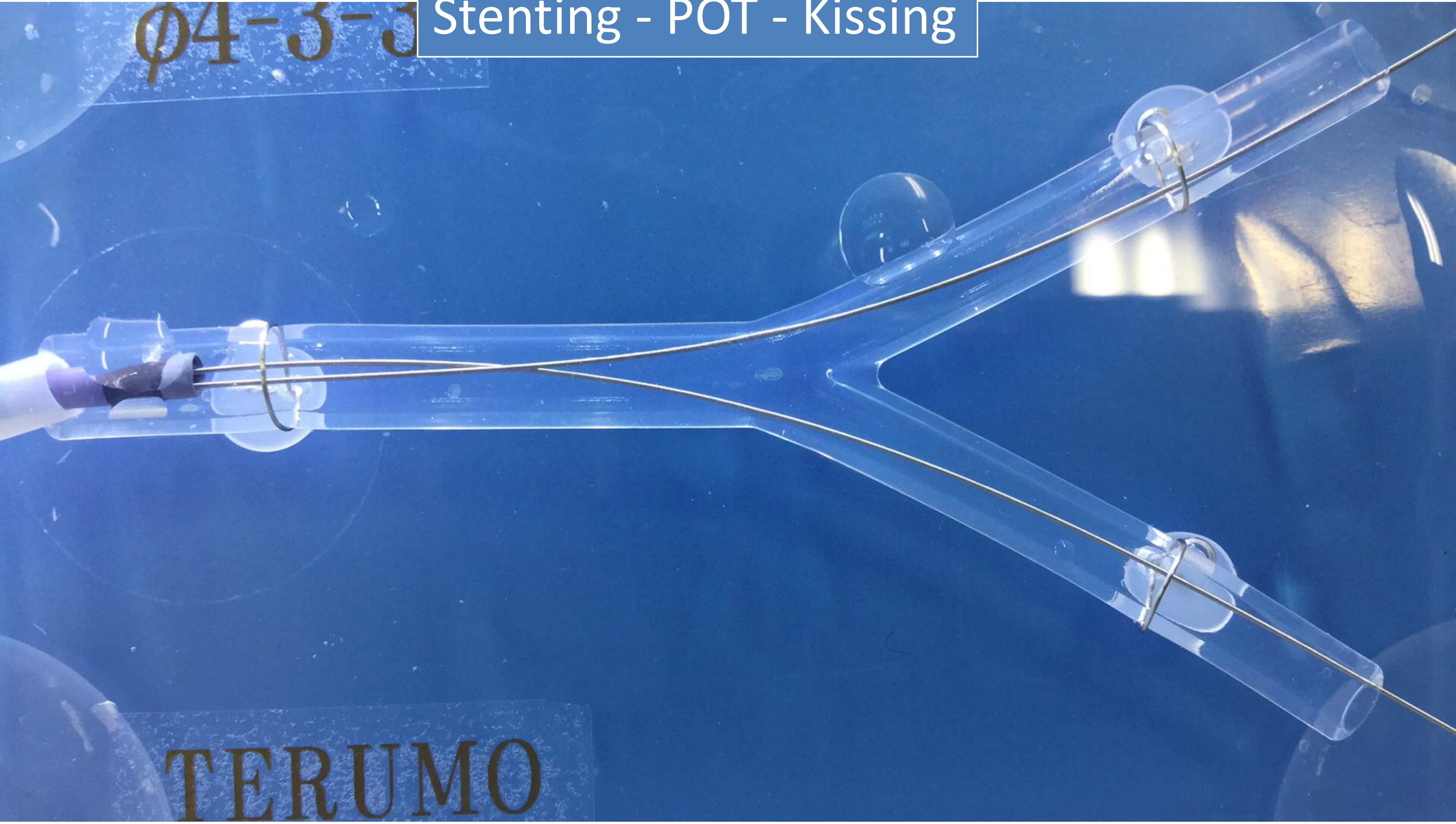
Inadequate wire position



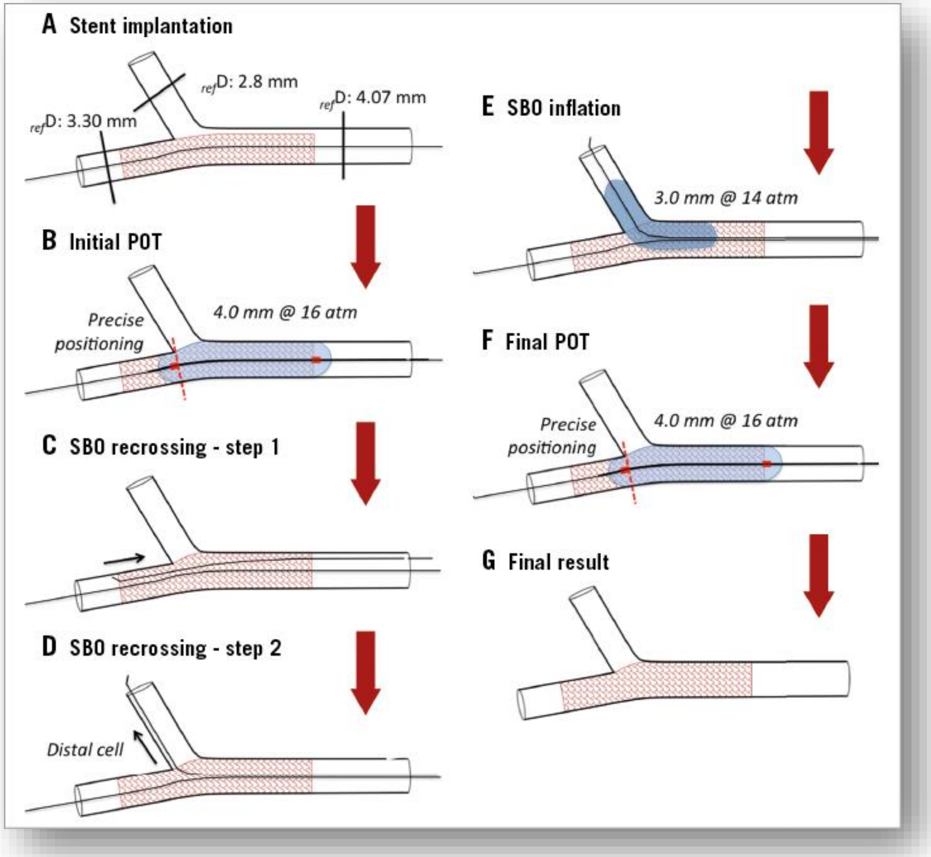
Amabile N Eurointervention. 2021

Enseignements du Banc

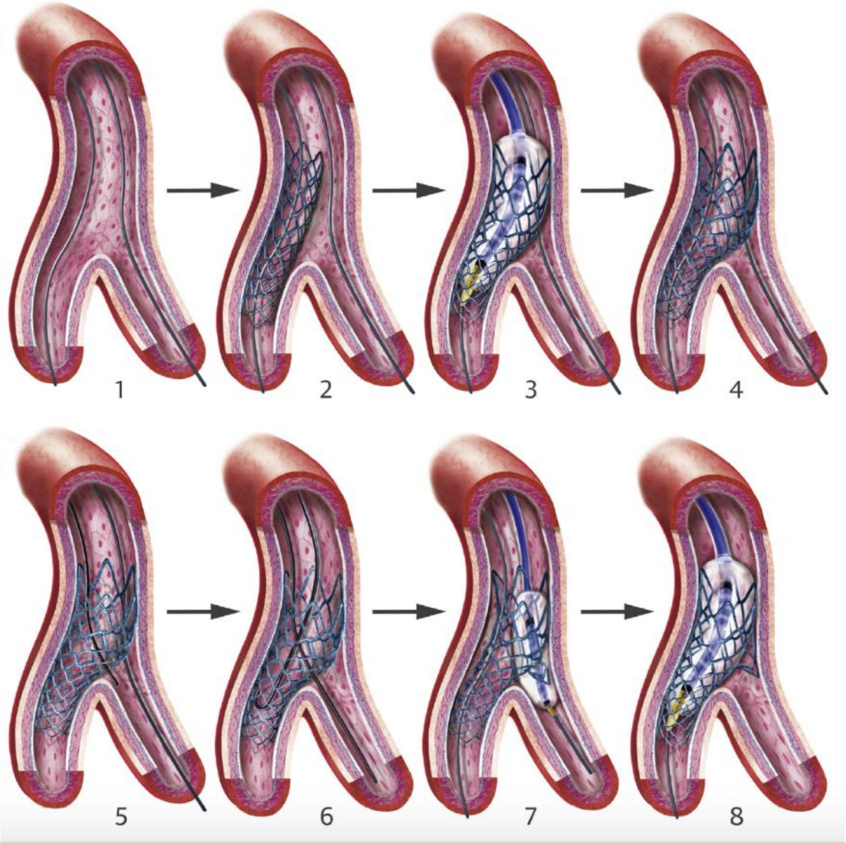
Stenting - POT - Kissing


ϕ4-3-3
TERUMO

Stenting POT- Side -POT ou **REPOT**

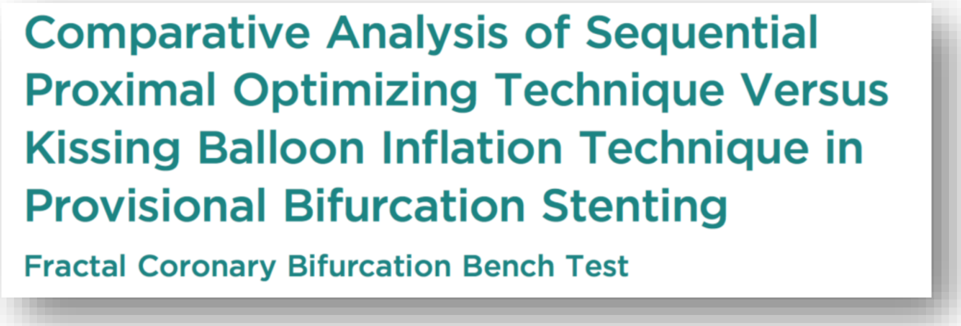

A Stent implantation
refD: 3.30 mm
refD: 2.8 mm
refD: 4.07 mm
B Initial POT
Precise positioning
4.0 mm @ 16 atm
C SBO recrossing - step 1
D SBO recrossing - step 2
Distal cell
E SBO inflation
3.0 mm @ 14 atm
F Final POT
Precise positioning
4.0 mm @ 16 atm
G Final result

Finet G, JACC Cardiovasc Interv. 2015



Sawaya FJ, JACC Cardiovasc Interv 2016

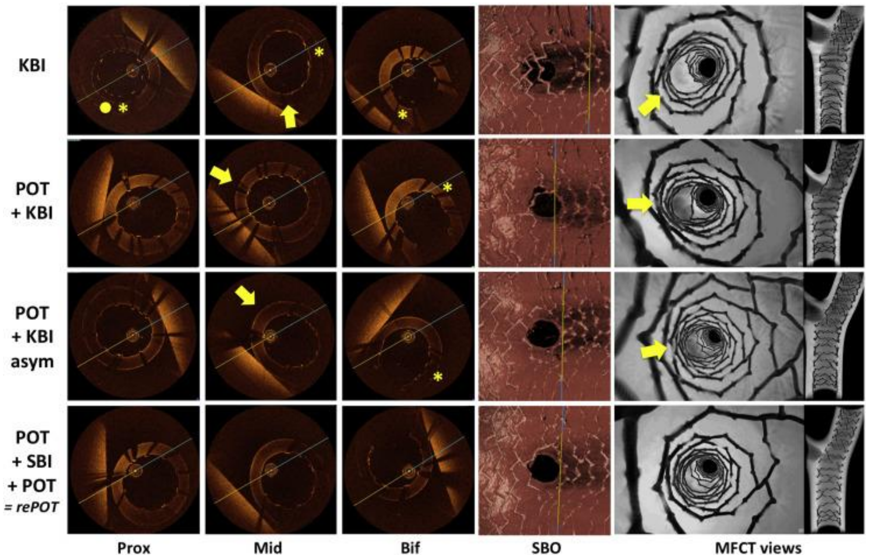
Stenting POT- Side -POT ou **REPOT**

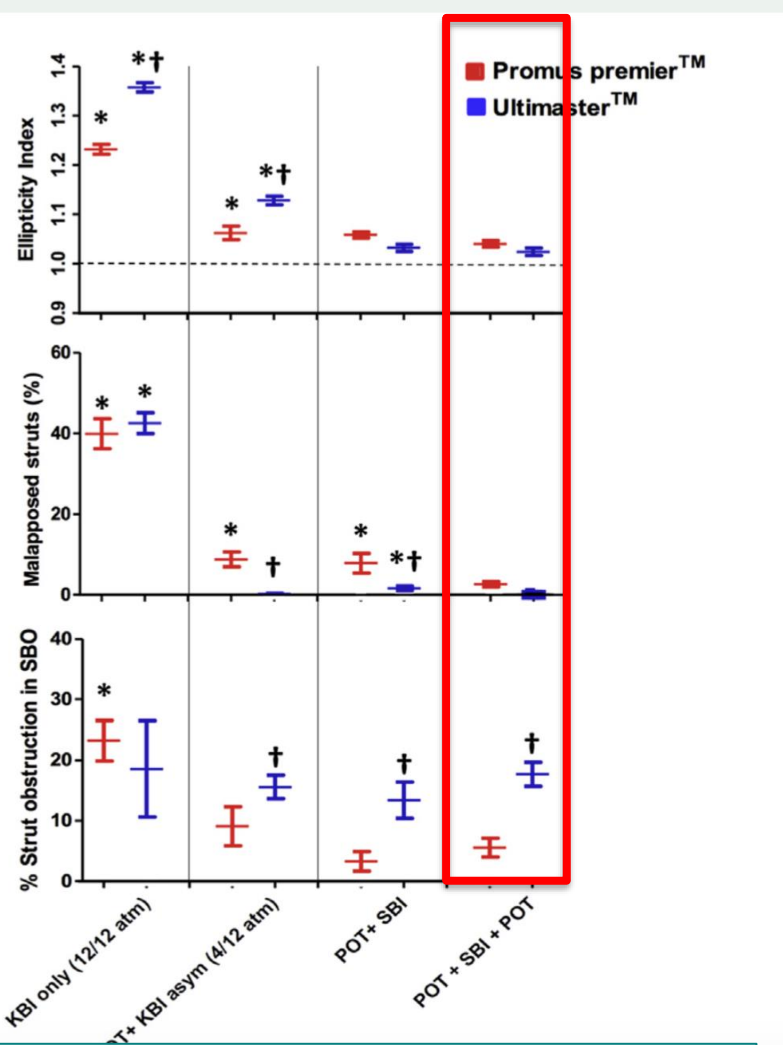


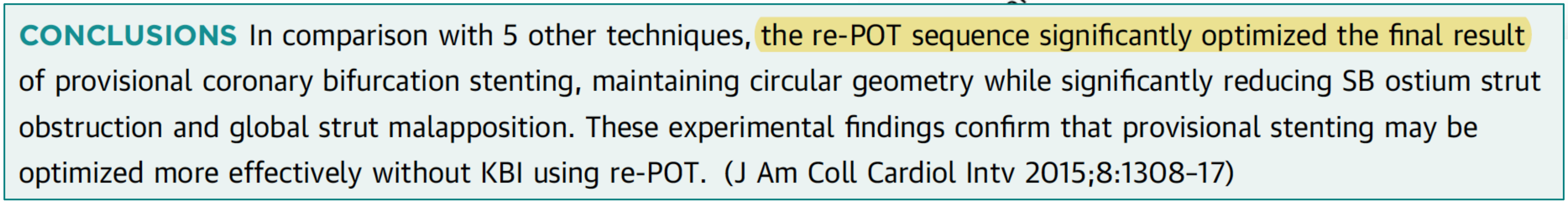
Comparative Analysis of Sequential Proximal Optimizing Technique Versus Kissing Balloon Inflation Technique in Provisional Bifurcation Stenting

Fractal Coronary Bifurcation Bench Test

Finet G, JACC Cardiovasc Interv. 2015

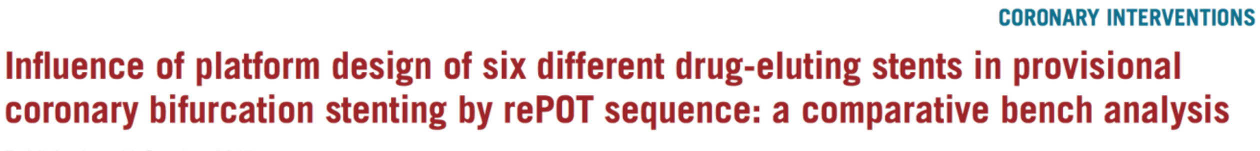






CONCLUSIONS In comparison with 5 other techniques, the re-POT sequence significantly optimized the final result of provisional coronary bifurcation stenting, maintaining circular geometry while significantly reducing SB ostium strut obstruction and global strut malapposition. These experimental findings confirm that provisional stenting may be optimized more effectively without KBI using re-POT. (J Am Coll Cardiol Intv 2015;8:1308–17)

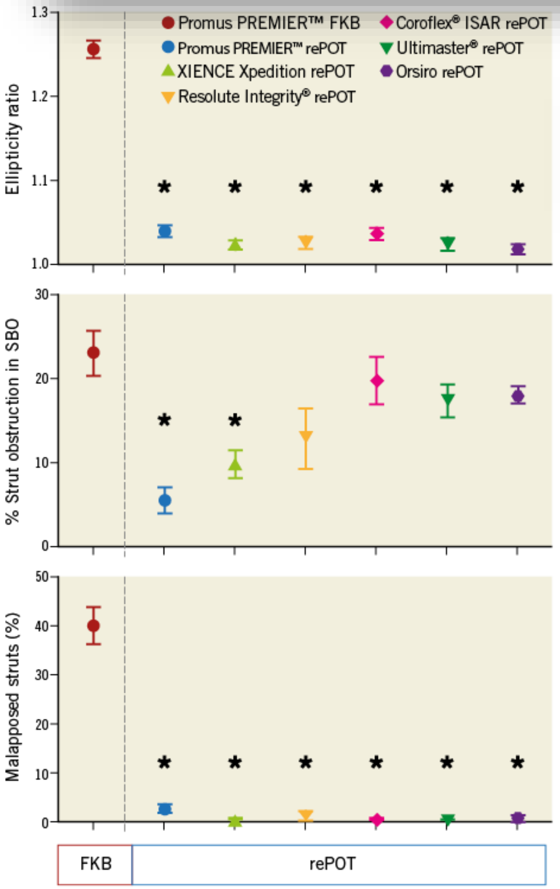
Stenting POT- Side -POT ou **REPOT**

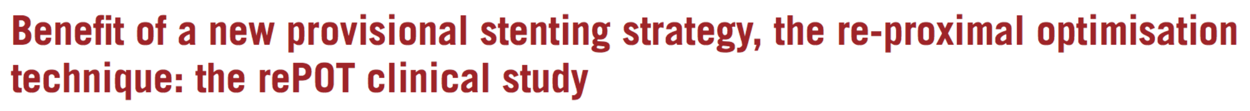


CORONARY INTERVENTIONS

Influence of platform design of six different drug-eluting stents in provisional coronary bifurcation stenting by rePOT sequence: a comparative bench analysis

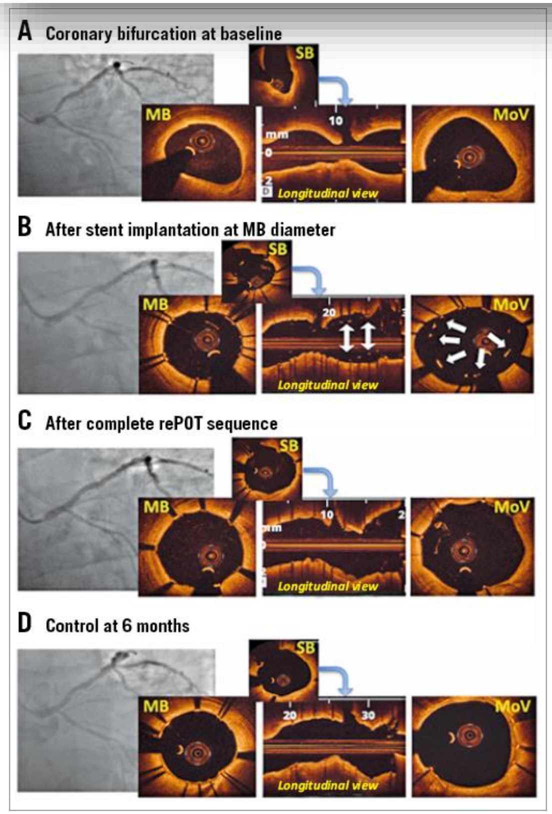
Derimay F, Eurointervention 2017





Benefit of a new provisional stenting strategy, the re-proximal optimisation technique: the rePOT clinical study

Derimay F, Eurointervention 2018


A Coronary bifurcation at baseline
SB
MB
MoV
10
mm
0
Longitudinal view
B After stent implantation at MB diameter
SB
MB
MoV
20
Longitudinal view
C After complete rePOT sequence
SB
MB
MoV
10
Longitudinal view
D Control at 6 months
SB
MB
MoV
20
30
Longitudinal view

REPOT

« ça marche avec tous les stents »

« efficace sur banc et en clinique »

- 106 pts
- 40% TC
- <1% TLR à 6 mois

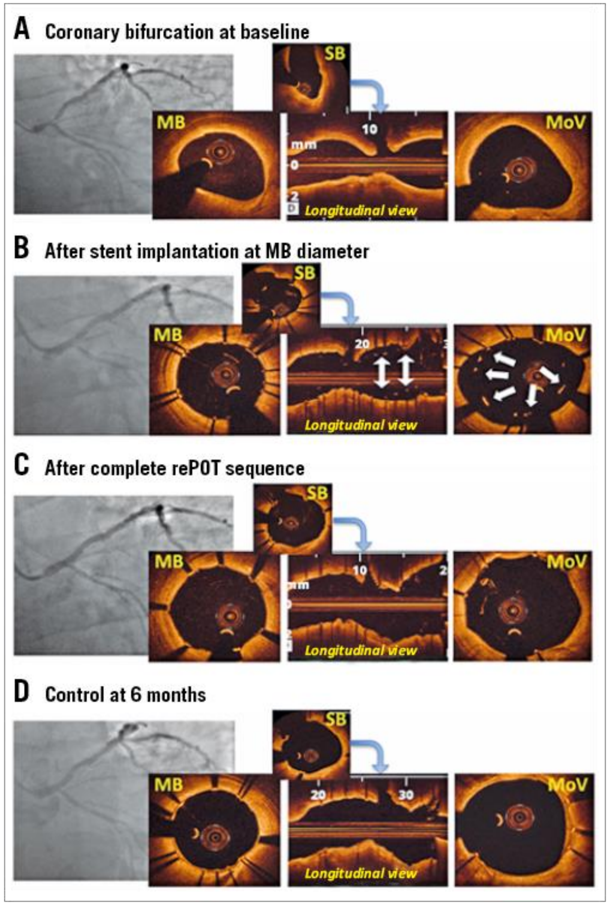
Impact de l’imagerie sur le pronostic

PCI Strategy & PCI Guiding

Benefit of a new provisional stenting strategy, the re-proximal optimisation technique :

The rePOT clinical study

Derimay F, Eurointervention 2018

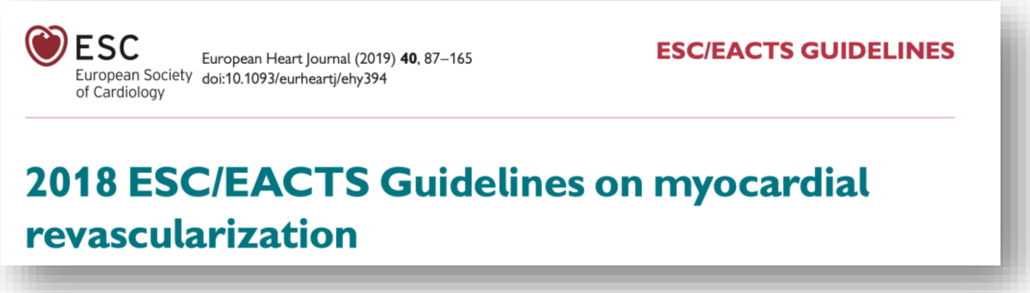

A Coronary bifurcation at baseline
SB
MB
10
mm
Longitudinal view
MoV
B After stent implantation at MB diameter
SB
MB
20
Longitudinal view
MoV
C After complete rePOT sequence
SB
MB
10
Longitudinal view
MoV
D Control at 6 months
SB
MB
20
30
Longitudinal view
MoV

rePOT

« Showed the benefit of the rePOT sequence in provisional stenting, **replicating in vivo the excellent in vitro geometric results previously reported**, and confirming ease of implementation and medium-term safety »

- **106 pts, 40% Left Main**
- **<1% TLR @ 6 months**

Expérience et volume de pratique

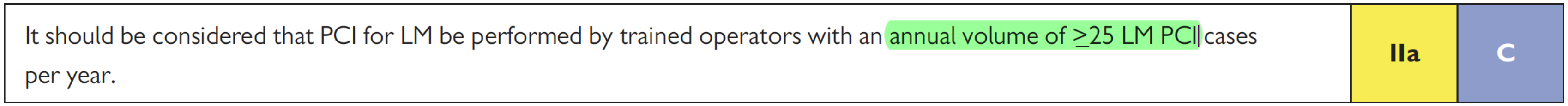


ESC
European Society of Cardiology

European Heart Journal (2019) **40**, 87–165
doi:10.1093/eurheartj/ehy394

ESC/EACTS GUIDELINES

2018 ESC/EACTS Guidelines on myocardial revascularization



It should be considered that PCI for LM be performed by trained operators with an annual volume of ≥25 LM PCI cases per year.	**IIa**	**C**

3 opérateurs dans un centre,
75 TC (5% des procédures),
volume de 1500 angioplasties…/an

Haut volume, expérience, compagnonnage, maitriser les techniques

Décision d'ATL

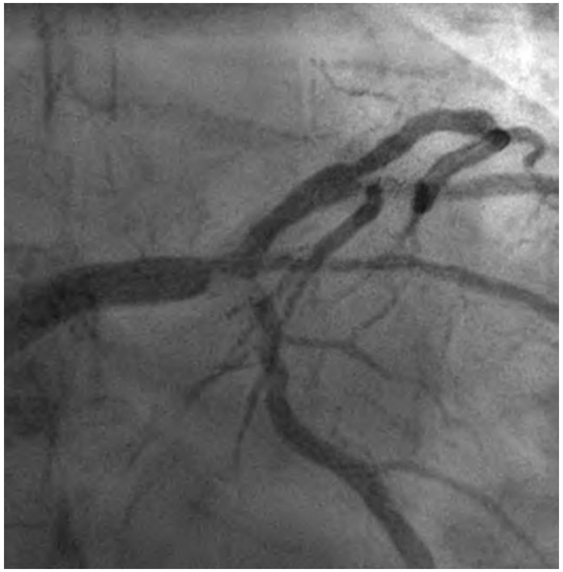
- Score SYNTAX: 24
- Euroscore : 5,1%
- Co-morbidité

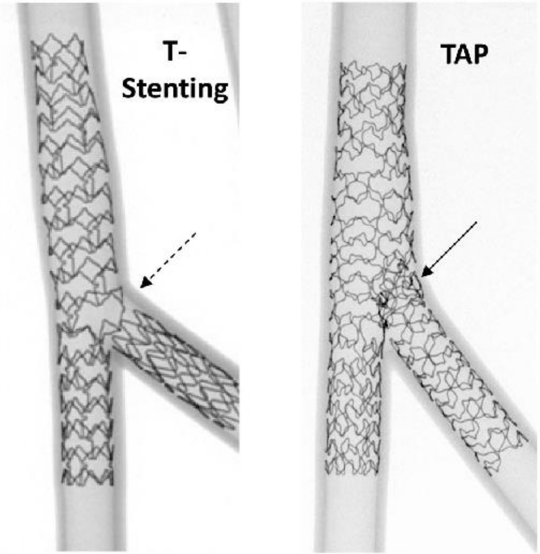
Medina ?

- 1/1/1

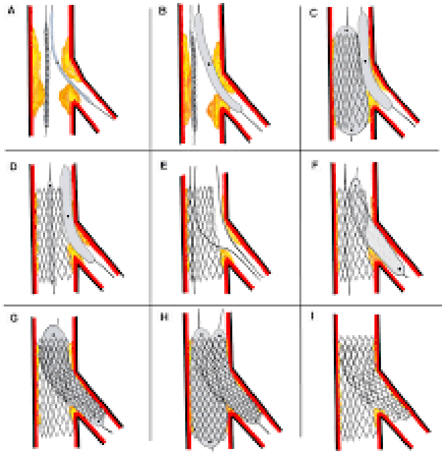
Quelle technique ?

- T stenting
- DK Crush
- Culotte

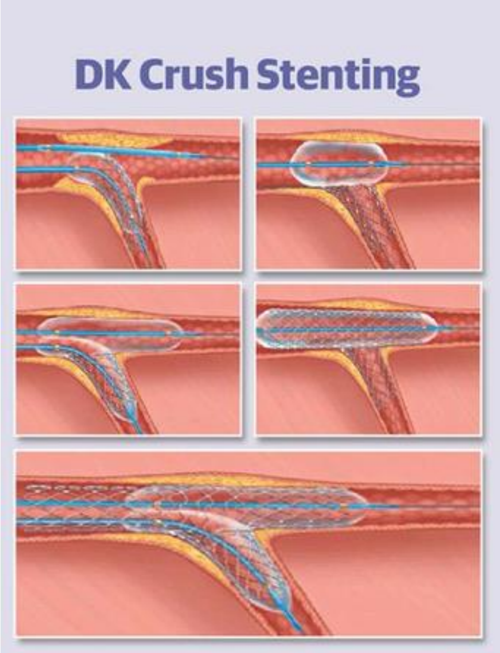



T-Stenting
TAP

T-Stenting ou TAP



Culotte



DK Crush Stenting

Collège
National des
Cardiologues des
Hôpitaux

Pourquoi j’évite le DK crush?

« La simplicité, c’est la sophistication suprême »

Léonard de Vinci

Collège
National des
Cardiologues des
Hôpitaux

Pourquoi j’évite le DK crush?

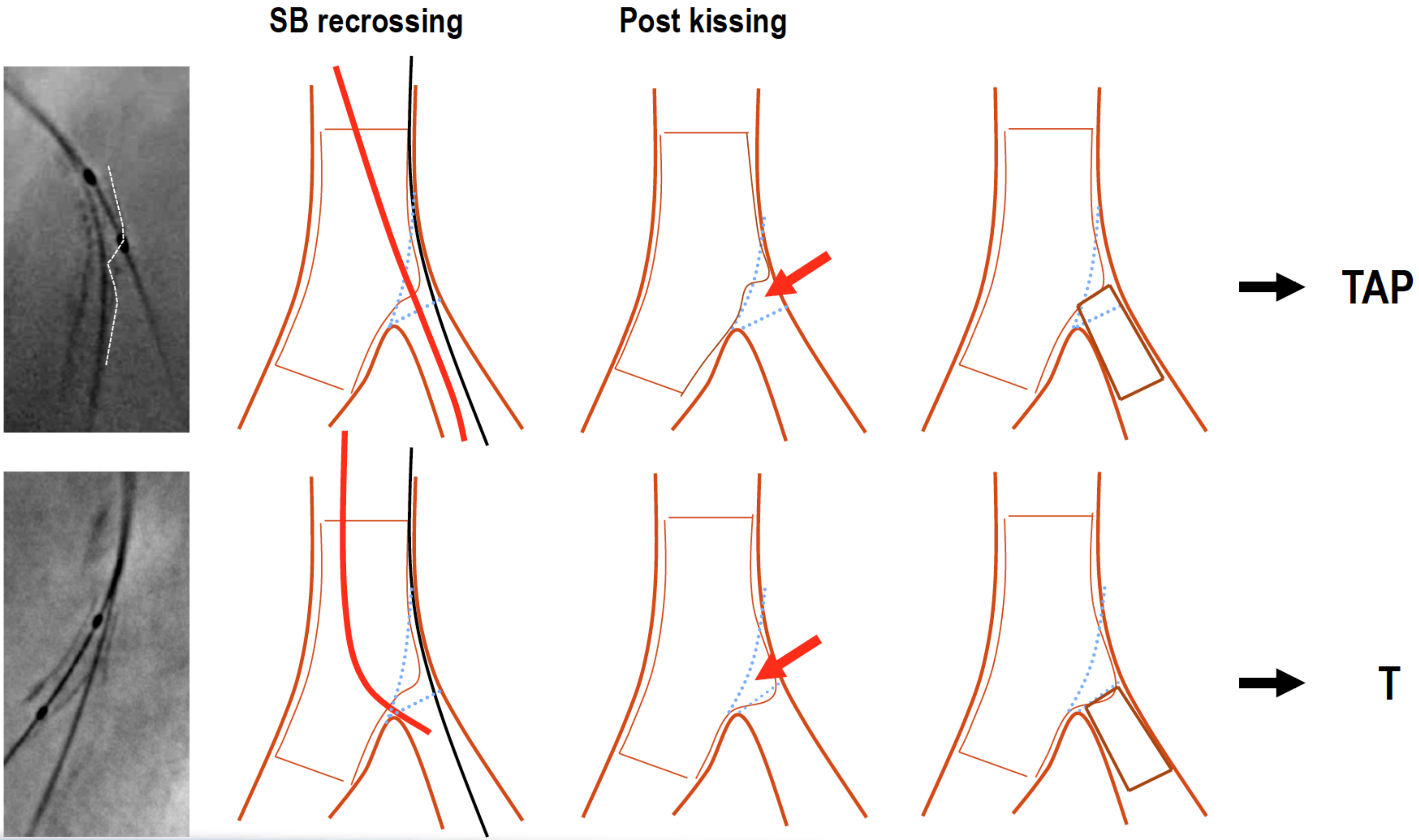
Je préfère le T ou TAP stenting

☐ Parce que c’est simple et rapide

☐ 1 seule couche de stent

☐ Franchissement SB plus simple

Je choisis le T ou TAP stenting en fonction de l'angulation, de la lésion ostiale…



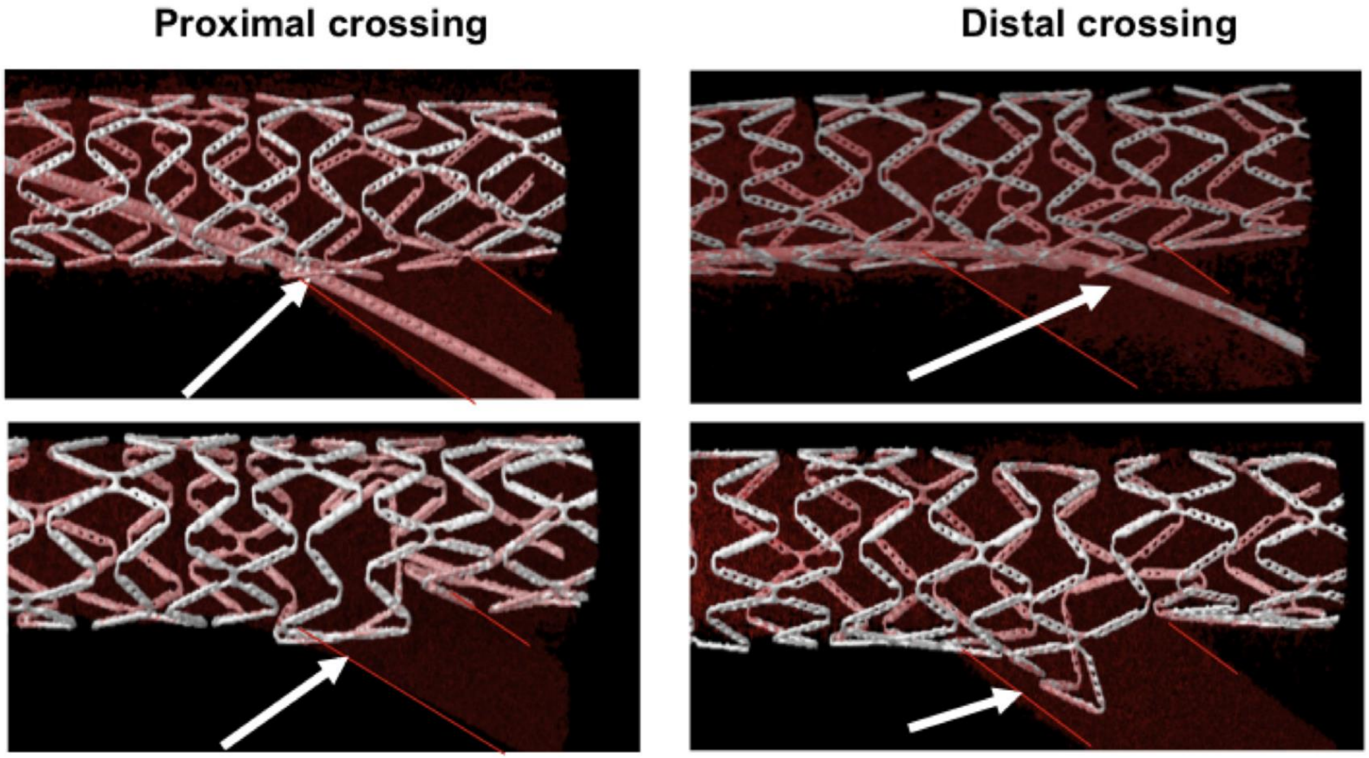
SB recrossing

Post kissing

→ TAP

→ T

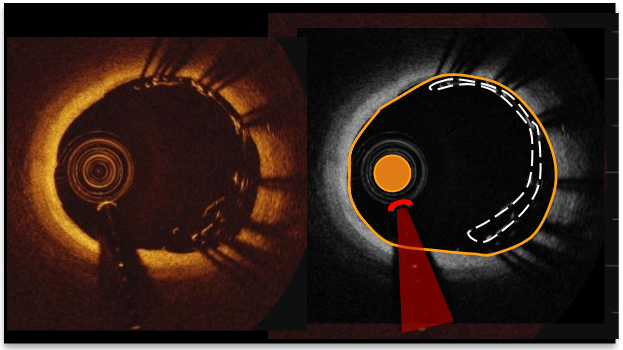
En cas de T stenting, ouvrir la cellule la plus distale

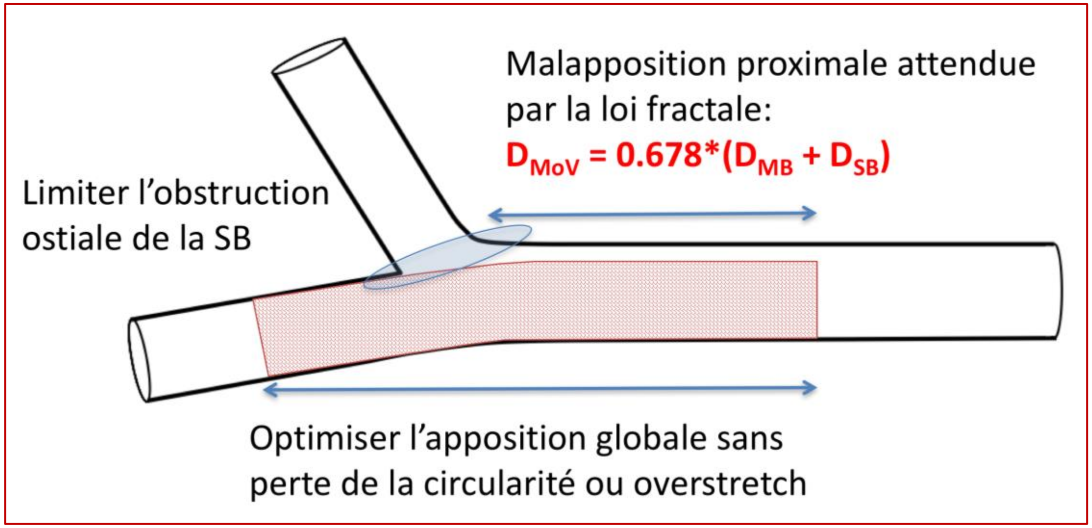

Proximal crossing
Distal crossing

Sawaya FJ, JACC Cardiovasc Interv 2016

Intérêt majeur du POT

- Apposer stent sur segment proximal en respectant la loi fractale
- Eviter crush (guide extrastent)
- Faciliter ouverture en direction collatérale





Malapposition proximale attendue par la loi fractale:

$D_{MoV} = 0.678*(D_{MB} + D_{SB})$

Limiter l'obstruction ostiale de la SB

Optimiser l'apposition globale sans perte de la circularité ou overstretch

Courtesy of Finet G, Derimay F

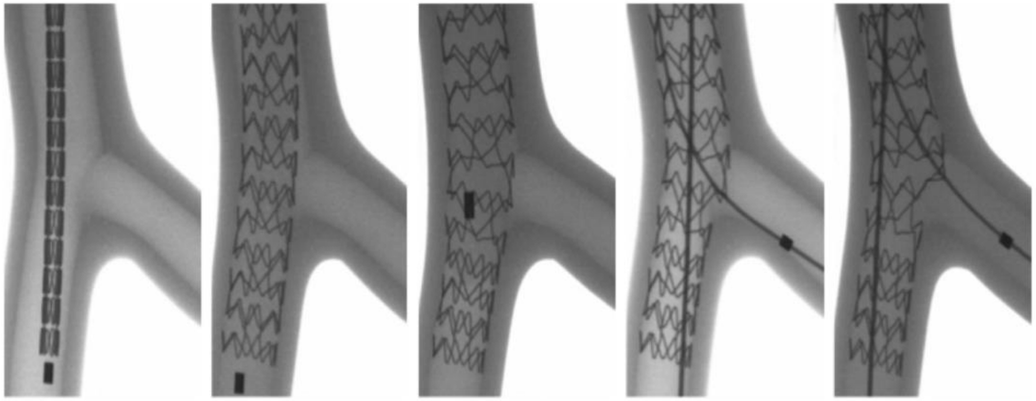
Intérêt majeur du POT

Réussir son POT

- SCB ou NCB au diamètre adapté
- Position optimale du ballon
- Eviter effet « bottle neck »

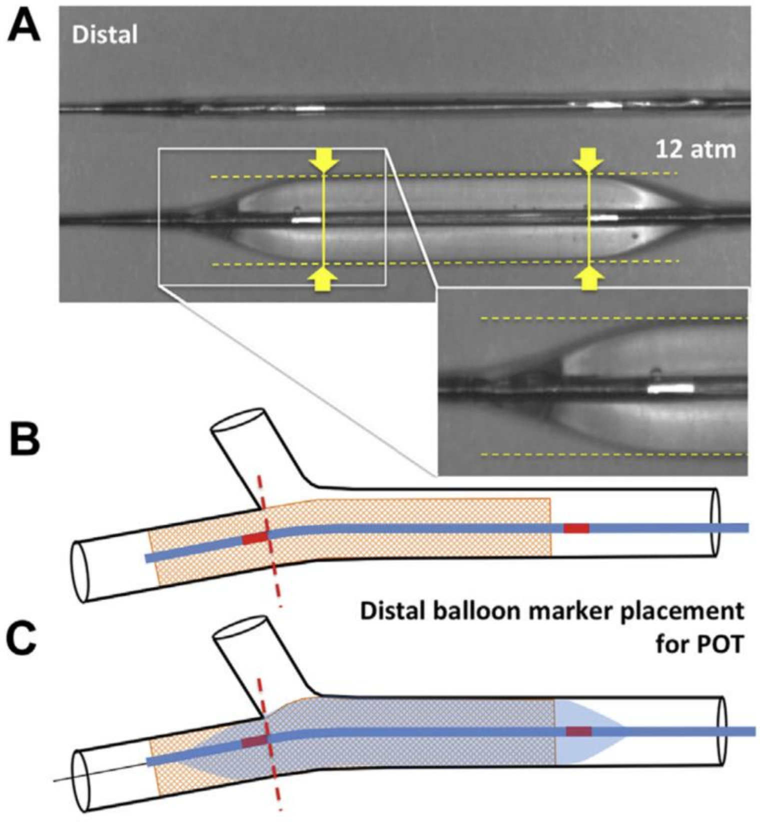
Choix du stent 1 adapté :
  - longueur lésion
  - en taille du ballon du POT (min 6 mm)

FIGURE 4 **Proximal Optimization Technique**



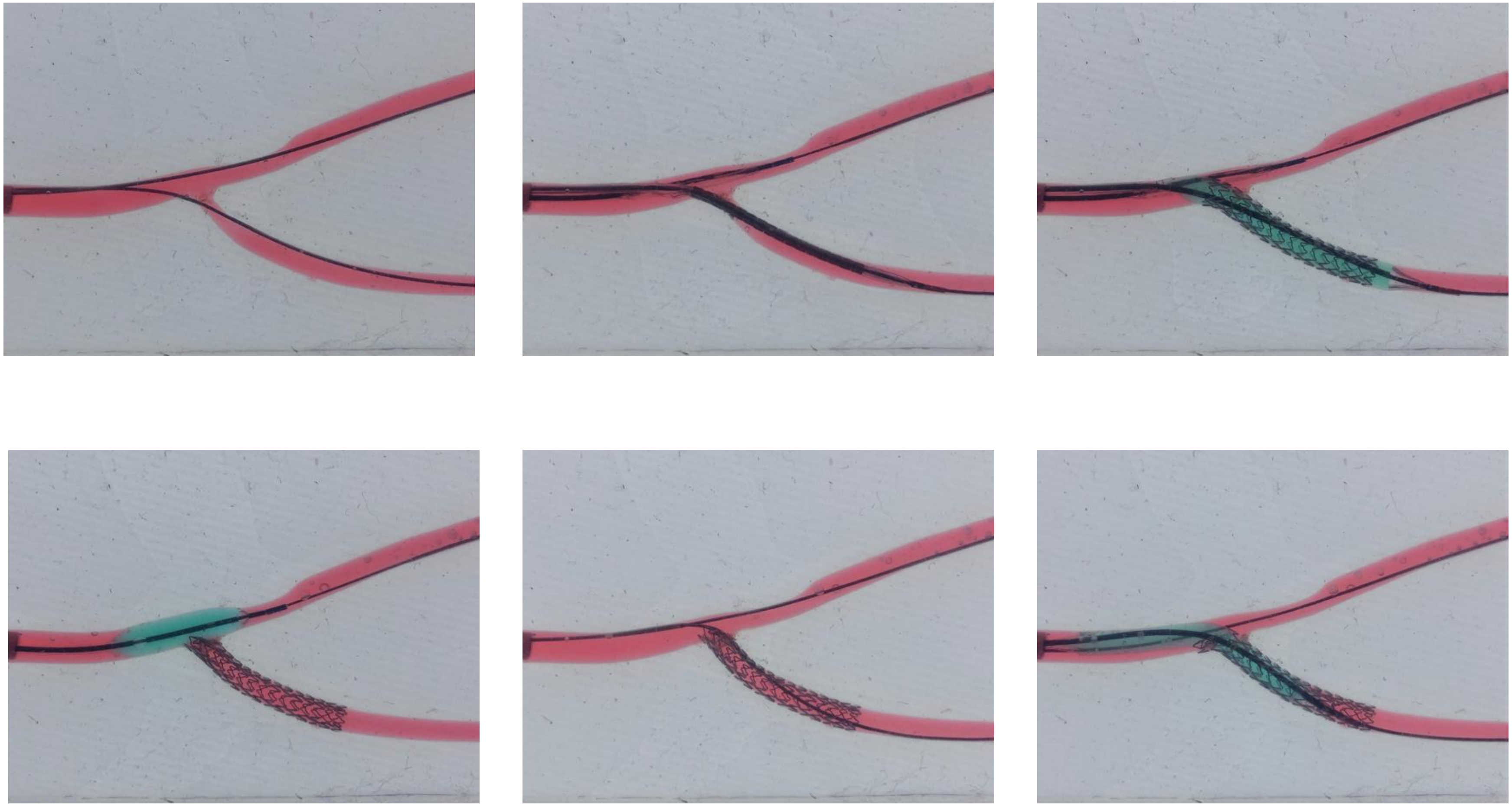
Sawaya FJ, JACC Cardiovasc Interv 2016

FIGURE 2 **Balloon Positioning for the POT**


A
Distal
12 atm
B
C
Distal balloon marker placement for POT

Finet G, JACC Cardiovasc Interv. 2015

Eviter les pièges et complexité du DK



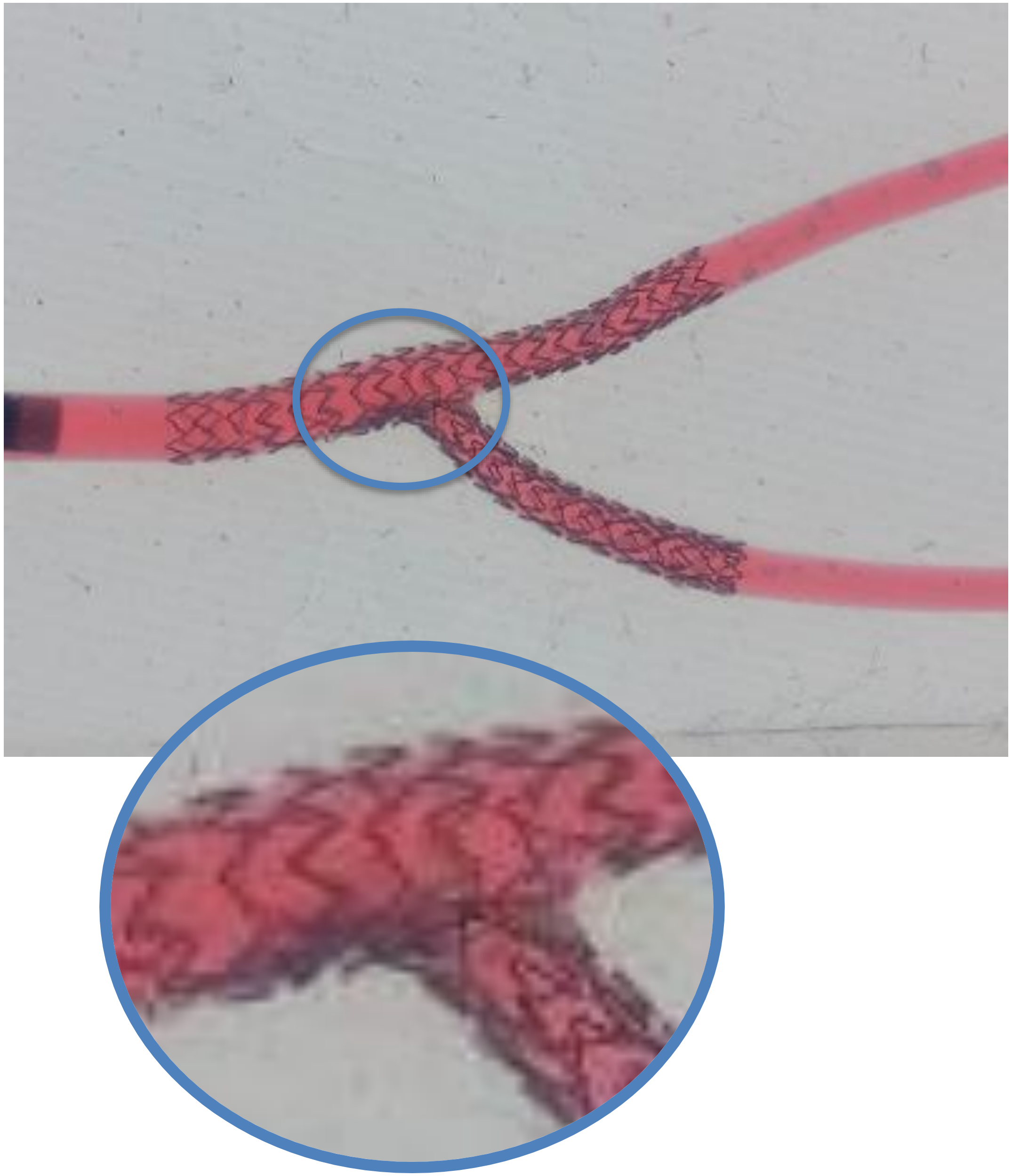
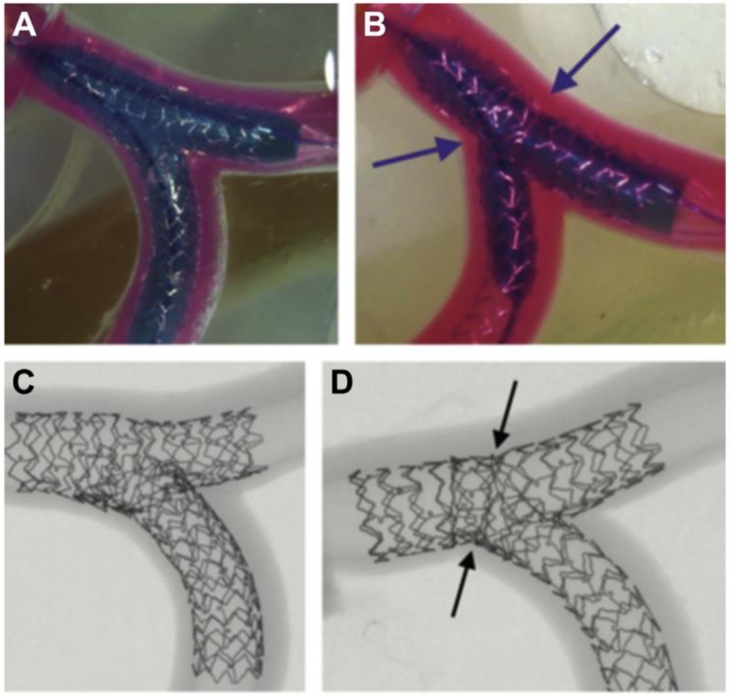


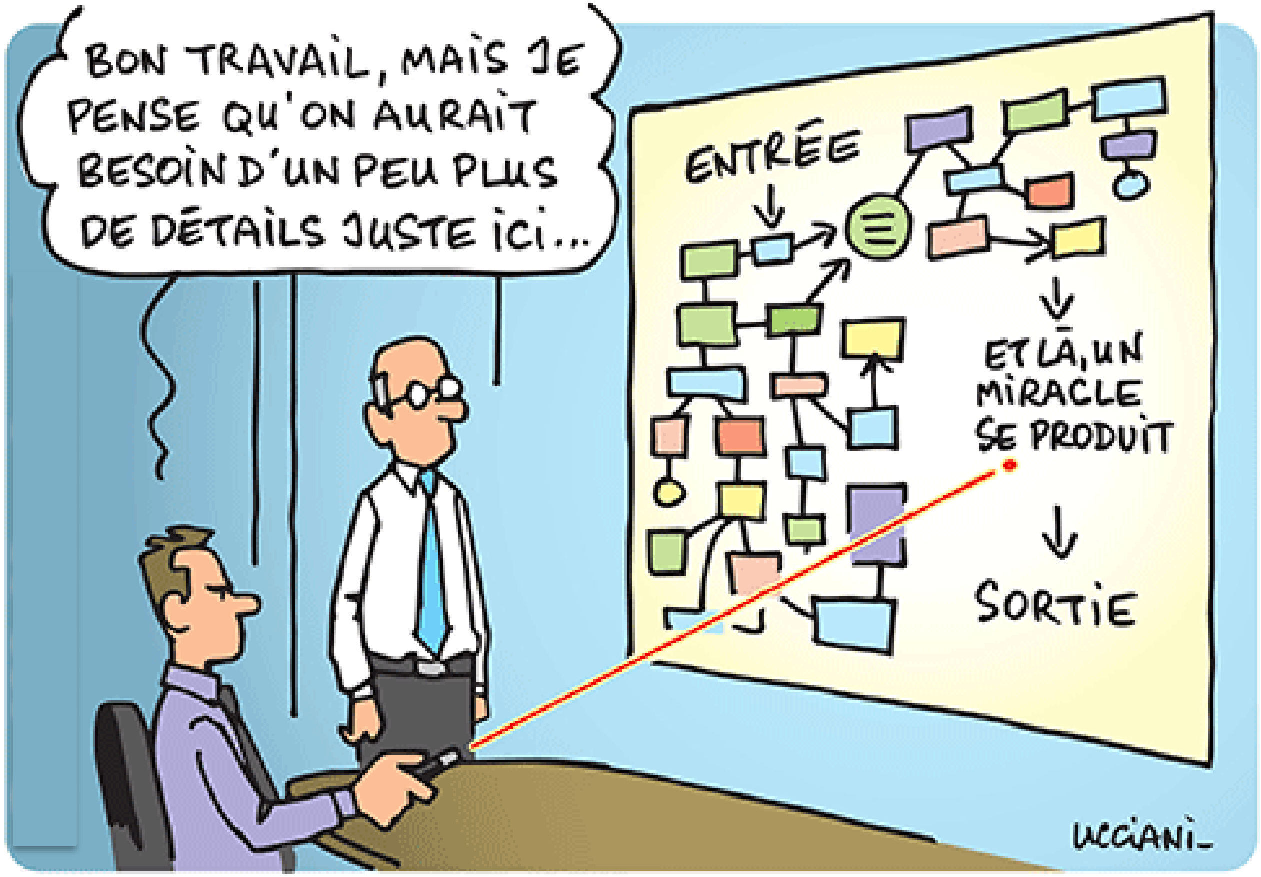
FIGURE 7 **Inferior Results After Final Kissing Balloon Inflation in Culotte Stenting Compared With Double Kissing Crush Stenting of Left Main Coronary Artery Bifurcation**



J Am Coll Cardiol Intv. 2017

Le DK …m'empêche de dormir

Un peu complexe…

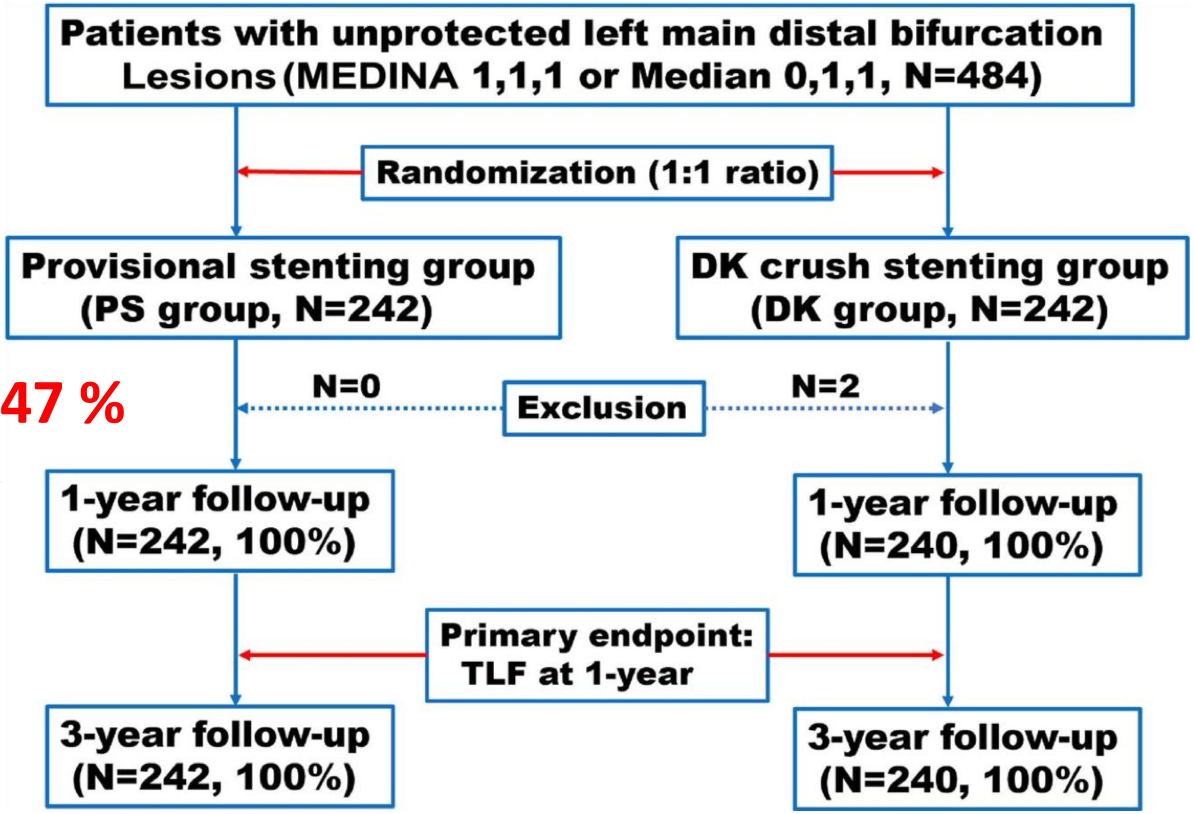

BON TRAVAIL, MAIS JE PENSE QU'ON AURAIT BESOIN D'UN PEU PLUS DE DÉTAILS JUSTE ICI…
ENTRÉE
ET LÀ, UN MIRACLE SE PRODUIT
SORTIE
UCCIANI

Collège
National des
Cardiologues des
Hôpitaux

Pourquoi je fais un DK crush?

Résultats cliniques impressionnant !

DK crush V



Patients with unprotected left main distal bifurcation Lesions (MEDINA 1,1,1 or Median 0,1,1, N=484)

Randomization (1:1 ratio)

Provisional stenting group (PS group, N=242)

DK crush stenting group (DK group, N=242)

Exclusion

N=0

N=2

1-year follow-up (N=242, 100%)

1-year follow-up (N=240, 100%)

Primary endpoint: TLF at 1-year

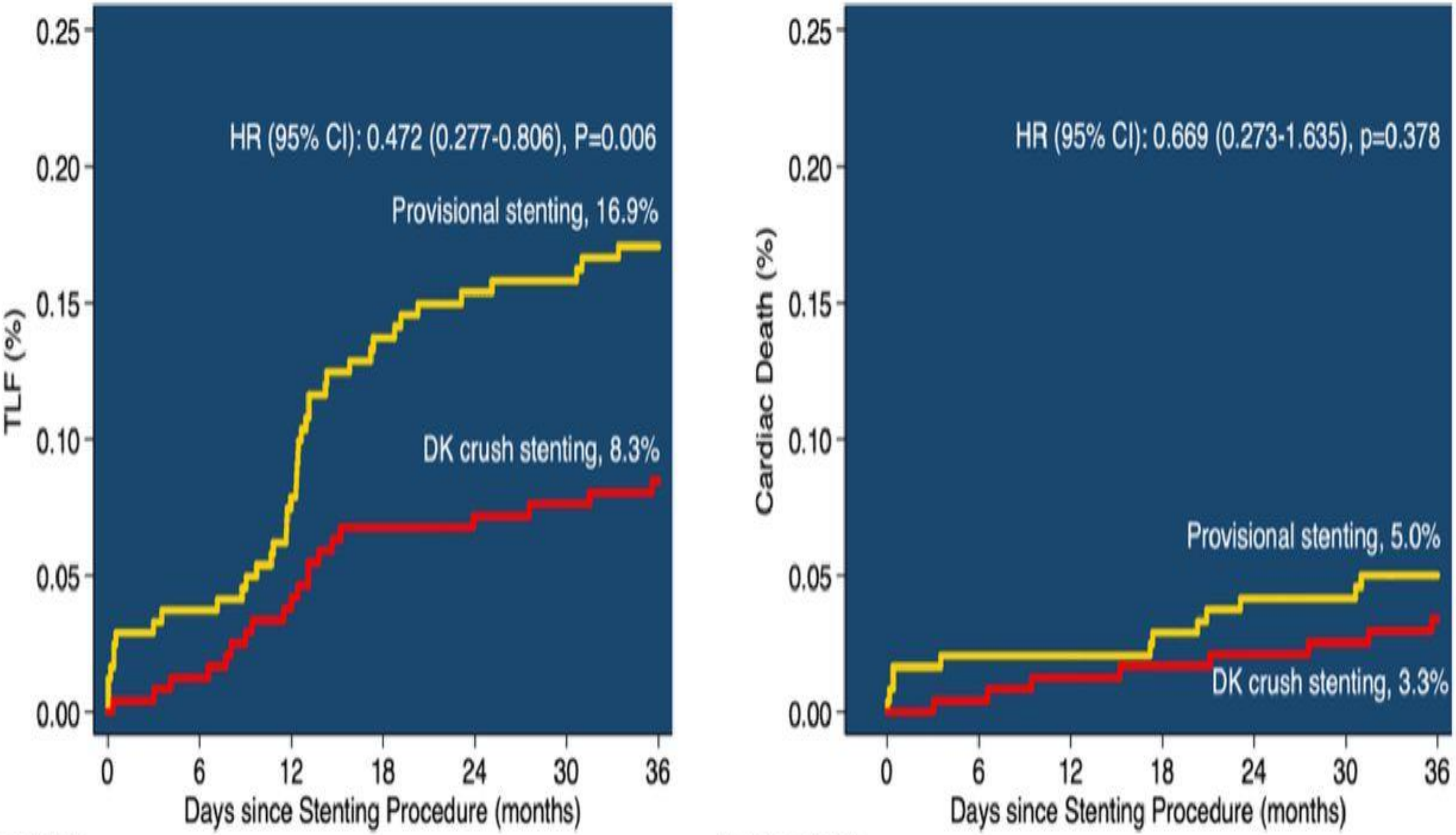
3-year follow-up (N=242, 100%)

3-year follow-up (N=240, 100%)

Stent SB : 47 %

If DS >75% , dissection B or TIMI < 3

MACE à 3 ans : PS vs DK-crush



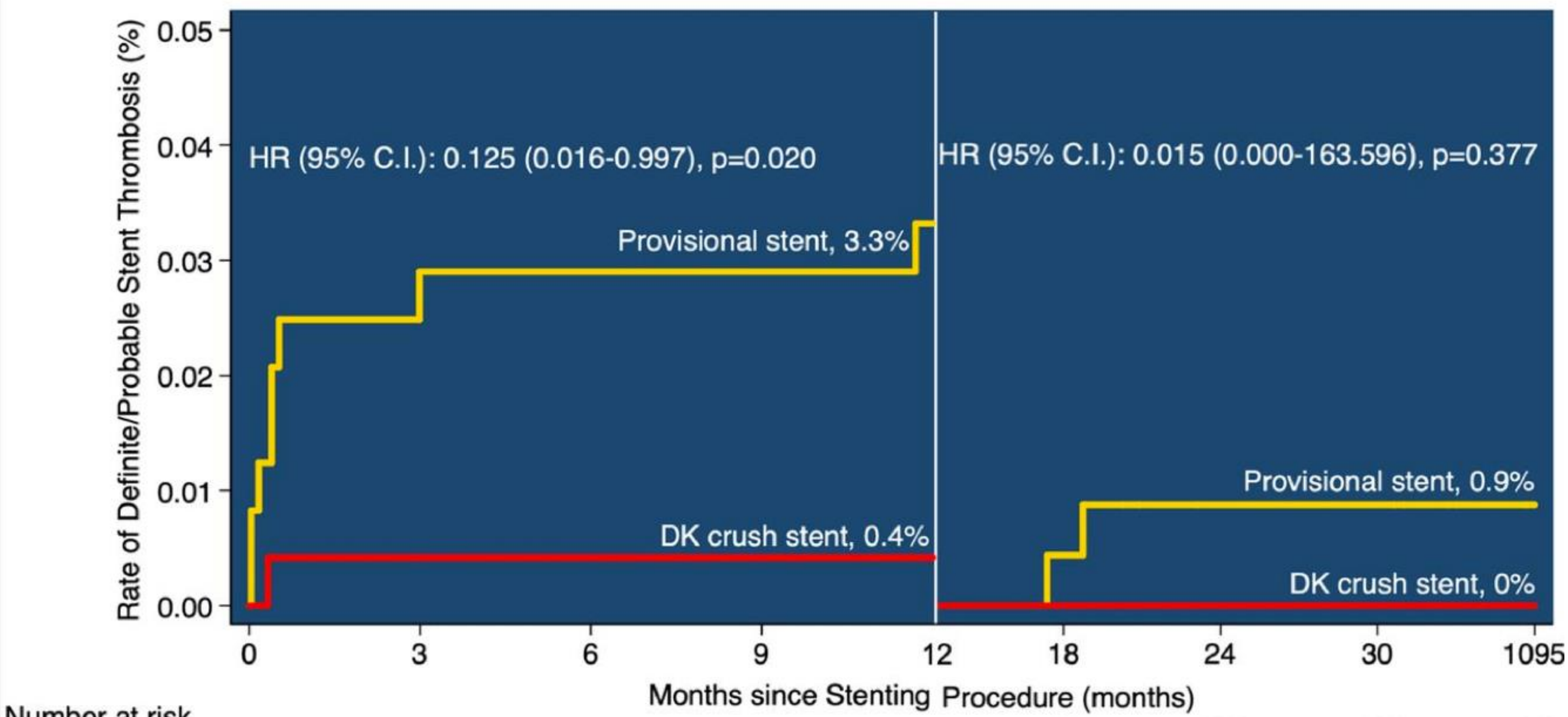
Number at risk

PS group	242	232	222	206	201	200	194
DK group	240	235	226	220	217	215	213

Number at risk

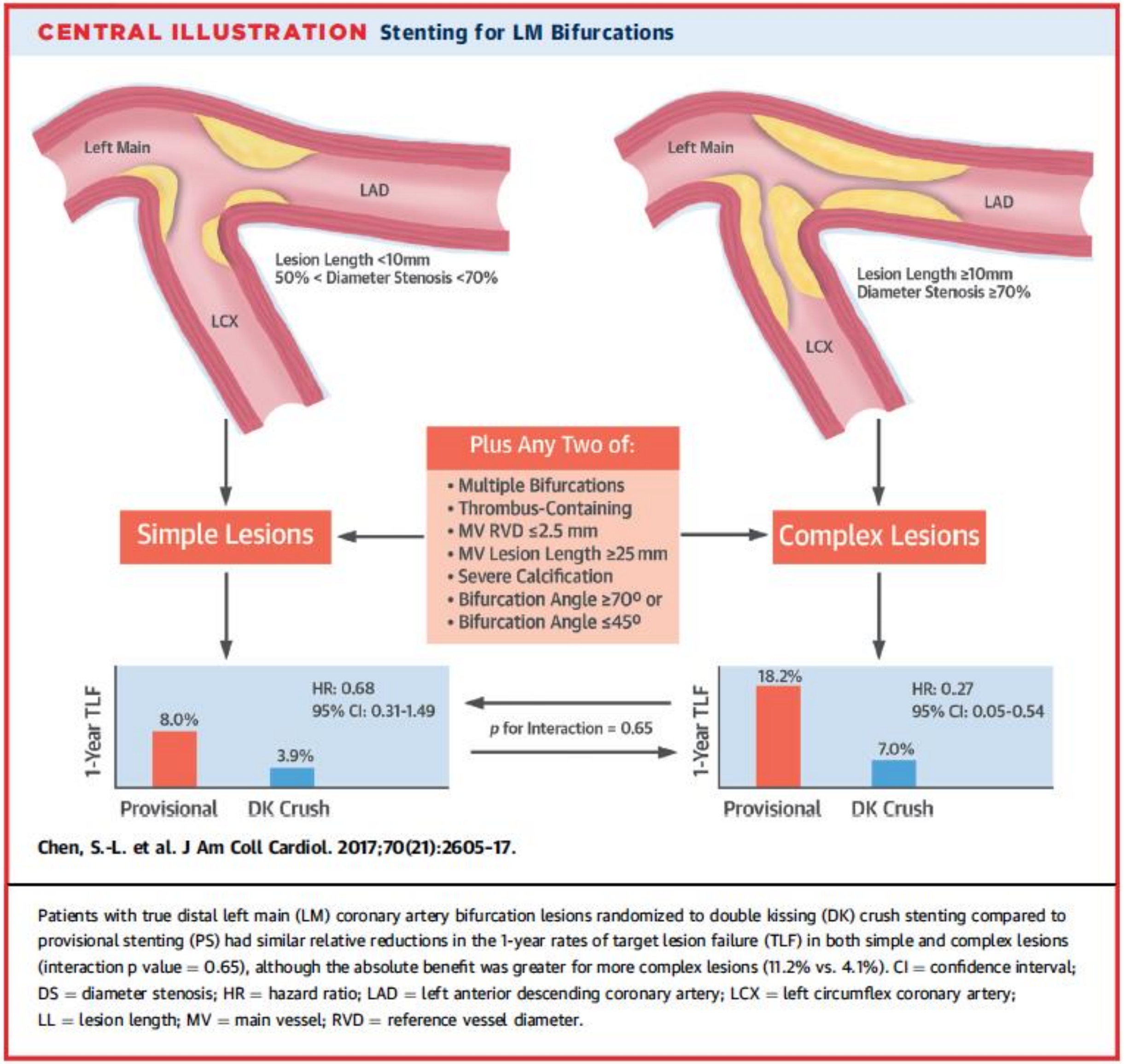
PS group	242	236	236	232	228	228	223
DK group	240	237	233	231	228	226	224

Thrombose de stent PS vs DK-crush



Number at risk									
PS group	242	236	234	234	234	231	226	221	216
DK group	240	239	238	238	237	232	230	227	222

Bénéfice sur TLF majoré si lésions complexes



CENTRAL ILLUSTRATION **Stenting for LM Bifurcations**

Left Main
LAD
LCX
Lesion Length <10mm
50% < Diameter Stenosis <70%
Left Main
LAD
LCX
Lesion Length ≥10mm
Diameter Stenosis ≥70%

Plus Any Two of:

- Multiple Bifurcations
- Thrombus-Containing
- MV RVD ≤2.5 mm
- MV Lesion Length ≥25 mm
- Severe Calcification
- Bifurcation Angle ≥70º or
- Bifurcation Angle ≤45º

Simple Lesions
Complex Lesions
1-Year TLF
8.0%
3.9%
HR: 0.68
95% CI: 0.31-1.49
Provisional
DK Crush
p for Interaction = 0.65
1-Year TLF
18.2%
7.0%
HR: 0.27
95% CI: 0.05-0.54
Provisional
DK Crush

Chen, S.-L. et al. J Am Coll Cardiol. 2017;70(21):2605-17.

Patients with true distal left main (LM) coronary artery bifurcation lesions randomized to double kissing (DK) crush stenting compared to provisional stenting (PS) had similar relative reductions in the 1-year rates of target lesion failure (TLF) in both simple and complex lesions (interaction p value = 0.65), although the absolute benefit was greater for more complex lesions (11.2% vs. 4.1%). CI = confidence interval; DS = diameter stenosis; HR = hazard ratio; LAD = left anterior descending coronary artery; LCX = left circumflex coronary artery; LL = lesion length; MV = main vessel; RVD = reference vessel diameter.

Critiques de DK crush 5

- C’est des centres hyper selectionnés !

26 centres

- C’est des chinois !

Chine , EU , Thaïlande, Indonésie, Italie

- C’est des centres experts !

Exigences : 20 TC / an et 3 DK Crush avant rando

- Etude isolée …

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 13, NO. 12, 2020
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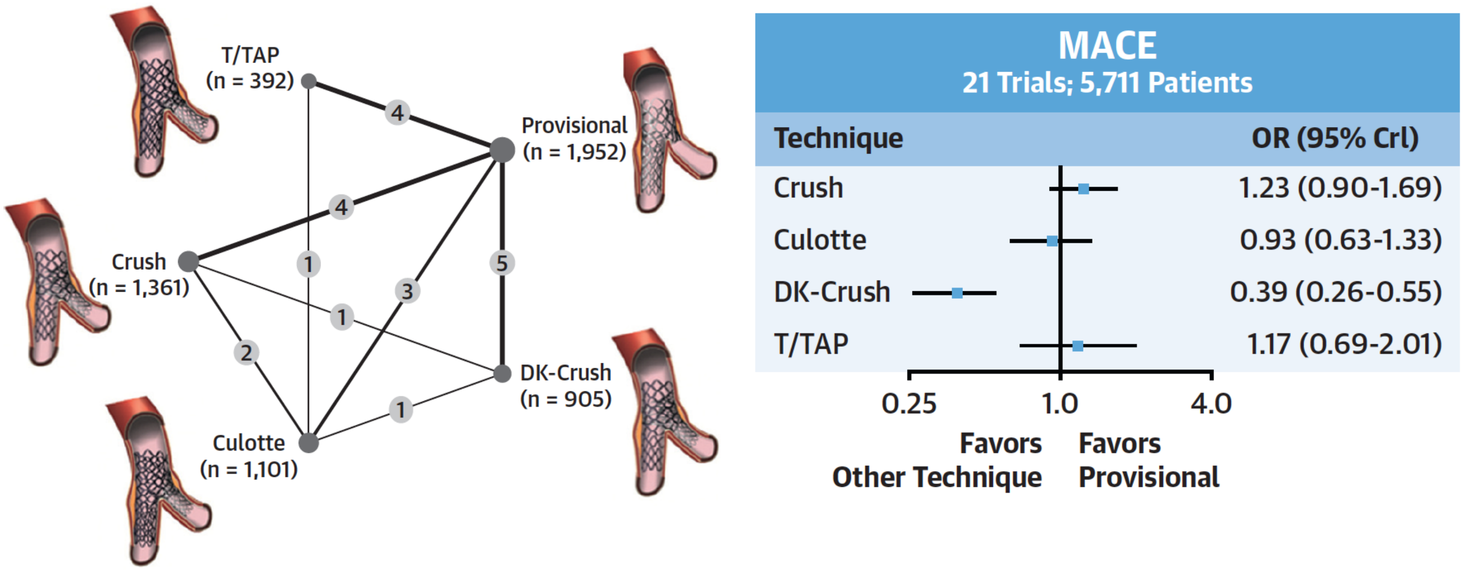
Clinical Outcomes Following Coronary Bifurcation PCI Techniques

A Systematic Review and Network Meta-Analysis Comprising 5,711 Patients

CENTRAL ILLUSTRATION **Network Plot and Forest Plot for the Primary Outcome of Interest**



Di Gioia, G. et al. J Am Coll Cardiol Intv. 2020;13(12):1432-44.

(Left) Network plot. The widths of **connecting lines** between different treatment nodes reflect the number of studies available for each comparison. The size of each **circle** reflects the number of patients randomized to each treatment node. **(Right)** Forest plot and relative treatment effects for the primary outcome of interest. Treatment effects are reported as odds ratios (ORs) with 95% credibility intervals (CrIs) compared with the provisional strategy, used as a reference. An OR >1 favors the provisional strategy, while an OR <1 favors the other technique. DK-crush = double-kissing crush; MACE = major adverse cardiovascular events; T/TAP = T stenting/T and protrusion.

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 13, NO. 12, 2020

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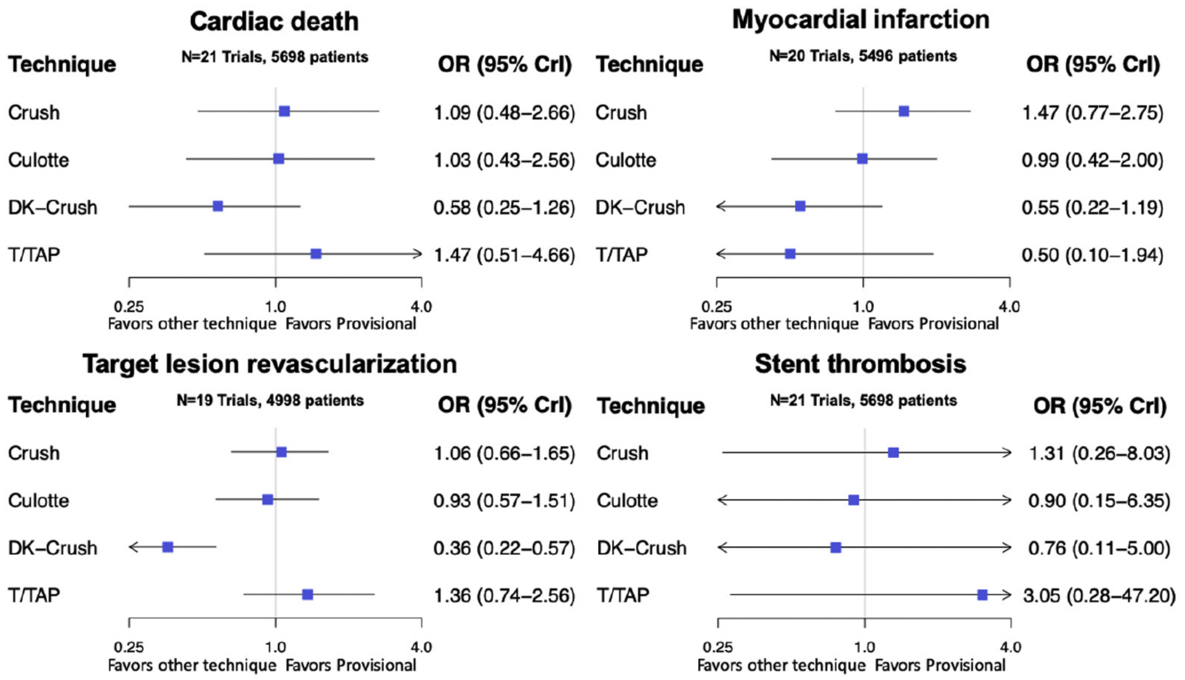
Clinical Outcomes Following Coronary Bifurcation PCI Techniques

A Systematic Review and Network Meta-Analysis Comprising 5,711 Patients

FIGURE 2 Network Meta-Analysis Forest Plots for the Secondary Outcomes of Interest

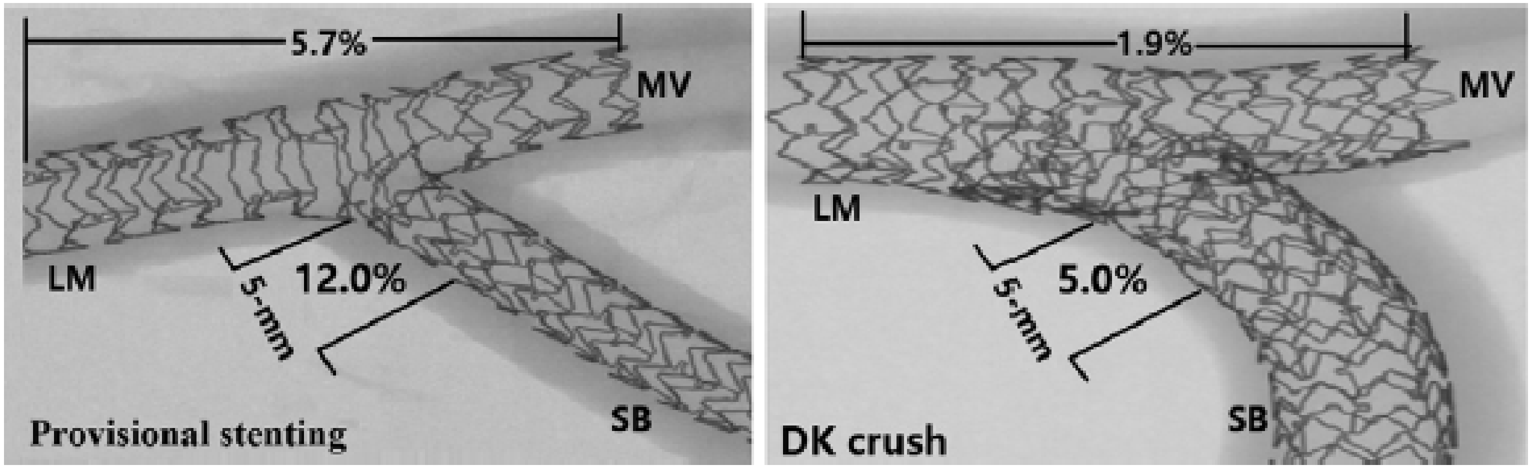


CrI = credible interval; DK-crush = double-kissing crush; MACE = major adverse cardiovascular events; OR = odds ratio; T/TAP = T stenting/T and protrusion.

Pourquoi c’est mieux ?

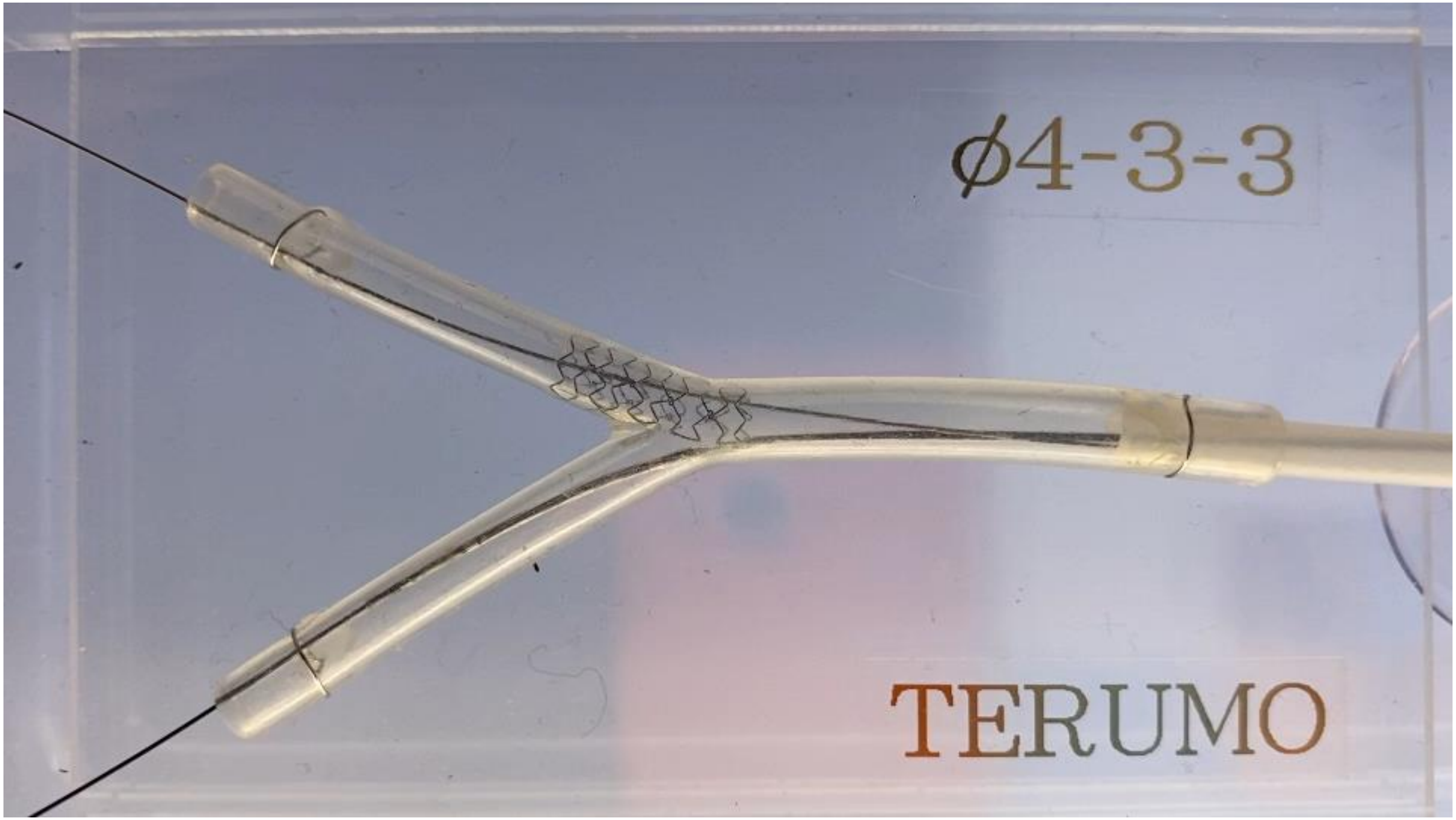
Meilleur couverture de stent = moins de RIS
PS vs DK-crush

FIGURE 3 **Distribution of ISR**


5.7%
MV
LM
5-mm
12.0%
SB
Provisional stenting
1.9%
MV
LM
5-mm
5.0%
SB
DK crush

The rates of in-stent restenosis (ISR) in the main vessel (MV) at 13-month angiographic follow-up were comparable with DK crush stent and provisional stenting (PS). The rate of ISR at the ostium of side branch (SB) was 12.0% with PS versus 5.0% with DK crush ($p = 0.09$). LM = left main.

Sécurise branche fille +++
Car stenting SB d'emblée
(lève la sténose serrée de SB)


ϕ4-3-3
TERUMO

Critiques du DK crush

- C’est compliqué ?

Chartres s’y est mis , donc …
10 étapes pour TAP vs 11 étapes DK crush

- Difficile de refranchir SB ?

Oui pour Crush classique (double couche de stent)
Non pour DK (ou SK) crush = T stenting
Car franchissement d’une seule couche de stent / étape

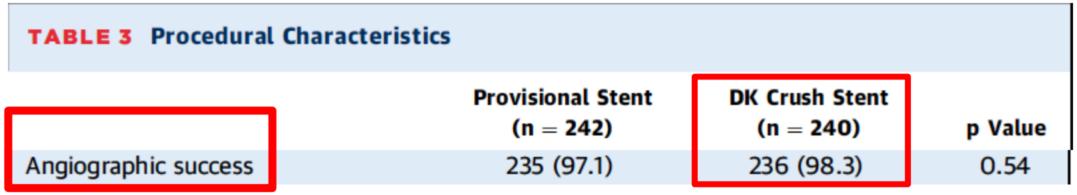
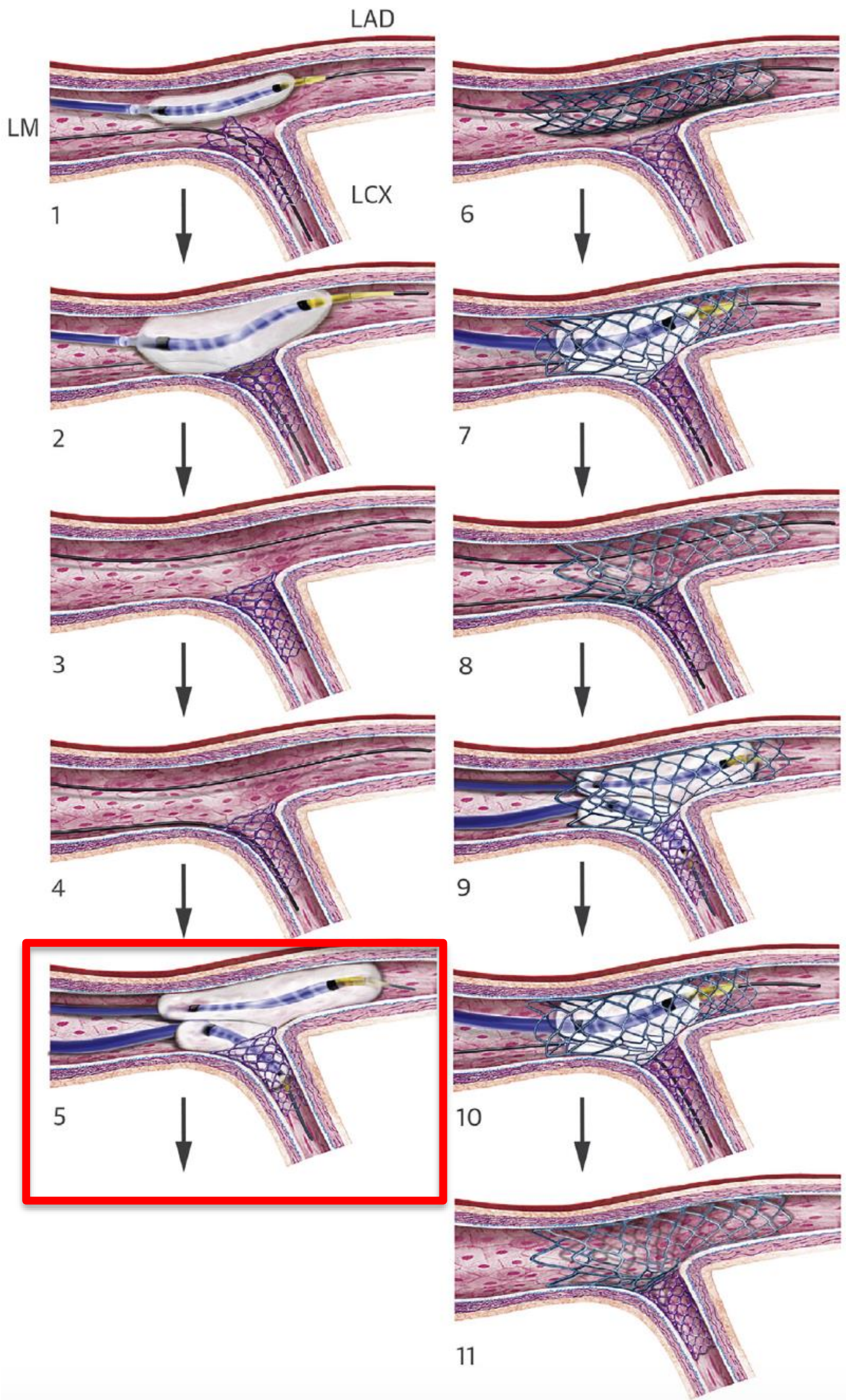


TABLE 3 **Procedural Characteristics**

	Provisional Stent (n = 242)	DK Crush Stent (n = 240)	p Value
Angiographic success	235 (97.1)	236 (98.3)	0.54

SK CRUSH technique (sur banc)

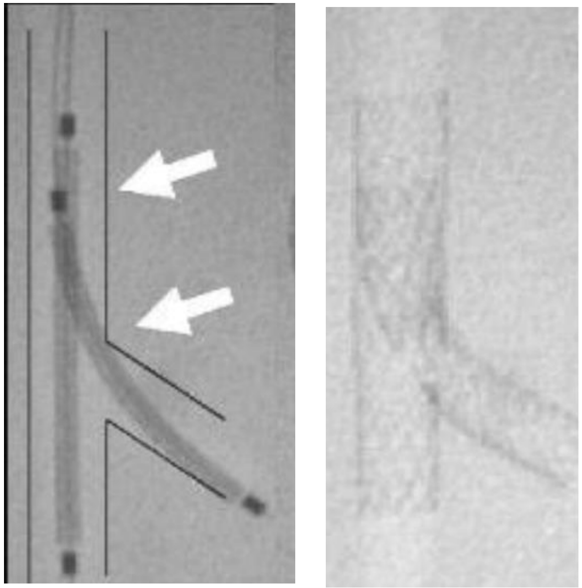
DK crush
ou SK crush ?


LAD
LM
LCX
1
2
3
4
5
6
7
8
9
10
11

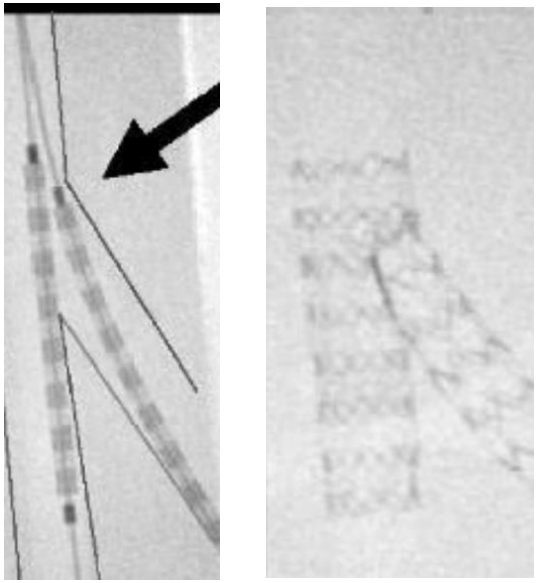
Ou simple ouverture de maille ?

Les variantes du DK crush

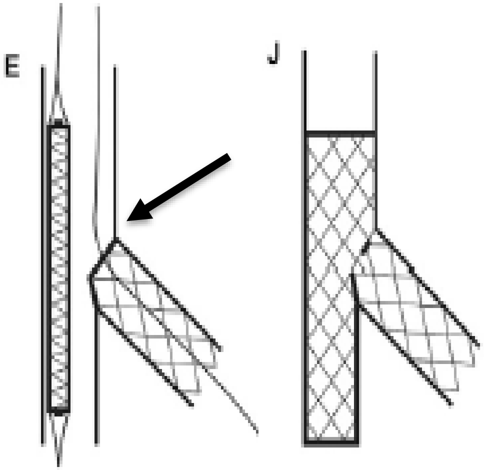
Classic Crush Technique



Mini Crush Technique



Nanocrush



Les inconvénients

- Plus compliqué : Formation +++
- Plus long
- Plus de contraste et Rx

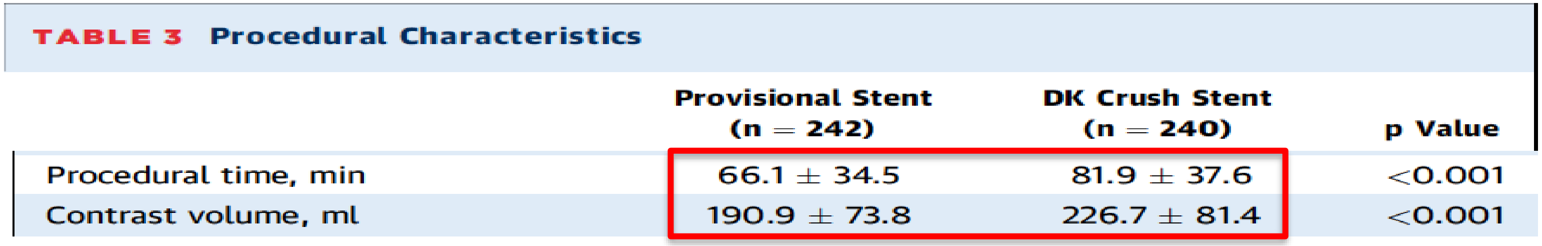
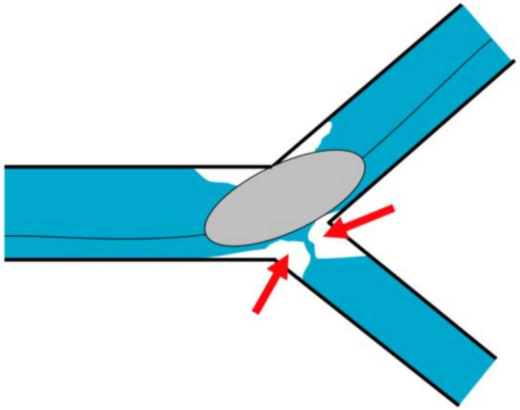


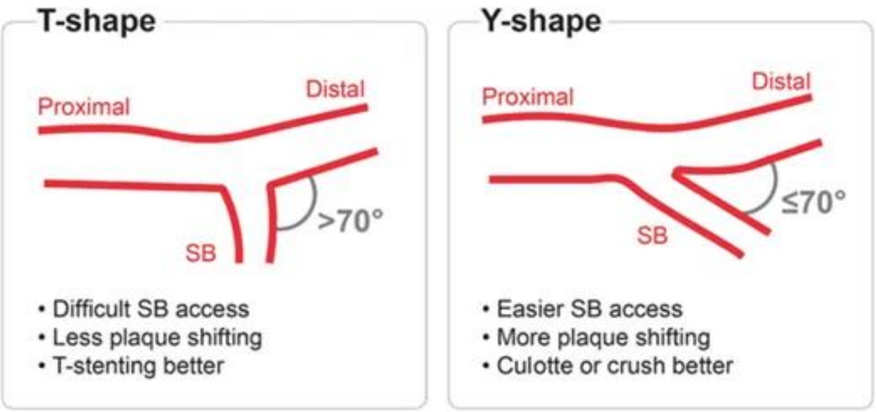
TABLE 3 Procedural Characteristics

	Provisional Stent (n = 242)	DK Crush Stent (n = 240)	p Value
Procedural time, min	66.1 ± 34.5	81.9 ± 37.6	<0.001
Contrast volume, ml	190.9 ± 73.8	226.7 ± 81.4	<0.001

Pourquoi le T ou tap stenting c'est pas terrible !

PS : SB non sécurisée
Plaque shifting




T-shape
Proximal
Distal
SB
>70°
Y-shape
Proximal
Distal
SB
≤70°

- Difficult SB access
- Less plaque shifting
- T-stenting better

- Easier SB access
- More plaque shifting
- Culotte or crush better

Source: Habib Samady, William F. Fearon, Alan C. Yeung, Spencer B. King III: Interventional Cardiology, 2nd Edition
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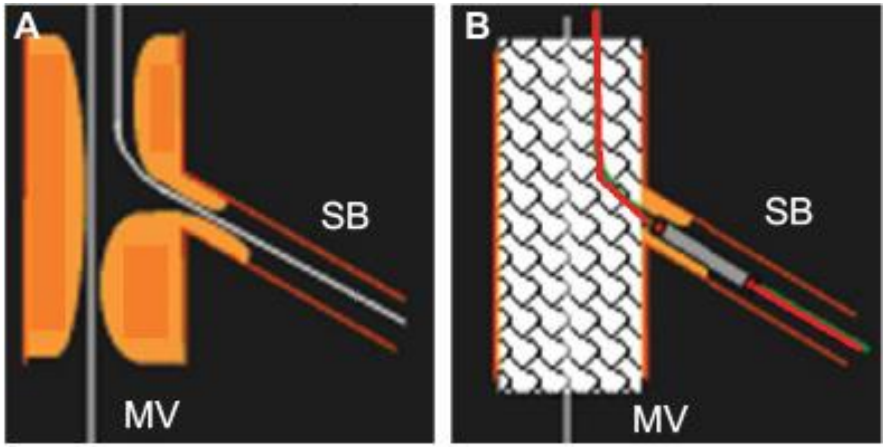
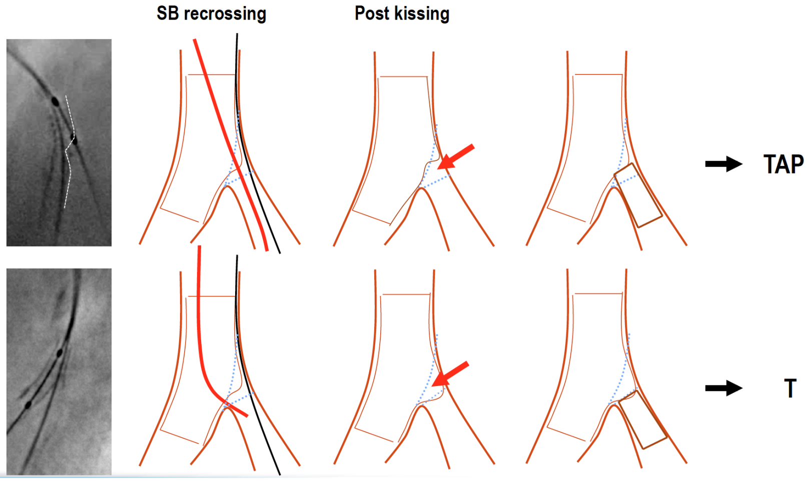

A
SB
MV
B
SB
MV

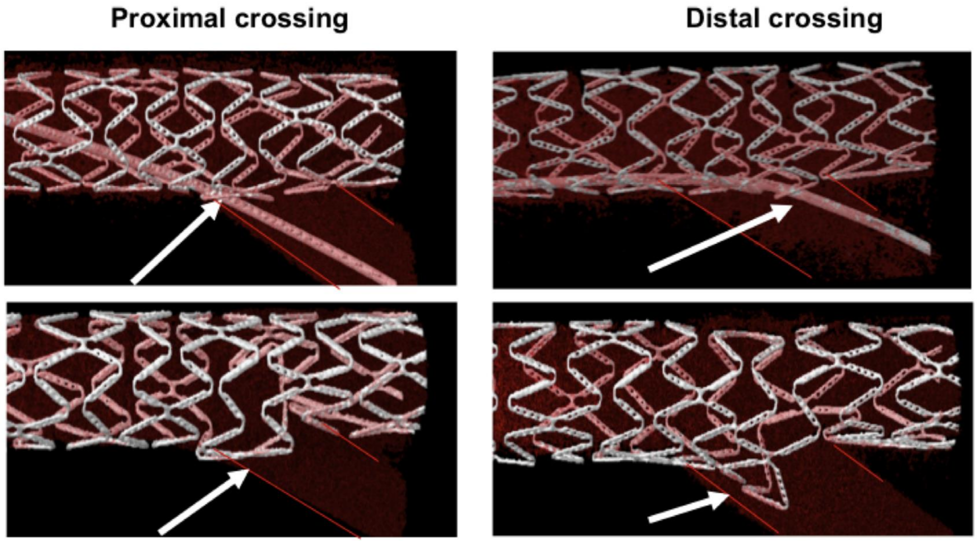
Provisional stenting
= 9 % d'echec de refranchissement SB * / Bif

* **JACC. Cardiovascular Interventions**, 26 Mar 2015, 8(4):536-546

Limites du T ou Tap stenting

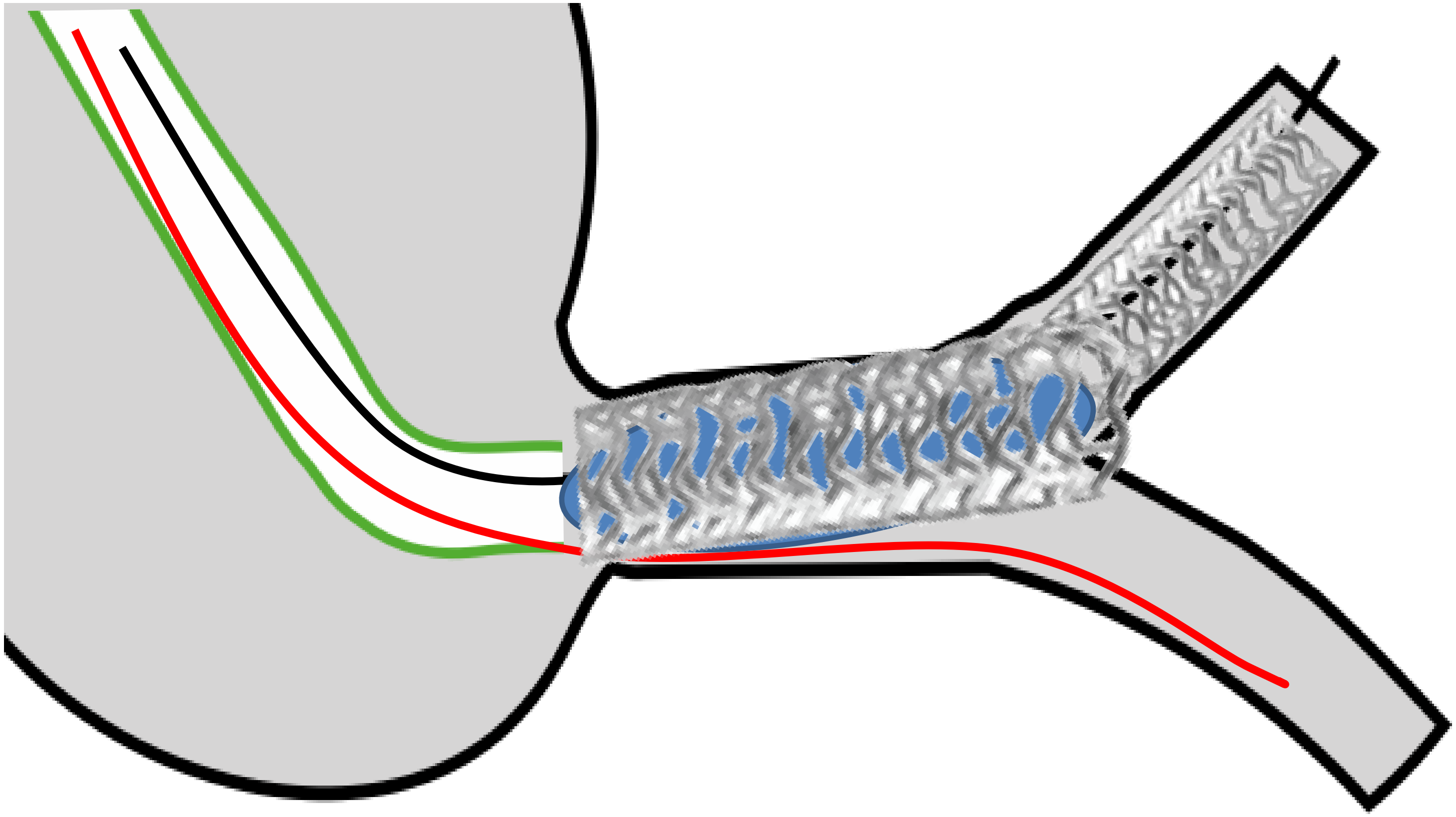

SB recrossing
Post kissing
TAP
T

T ou Tap : pas facile !


Proximal crossing
Distal crossing

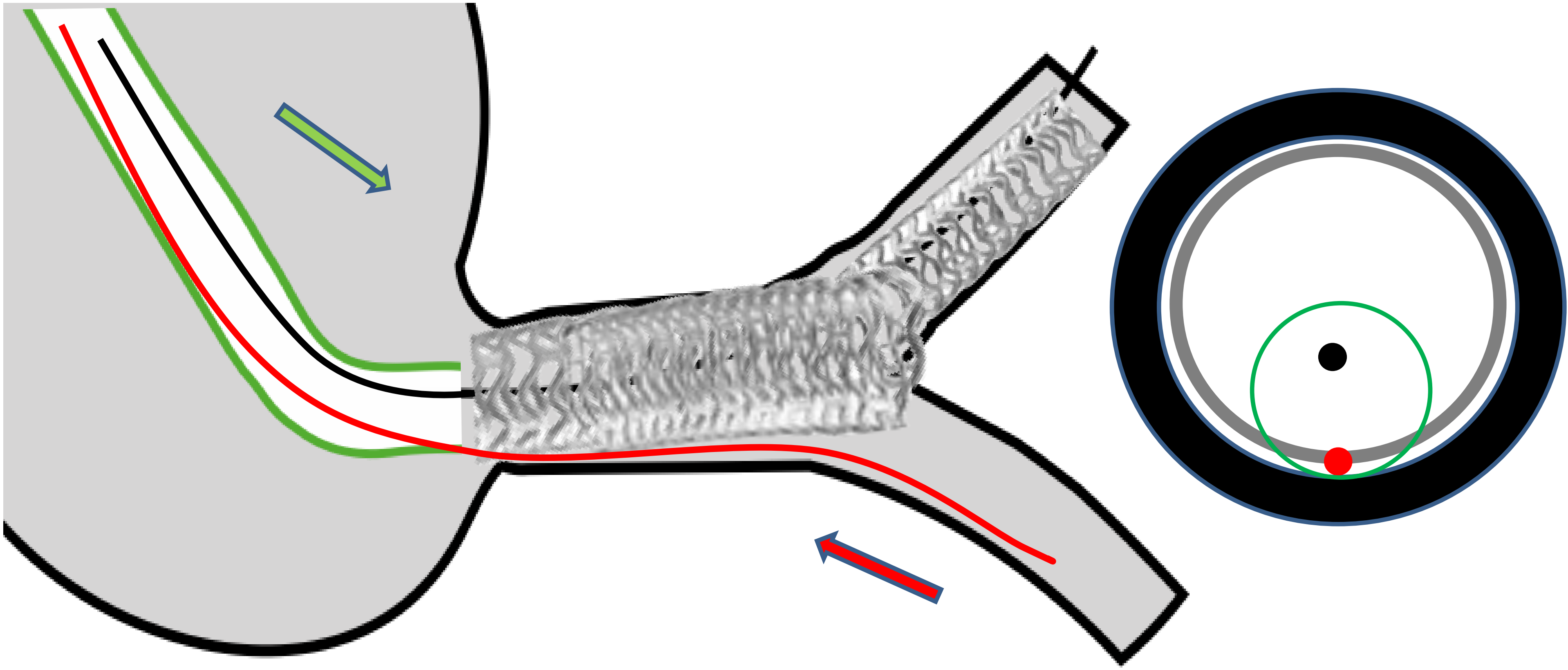
20 % d'échec de franchissement de maille distale dans LEMON

Provisional stenting
Le piège du guide piégé



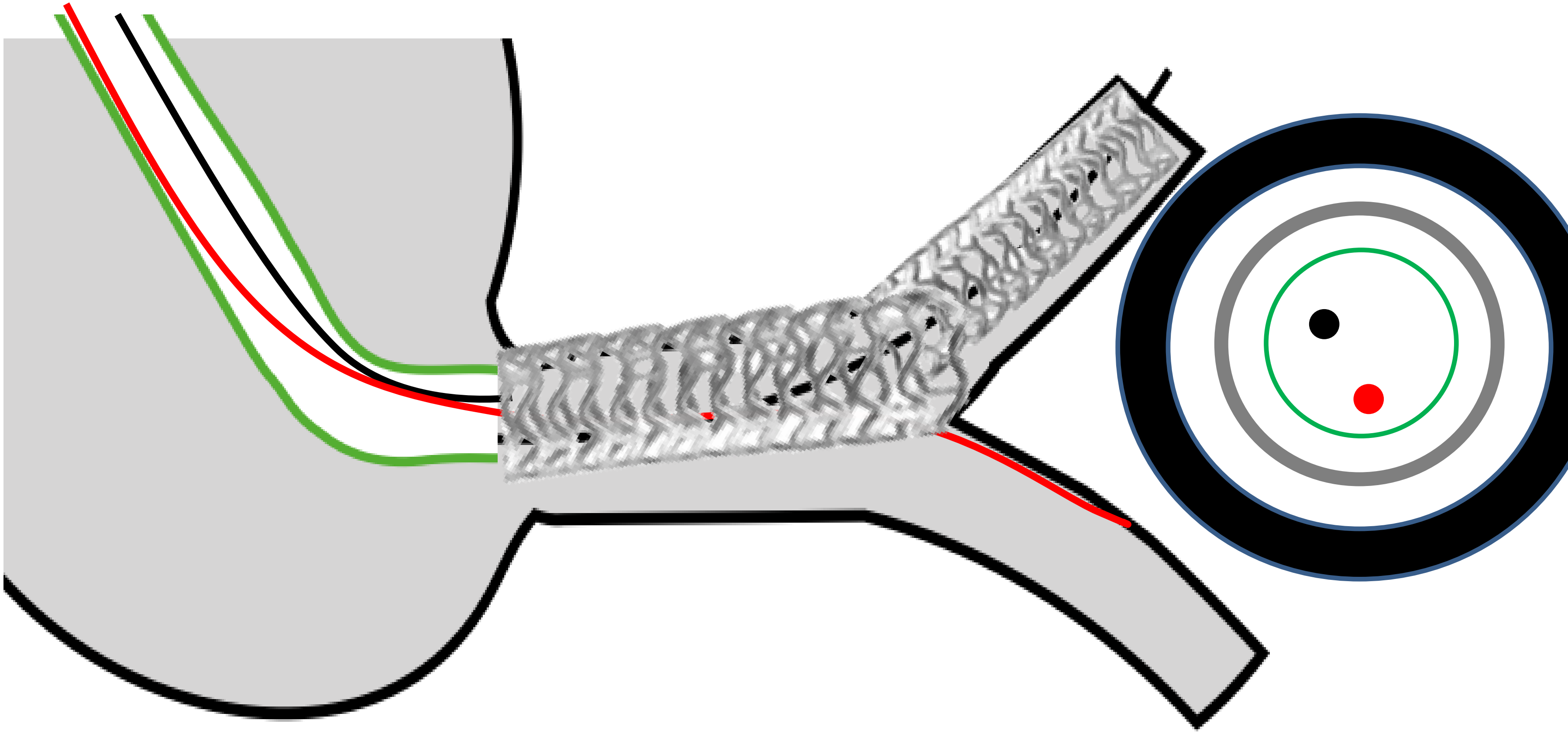
Dr Godin Courtesy

Le piège du guide piégé
Compaction de stent



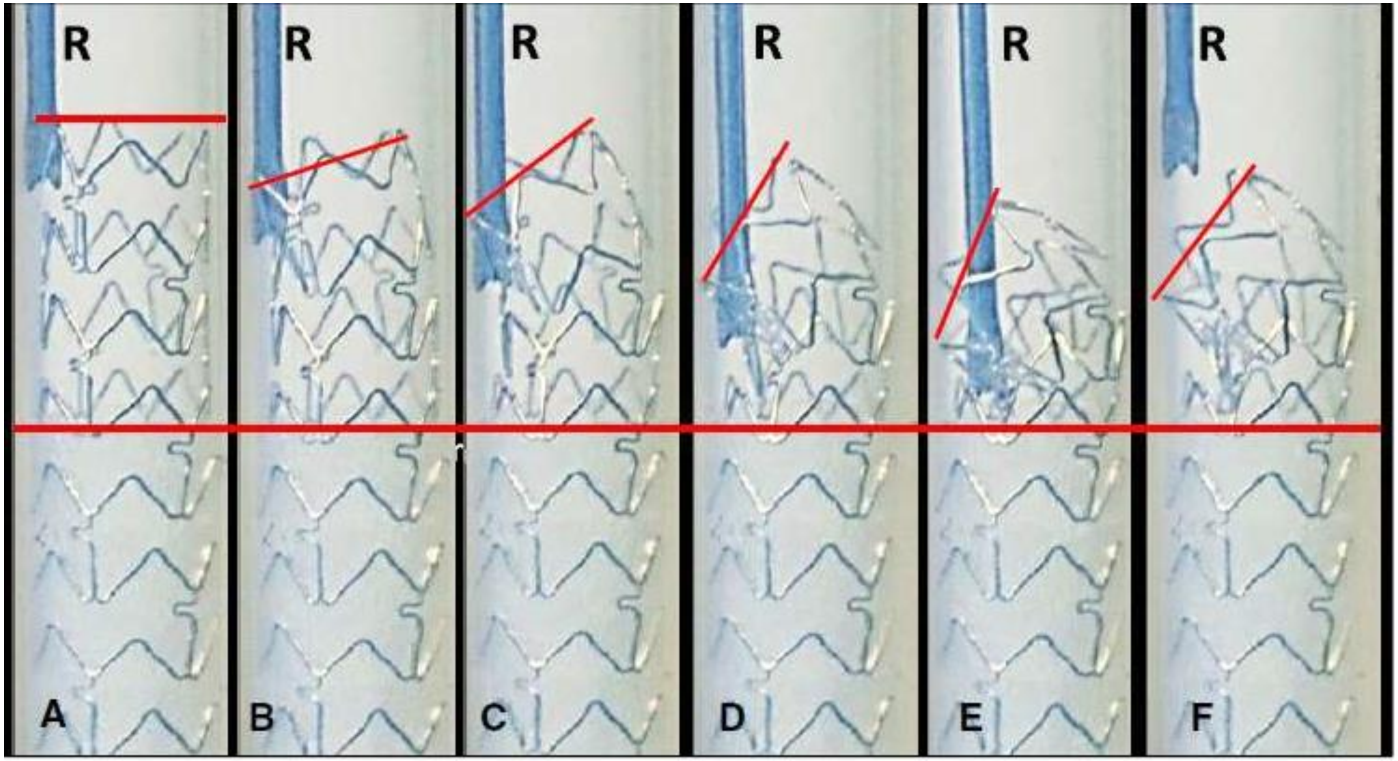
Dr Godin Courtesy

DK crush
aucun guide piegé = aucun risque



Dr Godin Courtesy

compaction proximale du stent


R
R
R
R
R
R
A
B
C
D
E
F

Quand privilégier DK ?

- Lésion complexe (1,1,1 ou 0,1,1)
- Sténose SB > 70 %
- Angle fermé < 70°
- Patient stable (durée plus longue)
- Patient peu fragile (FE / I rénale)
- Maitrise de la technique (learning curve 5-10)

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Suite du Cas Clinique

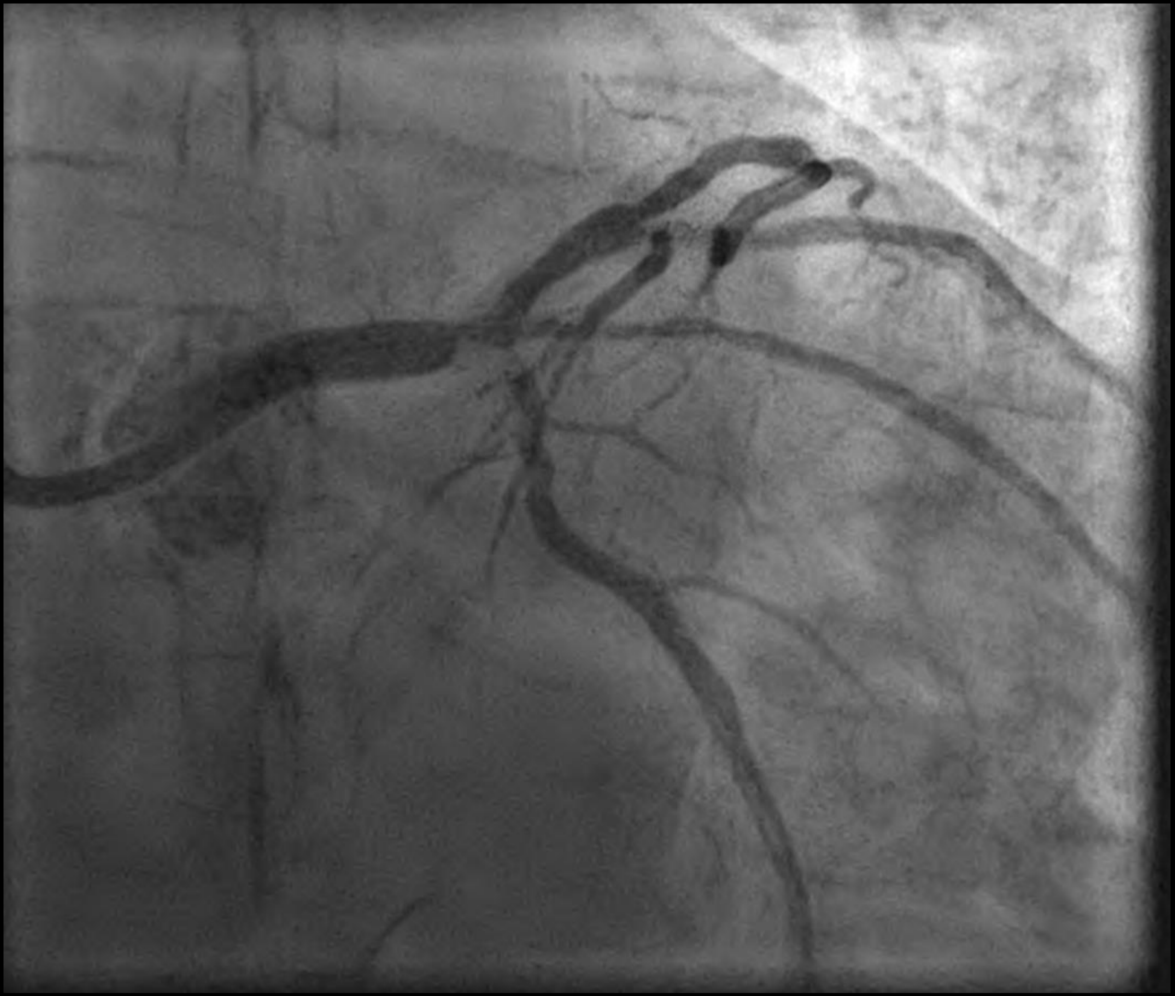
Décision d’ATL

- -Score SYNTAX: 24
- -Euroscore : 5,1%
- - Co-morbidité

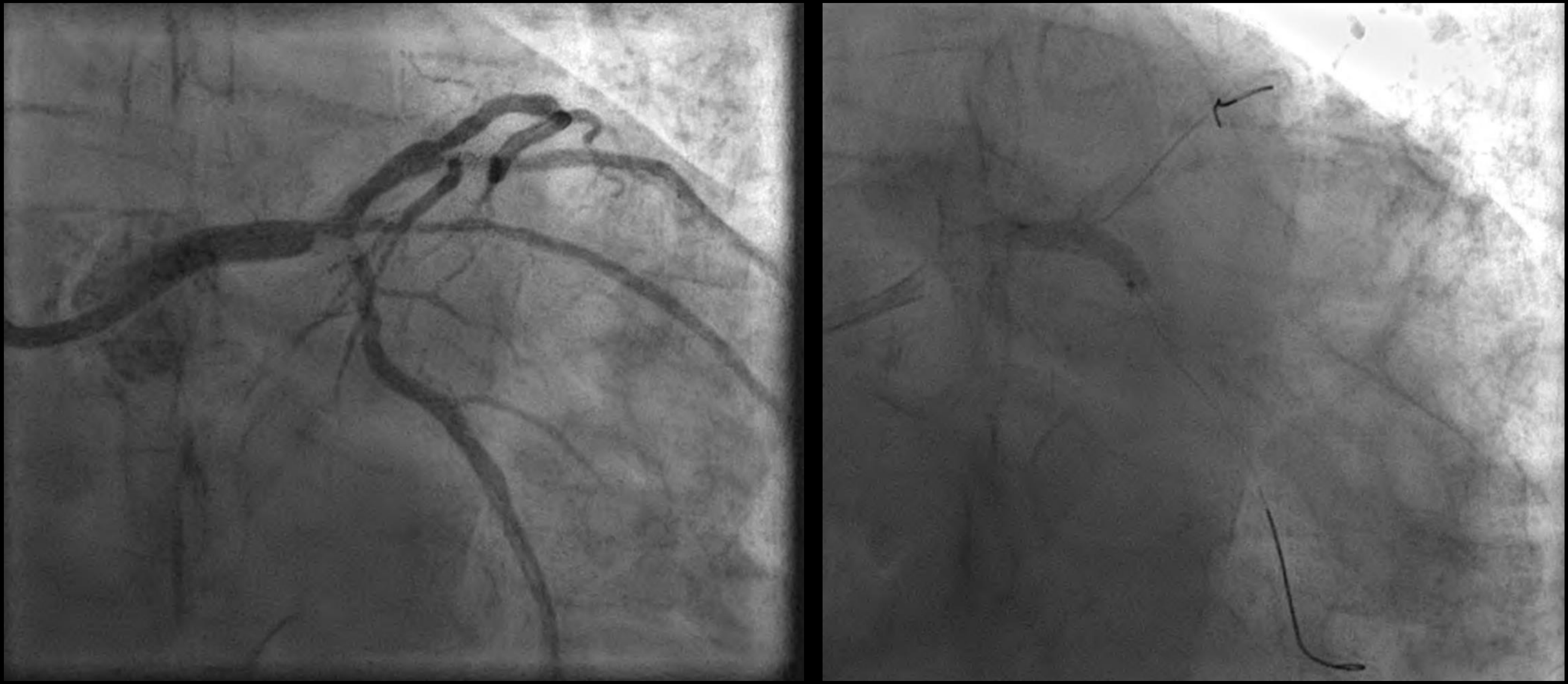
Classification

- - Medina : 1/1/1
- - ABCd

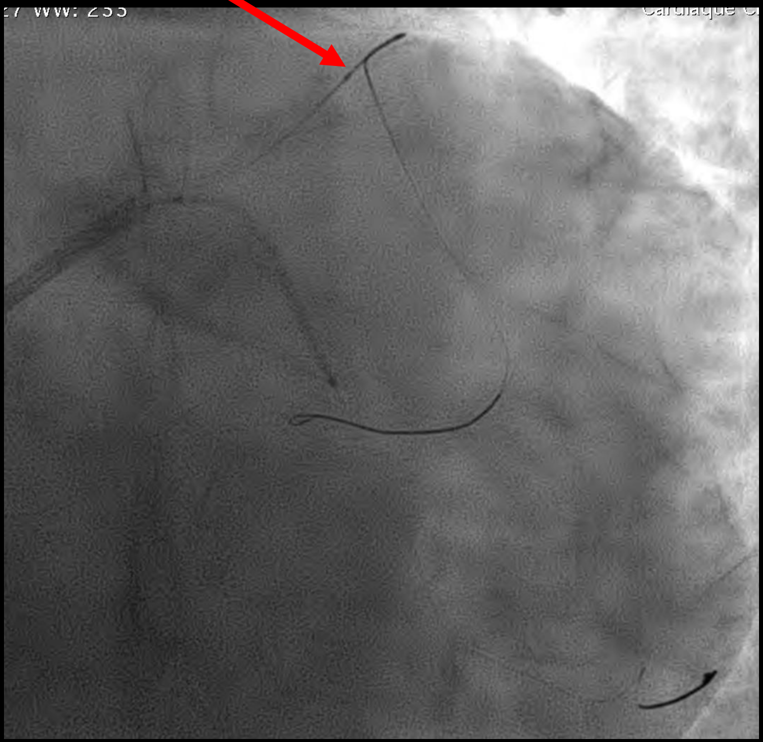
Quelle technique ?



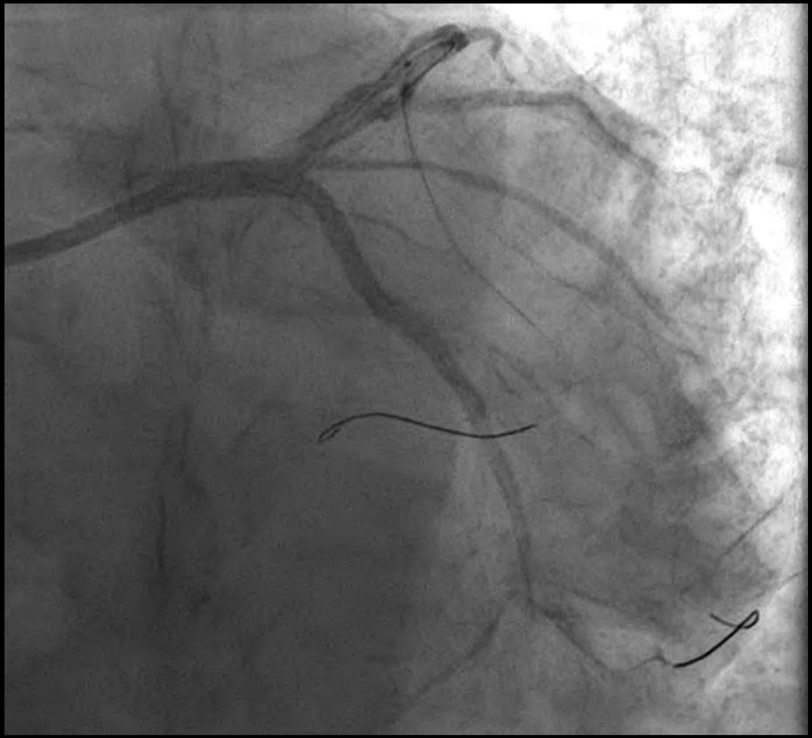
Suite du Cas Clinique



Ballon IVA en aval


WW: 255
Cardiaque C

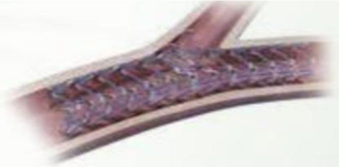
Positionnement stent TC-Cx
TANSAI 3,0 x 28



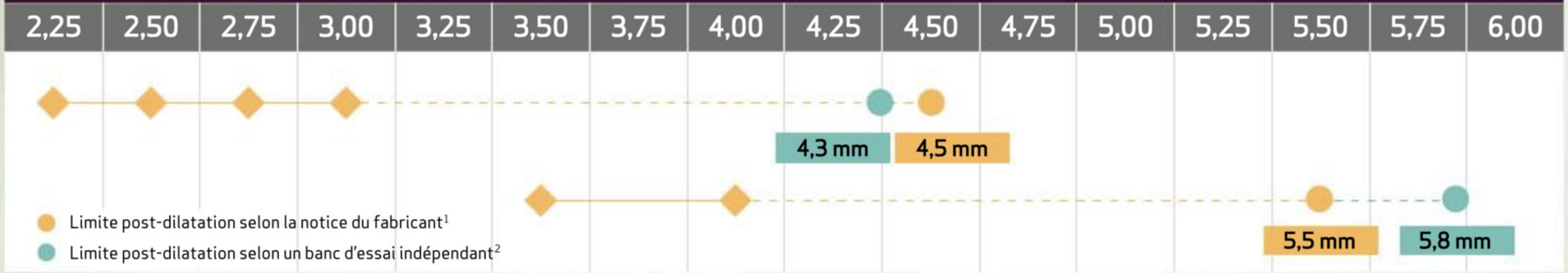
Contrôle angio:
Vérifier absence dissection avant retrait guide

Ultimaster™ Tansei™

Stent coronaire à libération de sirolimus

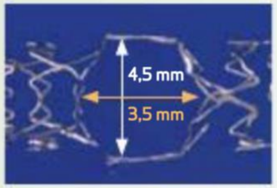


GRANDE CAPACITÉ DE SUREXPANSION - Diamètre du stent (mm)



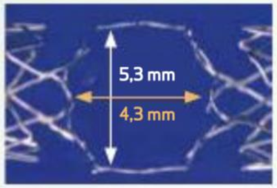
ACCÈS FACILE À LA BRANCHE LATÉRALE[3]

Ø 2,25–3,0 mm



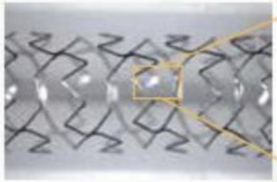
Cathéter à ballonnet non compliant
Ø 4,0 mm, pression nominale

Ø 3,5-4,0 mm

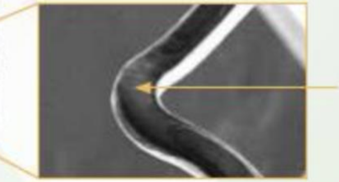


Cathéter à ballonnet non compliant
Ø 5,0 mm, pression nominale

TECHNOLOGIE DE REVÊTEMENT À GRADIENT POUR MAINTENIR L'INTÉGRITÉ DU POLYMÈRE, **MÊME EN CAS DE SUREXPANSION**[4]



Ø4,0-12 mm Ultimaster Tansei
a une expansion max. de 5,5 mm[1]



Grossissement 150x

Pas de revêtement de principe actif sur les parties du stent qui subissent le plus de contraintes physiques

DAPT 1 MOIS[5]

Inclus dans la notice pour les patients devant arrêter la bithérapie précocément[6]

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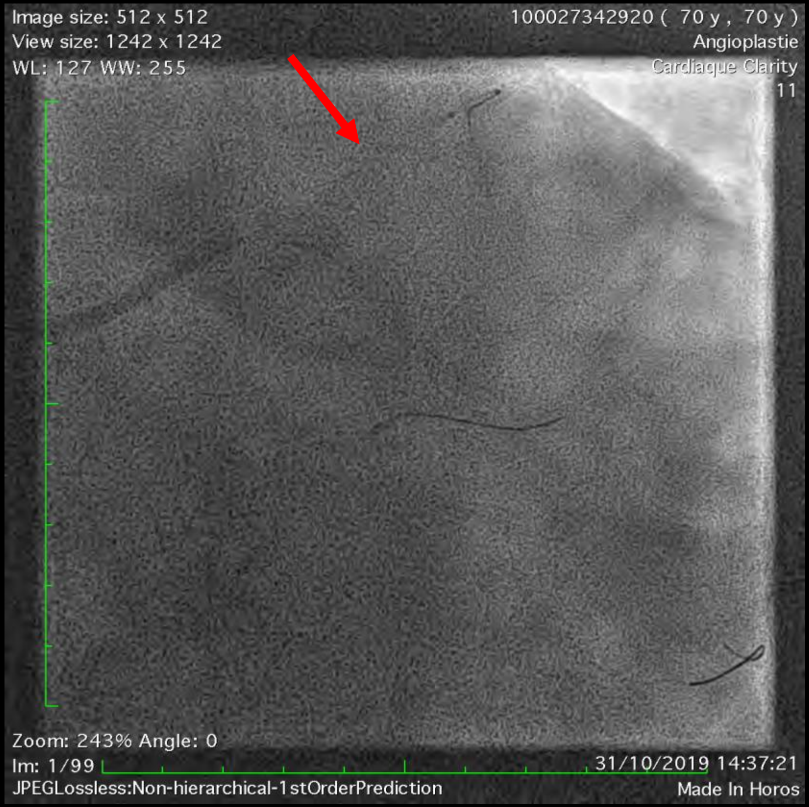
1. L'agrément CE a été reçu le 2 août 2019. La notice sera mis à jour afin de refléter les limites post-dilatation spécifiées. 2. Ng J et al. Int J Cardiol 2016;221:171–9. 3. Test ISCD-523-31-34 réalisé et consigné par Terumo Corporation - Méthode de test : dilater une cellule avec un ballonnet à la pression nominale. 4. Saito N et al. Medical Devices: Evidence and Research 2016:9;33-43. 5. Les patients doivent poursuivre un traitement antiplaquettaire postopératoire cliniquement adapté conformément aux directives en vigueur. Si nécessaire, le double traitement antiplaquettaire peut être arrêté précocement mais pas avant un mois. 6. Notice de l'Ultimaster™ Tansei™, version 01-2018.

from ACCESS to CLOSURE(*)
CARDIOLOGIE INTERVENTIONNELLE
(*) De l'abord à la fermeture

Ultimaster™ Tansei™, endoprothèse coronaire à libération de Sirolimus est indiquée pour améliorer la perfusion au niveau du myocarde chez les patients atteints de lésions sténotiques des artères coronaires. Ultimaster Tansei est exclusivement réservé aux professionnels de santé. Dispositif médical de classe III (CE 0482) fabriqué par Terumo Europe NV, Belgique. Fait l'objet d'une prise en charge au titre III de la liste des Produits et Prestations Remboursables (LPPR) prévue par l'article L165-1 du code de la sécurité sociale sous les codes : Ultimaster™ Tansei™ Ø 2,25mm, code LPP : 3159907, Ultimaster™ Tansei™ Ø 2,50mm, code LPP : 314840, Ultimaster™ Tansei™ Ø 2,75mm, code LPP : 3153856, Ultimaster™ Tansei™ Ø 3,00mm, code LPP : 3129728, Ultimaster™ Tansei™ Ø 3,50mm, code LPP : 3163398, Ultimaster™ Tansei™ Ø 4,00mm, code LPP : 3199580.

TERUMO
INTERVENTIONAL
SYSTEMS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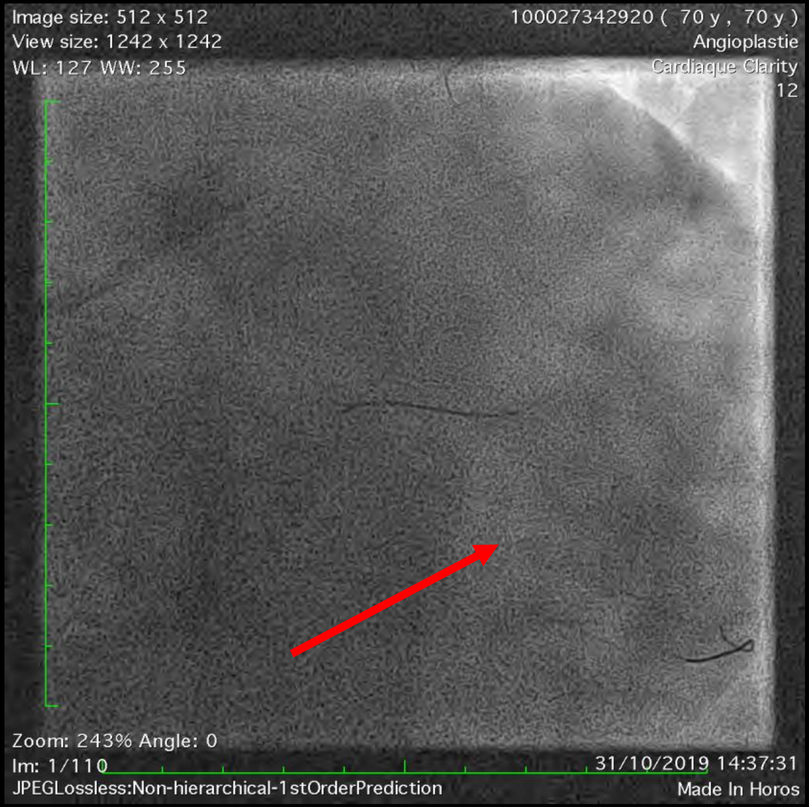
Angioplastie
Cardiaque Clarity
11
Zoom: 243% Angle: 0
Im: 1/99
31/10/2019 14:37:21
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

Positionnement ballon IVA pour crush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Cardiaque Clarity
12
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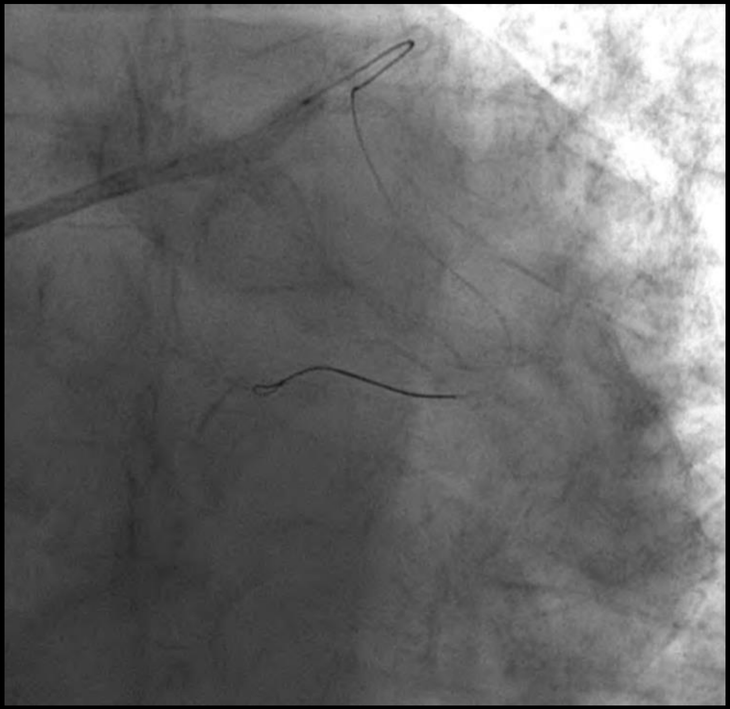
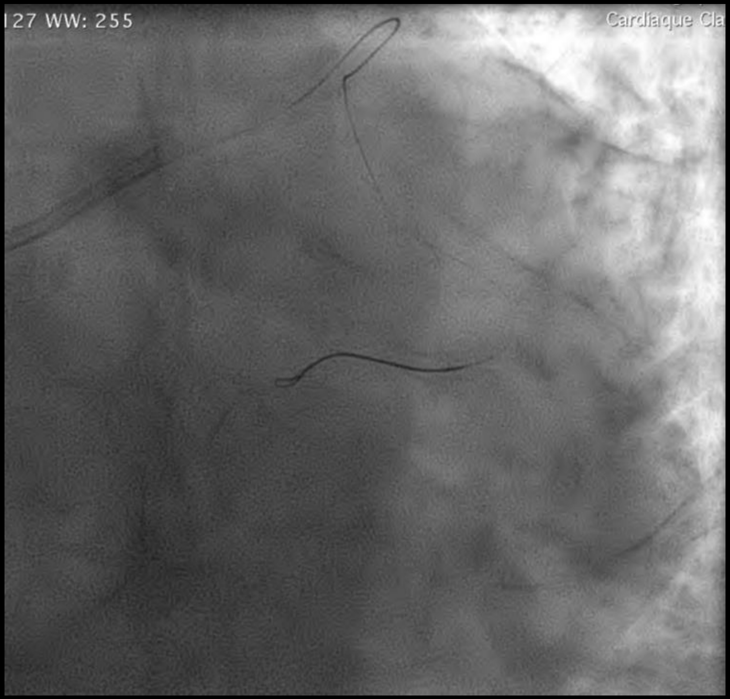
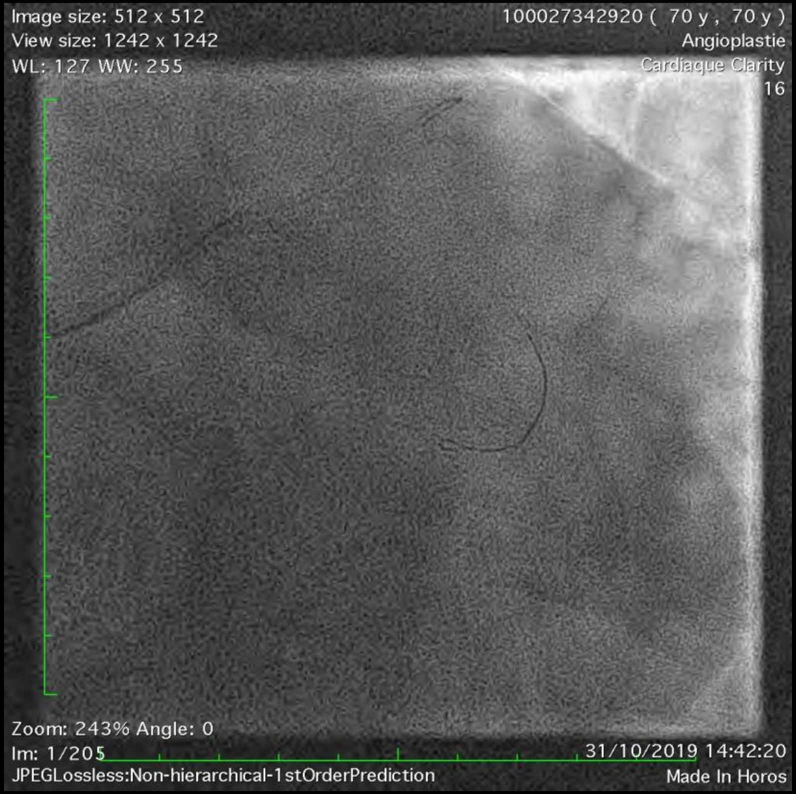
Made In Horos

Retrait guide Cx avant crush



CRUSH


127 WW: 255
Cardiaque Cla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Angioplastie
Cardiaque Clarity
16
Zoom: 243% Angle: 0
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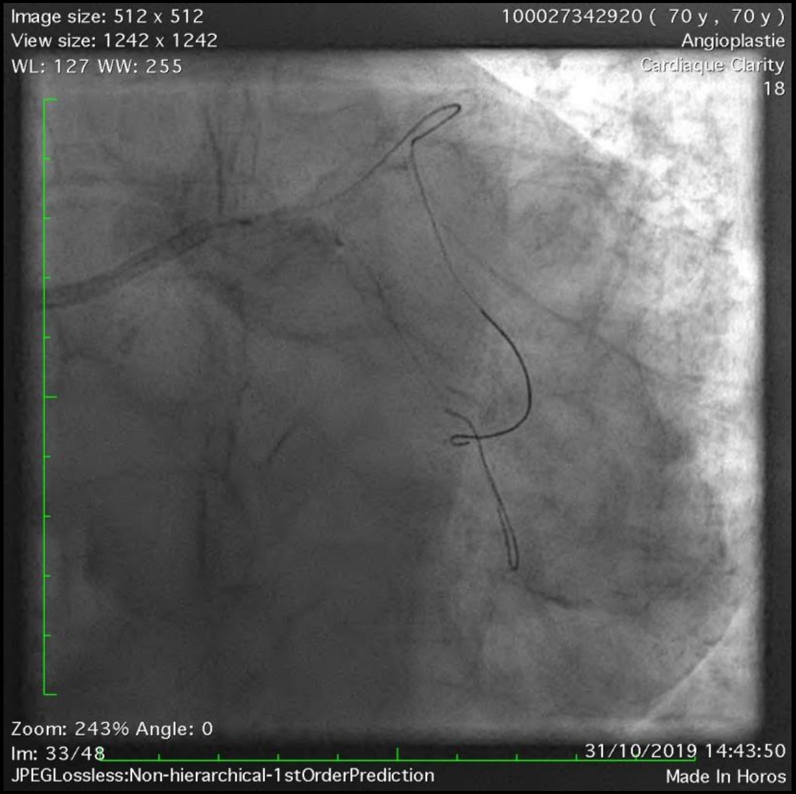
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

Refranchissement Cx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Angioplastie
Cardiaque Clarity
18
Zoom: 243% Angle: 0
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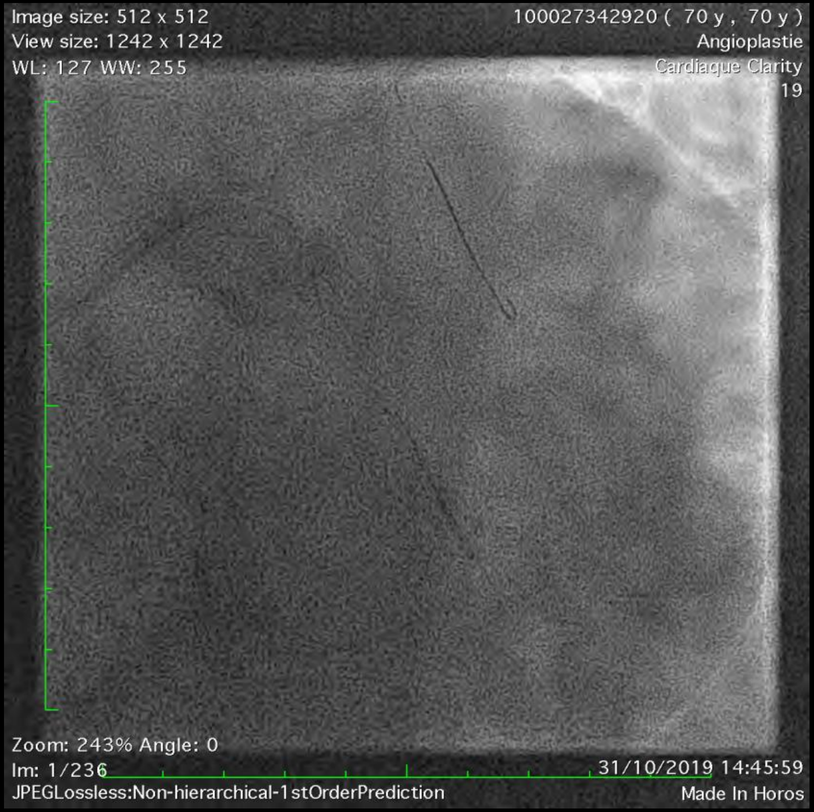
31/10/2019 14:43:50
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

Ouverture maille Cx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Angioplastie
Cardiaque Clarity
19
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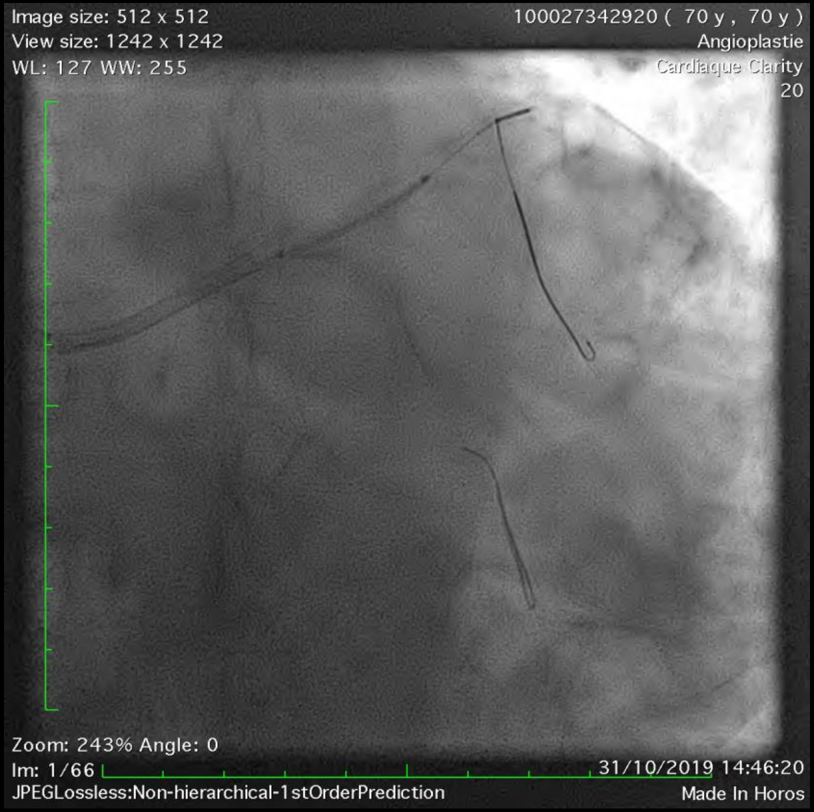
Made In Horos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Cardiaque Clarity
20
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Im: 1/66
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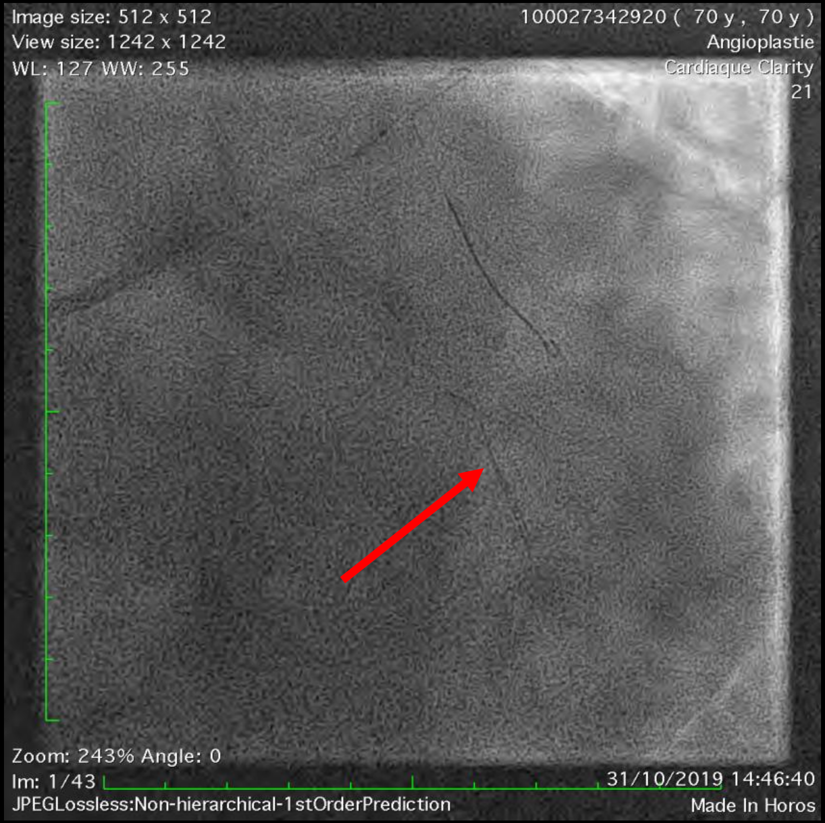
Made In Horos

Passage stent TC-IVA
TANSAI 3,5 x 18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Cardiaque Clarity
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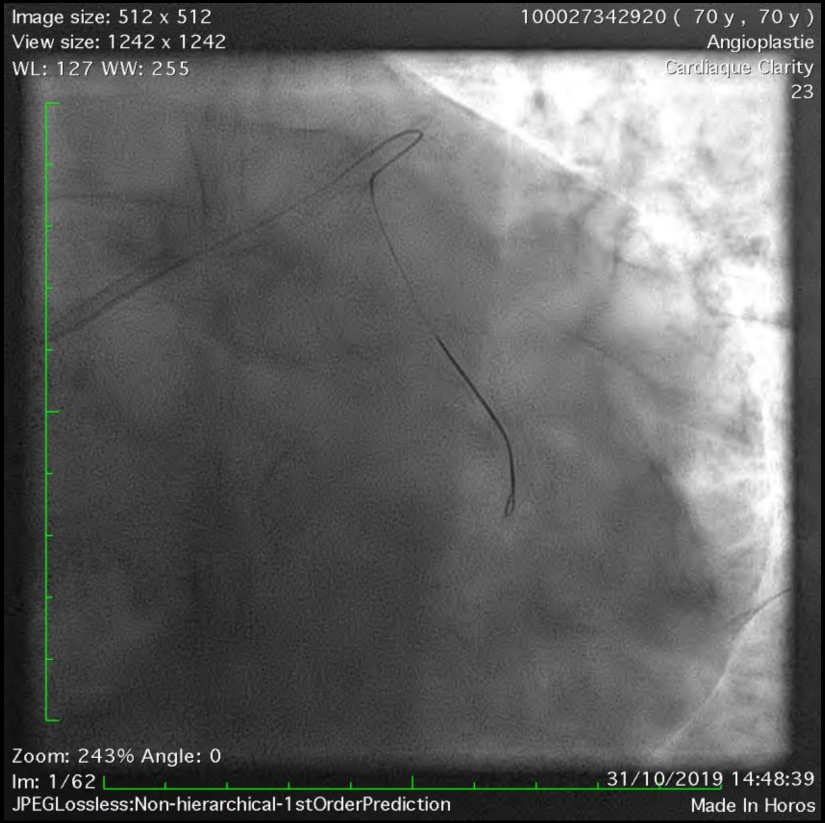
Made In Horos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Angioplastie
Cardiaque Clarity
23
Zoom: 243% Angle: 0
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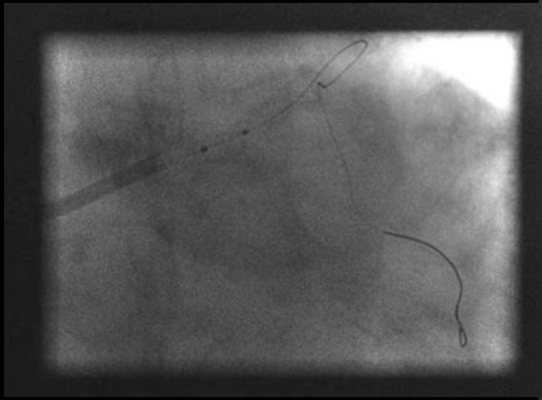
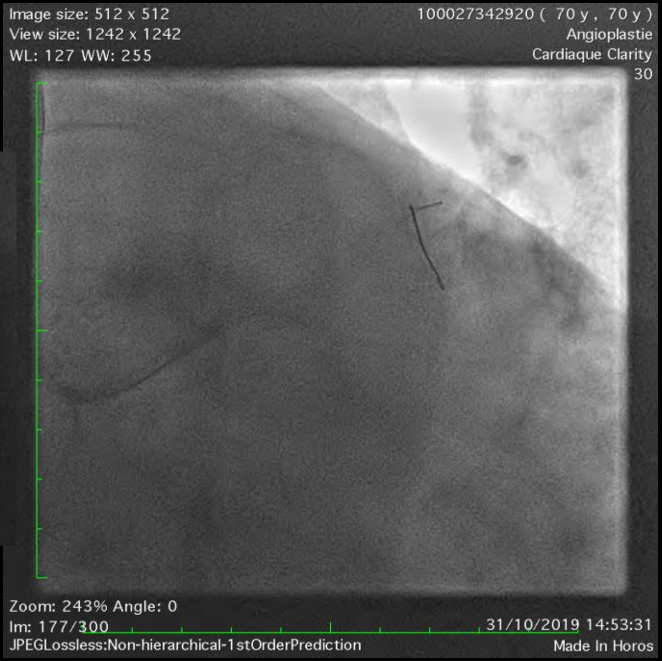
31/10/2019 14:48:39
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

Retrait guide Cx



POT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Angioplastie
Cardiaque Clarity
30
Zoom: 243% Angle: 0
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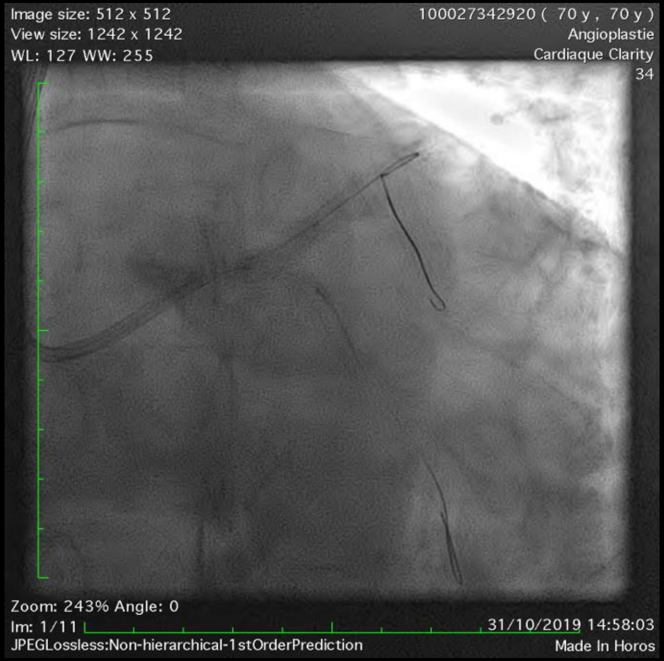
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

2ème refranchissement Cx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Angioplastie
Cardiaque Clarity
34
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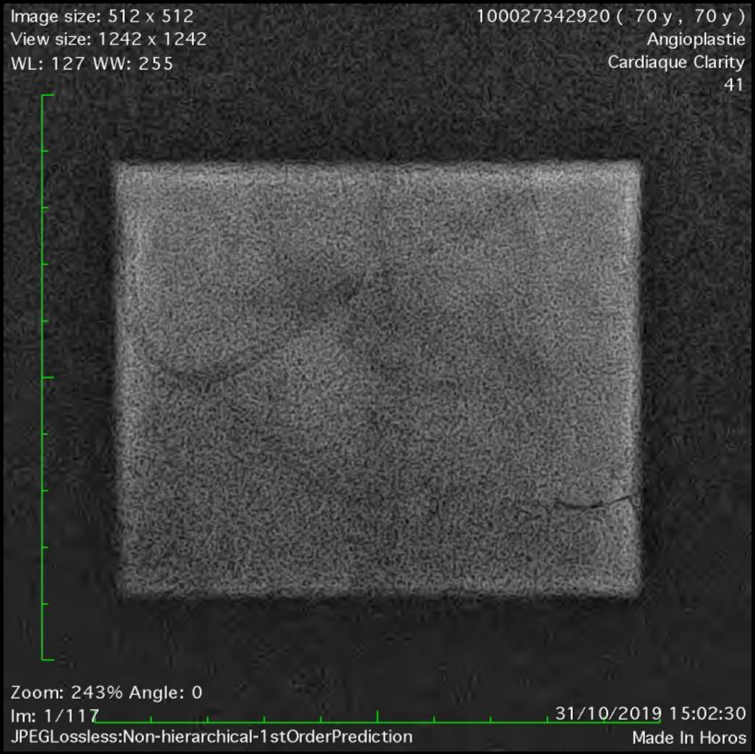
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

Kissing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Cardiaque Clarity
41
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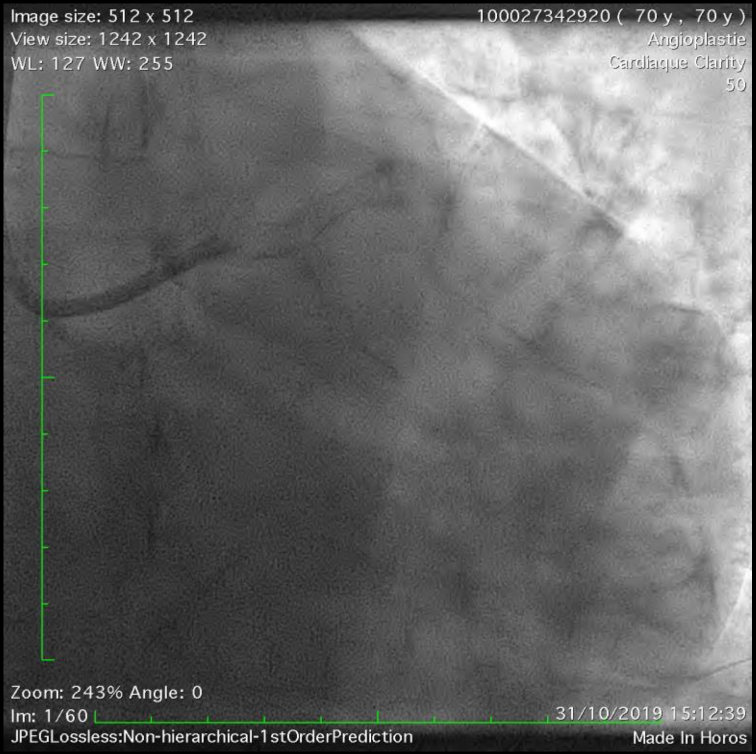
JPEGLossless:Non-hierarchical-1stOrderPrediction
Made In Horos

POT final
Ballon 4,5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Cardiaque Clarity
50
Zoom: 243% Angle: 0
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JPEGLossless:Non-hierarchical-1stOrderPrediction
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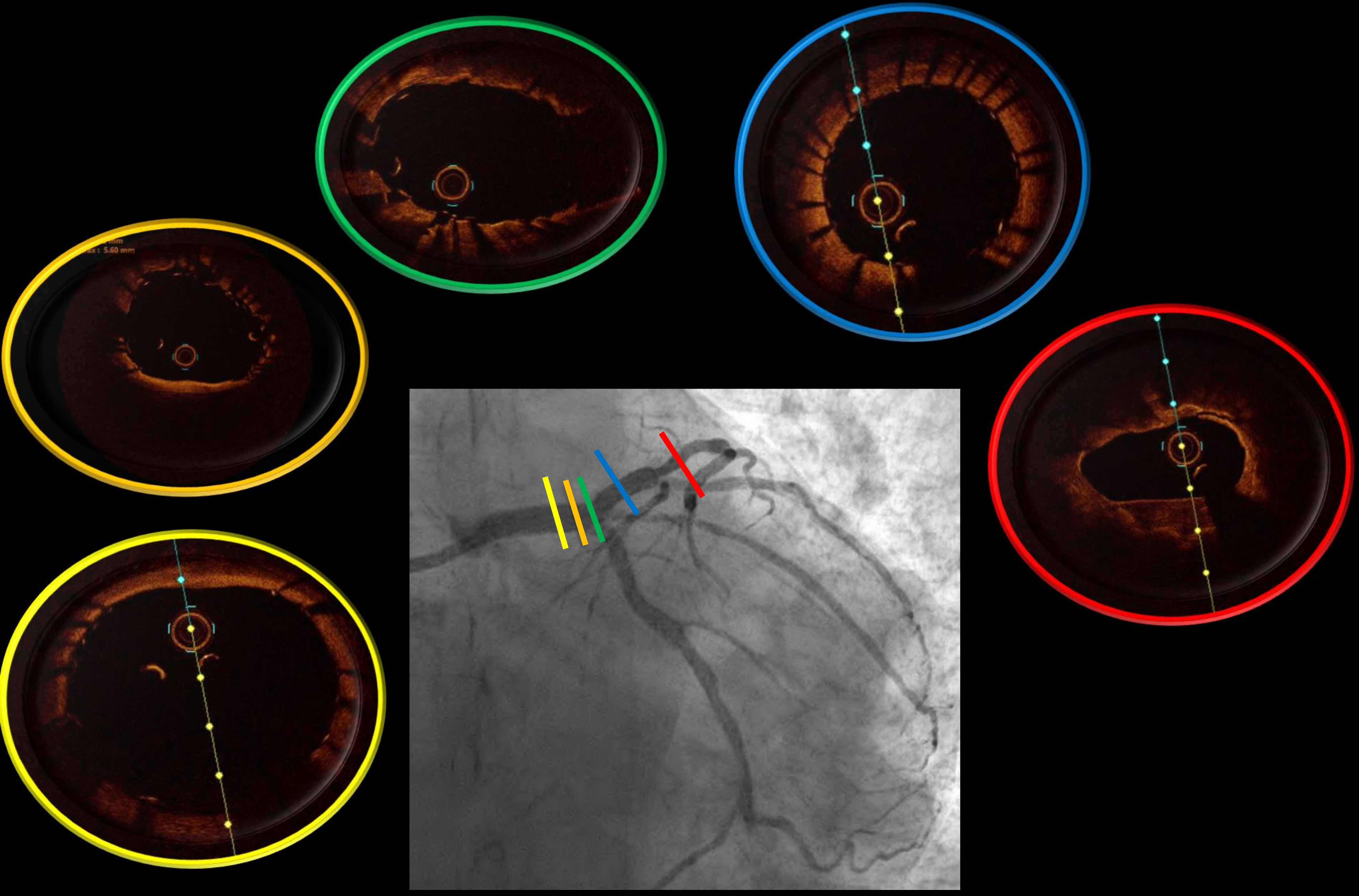
Résultat final


mm
ax : 5.60 mm

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Hôpitaux

Règles d’Or du DK Crush

- Connaître parfaitement la technique et les différentes étapes
  - Formation ++
- Réservée aux vraies bif : Médina 1,1,1 et 0,1,1
- ATL programmée, patient et famille informée
- Prétraitée AAP / ACT guidée (modif sous apixaban ??)
- 7 Fr si possible
- 2 opérateurs
- 2 règles d’or
  - Ballon du crush neuf sur ou en aval du stent à crusher (positionné avant le crush ++)
  - Retrait du guide dans branche fille avant chaque crush +++

Résultat

- Procédure
  - Durée procédure : 55 min
  - Temps de scopie: 17 min
  - Iode: 142 cc
  - Air Kerma: 1933 mGy
- Asympto
- ECG non modifié / Trop N
- Sortie J3

Collège
National des
Cardiologues des
Hôpitaux

Take Home Message

Angioplasties bifurcations complexes

- Jamais ad'hoc
- Connaître techniques et matériel
- Procédures planifiées
- Importance de la formation, expérience et volume de pratique

Merci pour votre attention, Merci à TERUMO

4-3-3
TERUMO
SHARP
動物実験に関する基本理念
TOSHIBA

L’atelier by Terumo