40 ans d'angioplastie : progrès techniques et évolution des stratégies

Dr Pierre Meyer
Institut Arnault Tzanck
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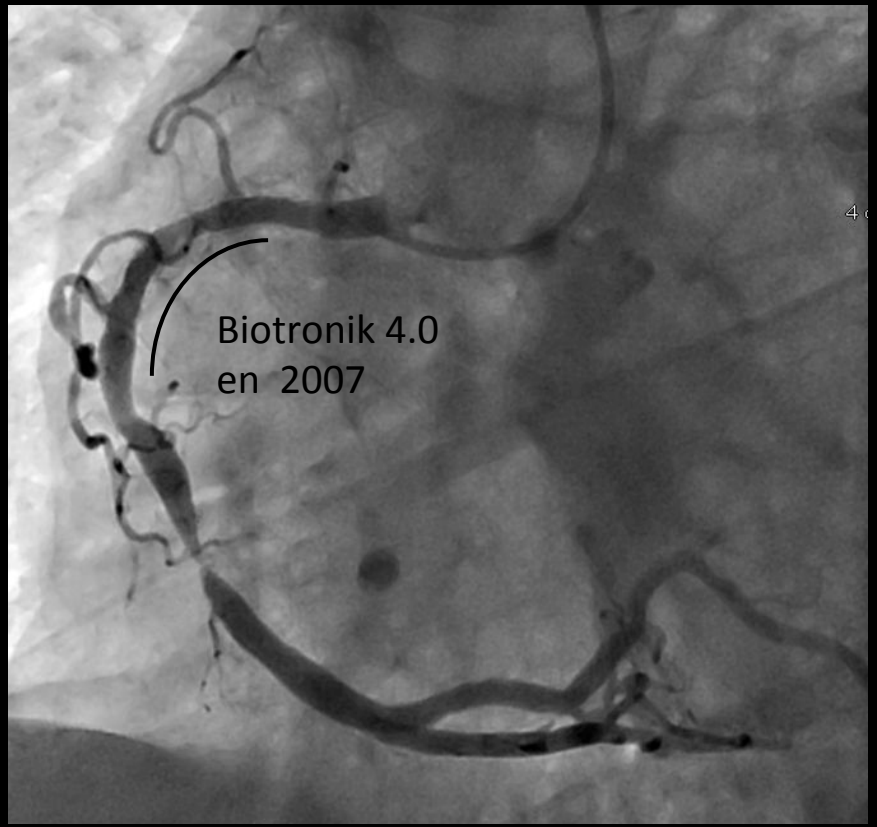
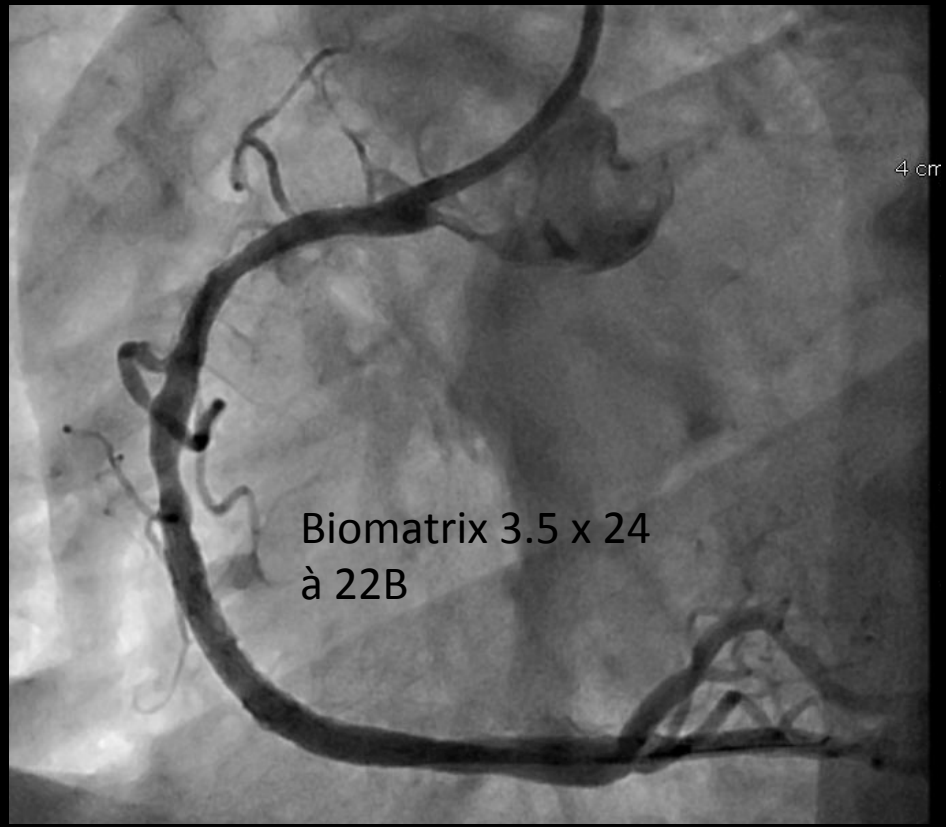
40 ANS D'INNOVATIONS

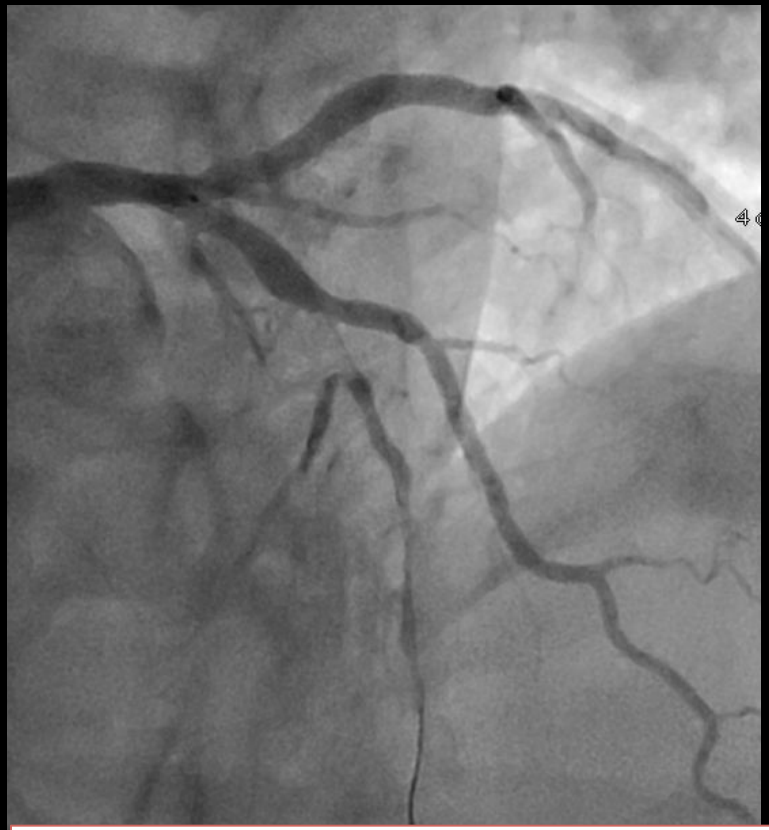
1977 : première angioplastie coronaire par Andreas Gruëntzig.
Depuis cette date, les seules innovations qui ont su s'imposer correspondaient à un réel besoin et ont pu prouver leur efficacité et leur sécurité :

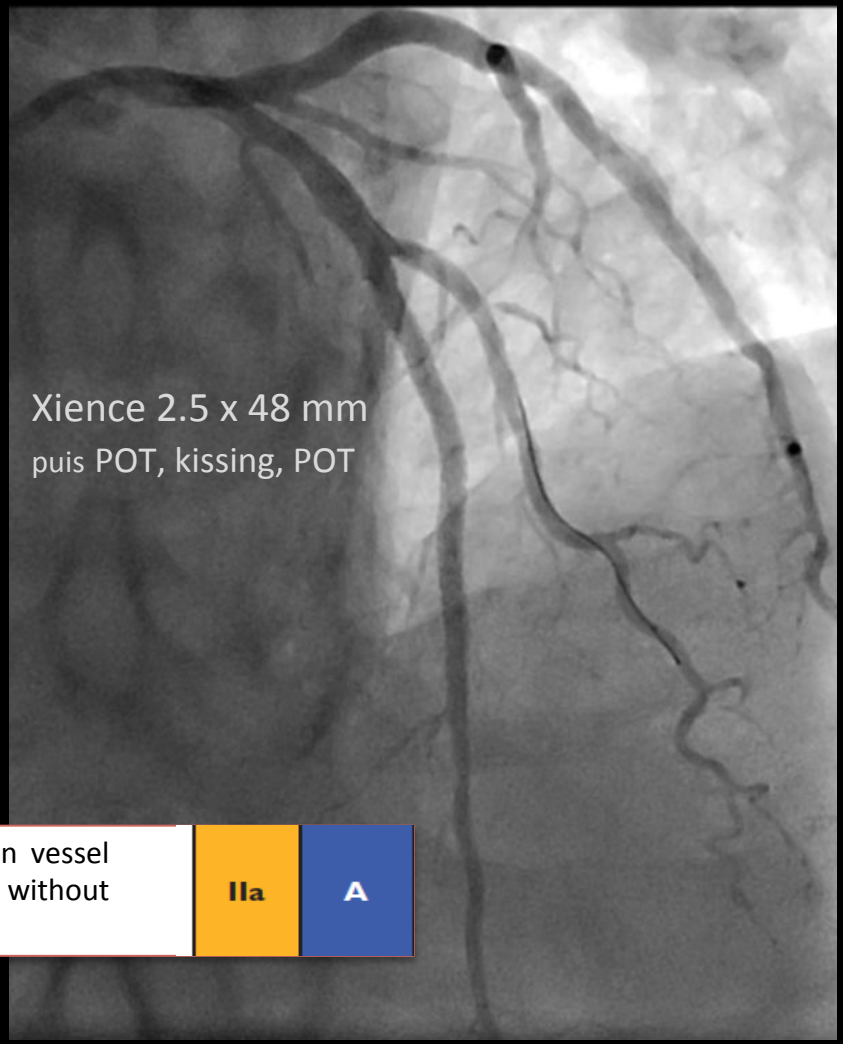
- Le guide orientable (steerable) a facilité le franchissement des lésions, le monorail a simplifié la manipulation des cathéters à ballonnet.
- Le rotablator a permis de traiter les lésions infranchissables ou indilatables.
- Les premiers stents ont sécurisé l'angioplastie en traitant les dissections occlusives, supprimant le recours au stand-by chirurgical.
- Les bons stents nus (Palmaz & Schatz) ont diminué le risque de resténose en améliorant le résultat primaire et surtout en empêchant le remodelage cicatriciel tardif constrictif du vaisseau, malgré une prolifération fibreuse délétère…
- Les stents actifs ont supprimé cette réaction fibro-prolifération…

Mr Cuz…75 ans agriculteur toujours actif. Angor de novo avec ischémie antéro-septale et postérieure étendue à la scintigraphie. Infarctus rudimentaire postérieur traité par angioplastie droite en 2007.
FE normale, sans trouble de la cinétique segmentaire.









For PCI of bifurcation lesions, stent implantation in the main vessel only, followed by provisional balloon angioplasty with or without stenting of the side branch, should be the preferred treatment.

IIa	A

Mechanisms of Very Late Stent Thrombosis After Drug-Eluting Stent Implantation

Findings From Coronary Angioscopy and Optical Coherence Tomography

Hiroki Ikenaga, MD, Masaharu Ishihara, MD, PhD, Kazuoki Dai, MD,
Yasuharu Nakama, MD, Takayuki Ohtani, MD

JACC: CARDIOVASCULAR IMAGING VOL. 4, NO. 11, 2011

DRUG-ELUTING STENTS (DES) ARE NOW WIDELY USED FOR PATIENTS WITH CORONARY ARTERY DISEASE UNDERGOING PERCUTANEOUS CORONARY INTERVENTIONS. A current major concern of using DES is very late stent thrombosis (VLST) that may occur beyond 1 year after DES implantation (1). VLST is an infrequent, albeit catastrophic complication, which can lead to myocardial infarction or sudden cardiac death . However, the
of VLST after s
optical cohere

2007
panique à l'ESC

OCT suggests 3 differential mechanisms of very late stent thrombosis :

1. uncovered and malapposed stent struts at the culprit lesion.
2. Late stent malapposition caused by thrombus resolution or by positive vessel remodeling.
3. Enhanced inflammation after DES implantation may promote neo-atherosclerosis and exaggerate vulnerability of this lesion.

European Heart Journal (2016) **37**, 1208–1216
doi:10.1093/eurheartj/ehv711

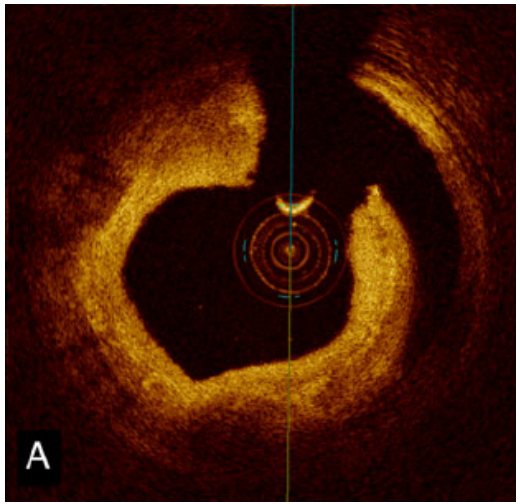
Mechanisms of stent thrombosis analysed by optical coherence tomography: insights from the national PESTO French registry

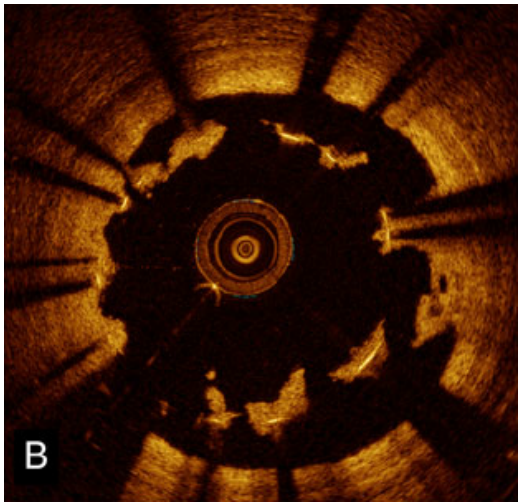
In patients with confirmed ST, OCT imaging identified an underlying morphological abnormality in 97% of cases.

Les deux causes de thrombose aiguë ou subaiguë :

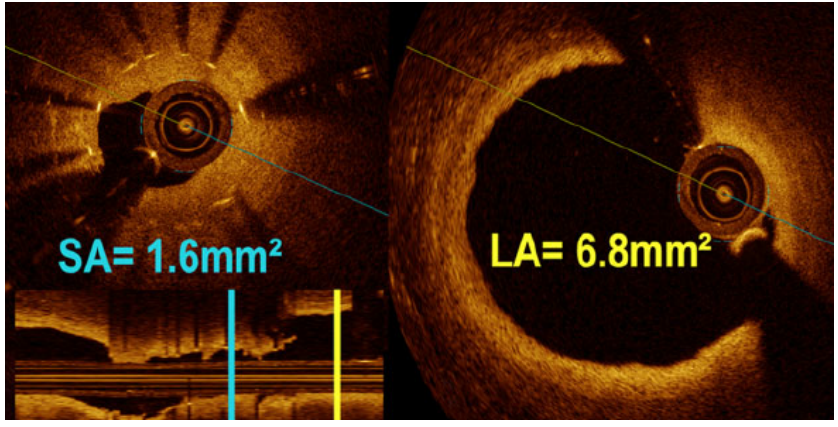
A : la dissection de bord

B : la mal-apposition de stent





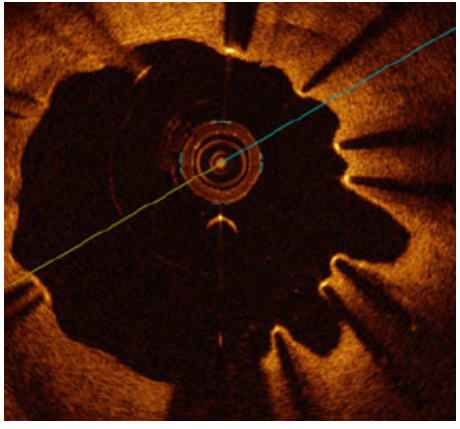
Les anomalies rencontrées dans les thromboses tardives ou très tardives



Le stent sous déployé

SA : aire luminale dans le stent

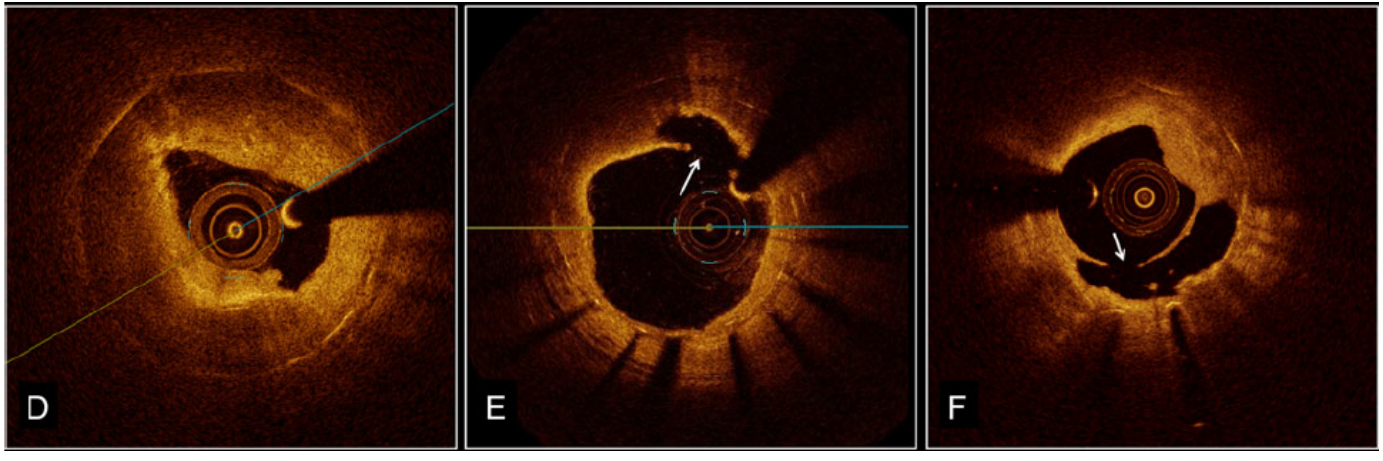
LA : aire luminale de référence…



Mal-apposition tardive

provoquée par un remodelage positif élargissant le vaisseau autour du stent

Néoathérogénèse avec (E-F) ou sans (D) rupture de plaque

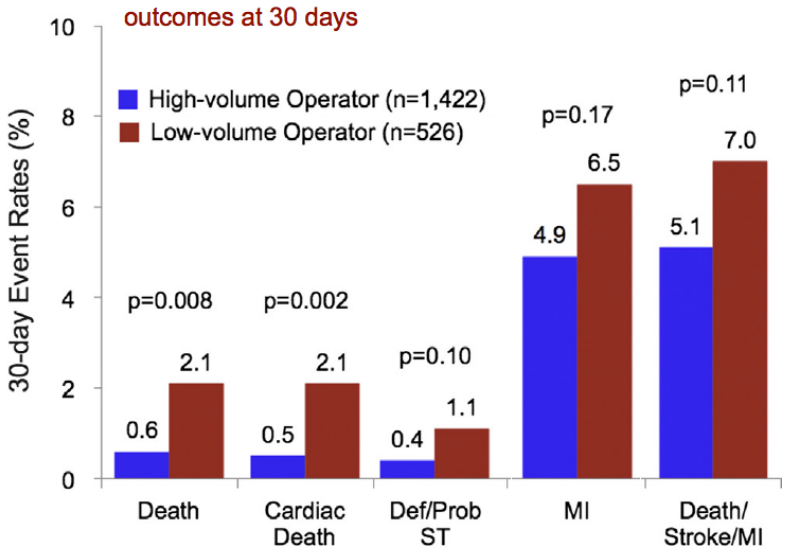


EDITORIAL COMMENT

The Volume–Outcome Relationship Revisited

Does It Matter for High-Risk PCI?

Ralph G. Brindis, MD, MPH, Gregory J. Dehmer, MD



Impact of Operator Experience and Volume on Outcomes After Left Main Coronary Artery Percutaneous Coronary Intervention

Bo Xu, MBBS,[a] Björn Redfors, MD, PhD,[b,c] Yuejin Yang, MD,[a] Shubin Qiao, MD,[a] Yongjian Wu, MD,[a] Jilin Chen, MD,[a] Haibo Liu, MD,[a] Jue Chen, MD,[a] Liang Xu, MSc,[a] Yanyan Zhao, BS,[a] Changdong Guan, MSc,[a] Runlin Gao, MD,[a] Philippe Généreux, MD[b,d,e,f]

ABSTRACT

OBJECTIVES The aim of this study was to assess the impact of operator experience on prognosis after left main coronary artery (LM) percutaneous coronary intervention (PCI).

BACKGROUND LM PCI can be technically challenging and potentially risky considering the amount of supplied myocardium.

METHODS Consecutive patients who underwent unprotected LM PCI at a single institution were included and compared according to whether the primary operator was an experienced, high-volume LM operator (defined as an operator who performed at least 15 LM PCIs per year for at least 3 consecutive years) or not. Kaplan-Meier estimates and Cox proportional hazards models are presented.

RESULTS From January 2004 to December 2011, a total of 1,948 patients underwent unprotected LM PCI by 25 operators. Of these, 7 operators (28%) were considered experienced, and 18 (72%) were considered less experienced, with an overall mean experience of 12.0 ± 11.5 LM PCIs per year. LM PCI was performed in 1,422 patients (73%) by experienced operators and in 526 patients (27%) by less experienced operators. Patients treated by experienced operators had more complex and extensive coronary artery disease. Unadjusted and adjusted risks for cardiac death were lower for patients who were treated by experienced operators, both at 30-day (unadjusted hazard ratio [HR]: 0.23; 95% confidence interval [CI]: 0.09 to 0.60; $p = 0.003$; adjusted HR: 0.22; 95% CI: 0.09 to 0.59; $p = 0.003$) and 3-year (unadjusted HR: 0.53; 95% CI: 0.32 to 0.89, $p = 0.02$; adjusted HR: 0.49; 95% CI: 0.29 to 0.84; $p = 0.009$) follow-up. Discrimination improved when operator experience was added to Cox proportional hazards models containing the SYNTAX (Synergy Between PCI With Taxus and Cardiac Surgery) score (integrated discriminatory index = 0.004, $p = 0.03$) or SYNTAX score II (integrated discriminatory index = 0.007, $p = 0.02$). No significant interaction was detected between operator experience and distal bifurcation LM lesion, 2-stent bifurcation stenting, and intravascular ultrasound use ($p > 0.10$ for all).

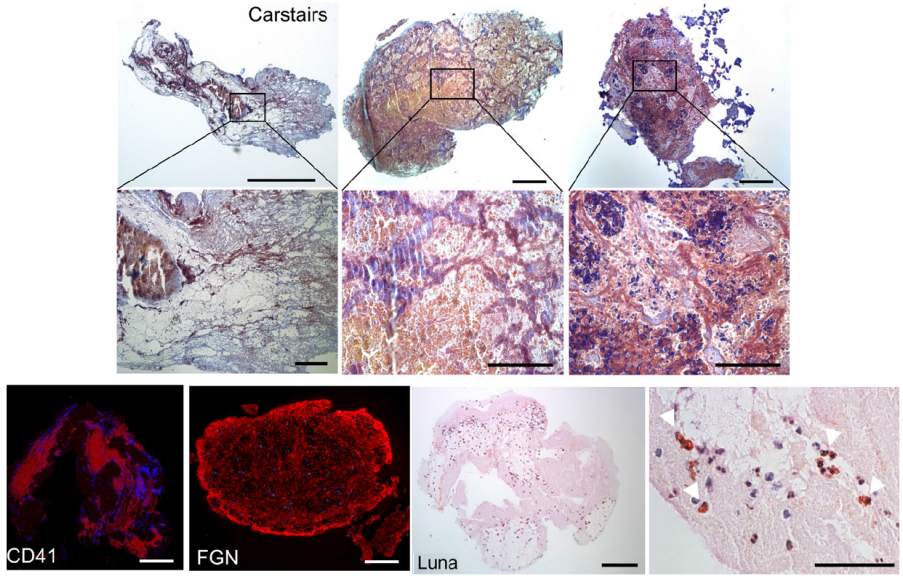
CONCLUSIONS Patients who underwent LM PCI by high-volume and experienced operators had better short- and long-term prognoses. Operator experience is an important factor in a complex intervention such as LM PCI.
(J Am Coll Cardiol Intv 2016;9:2086–93)

CONCLUSIONS : Patients who underwent LM PCI by high-volume and experienced operators had better short and long-term prognoses. Operator experience is an important factor in a complex intervention such as LM PCI.

European Heart Journal (2016) 37, 1538–1549
doi:10.1093/eurheartj/ehv419

Histopathological evaluation of thrombus in patients presenting with stent thrombosis. A multicenter European study: a report of the prevention of late stent thrombosis by an interdisciplinary global European effort consortium†

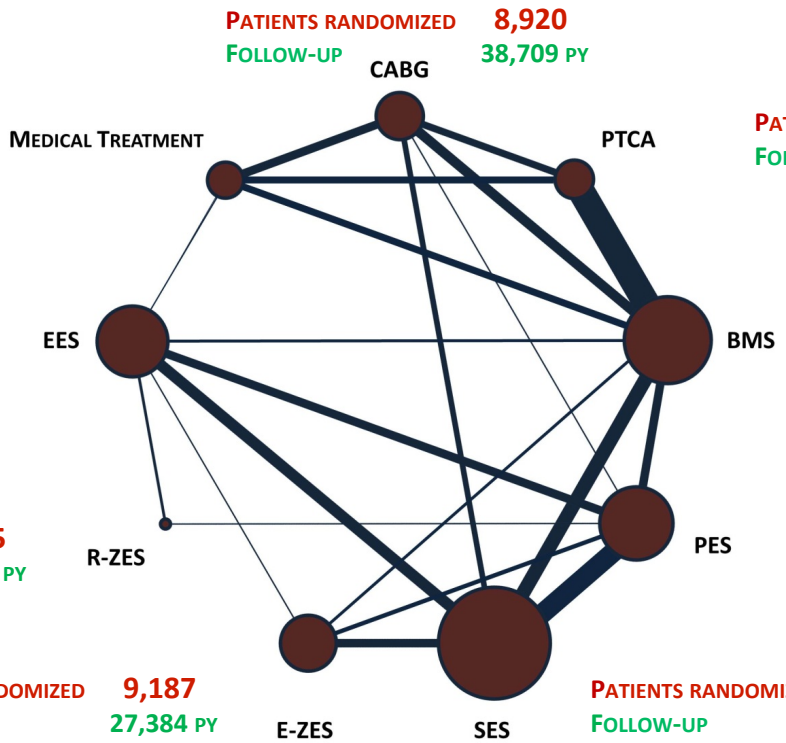
Julia Riegger[1,2‡], Robert A. Byrne[2,3‡], Michael Joner[3,4], Sue Chandraratne[1,2], Anthony H. Gershlick[5], Jurrien M. ten Berg[6], Tom Adriaenssens[7,8], Giulio Guagliumi[9], Thea C. Godschalk[6], Franz-Josef Neumann[10], Dietmar Trenk[10], Laurent J. Feldman[11,12,13], Philippe Gabriel Steg[11,12,13,14], Walter Desmet[7,8], Fernando Alfonso[15], Alison H. Goodall[5], Roman Wojdyla[16], Dariusz Dudek[16], Vanessa Philippi[1,2], Sheryl Opinaldo[1,2], Anna Titova[1,2], Nikesh Malik[5], James Cotton[17], Darshni A. Jhagroe[6], Antonius A.C.M. Heestermans[18], Peter Sinnaeve[7,8], Paul Vermeersch[19], Christian Valina[10], Christian Schulz[1,2], Adnan Kastrati[2,3*], and Steffen Massberg[1,2*], On Behalf of the Prevention of Late Stent Thrombosis by an Interdisciplinary Global European Effort (PRESTIGE) Investigators



Conclusion In a large-scale study of histological thrombus analysis from patients presenting with ST, thrombus specimens displayed heterogeneous morphology. Recruitment of leukocytes, particularly neutrophils, appears to be a hallmark of ST. The presence of NETs supports their pathophysiological relevance. Eosinophil recruitment suggests an allergic component to the process of ST.

Revascularization versus Medical Therapy in Stable CAD : A Network Meta-Analysis *Windecker S et al. BMJ 2014*

100 RCTs – 93.553 patients randomized
Follow-up of 262.090 Patient-years



Patients randomized 8,920
Follow-up 38,709 PY

Patients randomized 6,846
Follow-up 30,628 PY

Patients randomized 6,920
Follow-up 17,678 PY

Patients randomized 14,802
Follow-up 25,096 PY

Patients randomized 15,787
Follow-up 45,467 PY

Patients randomized 2,035
Follow-up 3,134 PY

Patients randomized 12,457
Follow-up 28,828 PY

Patients randomized 9,187
Follow-up 27,384 PY

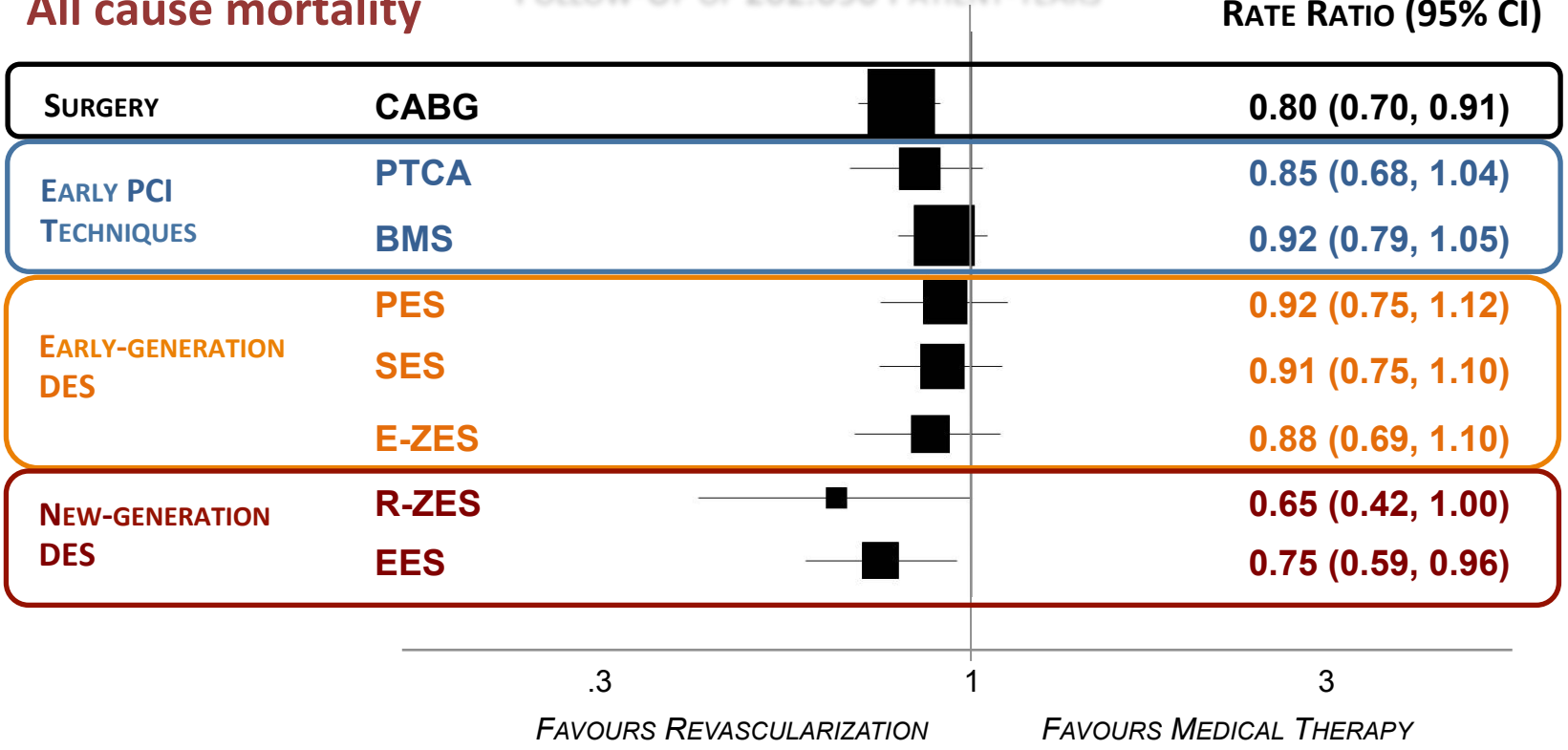
Patients randomized 19,391
Follow-up 45,679 PY

Revascularization versus Medical Therapy in Stable CAD : A Network Meta-Analysis

Windecker S et al. BMJ 2014

100 RCTs – 93.553 PATIENTS RANDOMIZED
FOLLOW-UP OF 262.090 PATIENT-YEARS

All cause mortality



ESC 2013 - 2014

Recommendation for the type of revascularization (CABG or PCI) in patients with SCAD with suitable coronary anatomy for both procedures and low predicted surgical mortality

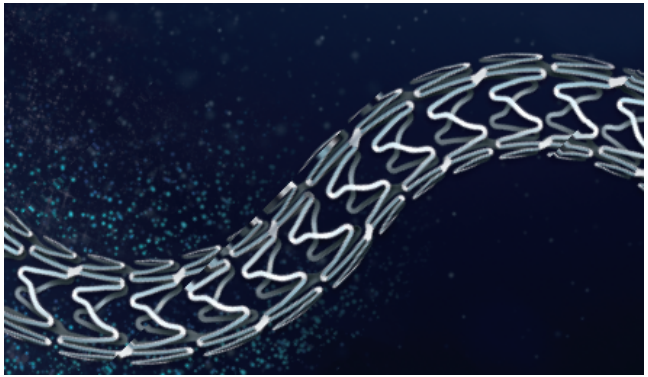
Recommendations according to extent of CAD	CABG		PCI	
	Class	Level	Class	Level
One or two-vessel disease without proximal LAD stenosis.	IIb	C	I	C
One-vessel disease with proximal LAD stenosis.	I	A	I	A
Two-vessel disease with proximal LAD stenosis.	I	B	I	C
Left main disease with a SYNTAX score ≤ 22.	I	B	I	B
Left main disease with a SYNTAX score 23–32.	I	B	IIa	B
Left main disease with a SYNTAX score >32.	I	B	III	B
Three-vessel disease with a SYNTAX score ≤ 22.	I	A	I	B
Three-vessel disease with a SYNTAX score 23–32.	I	A	III	B
Three-vessel disease with a SYNTAX score >32.	I	A	III	B

DES is recommended in SCAD patients undergoing stenting if there is no contraindication to prolonged DAPT.	I	A
New-generation DES are recommended over BMS in primary PCI.	I	A
New-generation DES are indicated for percutanous treatment of significant coronary lesions in ACS patients	I	A

Le cahier des charges d'un stent moderne

- Facile à délivrer sur sa cible, sur toutes anatomies, quels que soient le calibre, les sinuosités, la position de la lésion, la texture de l'athérome…
- Disponibilité d'un grand choix de diamètres et longueurs
- Mailles fines et profilées, peu agressives lors de l'incrustation du stent
- Déploiement homogène et harmonieux des mailles assurant un bon étayage de la paroi, avec une bonne résistance à la rétraction précoce des tissus et au remodelage constrictif tardif
- **Malléable et conformable pour s'adapter à l'anatomie +++**
- Matériau biocompatible, peu thrombogène
- Rapidement endothélialisé sans pour autant induire de réaction fibro-proliférative excessive…
- Le moins de matériel possible, et si possible rapidement résorbable pour éviter les hypersensibilités délétères sur le long terme (néo-athérogénèse, thromboses tardives...)

Bref, facile à utiliser, fiable, sûr,
à faible risque de resténose et de thrombose,
il doit pardonner les imperfections techniques…



New DES workhorse and model designs

	Synergy	Xpedition	Res. Onyx	Ultimaster	BioMatrix A	Orsiro
2.25	Small vessel (8 crowns, 2-4 connectors)	Small vessel (6 crowns, 3 connectors)	Small vessel (6.5 crowns, 2 connectors)	Small vessel (8 crowns, 2 connectors)	Small vessel (6 crowns, 2 connectors)	Small vessel (6 crowns, 3 connectors)
2.50						
2.75			Medium vessel (8.5 crowns, 2 connectors)			
3.00	Workhorse(8 crowns, 2-4 connectors)					
3.50		Large vessel (9 crowns, 3 connectors)	Large vessel (9.5 crowns, 2.5 connectors)	Large vessel (8 crowns, 2 connectors)	Large vessel (9 crowns, 3 connectors)	Large vessel (6 crowns, 3 connectors)
4.00	Large vessel (10 crowns, 2-5 connectors)					
4.50			Extra-Large vessel (10.5 crowns, 2.5 connectors)			
5.00						

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Over-expansion capacity and stent design model: An update with contemporary DES platforms

Jaryl Ng [a,1], Nicolas Foin [a,*,1], Hui Ying Ang [a], Jiang Ming Fam [a], Sayan Sen [b], Sukhjinder Nijjer [b], Ricardo Petraco [b], Carlo Di Mario [c], Justin Davies [c], Philip Wong [a]

[a] National Heart Research Institute Singapore, National Heart Centre Singapore, Singapore
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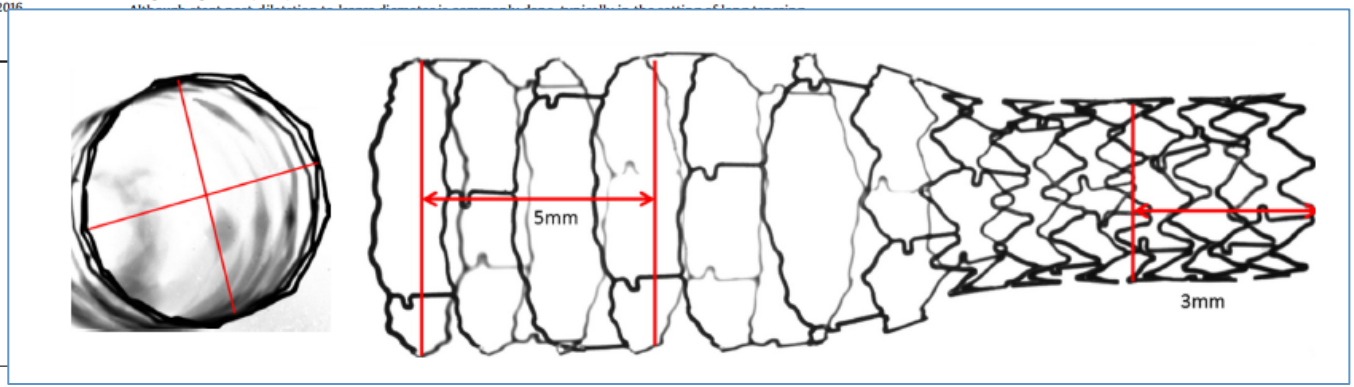
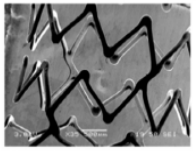
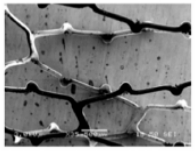
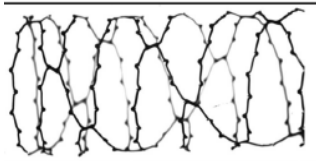
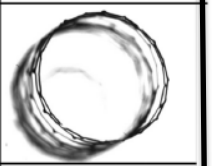
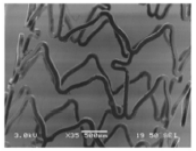
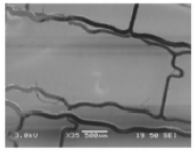
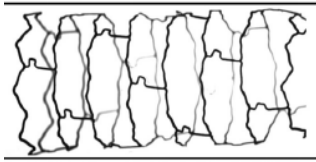
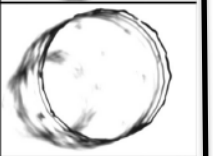
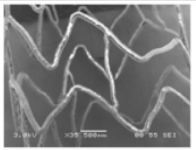
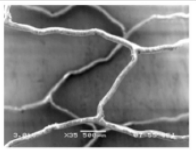
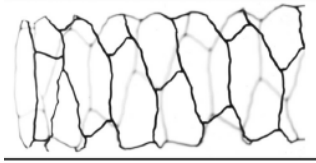
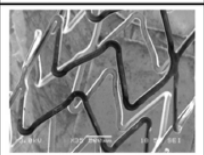
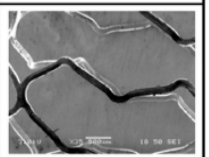
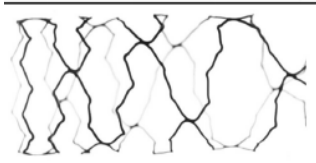
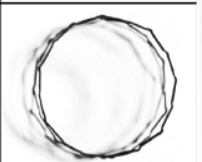
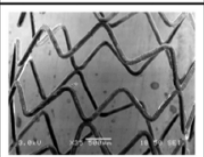
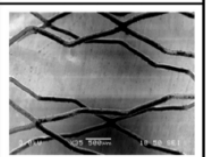
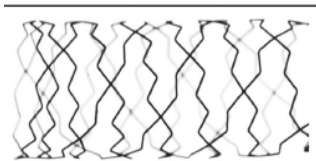
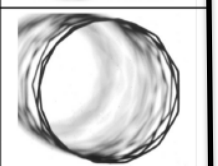
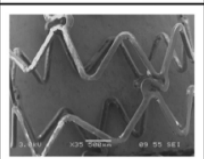
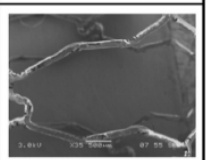
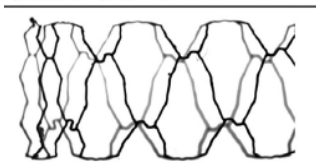
Expansion

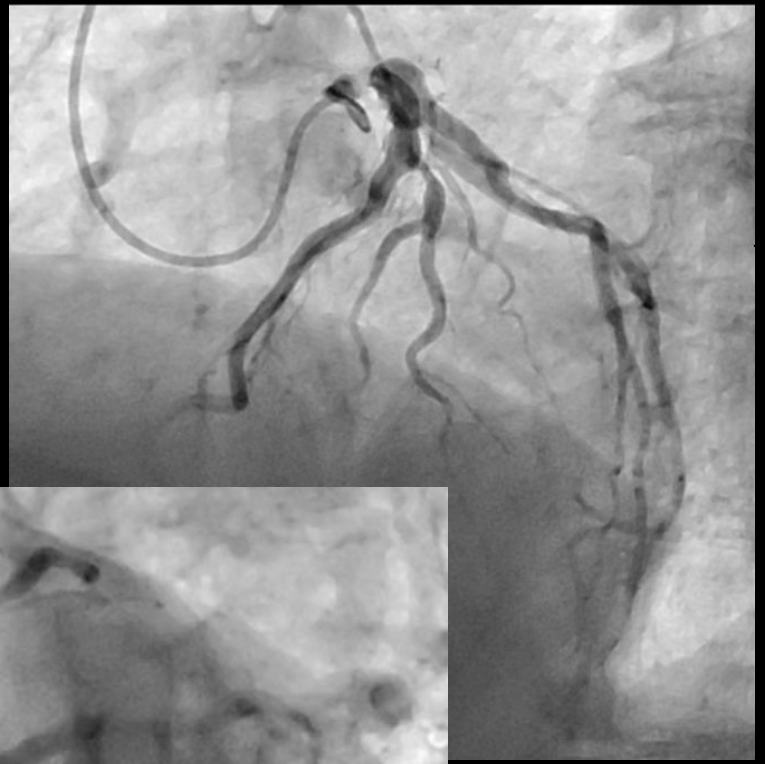
ABSTRACT

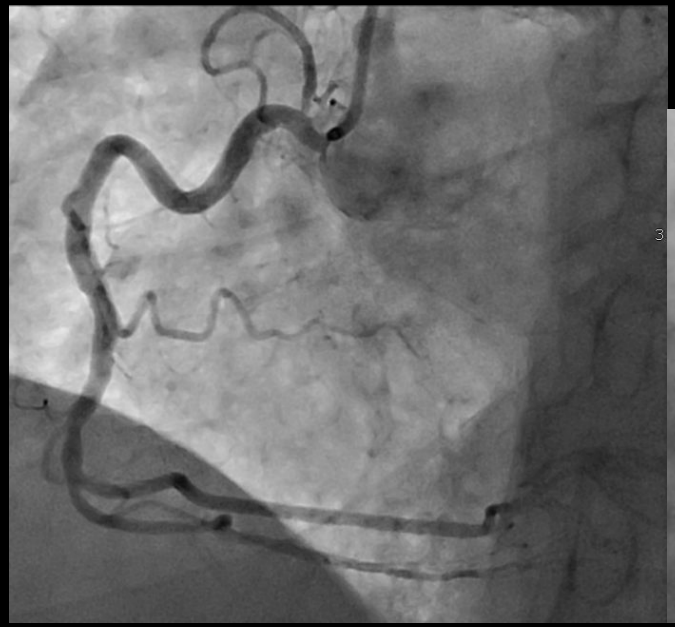
Background: Previously, we examined the difference in stent designs across different sizes for six widely used Drug Eluting Stents (DESs).

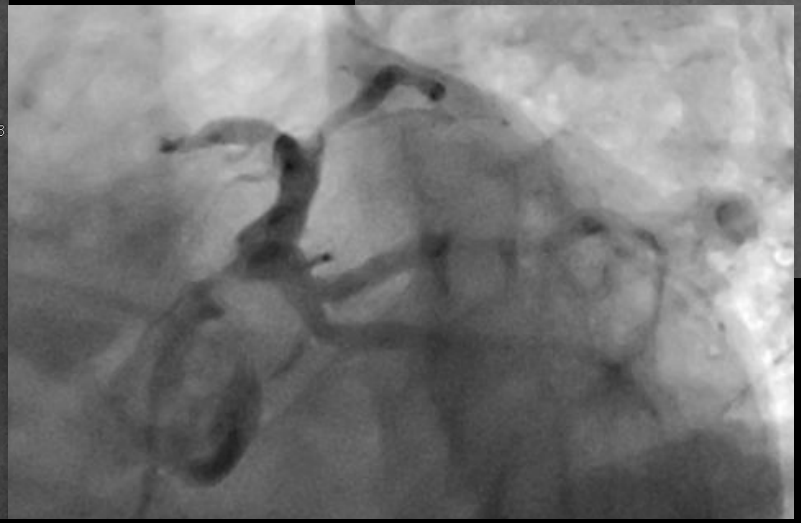


	Nominal Pressure	Overexpansion	OVEREXPANSION WITH 6.0mm SC at 14 ATM	CROSS-SECTION	MLD max
Synergy					5.7mm
Xience Xpedition					5.6mm
Orsiro					5.2mm
Ultimaster					5.8mm
Resolute Onyx					5.5mm 5.9 for XL size
Biomatrix A. Chroma					5.5mm

Mr Rol… 86 ans, très actif. Hypertendu.
Dyspnée évoluant crescendo, invalidante.
Examen, Echo cardiaque normaux. Excellent VG
Scintigraphie myocardique : ergométrie stoppée à 90w : - 4mm p<0 de V1 à V6 contrastant avec une fixation du traceur normale. Récupération lente… hospitalisé au décours de la scinti.







Lésion anfractueuse bourgeonnante calcifiée du tronc commun ostial.
Lésion en rappel sur le tronc diagonal.
Staff médico-chirurgical….

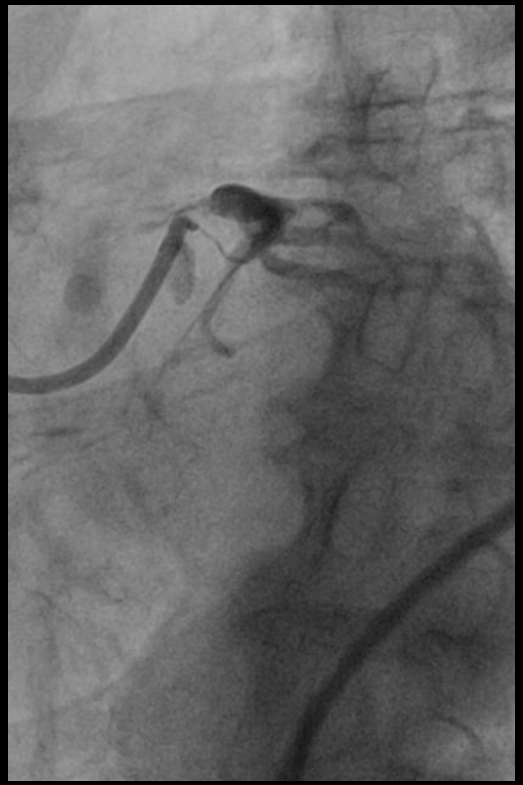
Staff médico-chirurgical….
Décision de pontages, que le patient refuse formellement…

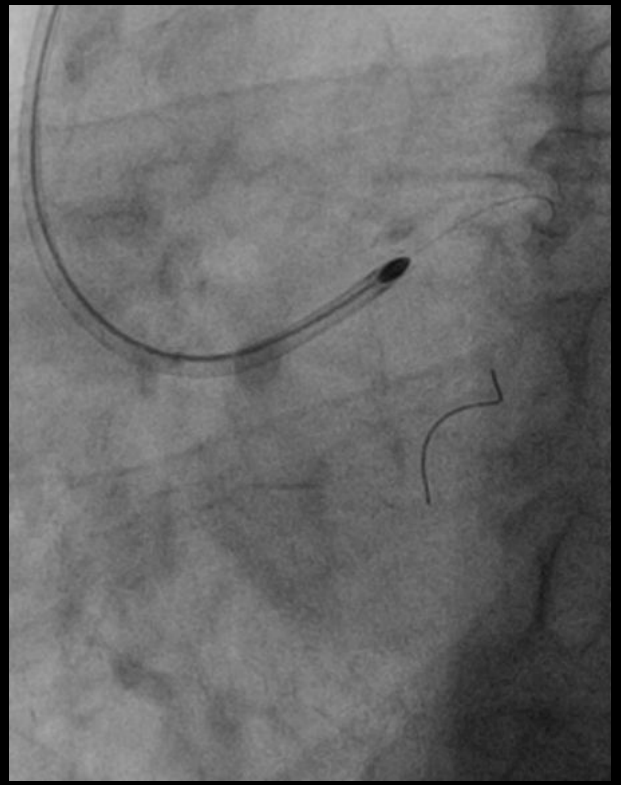
Stratégie d'utilisation première du rotablator puis stent actif…

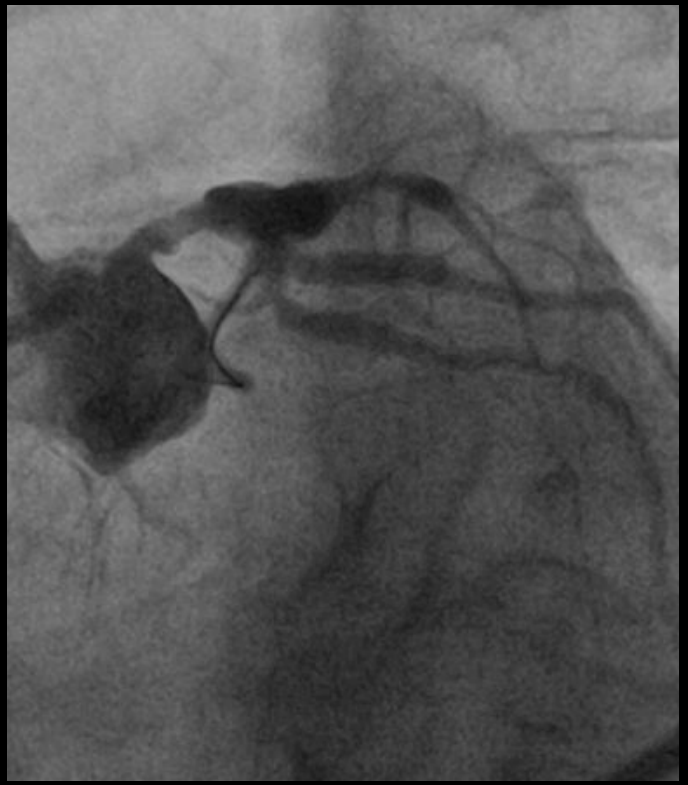
Cathéter 7F EBU 3.5
Rotawire ES
Fraise 1.75 puis 2 mm

Mr Rol…

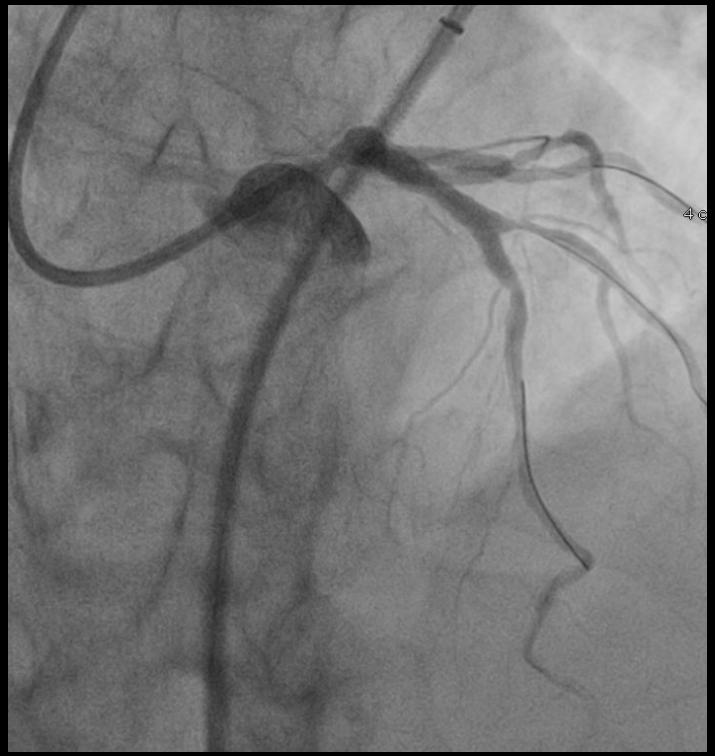
Cathéter 7F EBU 3.5
Rotawire ES puis Fraise 1.75 puis 2 mm

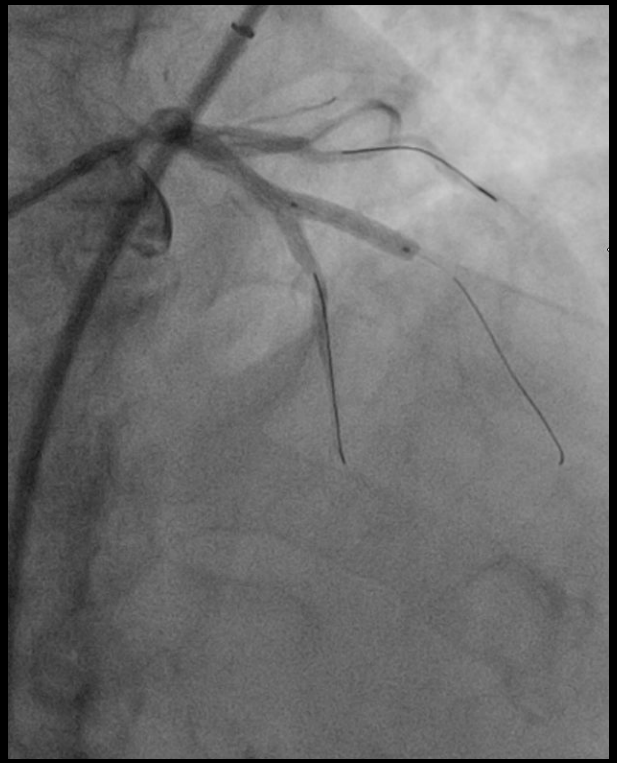




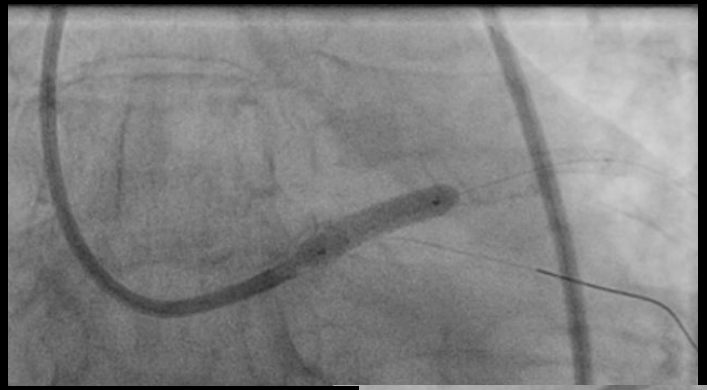


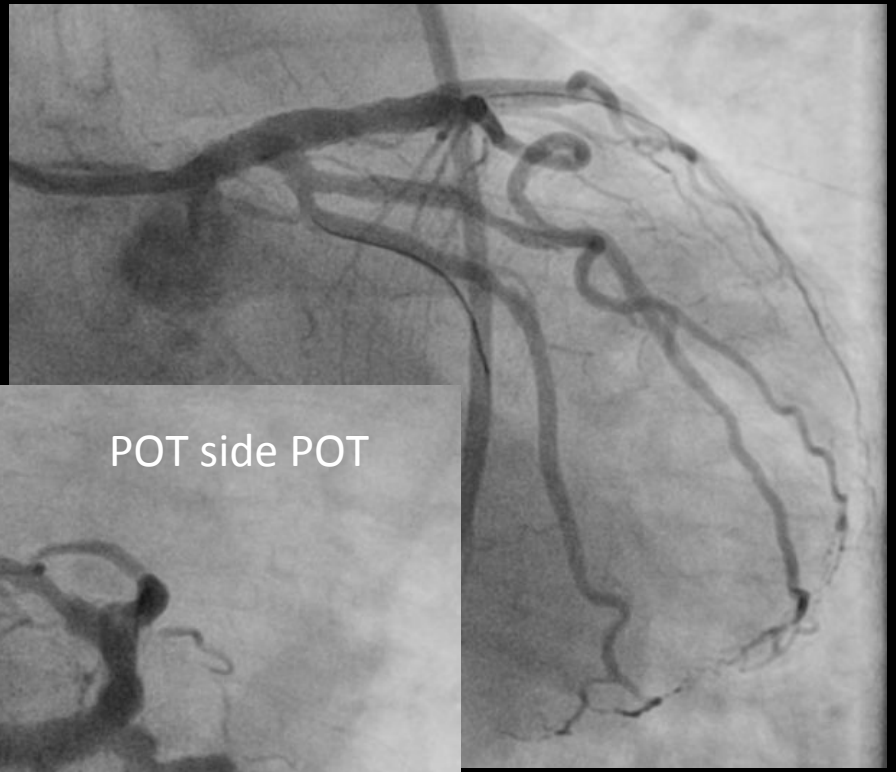
Whisper Extra Support dans la distalité de la diagonale Sion Blue dans la circonflexe, puis prédilatation de la diagonale à 18 bars par un ballon 3.0 x 15 mm Sapphire NC et implantation d'un **stent Ultimaster 3.0 x 15** surdilaté à 20 bars.



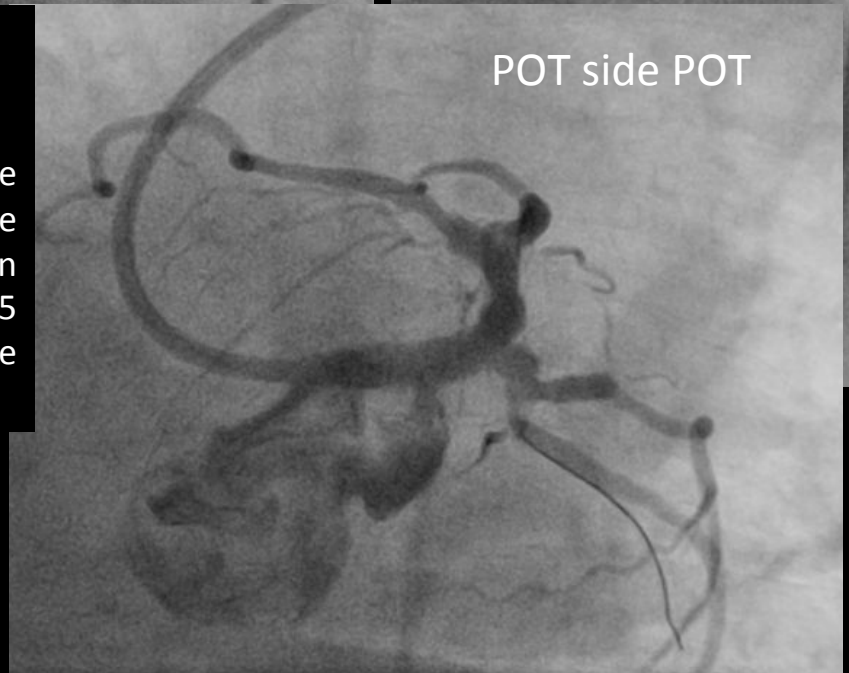


Mr Rol…





Ultimaster 4.0 x 15 à 22 bars sur le tronc commun.
Le guide de protection de la circonflexe est reculé, repassé à travers la maille puis ouverture de la maille par un ballon Sapphire NC 3.5 mm gonflé à 15 bars. Surdilatation par un 5 x 10 NC de l'Ultimaster à 25 bars.



POT side POT

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 8, 2016 VOL. 375 NO. 23

Everolimus-Eluting Stents or Bypass Surgery for Left Main Coronary Artery Disease

G.W. Stone, J.F. Sabik, P.W. Serruys, C.A. Simonton, P. Généreux, J. Puskas, D.E. Kandzari, M.-C. Morice, N. Lembo, W.M. Brown III, D.P. Taggart, A. Banning, B. Merkely, F. Horkay, P.W. Boonstra, A.J. van Boven, I. Ungi, G. Bogáts, S. Mansour, N. Noiseux, M. Sabaté, J. Pomar, M. Hickey, A. Gershlick, P. Buszman, A. Bochenek, E. Schampaert, P. Pagé, O. Dressler, I. Kosmidou, R. Mehran, S.J. Pocock, and A.P. Kappetein, for the EXCEL Trial Investigators*

ABSTRACT

BACKGROUND

Patients with obstructive left main coronary artery disease are usually treated with coronary-artery bypass grafting (CABG). Randomized trials have suggested that drug-eluting stents may be an acceptable alternative to CABG in selected patients with left main coronary disease.

METHODS

We randomly assigned 1905 eligible patients with left main coronary artery disease of low or intermediate anatomical complexity to undergo either percutaneous coronary intervention (PCI) with fluoropolymer-based cobalt–chromium everolimus-eluting stents (PCI group, 948 patients) or CABG (CABG group, 957 patients). Anatomic complexity was assessed at the sites and defined by a Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery (SYNTAX) score of 32 or lower (the SYNTAX score reflects a comprehensive angiographic assessment of the coronary vasculature, with 0 as the lowest score and higher scores [no upper limit] indicating more complex coronary anatomy). The primary end point was the rate of a composite of death from any cause, stroke, or myocardial infarction at 3 years, and the trial was powered for noninferiority testing of the primary end point (noninferiority margin, 4.2 percentage points). Major secondary end points included the rate of a composite of death from any cause, stroke, or myocardial infarction at 30 days and the rate of a composite of death, stroke, myocardial infarction, or ischemia-driven revascularization at 3 years. Event rates were based on Kaplan–Meier estimates in time-to-first-event analyses.

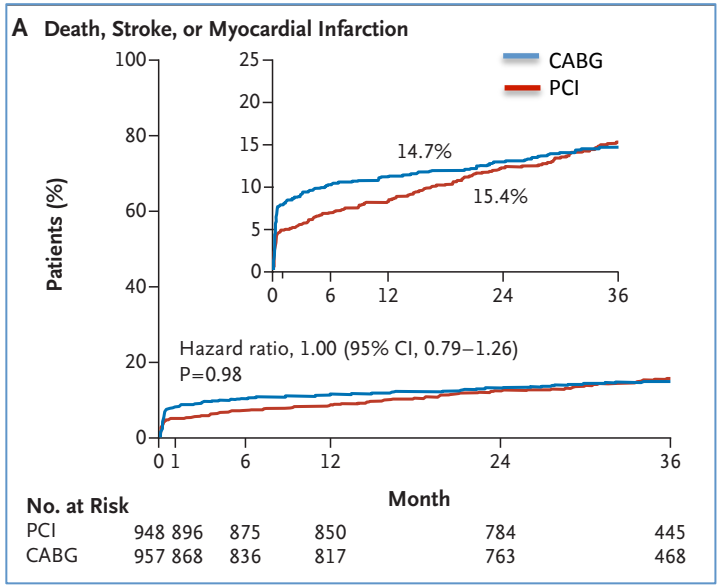
RESULTS

At 3 years, a primary end-point event had occurred in 15.4% of the patients in the PCI group and in 14.7% of the patients in the CABG group (difference, 0.7 percentage points; upper 97.5% confidence limit, 4.0 percentage points; P=0.02 for noninferiority; hazard ratio, 1.00; 95% confidence interval, 0.79 to 1.26; P=0.98 for superiority). The secondary end-point event of death, stroke, or myocardial infarction at 30 days occurred in 4.9% of the patients in the PCI group and in 7.9% in the CABG group (P<0.001 for noninferiority, P=0.008 for superiority). The secondary end-point event of death, stroke, myocardial infarction, or ischemia-driven revascularization at 3 years occurred in 23.1% of the patients in the PCI group and in 19.1% in the CABG group (P=0.01 for noninferiority, P=0.10 for superiority).

CONCLUSIONS

In patients with left main coronary artery disease and low or intermediate SYNTAX scores by site assessment, PCI with everolimus-eluting stents was noninferior to CABG with respect to the rate of the composite end point of death, stroke, or myocardial infarction at 3 years. (Funded by Abbott Vascular; EXCEL ClinicalTrials.gov number, NCT01205776.)

Events at a mean follow-up of 3 years



Clinical end points at 3 yr	PCI (N=948)		CABG (N=957)		Hazard Ratio (95% CI)	P Value
Ischemia-driven revascularization	112	12.6	66	7.5	1.72 (1.27–2.33)	<0.001
Ischemia-driven target-vessel revascularization	97	10.9	63	7.2	1.55 (1.13–2.13)	0.006
Ischemia-driven target-lesion revascularization	84	9.5	60	6.9	1.40 (1.00–1.95)	0.05
Ischemia-driven non–target-lesion revascularization	28	3.2	5	0.6	5.64 (2.18–14.61)	<0.001
Ischemia-driven non–target-vessel revascularization	21	2.5	6	0.7	3.50 (1.41–8.67)	0.004

Percutaneous Coronary Intervention Using Drug-Eluting Stents Versus Coronary Artery Bypass Grafting for Unprotected Left Main Coronary Artery Stenosis

A Meta-Analysis of Randomized Trials

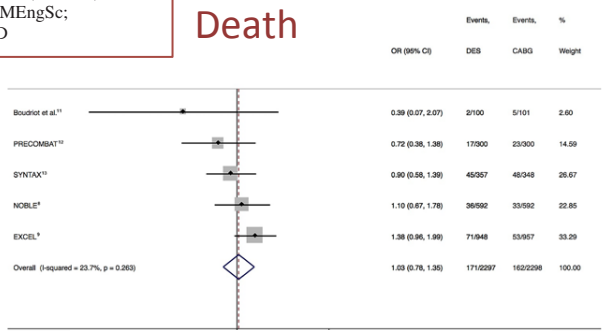
Nitesh Nerlekar, MBBS, MPH; Francis J. Ha, BMedSci; Kunal P. Verma, MBBS; Martin R. Bennett, MD, PhD; James D. Cameron, MBBS, MD, MEngSc; Ian T. Meredith, MBBS, PhD; Adam J. Brown, MD, PhD

Circ Cardiovasc Interv 2016;9:e004729

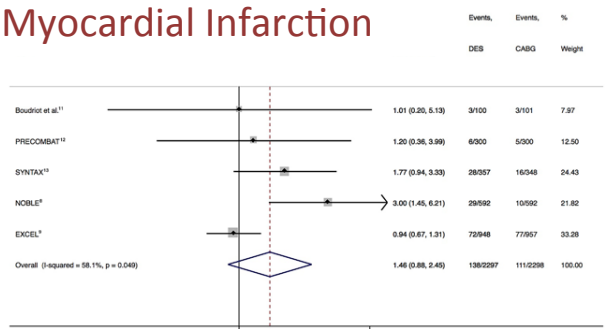
- This meta-analysis is limited to randomized trials at the longest reported follow-up duration and demonstrates no difference in clinical safety outcomes between percutaneous coronary intervention using drug-eluting stents and coronary artery bypass grafting in patients at low surgical risk.
- However, coronary artery bypass grafting may be a more clinically effective revascularization strategy because percutaneous coronary intervention is associated with significantly higher rates of repeat revascularization at long-term follow-up.

Risk estimates for individual clinical outcomes for percutaneous coronary intervention vs coronary artery bypass grafting

Death

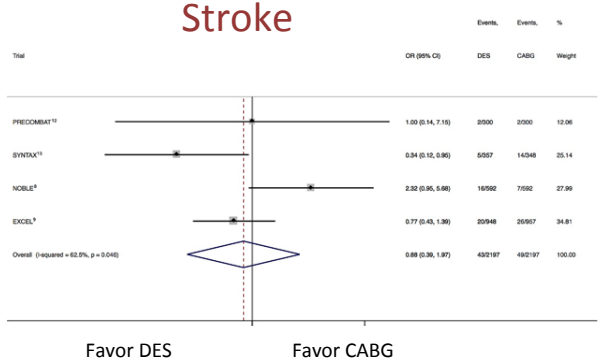


Myocardial Infarction

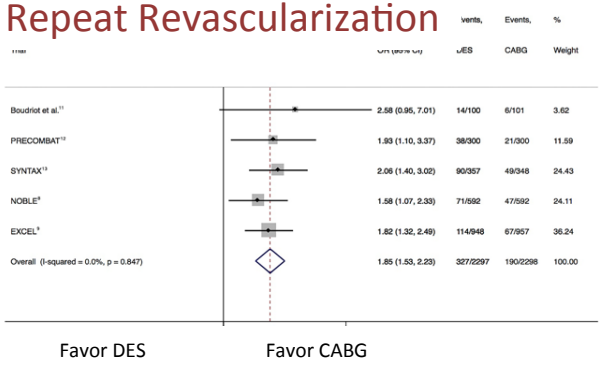


C

Stroke



Repeat Revascularization



Stents à polymère bioabsorbable

Stent SYNERGY™1

Enrobage polymère : Durée d'absorption PLGA : **3-4 mois**

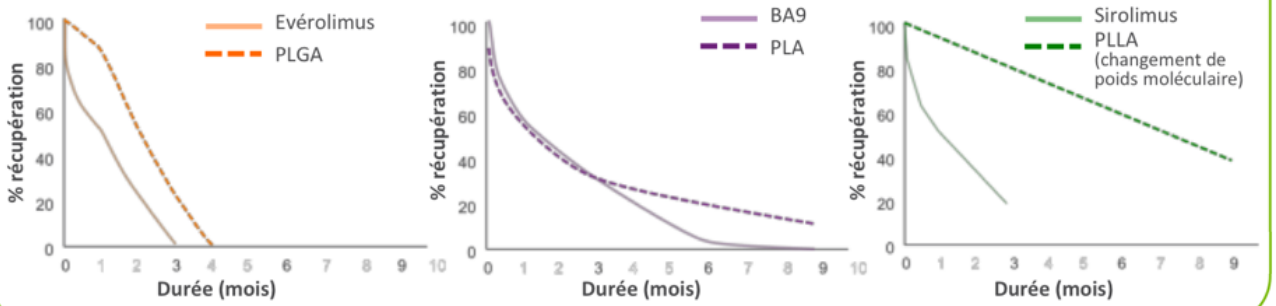
Stents Nobori™2 et BioMatrix Flex™3

Enrobage polymère : Durée d'absorption PLA : **> 9 mois**

Stent Orsiro™4

Enrobage polymère : Durée d'absorption PLLA : **> 12 mois**

★ Ultimaster : 4 mois

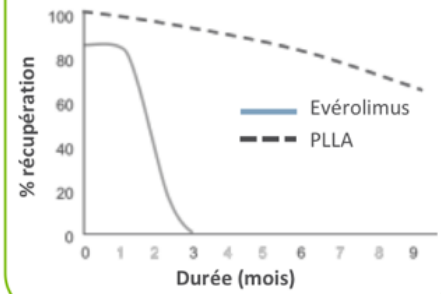


Stent bioabsorbable

Absorb™ BVS3

Enrobage polymère PLLA : Durée d'absorption PLLA :

> 2 ans

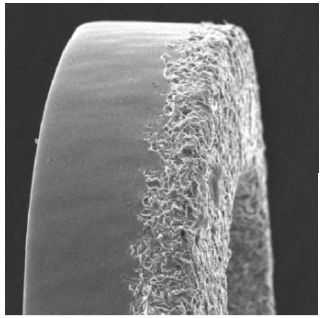


ESC 2014

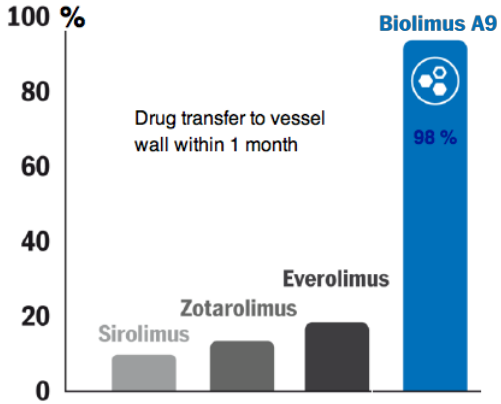
New-generation DES should therefore be considered by default in all clinical conditions and lesion subsets.

LEADERS FREE

Trial Design



Up to 10x the Lipophilicity of other common limus drugs used on current DES



Prospective, double-blind randomized (1:1) trial
2466 High bleeding risk (HBR) PCI patients

BioFreedom™ DCS **vs.** **Gazelle™ BMS**

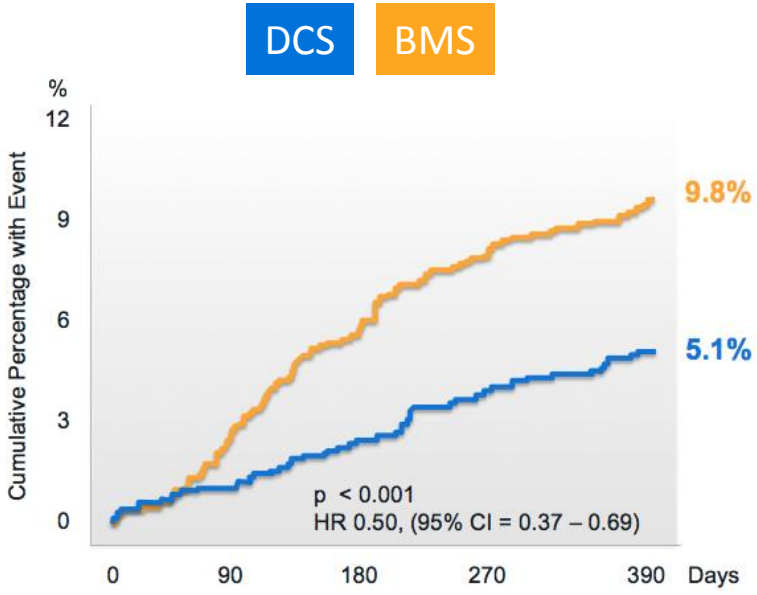
DAPT mandated for 1 month only, followed by long-term SAPT

- Primary safety endpoint:
  Composite of cardiac death, MI, definite / probable stent thrombosis at 1 year (non-inferiority then superiority)
- Primary efficacy endpoint:
  Clinically-driven TLR at 1 year (superiority)

Urban P et al. Am Heart J 2013; 165: 704-9

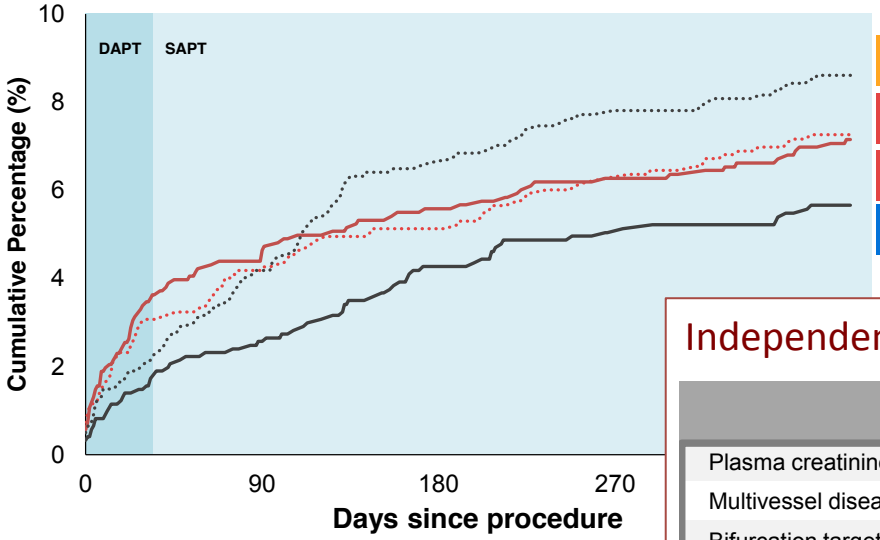
LEADERS FREE

Efficacy (cd-TLR)



Safety (cardiac death, MI, ST)

Major Bleeding and Thrombotic Events in the DCS and BMS Arms



8.6%
7.3%
7.2%
5.7%
p=0.006

BMS - Thrombotic Events
BMS - Bleeding
DCS - Bleeding
DCS - Thrombotic Events

Independent Predictors of Bleeding and Thrombosis

	Thrombotic Events	Major Bleeding
Plasma creatinine > 150 umol/l	1.80 (1.19-2.72) p=0.005	-
Multivessel disease	1.70 (1.14-2.54) p=0.010	-
Bifurcation target lesion (1 or more)	1.50 (1.03-2.19) p=0.036	-
BMS (vs. DCS)	1.43 (1.04-1.98) p=0.029	-
Age > 75	1.53 (1.08-2.16) p=0.017	1.50 (1.08-2.08) p=0.021
Number of stents/patient (per stent)	1.16 (1.02-1.31) p=0.018	1.14 (1.02-1.27) p=0.025
Haemoglobin (per 1 mmol/l lower)*	1.21 (1.04-1.40) p=0.014	1.74 (1.53-1.99) p<0.001
Femoral access	-	1.66 (1.22-2.27) p=0.001
Oral anticoagulants	-	1.83 (1.34-2.50) p>0.001

Patients âgés > 75 ans

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

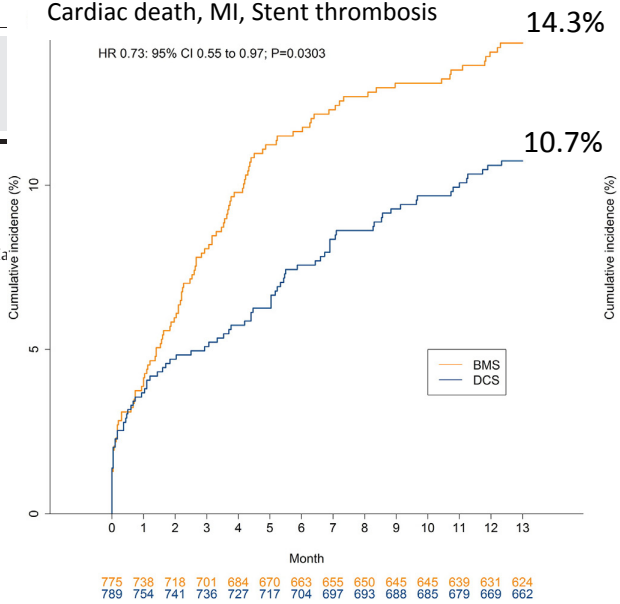
Drug-coated versus bare-metal stents for elderly patients: A predefined sub-study of the LEADERS FREE trial☆

Marie-Claude Morice [a,*], Suneel Talwar [b], Oliver Gaemperli [c], Gert Richardt [d], Franz Eberli [e], Ia
Azfar Zaman [g], Jean Fajadet [h], Samuel Copt [i], Samantha Greene [i], Philip Urban [j]

2466 high bleeding risk patients were enrolled by 68 sites in 20 countries.
The most frequent inclusion criteria were age ≥75, oral anticoagulant treatment, recent bleeding, anemia, and co-morbid conditions such as chronic renal failure or cancer. 1564 patients (789 recipients of DCS and 775 of BMS) were aged 75 or older, representing 63.4% of the overall trial population.

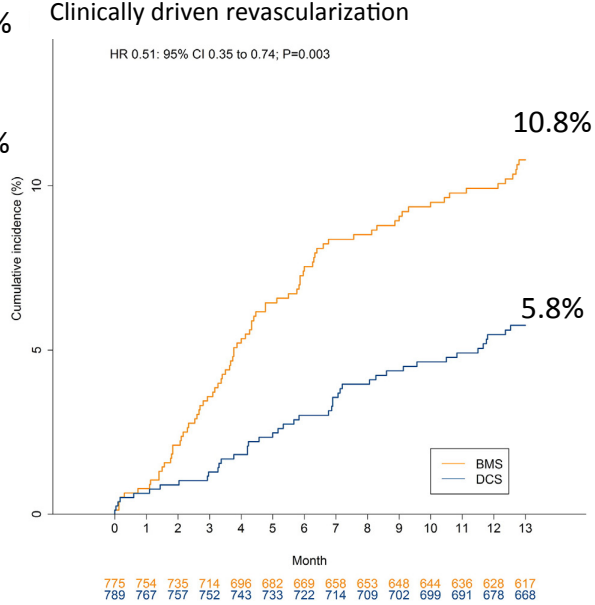
Primary Safety endpoint

Cardiac death, MI, Stent thrombosis



Primary efficacy endpoint

Clinically driven revascularization



	DCS	BMS		p
Composite safety endpoint, %	10.7%	14.3%	0.73 [0.55–0.97][c]	0.03
Cardiac death, %	4.8%	5.4%	0.88 [0.56–1.37]	0.57
Myocardial Infarction, %	7.1%	10.3%	0.67 [0.48–0.95]	0.02
Stent thrombosis (definite/probable), %	2.5%	2.2%	1.09 [0.57–2.10]	0.78

The major bleeding rate was similar in DCS and BMS recipients (7.3 vs. 8.2%, p = 0.55).

incidence of clinically driven TLR

LEADERS FREE

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European Heart Journal
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FASTTRACK CLINICAL RESEARCH
Interventional cardiology

Biolimus-A9 polymer-free coated stent in high bleeding risk patients with acute coronary syndrome: a *Leaders Free ACS* sub-study

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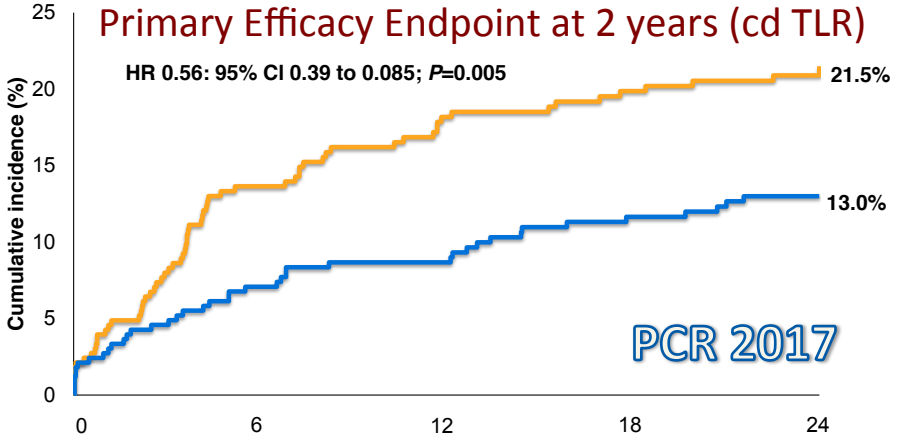
Aims Although a true clinical challenge, high bleeding risk patients with an acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI) have never been specifically studied. *Leaders Free ACS*, a pre-specified *Leaders Free* sub-study, determined efficacy, and safety of a combination of 1-month dual anti-platelet therapy (DAPT) with implantation of either a polymer-free Biolimus-A9-coated stent (BA9-DCS) or a bare-metal stent (BMS) in these patients.

Methods and results *Leaders Free* included 2466 patients undergoing PCI who had at least 1 of 13 pre-defined factors for an increased bleeding risk. Of these, 659 ACS patients were included in this analysis (BA9-DCS 330, BMS 329). At 12-month follow-up, treatment with the BA9-DCS was more effective (clinically driven target-lesion revascularization 3.9 vs. 9.0%, $P = 0.009$) and safer (cumulative incidence of cardiac death, myocardial infarction, or definite or probable stent thrombosis 9.3 vs. 18.5%, $P = 0.001$), driven by significantly lower rates of cardiac mortality (3.4 vs. 6.9%, $P = 0.049$) and myocardial infarction (6.9 vs. 13.8%, $P = 0.005$).

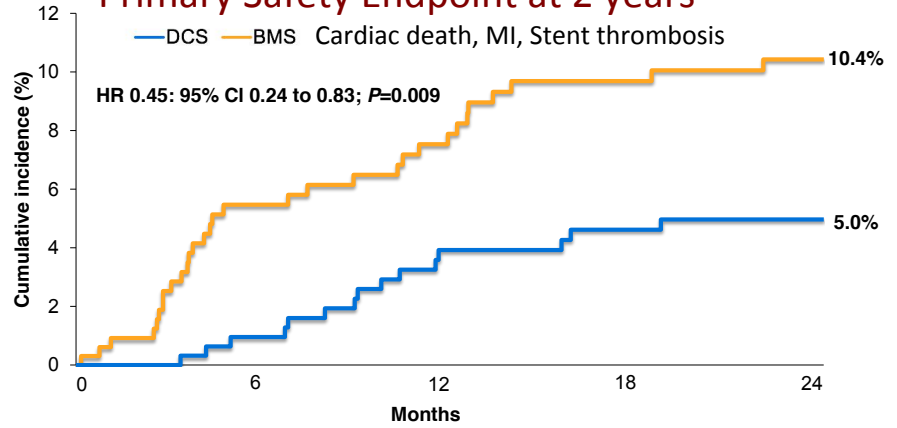
Conclusion We believe that the results of this sub-analysis from the *Leaders Free* trial are likely to significantly impact clinical practice for high bleeding risk patients presenting with an ACS: the use of a BMS can, in our view, no longer be recommended, and, given the paucity of available data for second-generation DES with shortened DAPT in these patients, the BA9-DCS should currently be considered as the device with the strongest evidence to support its use for this indication.

Keywords Acute coronary syndrome • High bleeding risk • Bare-metal stent • Drug-coated stent • Percutaneous coronary intervention

Primary Efficacy Endpoint at 2 years (cd TLR)



Primary Safety Endpoint at 2 years



330	307	287	274	212
329	282	260	246	180

Les stents métalliques à mailles fines délivrant une drogue antiprolifératives ont atteint un très haut niveau d'efficacité et de sécurité…

Oui, mais…

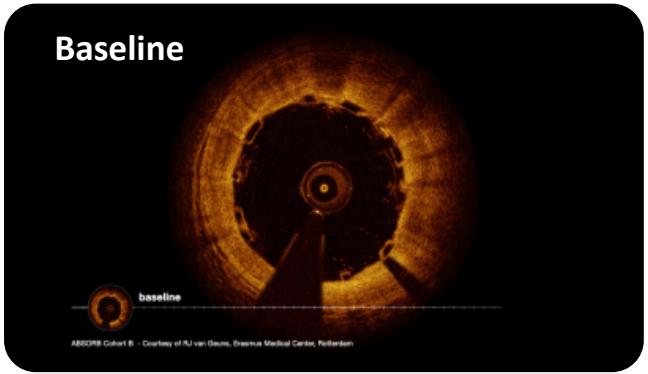
- La cage métallique empêche le vaisseau de se bonifier :
  - ✓ Plus d'élastance, plus de déformation systolo-diastolique
  - ✓ Il ne pourra plus recouvrer une vasomotricité normale, et le stent pourrait favoriser une dysfonction endothéliale
  - ✓ Le remodelage favorable devient impossible, voire dangereux, en décollant le stent de la paroi
  - ✓ Difficultés d'accéder aux collatérales, de faire des pontages
- La persistance de matériel est source de complications tardives : inflammation chronique, fracture de stent, néo-athérogénèse, tous facteurs favorisant la thrombose tardive …

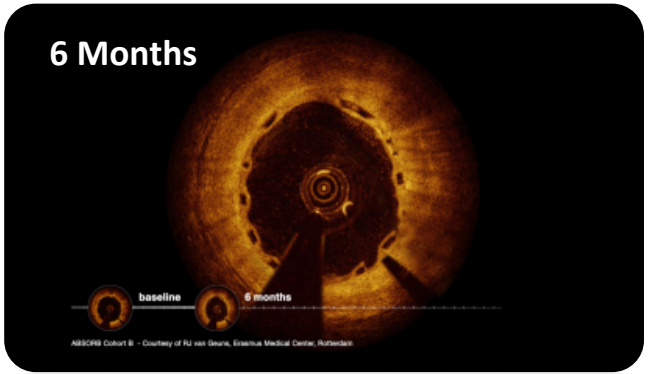
Bref, le stent idéal devrait disparaître sitôt qu'il a accompli le travail de sécurisation et de cicatrisation de la lésion…

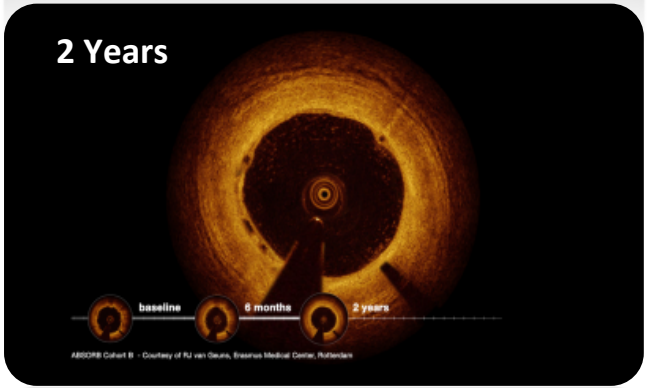
Alors, faut-il se laisser tenter par les stents actifs biodégradables (Biodegradable Vascular Scaffold (BVS) dont les études randomisées nous montrent qu'ils ne seraient pas inférieurs au stent actif de référence ?

ABSORB COHORT B : Long-term 5-Year OCT Images

De Bruyne, B. TCT 2014







The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 NOVEMBER 12, 2015 VOL. 373 NO. 20

Everolimus-Eluting Bioresorbable Scaffolds for Coronary Artery Disease

Stephen G. Ellis, M.D., Dean J. Kereiakes, M.D., D. Christopher Metzger, M.D., Ronald P. Caputo, M.D., David G. Rizik, M.D., Paul S. Teirstein, M.D., Marc R. Litt, M.D., Annapoorna Kini, M.D., Ameer Kabour, M.D., Steven O. Marx, M.D., Jeffrey J. Popma, M.D., Robert McGreevy, Ph.D., Zhen Zhang, Ph.D., Charles Simonton, M.D., and Gregg W. Stone, M.D., for the ABSORB III Investigators*

ABSTRACT

BACKGROUND

In patients with coronary artery disease who receive metallic drug-eluting coronary stents, adverse events such as late target-lesion failure may be related in part to the persistent presence of the metallic stent frame in the coronary-vessel wall. Bioresorbable vascular scaffolds have been developed to attempt to improve long-term outcomes.

METHODS

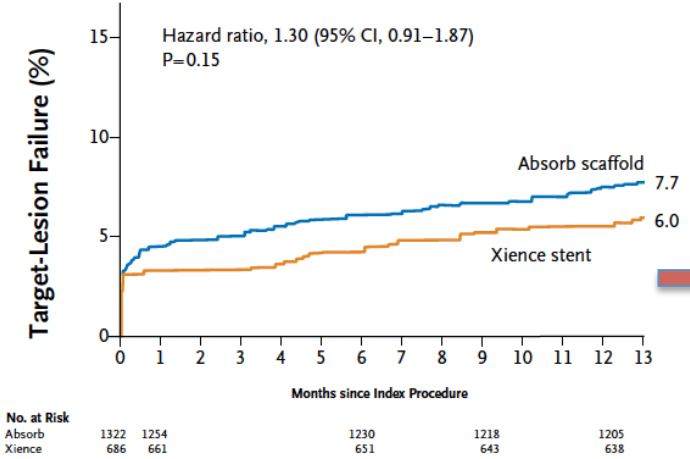
In this large, multicenter, randomized trial, 2008 patients with stable or unstable angina were randomly assigned in a 2:1 ratio to receive an everolimus-eluting bioresorbable vascular (Absorb) scaffold (1322 patients) or an everolimus-eluting cobalt–chromium (Xience) stent (686 patients). The primary end point, which was tested for both noninferiority (margin, 4.5 percentage points for the risk difference) and superiority, was target-lesion failure (cardiac death, target-vessel myocardial infarction, or ischemia-driven target-lesion revascularization) at 1 year.

ABSORB III

2008 patients

Table 2. Procedural Outcomes.*

Outcome	Absorb Scaffold	Xience Stent	P Value
During procedure			
Patients			
Total no.	1322	686	
Bivalirudin use — no. (%)	803 (60.7)	403 (58.7)	0.39
Glycoprotein IIb/IIIa inhibitor use — no. (%)	133 (10.1)	85 (12.4)	0.11
Treated lesions			
Any lesion†	1.2±0.4	1.2±0.4	0.45
Target lesion	1.0±0.2	1.0±0.2	0.38
Device implantation — no./total no. (%)‡			
Any unassigned device	79/1322 (6.0)	4/686 (0.6)	<0.001
Postdilatation performed — no./total no. (%)	866/1322 (65.5)	351/686 (51.2)	<0.001
Intravascular imaging guidance — no./total no. (%)	146/1302 (11.2)	73/673 (10.8)	0.81
Total study device length — mm	20.5±7.2	20.7±9.0	0.56
Maximum device diameter — mm§	3.18±0.43	3.12±0.45	0.007
Ratio of maximum device diameter to vessel diameter§	1.21±0.15	1.19±0.14	0.054
Maximum device pressure — atm§	15.4±3.0	15.4±3.2	0.83
Device success — no./total no. (%)	1278/1355 (94.3)	699/704 (99.3)	<0.001
After procedure			
Patients			
Total no.	1322	686	
Procedure success — no./total no. (%)	1240/1311 (94.6)	652/678 (96.2)	0.12
Treated lesions			
Total no.	1385	713	
In-device measures			
Acute gain — mm	1.45±0.45	1.59±0.44	<0.001
Minimum luminal diameter — mm	2.37±0.40	2.49±0.40	<0.001
Diameter stenosis — %	11.6±8.8	6.4±8.9	<0.001
Minimum luminal diameter — mm	2.15±0.41	2.14±0.43	0.58
Diameter stenosis — %	20.0±7.9	19.8±8.2	0.55



ABSORB III

Primary end-point

Table 3. Safety and Efficacy Outcomes at 1 Year.*

Adverse Event	Absorb Scaffold (N=1322)	Xience Stent (N=686)	Relative Risk (95% CI)	P Value
	no./total no. (%)			
Target-lesion failure	102/1313 (7.8)	41/677 (6.1)	1.28 (0.90–1.82)	0.16
Cardiac death	8/1313 (0.6)	1/677 (0.1)	4.12 (0.52–32.91)	0.29
Target-vessel myocardial infarction	79/1313 (6.0)	31/677 (4.6)	1.31 (0.88–1.97)	0.18
Ischemia-driven target-lesion revascularization	40/1313 (3.0)	17/677 (2.5)	1.21 (0.69–2.12)	0.50
Non–Q-wave	80/1313 (6.1)	35/677 (5.2)	1.18 (0.80–1.73)	0.40
During procedure	41/1313 (3.1)	22/677 (3.2)	0.96 (0.58–1.60)	0.88
Not during procedure	49/1313 (3.7)	16/677 (2.4)	1.58 (0.90–2.76)	0.10
Any revascularization	120/1313 (9.1)	55/677 (8.1)	1.12 (0.83–1.53)	0.45
Ischemia-driven	115/1313 (8.8)	54/677 (8.0)	1.10 (0.81–1.50)	0.55
Target vessel	66/1313 (5.0)	25/677 (3.7)	1.36 (0.87–2.14)	0.18
Nontarget vessel	71/1313 (5.4)	39/677 (5.8)	0.94 (0.64–1.37)	0.74
Patient-reported angina	238/1302 (18.3)	125/678 (18.4)	0.99 (0.82–1.21)	0.93
Definite or probable device thrombosis	20/1301 (1.5)	5/675 (0.7)	2.08 (0.78–5.51)	0.13
Early: 0 to 30 days	14/1315 (1.1)	5/686 (0.7)	1.46 (0.53–4.04)	0.46
Acute: ≤24 hr	2/1320 (0.2)	4/686 (0.6)	0.26 (0.05–1.42)	0.19
Subacute: >24 hr to 30 days	12/1315 (0.9)	1/686 (0.1)	6.26 (0.82–48.04)	0.04
Late: 31 days to 1 yr	6/1299 (0.5)	0/675	NA	0.10
Definite	18/1301 (1.4)	5/675 (0.7)	1.87 (0.70–5.01)	0.21
Probable	2/1301 (0.2)	0/675	NA	0.55

* One-year follow-up includes a window of ±28 days. NA denotes not applicable.

Florilège d'une campagne marketing pour imposer un concept…

In principle, the need for vessel scaffolding and drug delivery is temporary, rendering a permanent stent superfluous once the vessel has healed and the processes of recoil and hyperplasia have ended. Bioabsorbable drug-eluting scaffolds have emerged as a potential major breakthrough for treatment of coronary artery lesions. *

BVS restore normal cyclic pulsatility and vasodilatory responses; allow vessels to re-conform to their native shape (unstraighten), reducing shear and compliance mismatch; allow Glagov remodeling to accommodate late plaque gain; result in late lumen gain and some element of plaque regression…**

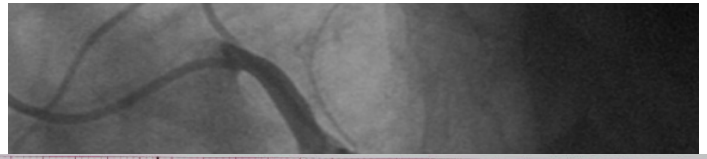
One of the main advantages of bioresorbable scaffolds is the theoretical reduction of long-term adverse events since these devices avoid the sustained local inflammation and vessel wall dysfunction that seem to promote the late and very late stent restenosis and thrombosis in Drug Eluting Stents ***

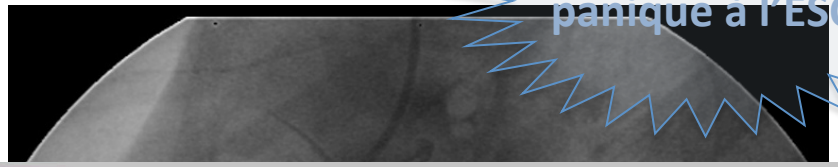
BVS may prevent permanent side branch caging and implantation does not preclude subsequent coronary artery bypass grafting of the intervened segment ******

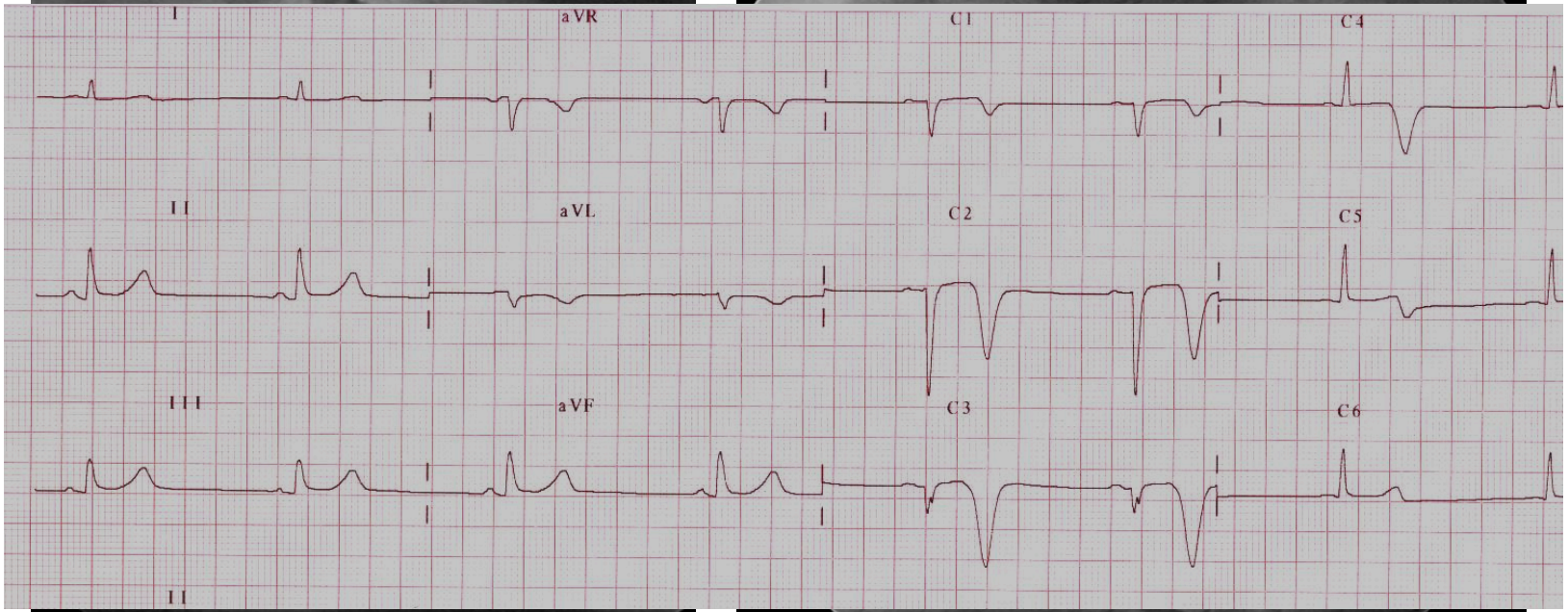
**Antonio Colombo, Carlo Di Mario ;*
***Greg Stones ;*
****Michela Faggioni and Roxana Mehran ;*
*****P. Hoppmann*

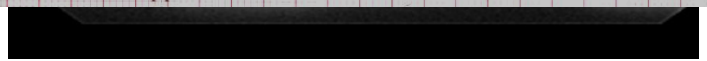
Patient tabagique de 50 ans, stenté 2 ans auparavant sur une lésion critique de l'Iva par un stent au Paclitaxel Taxus.
Admis pour un infarctus bégayant évoluant depuis 2 semaines…

2007
panique à l'ESC

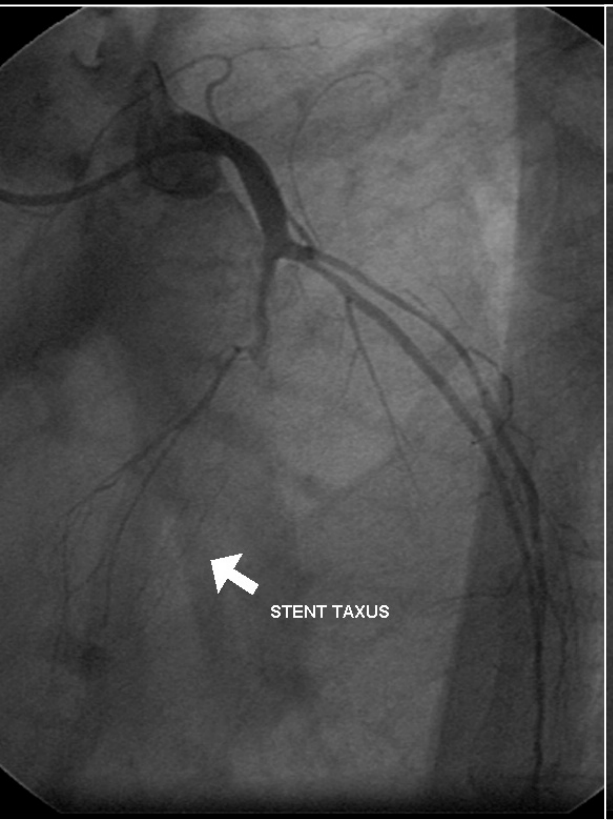


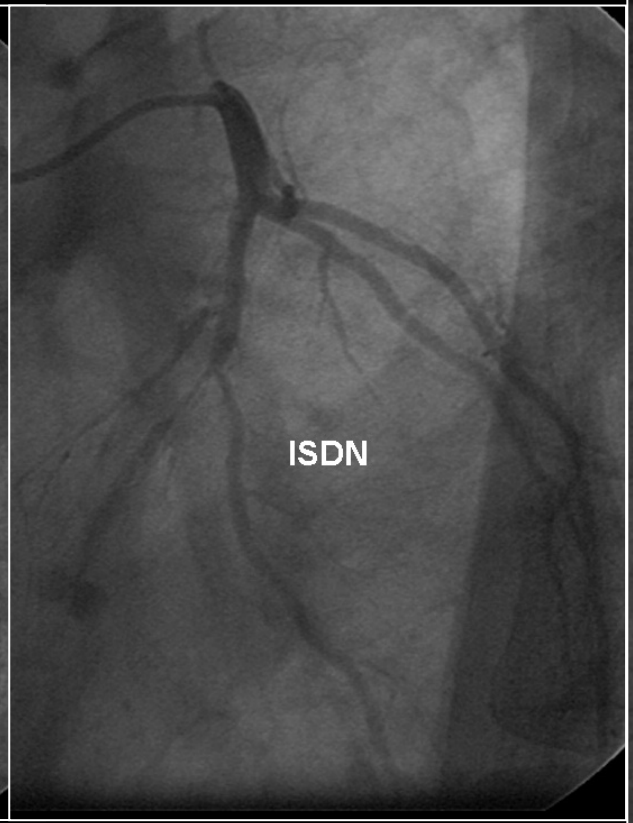


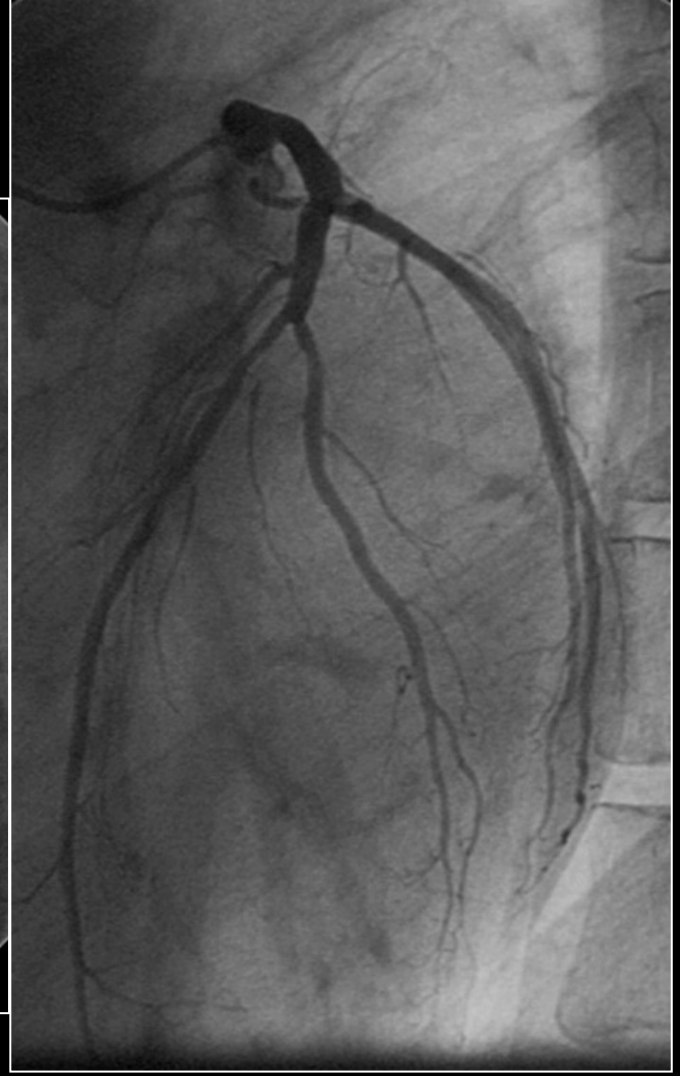


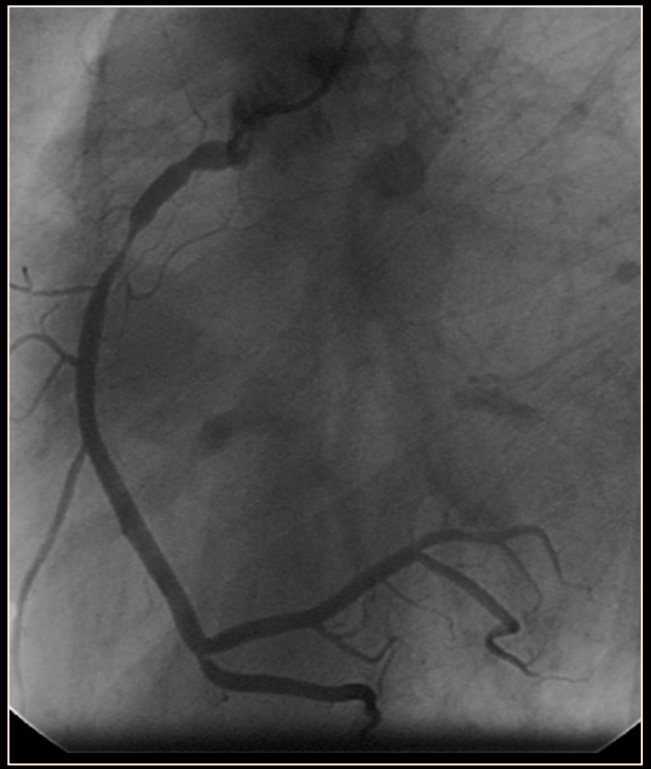


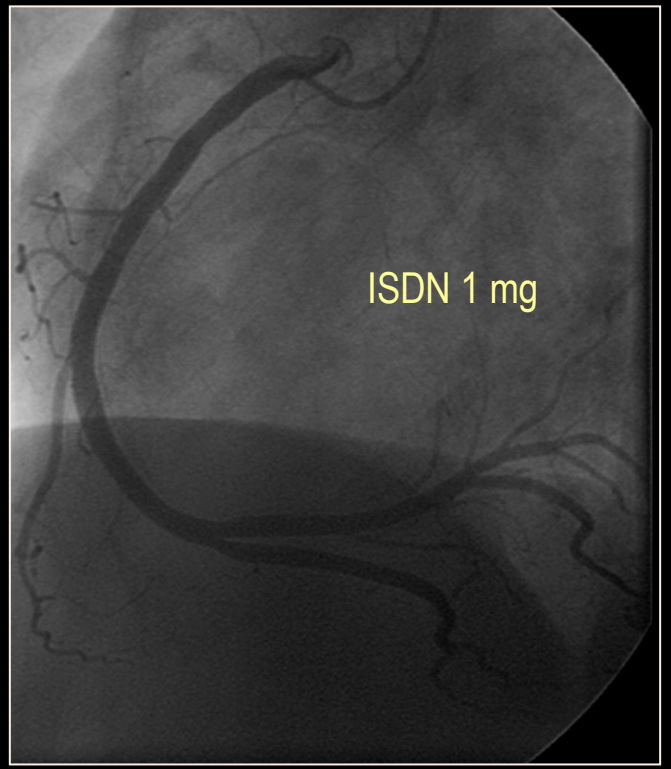
Test au méthergin provoquant la douleur à la 3° minute avec sus décalage antérieur…









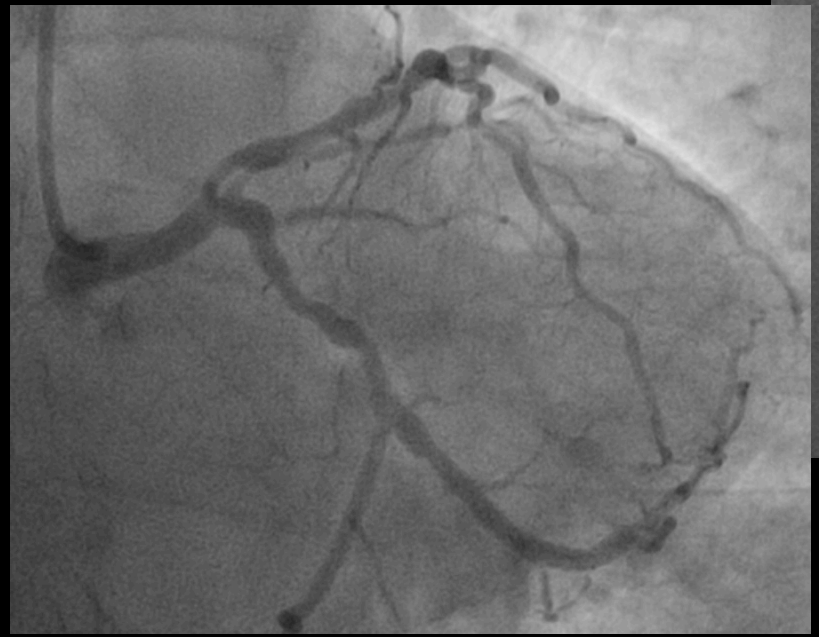


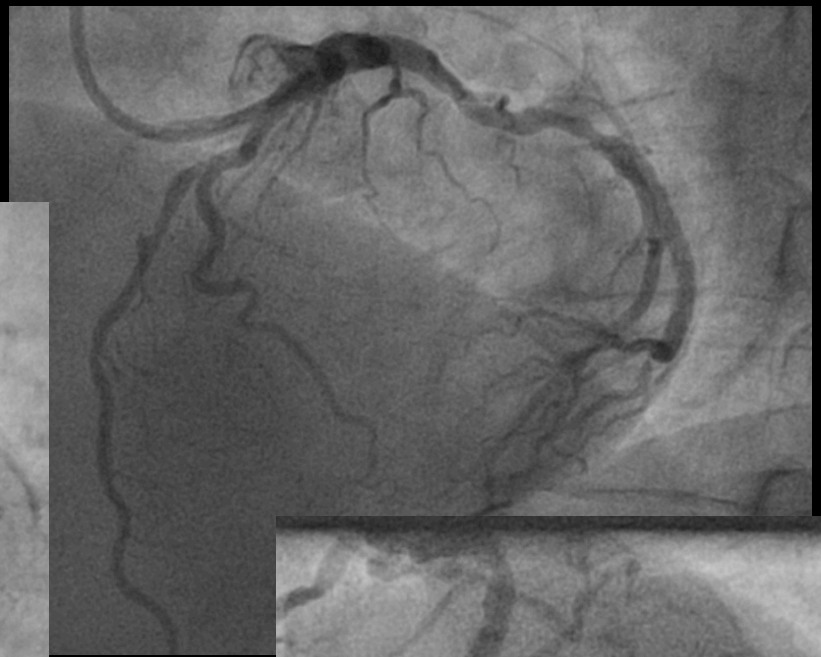
While more normal vasomotion is possible late with scaffolds, treated vessels are highly diseased – they'll never act normally.
Kirk Garrett

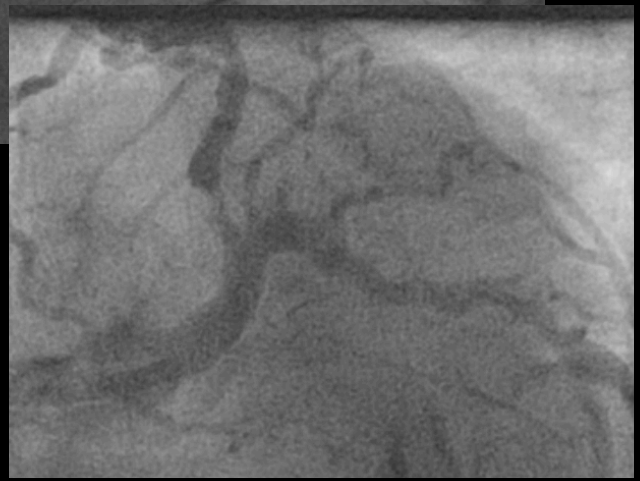
Le stent biorésorbable a fait la preuve de sa non infériorité comparé au stent métallique de référence. Alors laisse au patient une chance de rédemption. Il peut récupérer une coronaire normale et éviter thrombose tardive et néo athérogénèse si tu ne l'enfermes pas à vie dans cette cage…

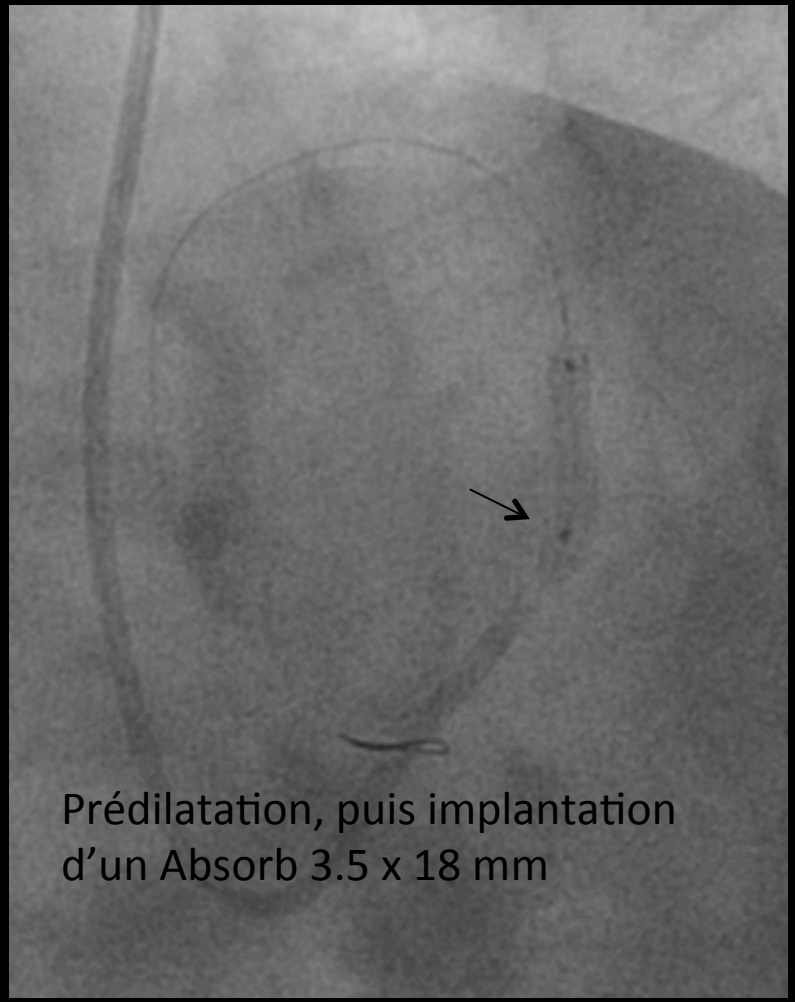
Evident! Je vais en faire bénéficier sans tarder mes patients les plus jeunes…

Mr V…45 ans.
SCA

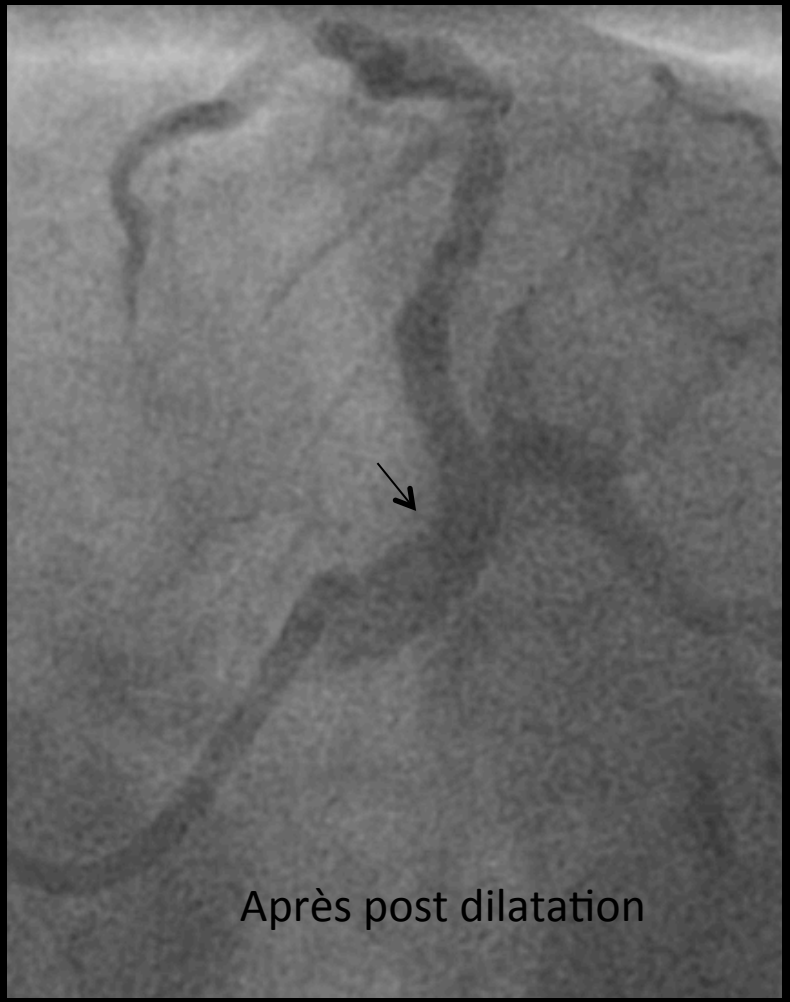




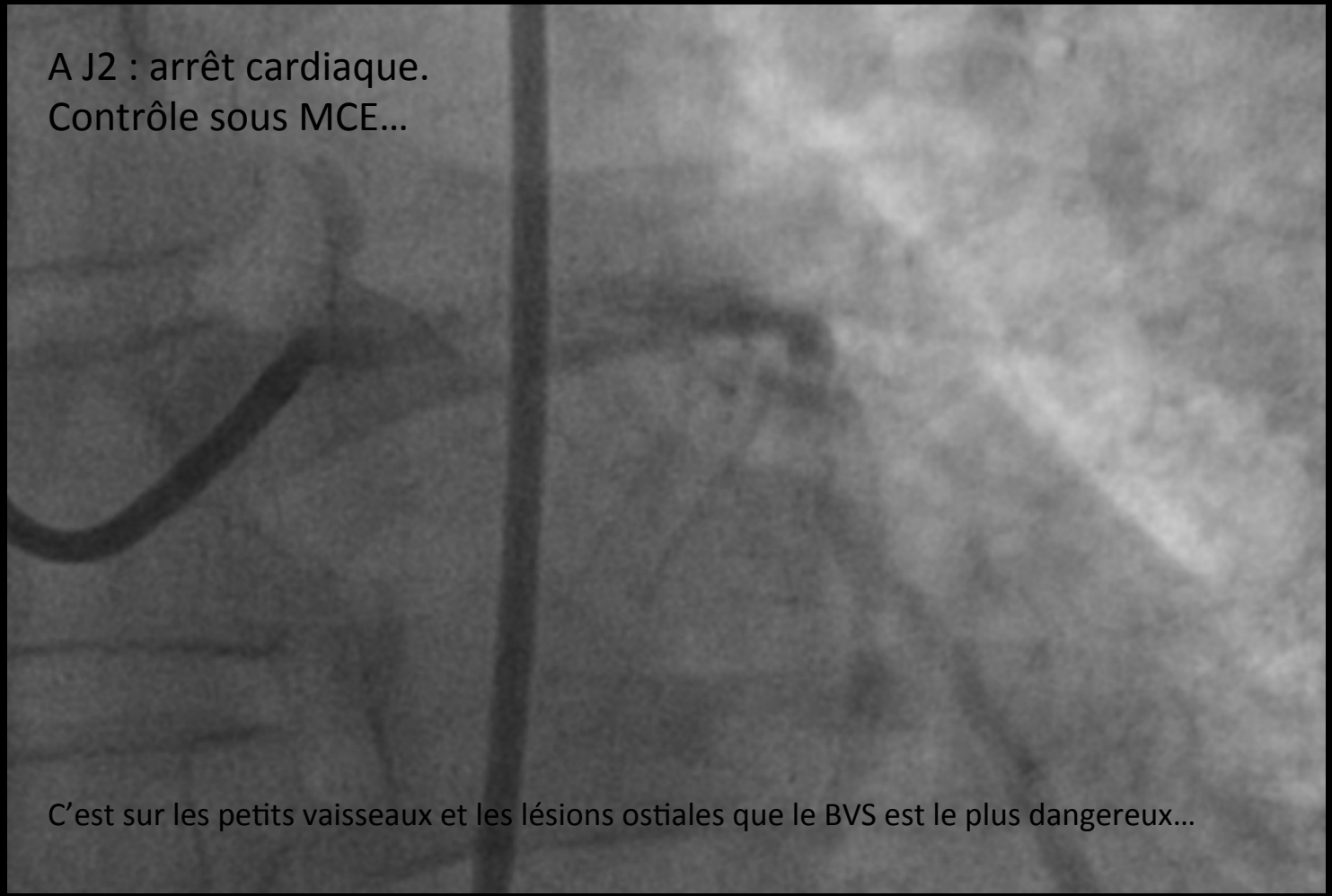




Prédilatation, puis implantation
d'un Absorb 3.5 x 18 mm



Après post dilatation


A J2 : arrêt cardiaque.
Contrôle sous MCE…
C’est sur les petits vaisseaux et les lésions ostiales que le BVS est le plus dangereux…

Bioresorbable Coronary Scaffold Thrombosis

Multicenter Comprehensive Analysis of Clinical Presentation, Mechanisms, and Predictors

Serban Puricel, MD,[a] Florim Cuculi, MD,[b] Melissa Weissner, MTA,[c] Axel Schmermund, MD,[d] Peiman Jamshidi, MD,[b] Tobias Nyffenegger, MD,[b] Harald Binder, PhD,[e] Holger Eggebrecht, MD,[d] Thomas Münzel, MD,[c] Stephane Cook, MD,[a] Tommaso Gori, Dott Med Chir, PhD[c]

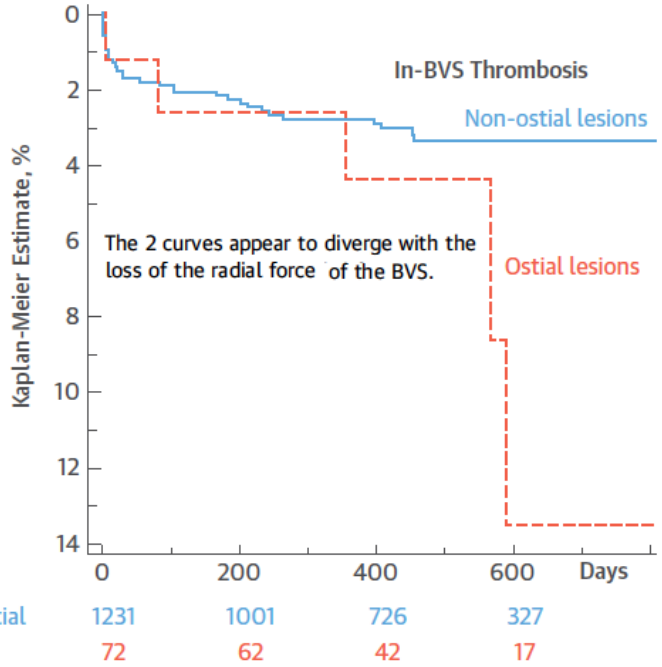
J Am Coll Cardiol 2016;67:921–31

ABSTRACT

BACKGROUND Recent reports suggest an elevated incidence of bioresorbable vascular scaffold (BVS) thrombosis (scaffold thrombosis [ScT]).

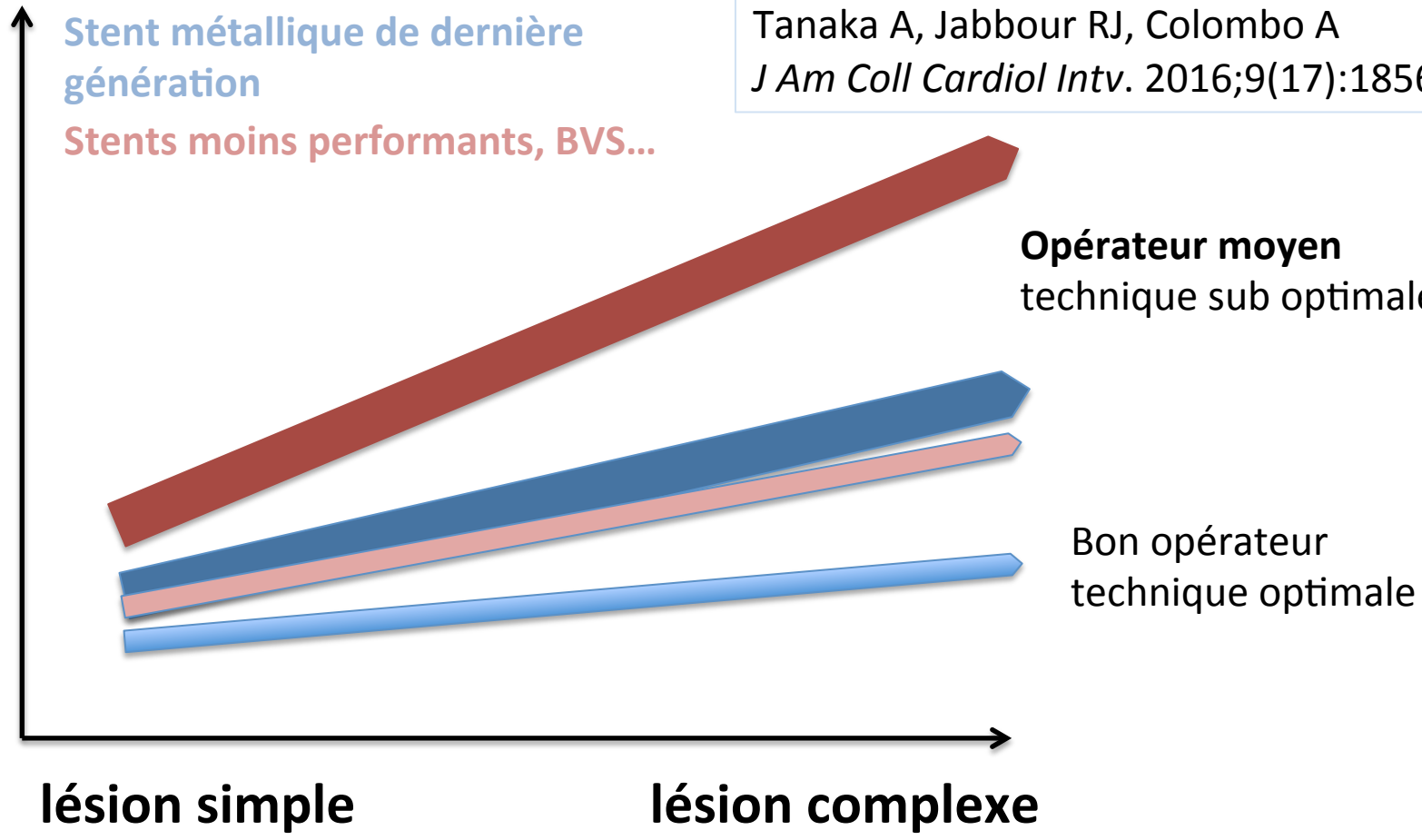
OBJECTIVES This study investigated occurrence rates, clinical and angiographic characteristics, and possible mechanisms of ScT in all-comer patients undergoing BVS implantation at 2 German and 2 Swiss hospitals.

METHODS A total of 1,305 consecutive patients (mean age 64 years, 78% male) who received 1,870 BVS (mean 1.4 ± 0.8 BVS/patient) were enrolled. Clinical/procedural characteristics, mortality, and ScT data at 485 days (range 312 to 652 days) were examined.



What Does “Less Forgiving” Mean?

Tanaka A, Jabbour RJ, Colombo A
J Am Coll Cardiol Intv. 2016;9(17):1856-1857.



Long-Term Efficacy and Safety of Everolimus-Eluting Bioresorbable Vascular Scaffolds Versus Everolimus-Eluting Metallic Stents

A Meta-Analysis of Randomized Trials

Ahmed N. Mahmoud, MD*; Amr F. Barakat, MD; Akram Y. Elgendy, MD;
Erik Schneibel, MD; Amgad Mentias, MD; Ahmed Abuzaid, MD; Islam Y. Elgendy, MD*

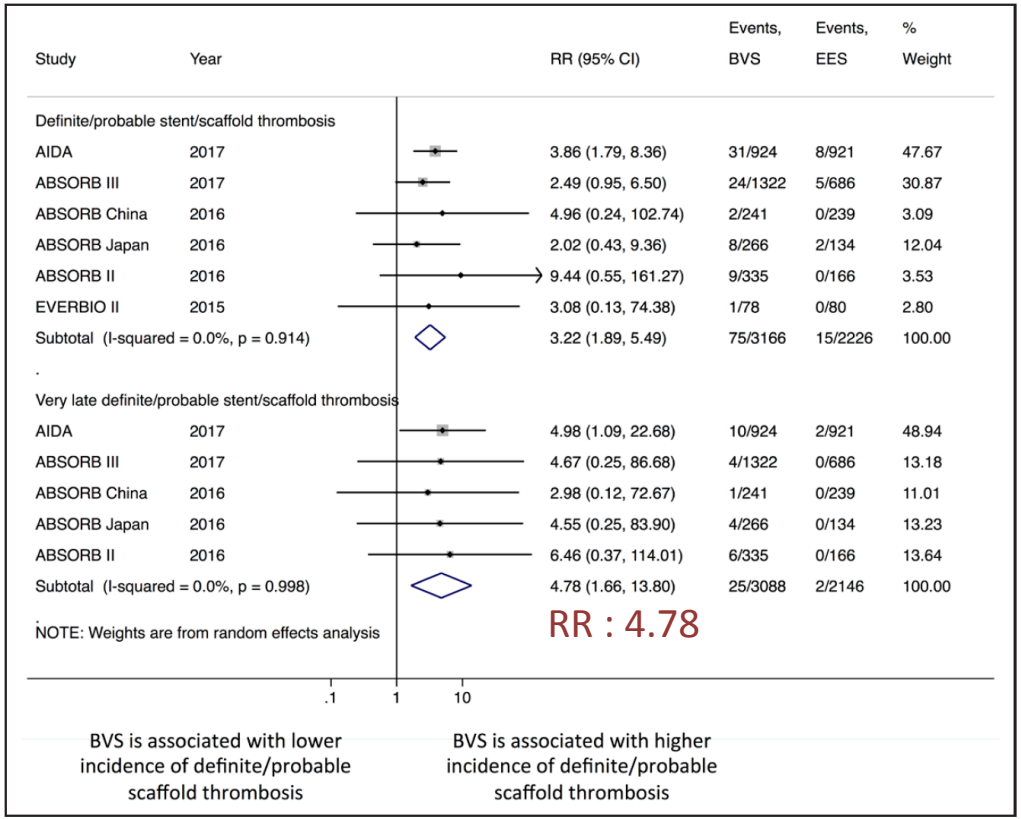
Background—Data regarding the long-term efficacy and safety of everolimus-eluting bioresorbable vascular scaffolds (BVS) compared with everolimus-eluting stents are limited. This meta-analysis aimed to compare the long-term outcomes with both devices.

Methods and Results—Randomized trials reporting clinical outcomes beyond 1 year and comparing BVS with everolimus-eluting stents were included. Summary estimates risk ratios (RRs) were constructed. The primary efficacy outcome was target lesion failure, defined as cardiac death, target vessel myocardial infarction, and ischemia-driven target lesion revascularization, and the primary safety outcome was definite or probable stent/scaffold thrombosis. Six trials with 5392 patients were included (mean follow-up, 25 months). BVS had a higher rate of target lesion failure (RR, 1.33; 95% confidence interval [CI], 1.11–1.58) driven by the higher rates of target vessel myocardial infarction (RR, 1.65; 95% CI, 1.26–2.17) and target lesion revascularization (RR, 1.39; 95% CI, 1.08–1.78). The risk of definite or probable stent/scaffold thrombosis (RR, 3.22; 95% CI, 1.89–5.49) and very late stent/scaffold thrombosis (>1 year; RR, 4.78; 95% CI, 1.66–13.8) was higher with BVS. The risk of cardiac and all-cause mortality was similar in both groups.

Conclusions—Compared with everolimus-eluting stents, BVS is associated with increased risk of target lesion failure driven by the increased rates of target vessel myocardial infarction and ischemia-driven target lesion revascularization in these studies (mean follow-up, 25 months). The risk of definite or probable stent/scaffold thrombosis and very late stent/scaffold thrombosis seems to be higher with BVS. Further information from randomized trials is critical to evaluate clinical outcomes with BVS on complete resolution of the scaffold. **(*Circ Cardiovasc Interv*. 2017;10:e005286. DOI: 10.1161/CIRCINTERVENTIONS.117.005286.)**

- This meta-analysis of randomized trials demonstrated that bioresorbable vascular scaffolds are associated with an increased risk of target lesion failure because of an increased risk of target vessel myocardial infarction and target lesion revascularization at a mean of 25 months.
- The risk of scaffold thrombosis and very late scaffold thrombosis appeared to be higher with bioresorbable vascular scaffolds.

Scaffold thrombosis



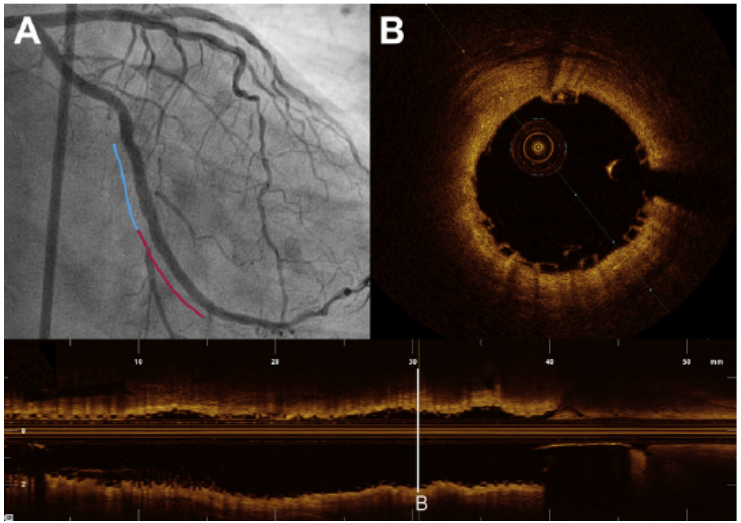
JACC: CARDIOVASCULAR INTERVENTIONS VOL. 9, NO. 24, 2016

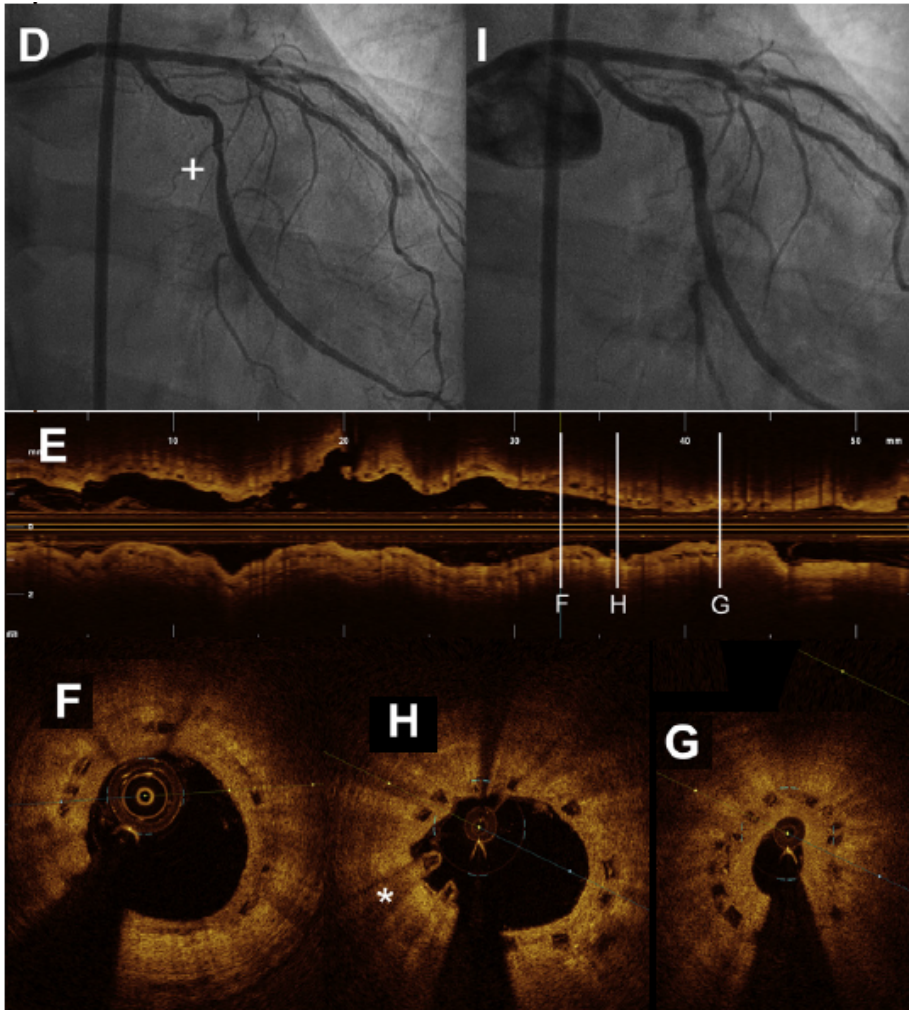
Malabsorption of a Bioresorbable Vascular Scaffold System Leading to Very Late In-Scaffold Restenosis More Than 3.5 Years After Implantation

Assessment by Optical Coherence Tomography

Michael Dommasch, MD, Nikolas Langwieser, MD, Karl-Ludwig Laugwitz, MD, Tareq Ibrahim, MD

Angio & OCT après BVS (A&B) et lors du contrôle à distance (D&E). Angio après restenting (I)





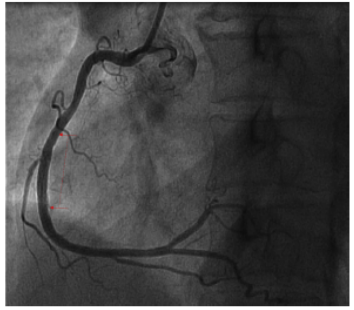
JACC intervention, sept 2016

Very Late Bioresorbable Scaffold Thrombosis Caused by Intraluminal Scaffold Dismantling

Chi Yuen Chan, MBChB, Eugene B. Wu, MD, Bryan P. Yan, MBBS

A 61-year-old woman presented to a rural hospital with inferior ST-elevation myocardial infarction 13 months after uncomplicated elective percutaneous coronary intervention with implantation of a 3.5 × 28-mm Absorb bioresorbable vascular scaffold (BVS; Abbott Vascular, Abbott Park, Illinois) in the right coronary artery for stable coronary artery disease (Figures 1 and 2, Online Videos 1 and 2). The patient completed 12 months of dual antiplatelet therapy up to 1 month before this presentation. Thrombolysis was administered followed by transfer to our hospital for percutaneous coronary intervention. Coronary angiogram showed haziness at the proximal segment of the BVS (Figure 3, Online Video 3). Coronary wire and optical coherence tomography (OCT) catheter were carefully advanced beyond the BVS. The OCT imaging showed intraluminal scaffold dismantling at the proximal segment of the BVS with adherent white thrombi (Figures 4 and 5, Online Video 4). Ticagrelor has been resumed for another 3 years. Follow-up OCT at 3 years has been arranged.

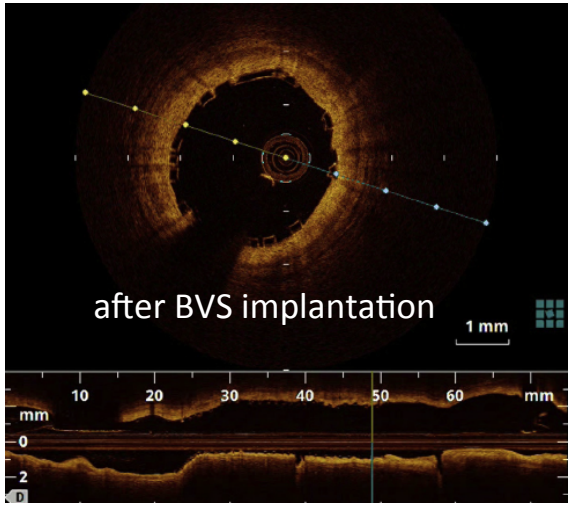
FIGURE 1 Final Coronary Angiogram at Baseline

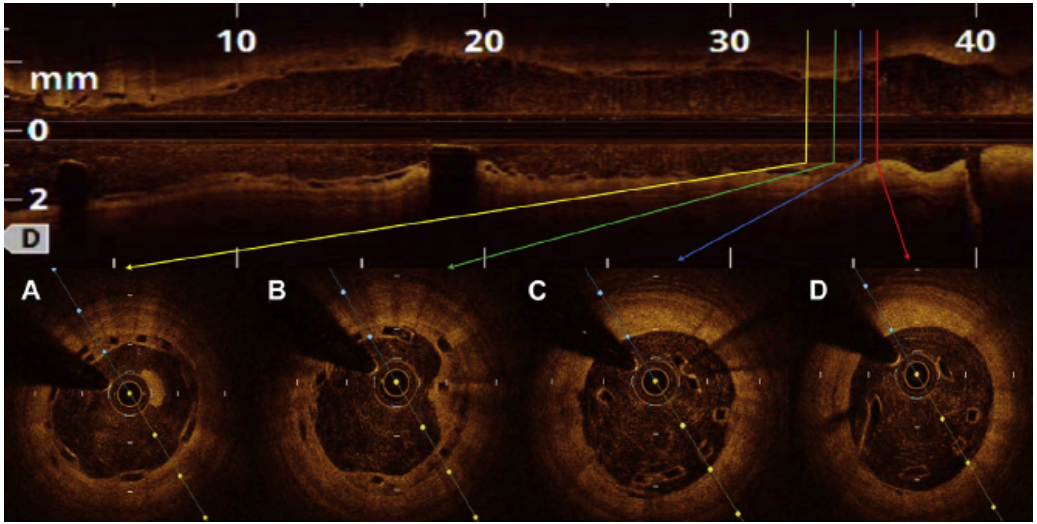


An Absorb bioresorbable vascular scaffold (BVS) 3.5 × 28 mm **(red dotted line)** was deployed at nominal pressure and post-dilated with a 3.5 mm noncompliance balloon at 16 atm. See also Online Videos 1 and 2.

Scaffold disruption could be caused by extreme overexpansion of the BVS during implantation. Late scaffold discontinuities have been observed in approximately 40% of patients treated with the Absorb BVS, which may be viewed as a normal bioresorption process without clinical implications (1). Both scaffold discontinuities and intraluminal scaffold dismantling have been observed in a case series of very late scaffold thrombosis (2). However, in this case series, baseline OCT was not available and index OCT images were obtained after the passage of a thrombus aspiration catheter which may have caused damage to the partially resorbed struts. Therefore, the mechanism of late BVS thrombosis remains unclear.

In our case, the scaffold was optimally post-dilated within the post-dilation size limit and baseline OCT confirmed full apposition and optimal expansion of





Very Late Scaffold Thrombosis

Intracoronary Imaging and Histopathological and Spectroscopic Findings

Lorenz Räber, MD, PhD,* Salvatore Brugaletta, MD, PhD,† Kyohei Yamaji, MD, PhD,* Crochan J. O'Sullivan, MD,‡ Shuji Otsuki, MD,† Tobias Koppara, MD,§ Masanori Taniwaki, MD,* Yoshinobu Onuma, MD, PhD,‖ Xavier Freixa, MD,† Franz R. Eberli, MD,‡ Patrick W. Serruys, MD, PhD,¶ Michael Joner, MD,§ Manel Sabaté, MD, PhD,† Stephan Windecker, MD*

J Am Coll Cardiol 2015;66:1901–14

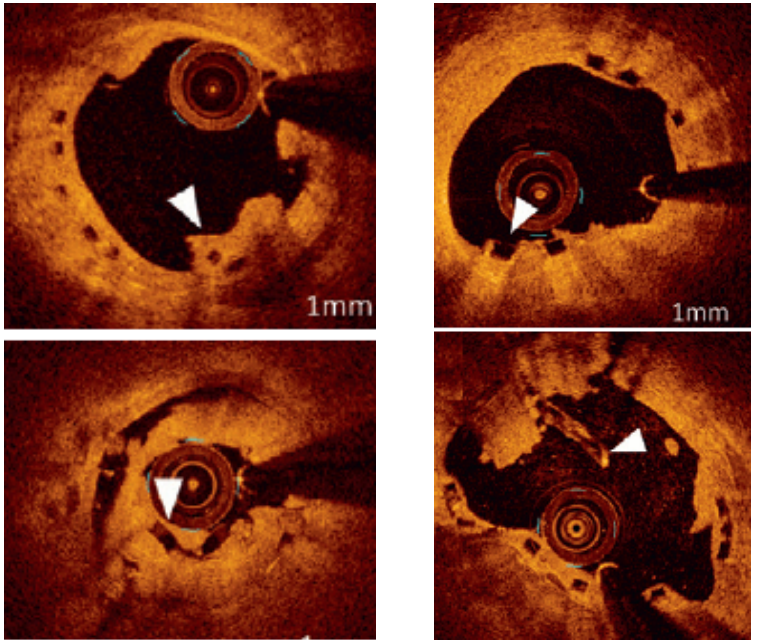
ABSTRACT

BACKGROUND Bioresorbable scaffolds provide transient lumen support followed by complete resorption.

OBJECTIVES This study examined whether very late scaffold thrombosis (VLScT) occurs when resorption is presumed to be nearly complete.

METHODS Patients with VLScT at 3 tertiary care centers underwent thrombus aspiration followed by optical coherence tomography (OCT). Thrombus aspirates were analyzed by histopathological and spectroscopic examination.

RESULTS Between March 2014 and February 2015, 4 patients presented with VLScT at 44 (case 1), 19 (cases 2 and 4), and 21 (case 3) months, respectively, after implantation of an Absorb Bioresorbable Vascular Scaffold 1.1 (Abbott Laboratories, Abbott Park, Illinois). At the time of VLScT, all patients were taking low-dose aspirin, and 2 patients were also taking prasugrel. OCT showed malapposed scaffold struts surrounded by thrombus in 7.1%, 9.0%, and 8.9% of struts in cases 1, 2, and 4, respectively. Scaffold discontinuity with struts in the lumen center was the cause of malapposition in



4 patients presented with VLScT 19 to 44 months after implantation of an Absorb BVS. All patients were taking low-dose aspirin, and 2 patients were also taking prasugrel.

OCT showed malapposed scaffold struts surrounded by thrombus in 7 to 9% of struts in 3 cases, and uncovered scaffold struts with superimposed thrombus in case 4.

OCT percent area stenosis at the time of VLScT was high in 2 cases 1 (>70%) without evidence of excessive neointimal hyperplasia.

CLINICAL RESEARCH

J Am Coll Cardiol Intv 2016;9:1203–12

Stent Thrombosis With Drug-Eluting Stents and Bioresorbable Scaffolds

Evidence From a Network Meta-Analysis of 147 Trials

ST at 1 year

Si-Hyuck Kang, MD,[a] In-Ho Chae, MD, PhD,[a] Jin-Joo Park, MD, PhD,[a] Hak Seung Lee, MD,[b] Do-Yoon Kang, MD,[c] Seung-Sik Hwang, MD, PhD,[d] Tae-Jin Youn, MD, PhD,[a] Hyo-Soo Kim, MD, PhD[b]

ABSTRACT

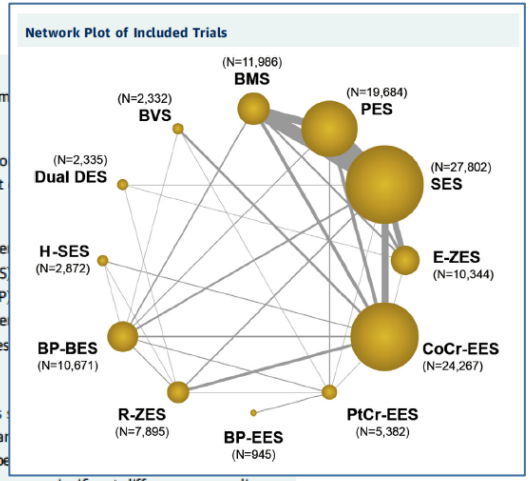
OBJECTIVES This study sought to perform a systematic review and network m
safety and efficacy of contemporary DES and BVS.

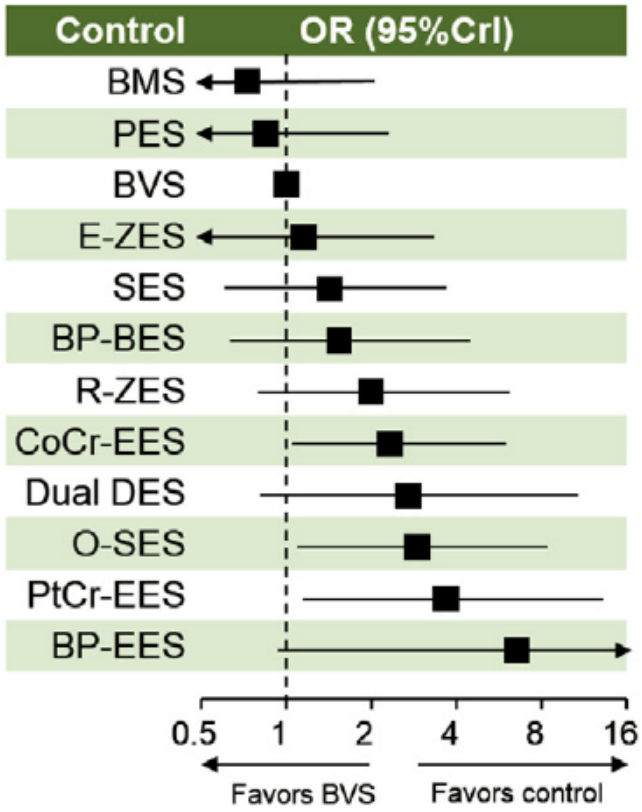
BACKGROUND To improve outcomes of patients undergoing percutaneous coro
advances in the design of drug-eluting stents (DES), including the development
scaffolds (BVS).

METHODS Prospective, randomized, controlled trials comparing bare-metal ste
(PES), sirolimus-eluting stents (SES), Endeavor zotarolimus-eluting stents (E-ZES
eluting stents (EES), platinum-chromium (PtCr)-EES, biodegradable polymer (BP
stents (R-ZES), BP biolimus-eluting stents (BP-BES), hybrid sirolimus-eluting ste
sirolimus- and probucol-eluting stents, or BVS were searched in online databases
probable stent thrombosis at 1 year.

RESULTS A total of 147 trials including 126,526 patients were analyzed in this
perior to BMS and PES in terms of definite or probable stent thrombosis at 1 year
associated with significantly lower risk than BVS. CoCr-EES and H-SES were supe
myocardial infarction was significantly lower with H-SES than with BVS. There were no significant differences regarding all-cause or cardiac mortality. Contemporary devices including BVS showed comparably low risks of repeat revascularization.

CONCLUSIONS Contemporary DES, including biocompatible DP-DES, BP-DES, and polymer-free DES, showed a low risk of definite or probable stent thrombosis at 1 year. BVS had an increased risk of device thrombosis compared with CoCr-EES, PtCr-EES, and H-SES. Data from extended follow-up are warranted to confirm the long-term safety of contemporary coronary devices. (J Am Coll Cardiol Intv 2016;9:1203–12) © 2016 by the American College of Cardiology Foundation.

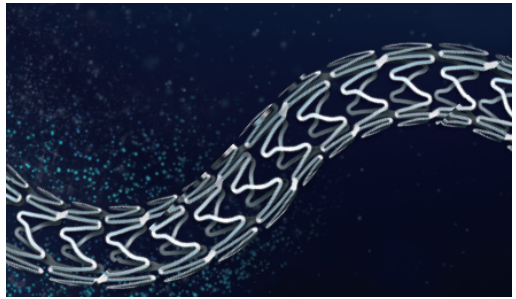




Definite or probable stent thrombosis within 1 year

Conclusions

to achieve long-term benefit, you must first "get the job done" and get it done well!



Les stents métalliques de dernière génération à mailles fines, délivrant un principe actif à partir d'un polymère biocompatible rapidement résorbable, ou sans polymère, ont considérablement fait progresser l'angioplastie

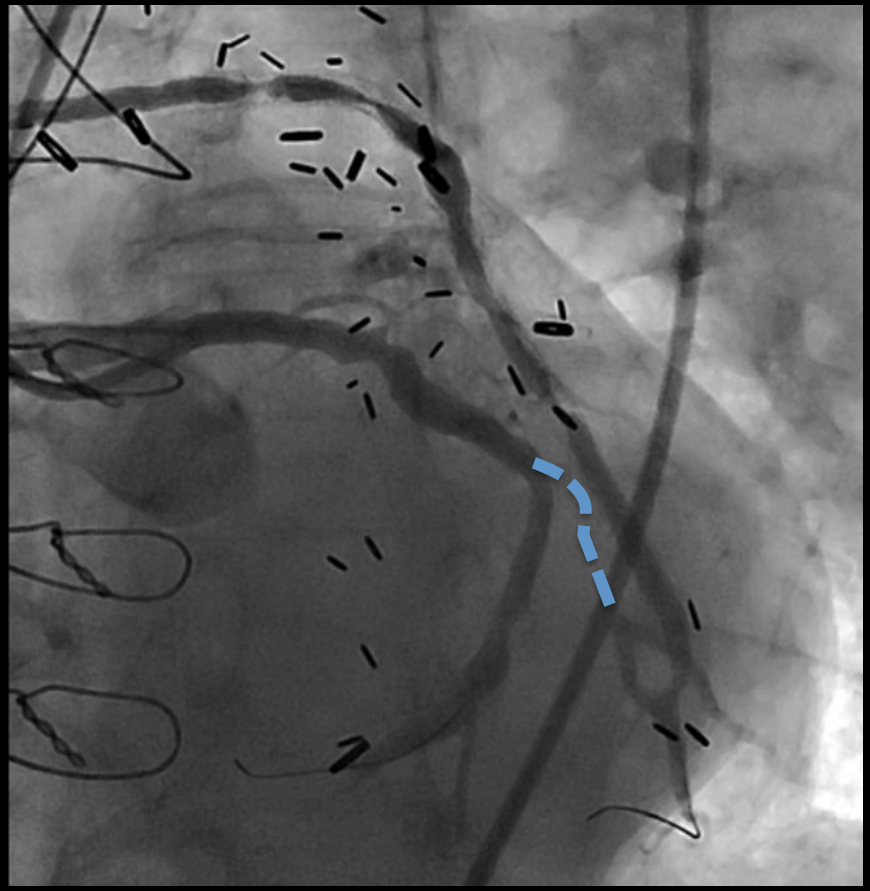
- Ils sont faciles à délivrer sur la lésion cible, même sur anatomie hostile…
- leur design assure un étayage correct de la paroi, avec une bonne résistance à la rétraction précoce des tissus et au remodelage constrictif tardif.
- Ils se conforment bien aux sinuosités du vaisseau et peuvent être travaillés pour s'adapter aux disparités de calibre amont/aval, permettant une bonne apposition à la paroi.
- Leurs matériaux sont biocompatibles, peu thrombogènes et permettent une couverture rapide par une néo-endothélialisation protectrice, sans pour autant induire de réaction fibro-proliférative excessive.
- Ils permettent de proposer aux patients à haut risque hémorragique des bithérapies écourtées.
- Tout patient devrait pouvoir en bénéficier. Il n'y a actuellement plus aucune indication à implanter un stent conventionnel ne délivrant pas de drogue…
- Les programmes de développement de stents biodégradables sont actuellement dans une impasse…

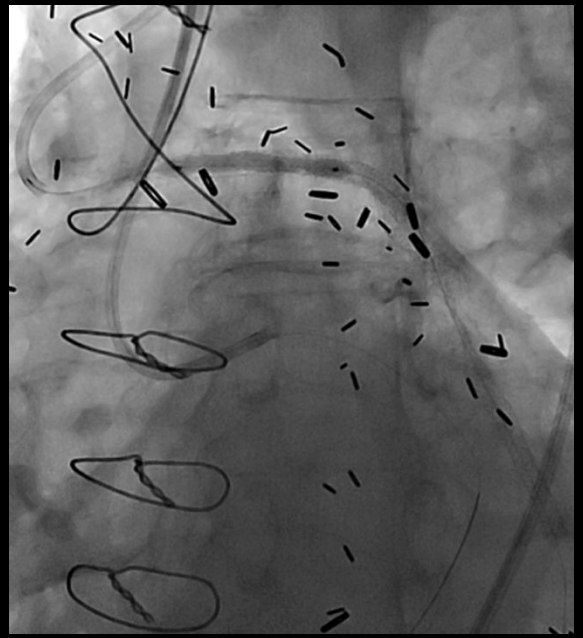
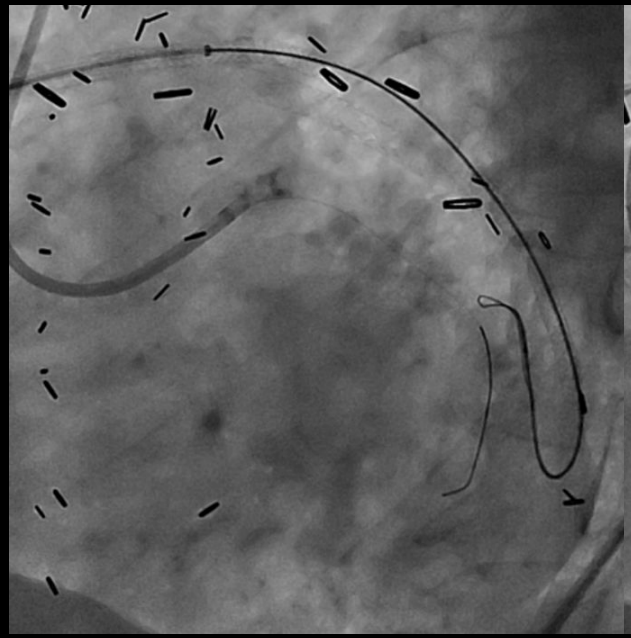
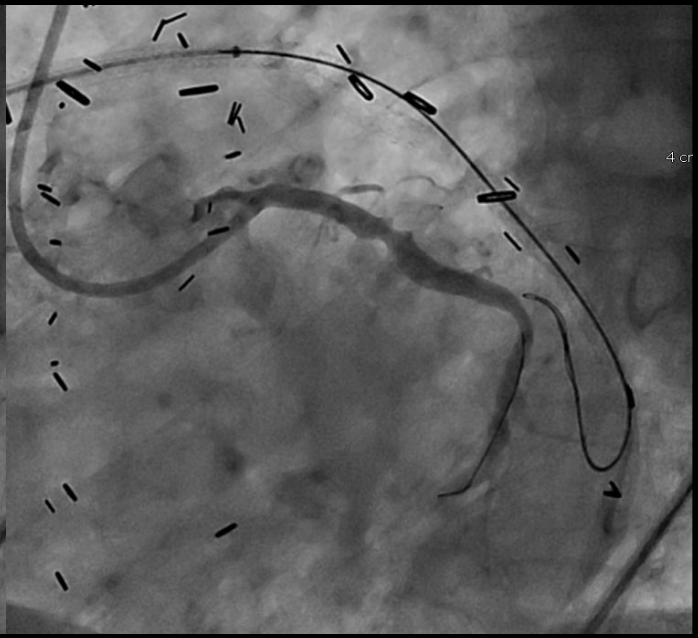
Mr D… 73 ans

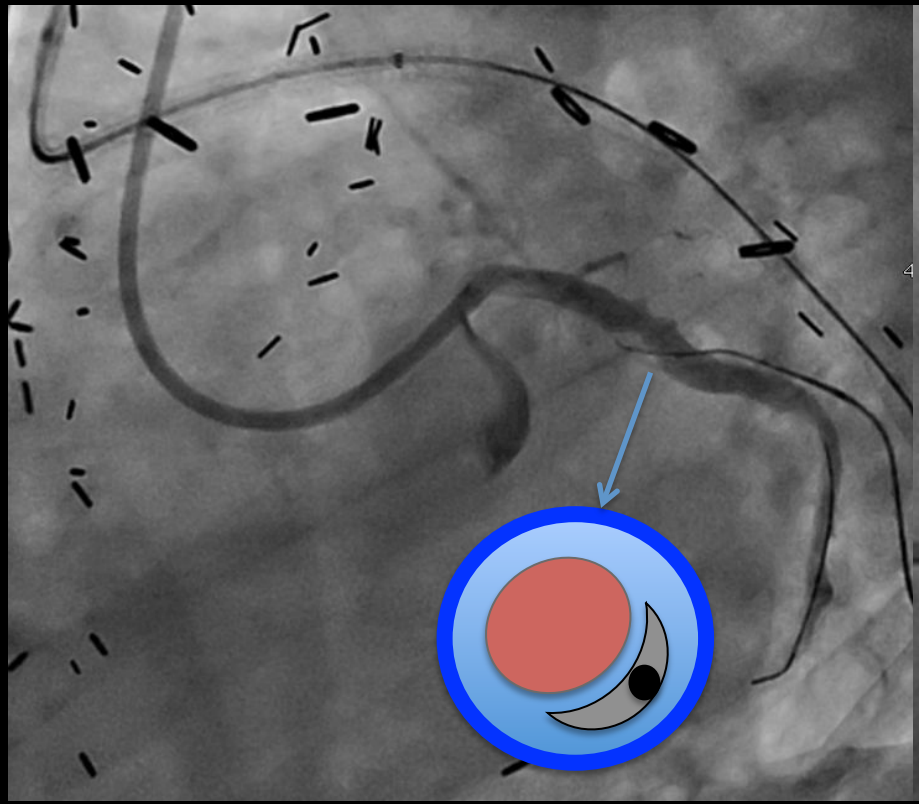
- ✓ 1999 : pontages aorto-coronariens au décours d'une SCA sur lésions tritronculaires complexes
  - AMIG…IVA
  - AMID…CD (lit d'aval équilibré)
  - Saphène sur une diagonale peu développée
  - Saphène sur la principale marginale
- ✓ 2005 : Infarctus rudimentaire.
  - Coronarographie en urgence :
  - Fonction gauche normale
  - 2 greffons mammaires parfaits destinés à l'IVA et à la droite.
  - Thrombose subtotale du greffon saphène…diagonale et dégénérescence du deuxième greffon saphène destinée à la principale marginale. Angioplastie des 2 pontages avec implantation d'endoprothèses conventionnelles
- ✓ 2006 : resténose précoce du pont diagonal, redilatée en ajoutant un 2° stent conventionnel
- ✓ 2010 : angor classe II avec ischémie latérale à la scintigraphie.
  - 2 ponts mammaires toujours parfaits. Bon VG
  - Occlusion chronique du pont sur la diagonale.
  - Nouvelle lésion critique du pont saphène sur la Cx traitée par un stent actif Promus. Echec de désobstruction de la Cx native par voie rétrograde (échec de réentrée dans la lumière de la Cx proximale)
- ✓ 2013 : à nouveau angineux sur une nouvelle lésion du pontage sur un autre site, traitée par un 3° stent (Promus long)
- ✓ Asymptomatique 4 ans reprise des symptômes fin 2016 sur une dégénérescence diffuse de ce vieux pontage saphène.
  - VG toujours normal
  - Excellents ponts mammaires sur l'IVA et la droite équilibrée.

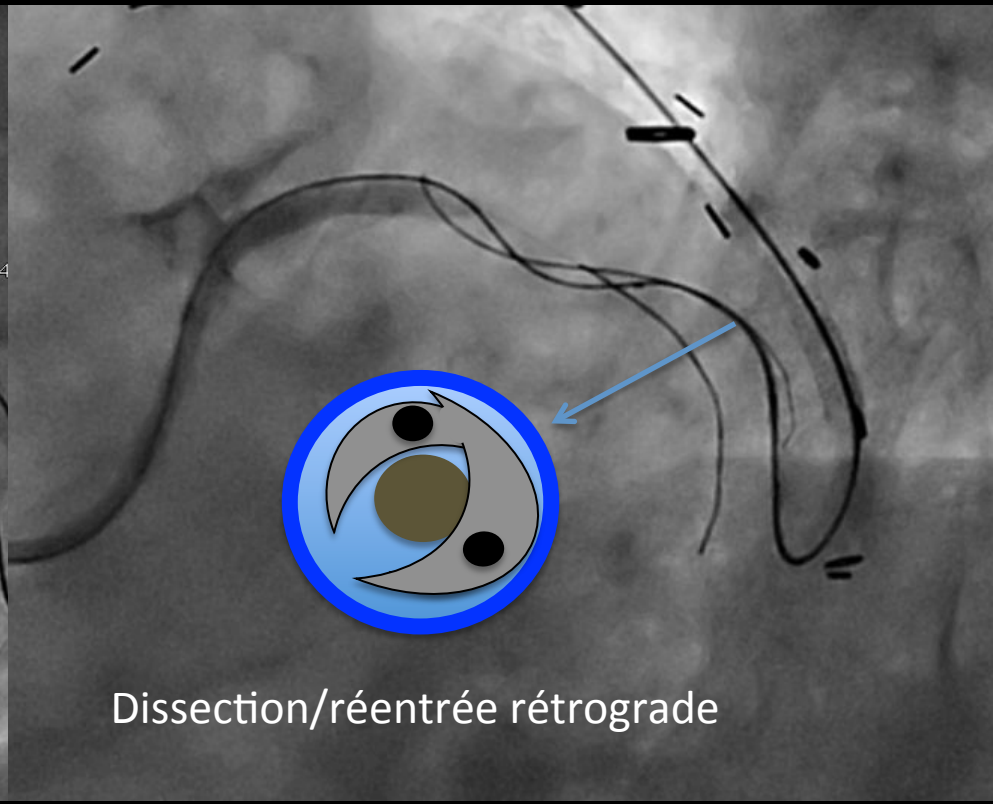
⇨ 2° tentative de désobstruction de la circonflexe native, 18 ans après son occlusion…

Dissection/réentrée rétrograde

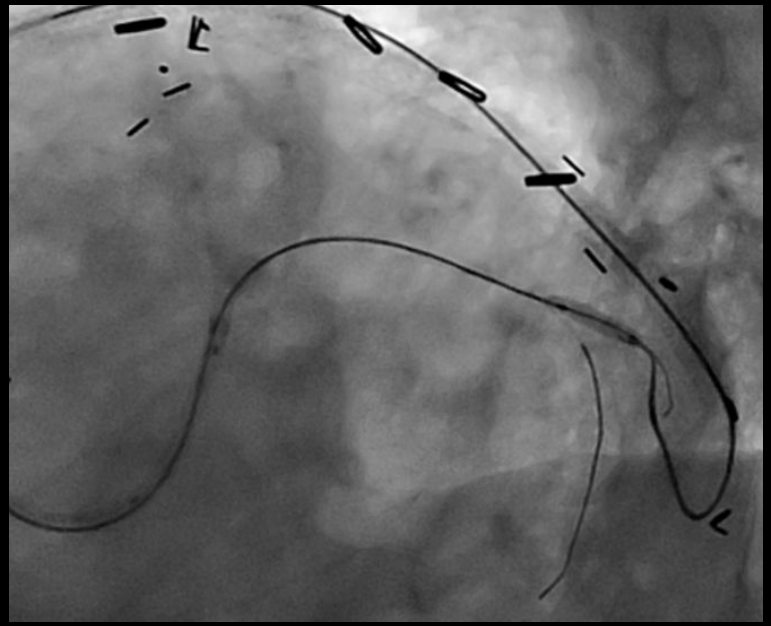


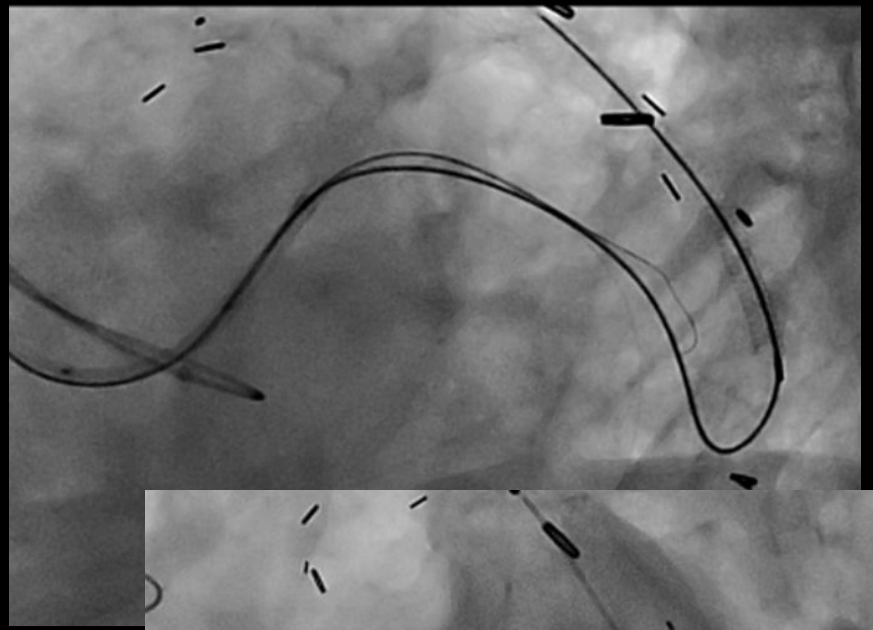




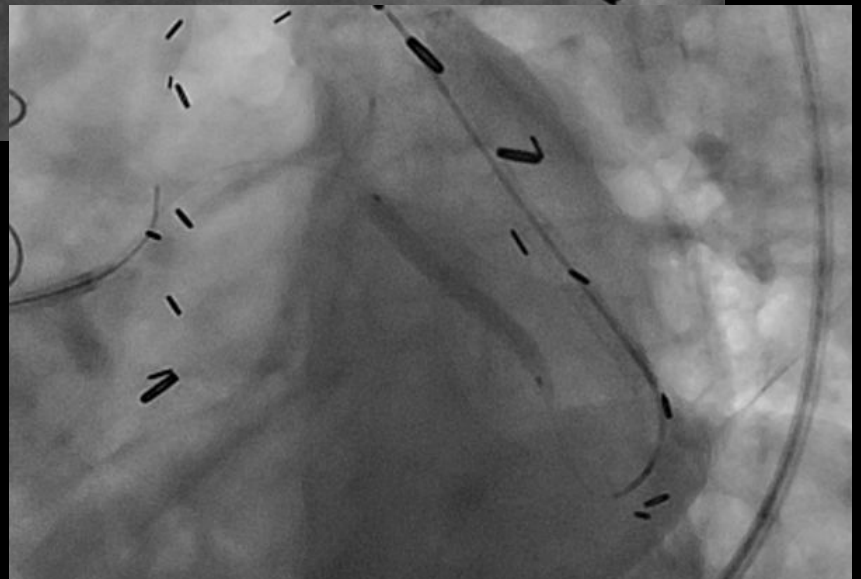


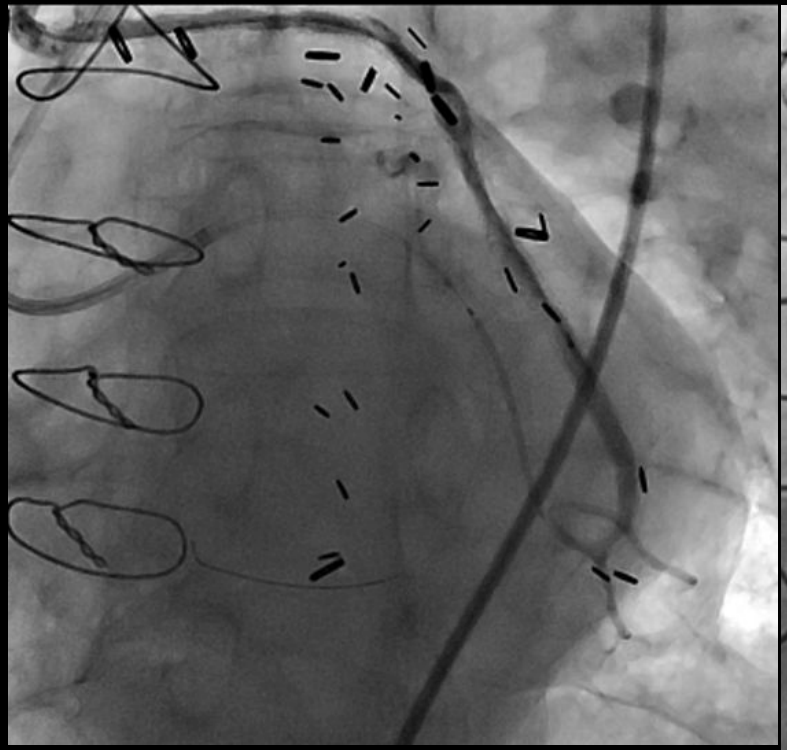


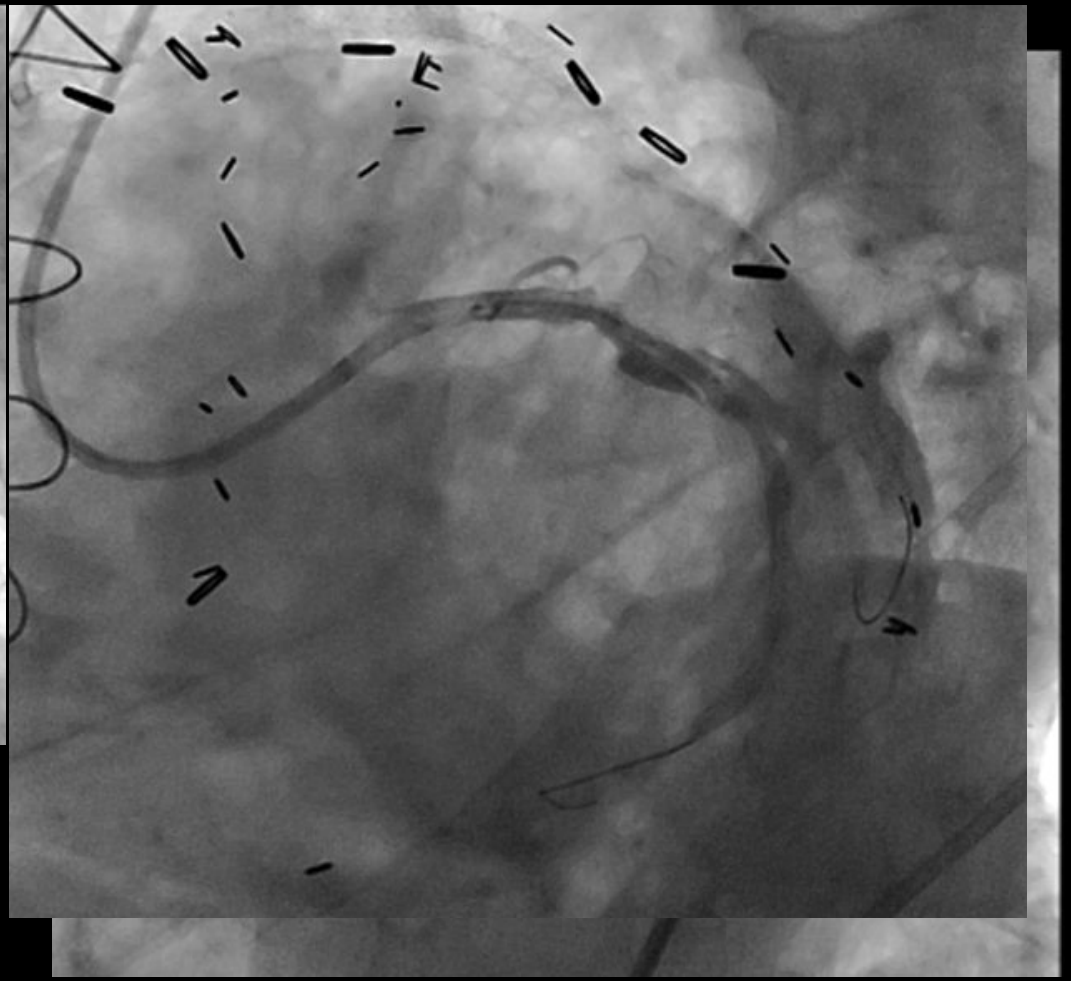
Dissection/réentrée rétrograde

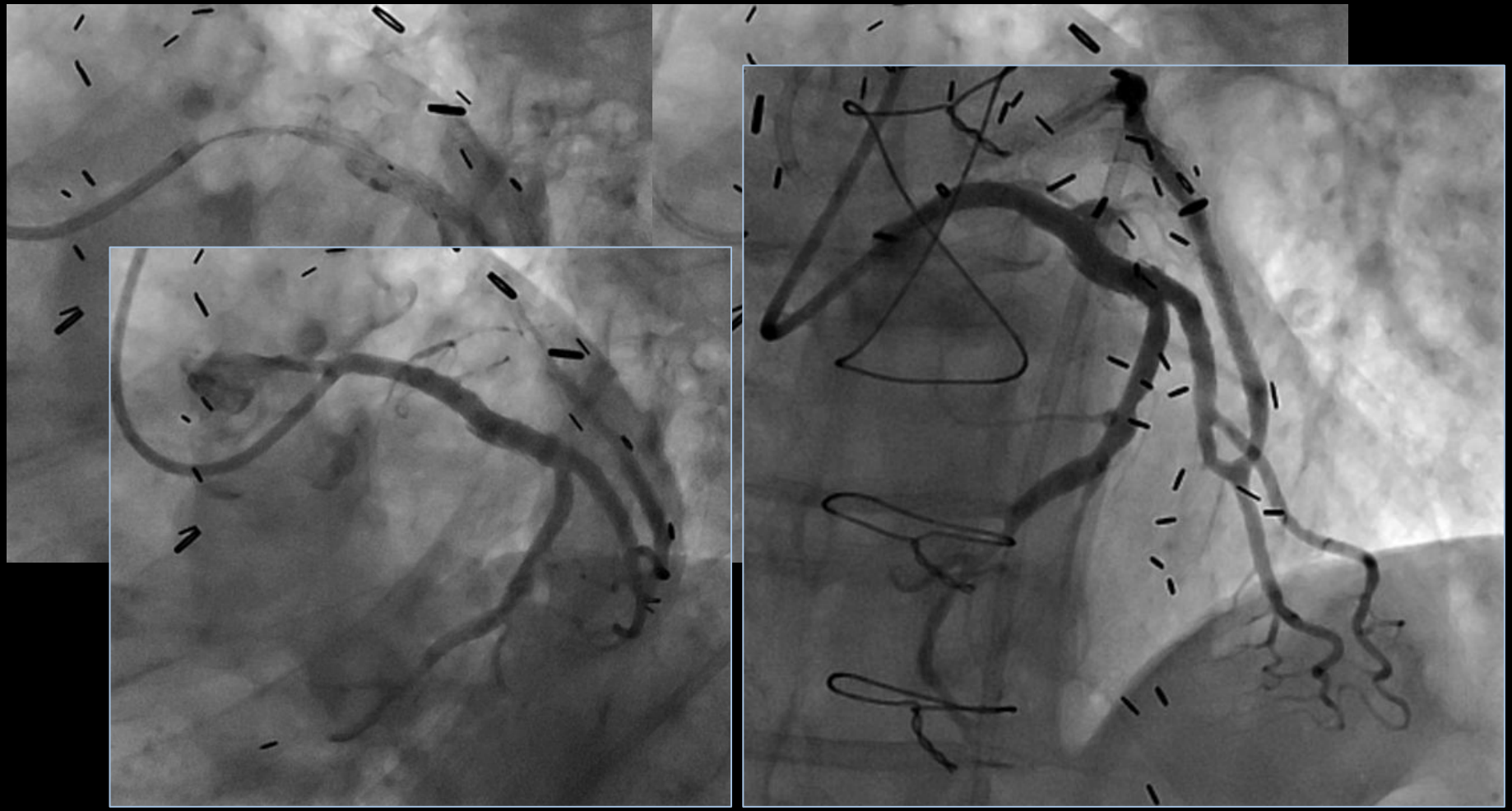




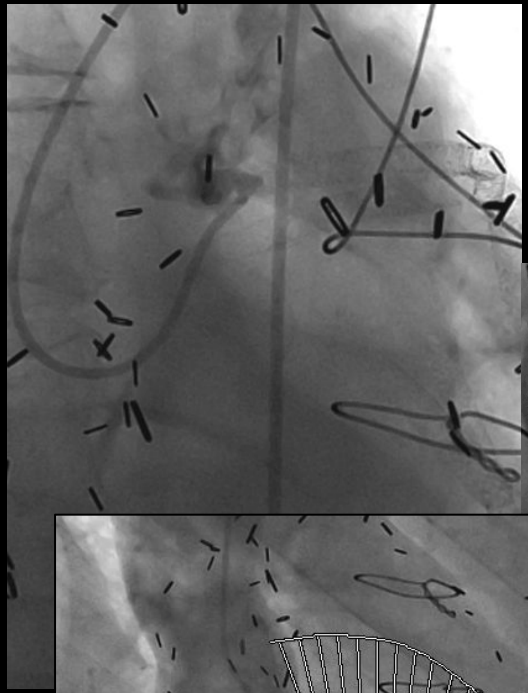


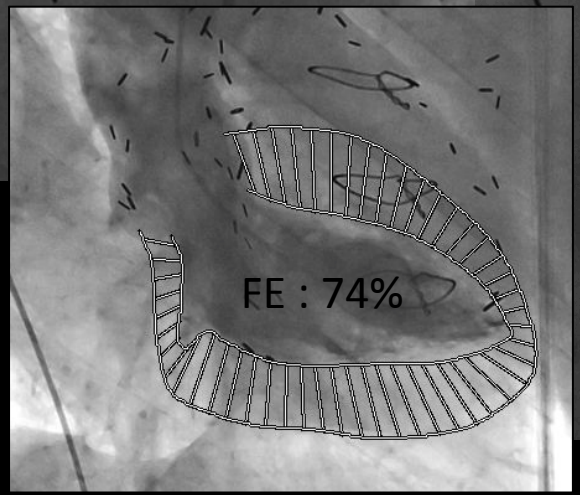


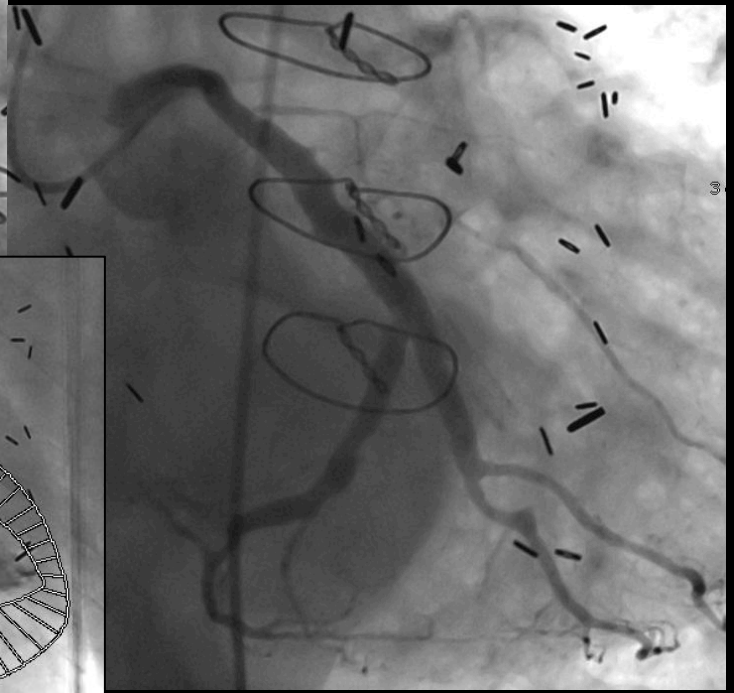


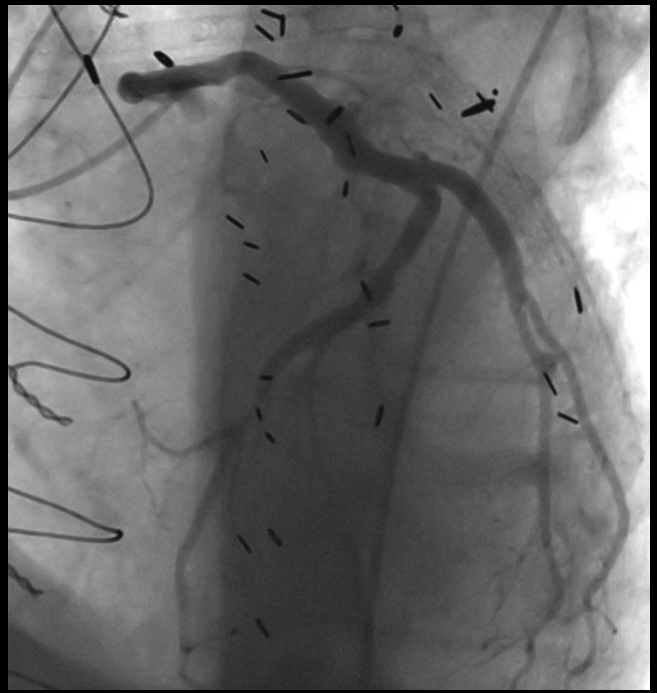


Contrôle à 6 mois : patient asymptomatique
FE normale. Occlusion du pont saphène … Cx
Excellents ponts mammaires IVA & CD



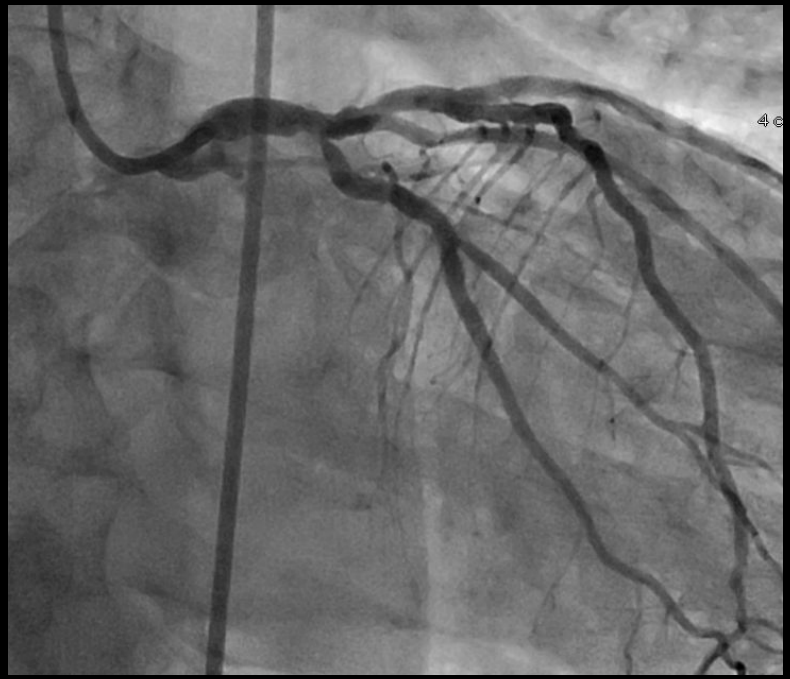


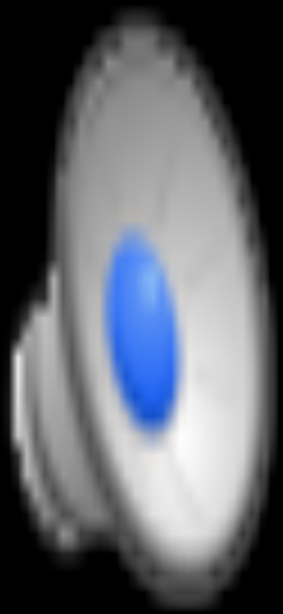


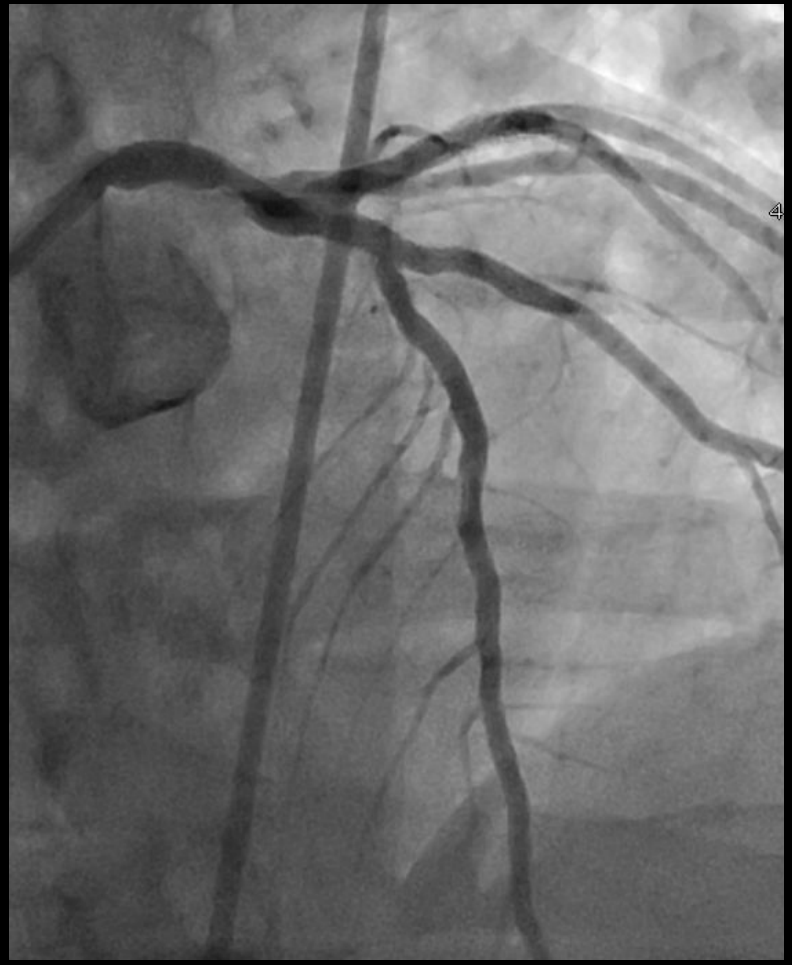


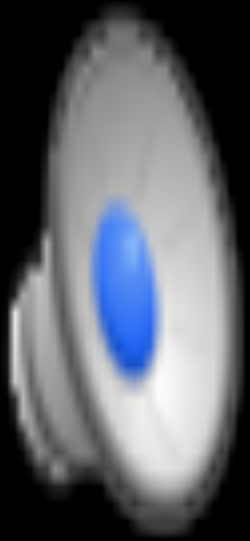
Mr Lom… 72 ans

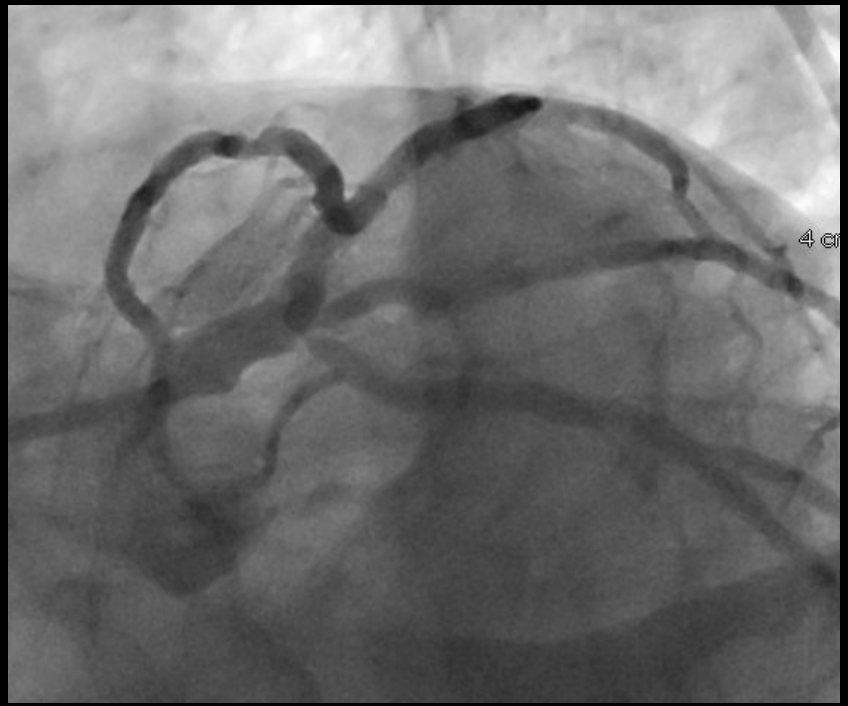
CMNO découverte en 2006, longtemps bien compensée sous OMT. FE : 40%
ATCD d'angioplastie D1 et Cx moyenne
Détérioration du statut fonctionnel…







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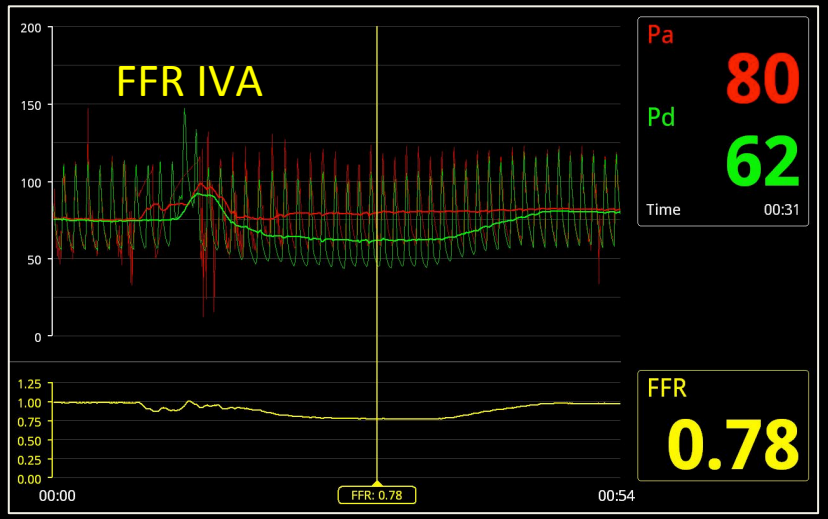
FFR IVA
Pa
80
Pd
62
Time
00:31
FFR
0.78
200
150
100
50
0
1.25
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0.75
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FFR: 0.78
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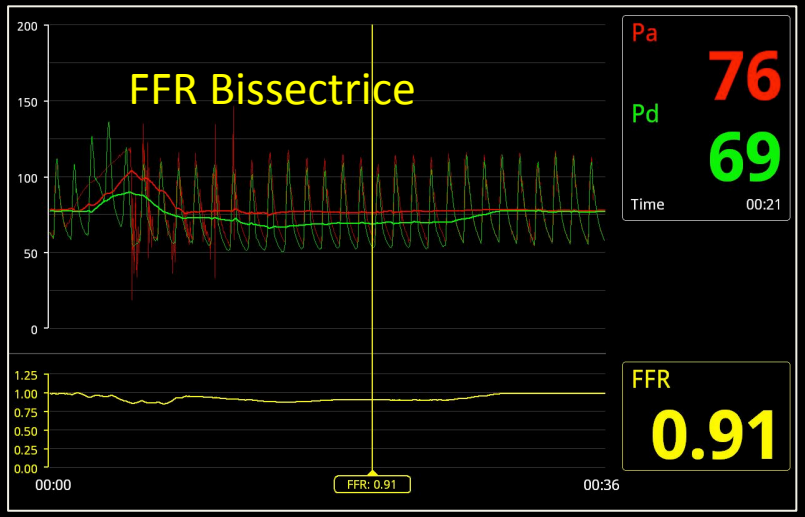
FFR Bissectrice
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76
Pd
69
Time
00:21
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FFR: 0.91
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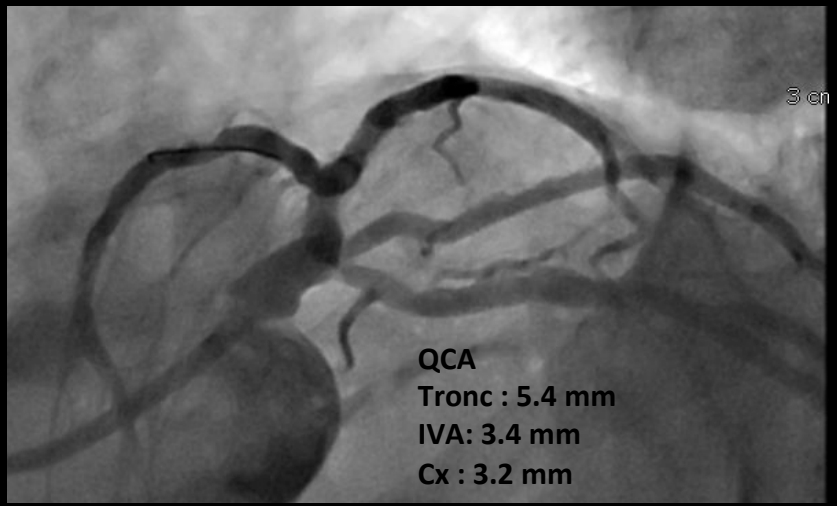
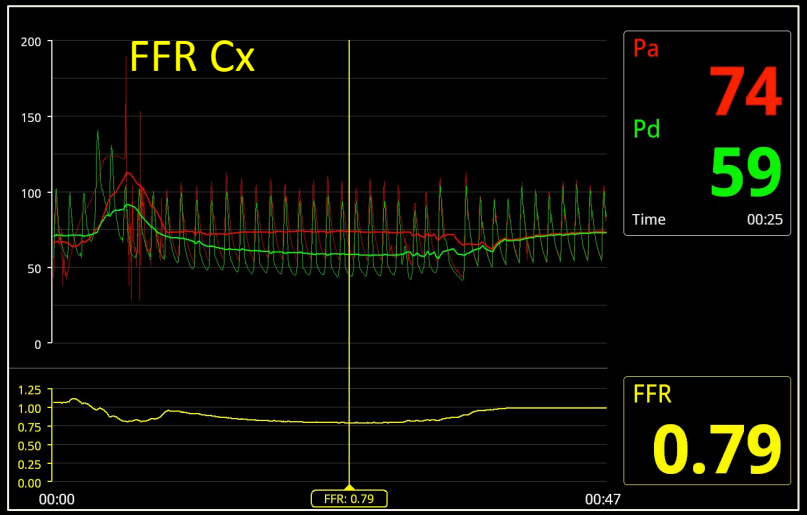

3 cn
QCA
Tronc : 5.4 mm
IVA: 3.4 mm
Cx : 3.2 mm


FFR Cx
Pa
74
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59
Time
00:25
FFR
0.79
200
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1.25
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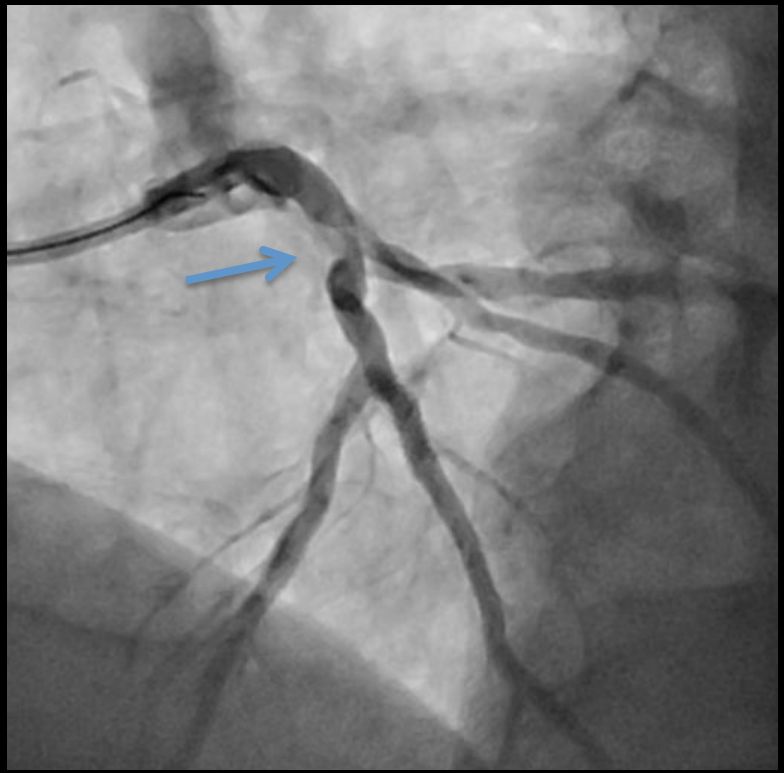
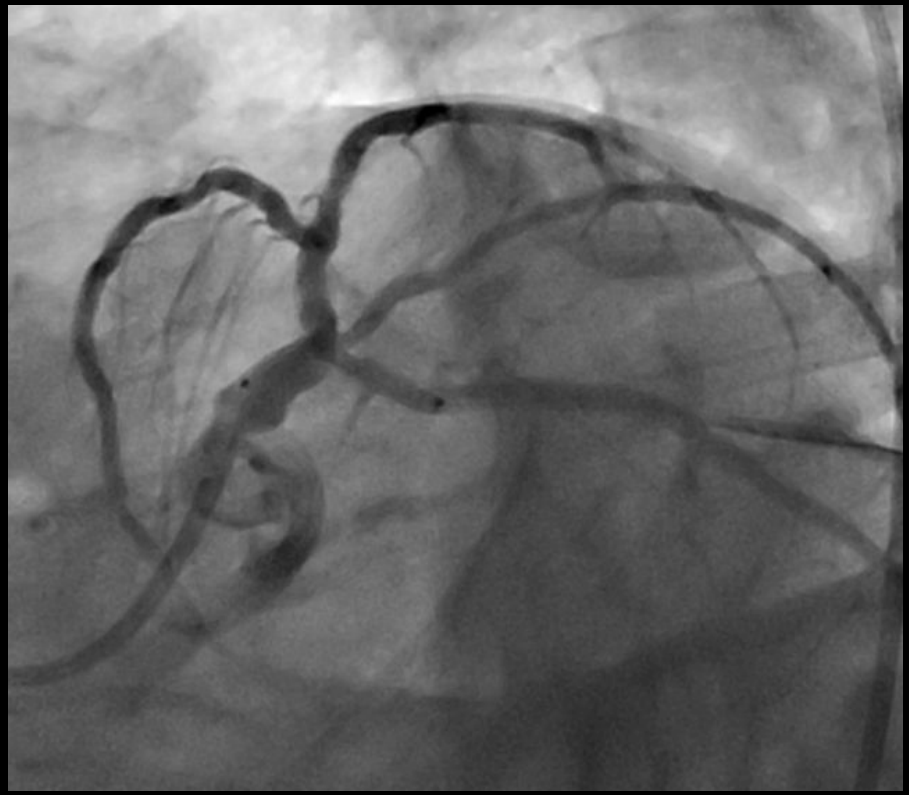
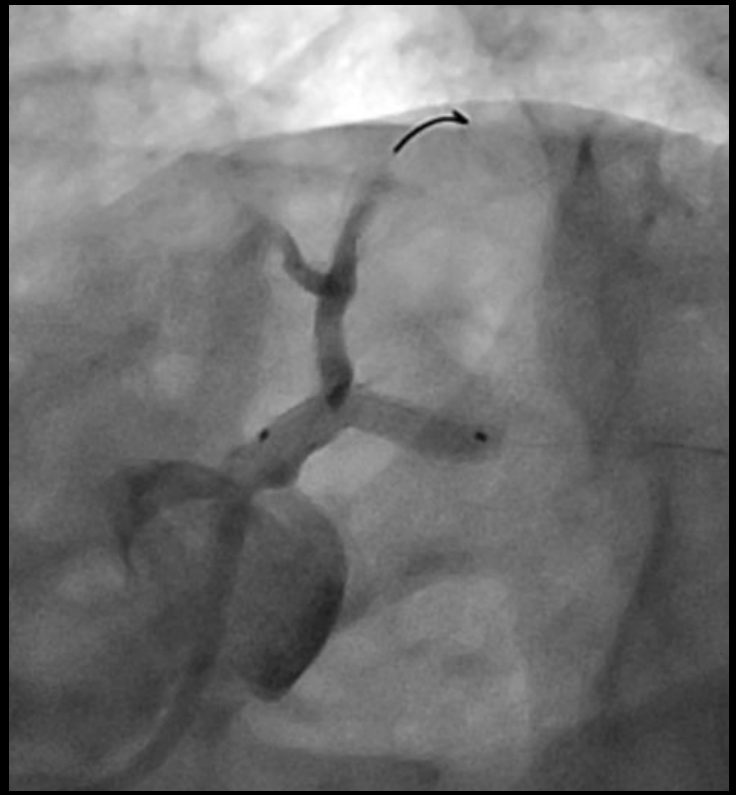
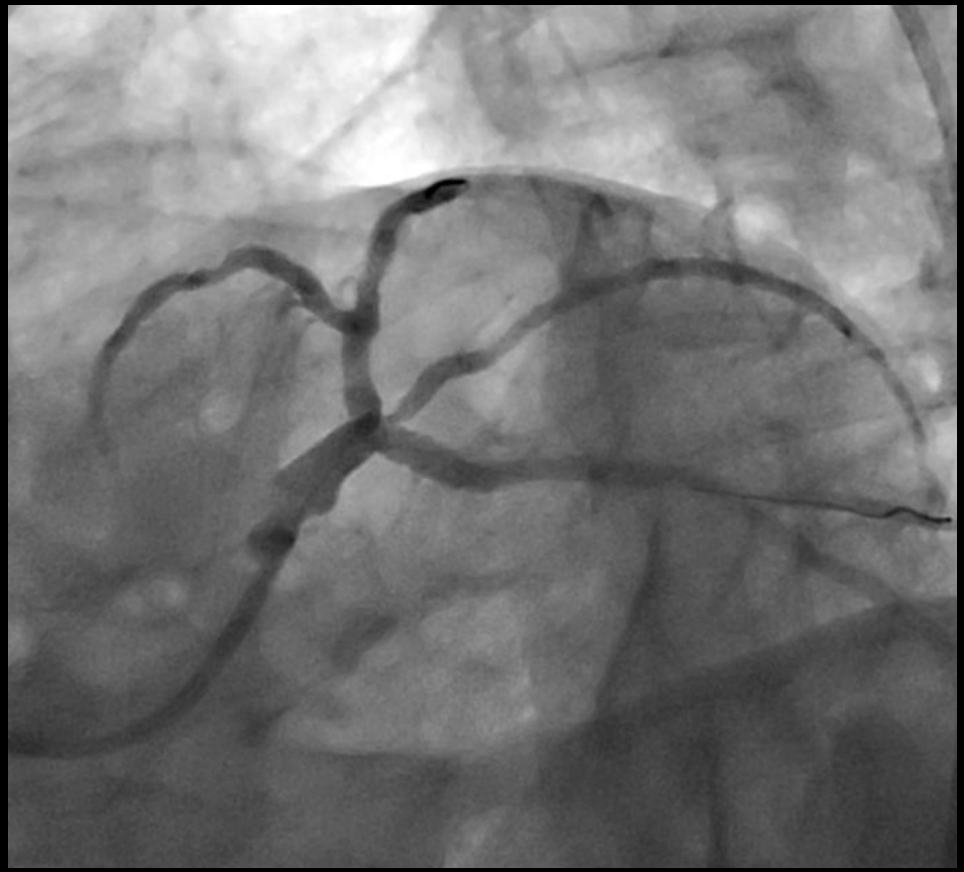


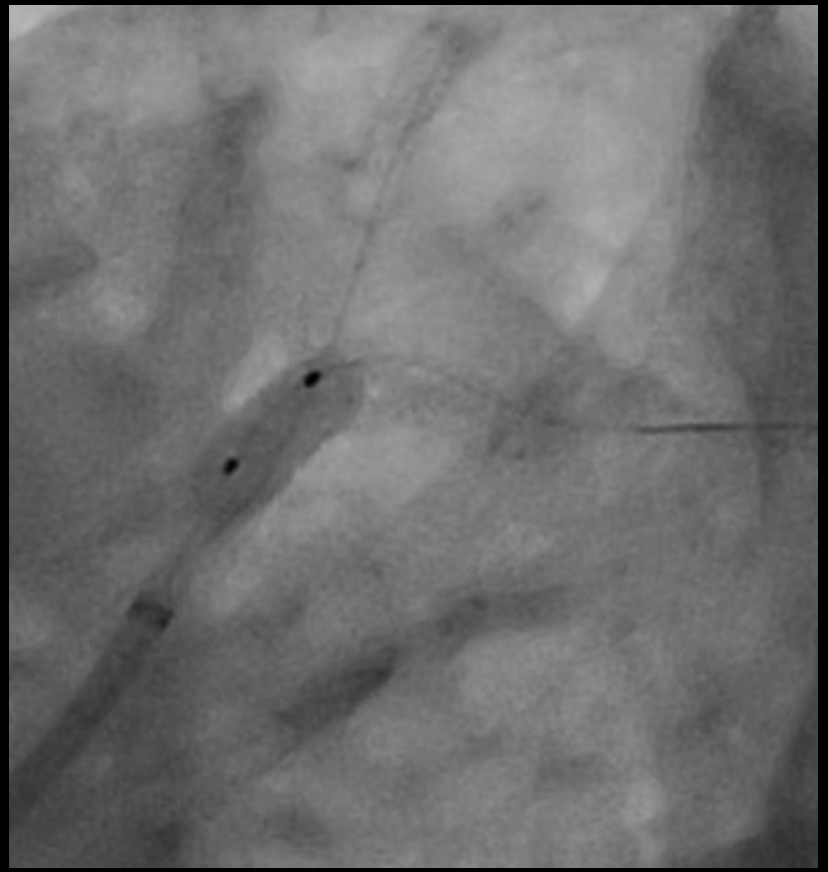
6F EBU 4.0. Whisper et Runthrough. Prédilatation par un sapphire 3.0 x 20 de la Cx puis stent stent Xience Alpine 3.5x23 mm à 20B.



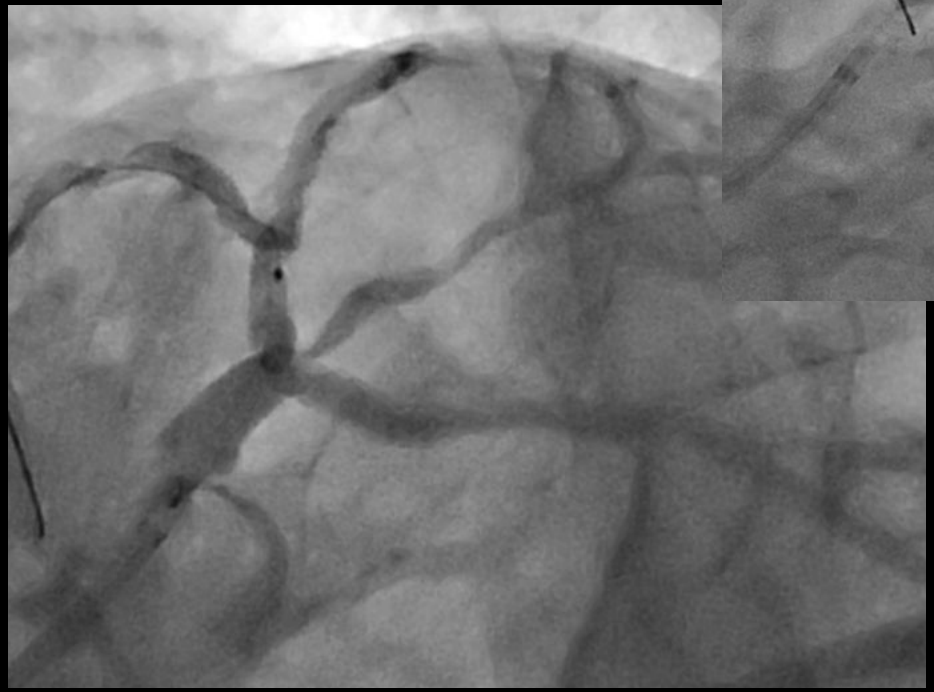


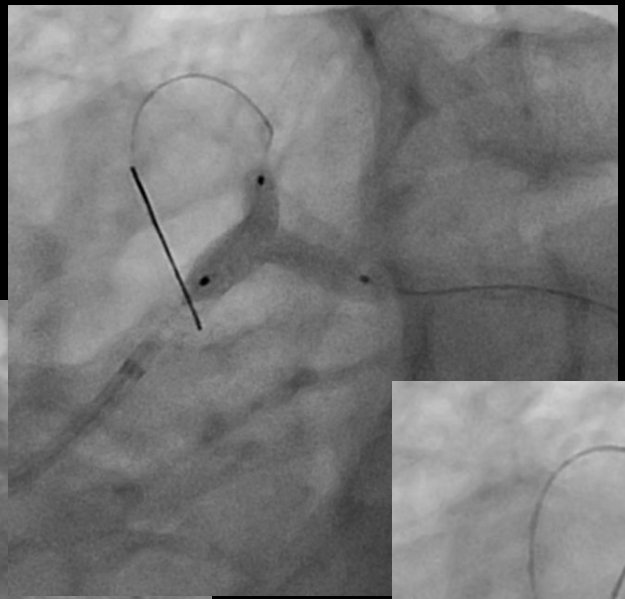
POT (Proximal Optimization Technique) par un ballon 5 x 10 à 18B puis ouverture de la maille couvrant l'iVA par le sapphire après avoir repassé le guide 014 et implantation d'un 2° stent en culotte.

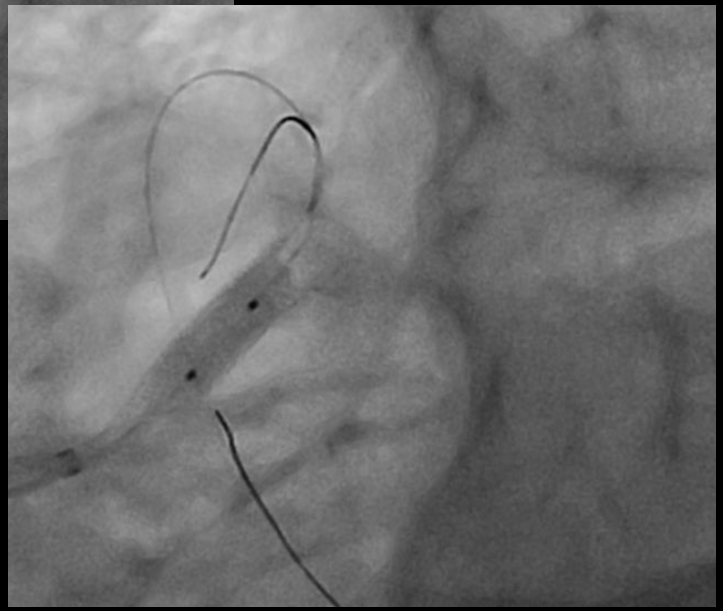


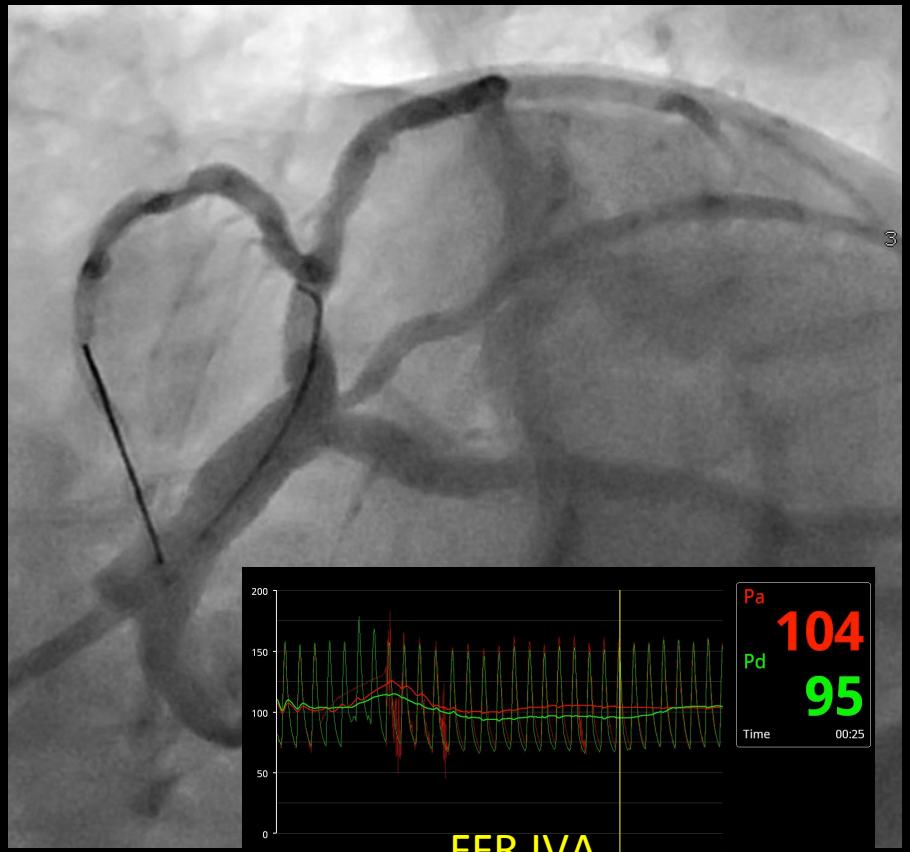


stent Abbott Xience Alpine 4.0 x 28 à 18 B sur le tronc depuis son ostium et sur l'iVA, puis refranchissement de maille Cx, kissing et POT final…





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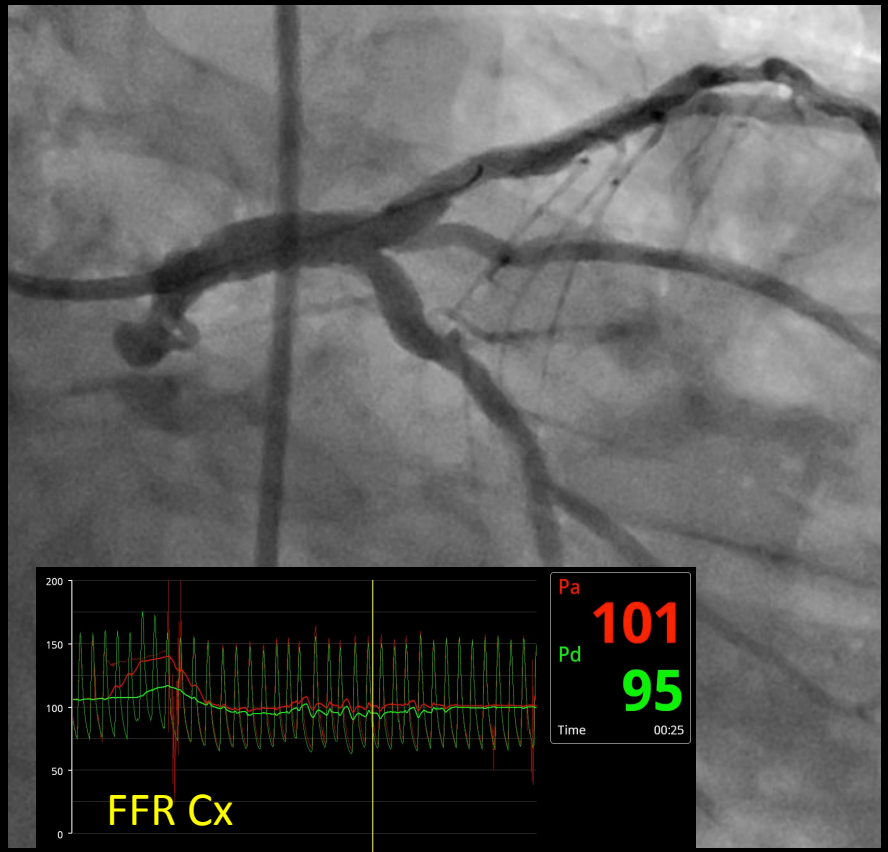
150
100
50
0
Pa
104
Pd
95
Time
00:25
FFR IVA
1.25
1.00
0.75
0.50
0.25
0.00
FFR
0.91
00:00
FFR: 0.91
00:32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150
100
50
0
Pa
101
Pd
95
Time
00:25
FFR Cx
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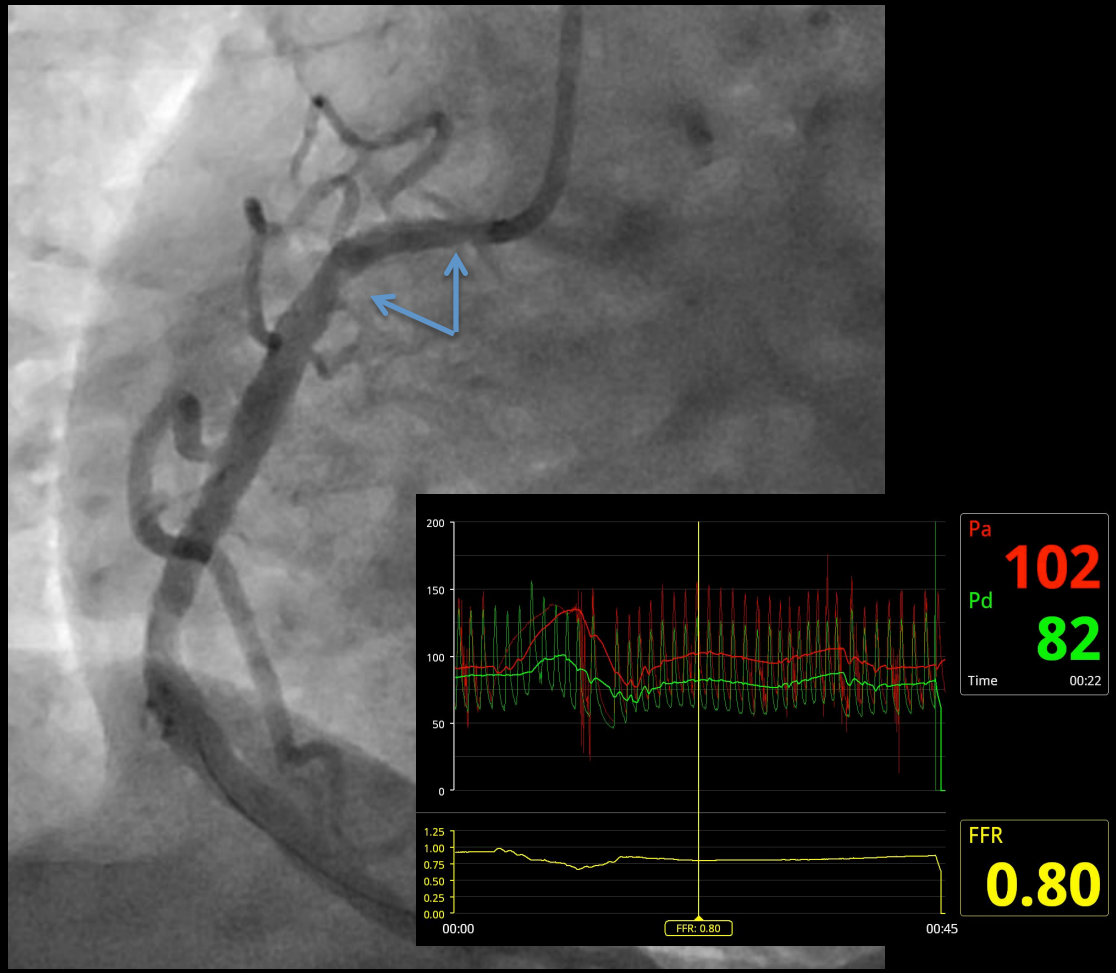
0.25
0.00
FFR
0.94
00:00
FFR: 0.94
00:38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100
50
0
Pa
102
Pd
82
Time
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1.25
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0.75
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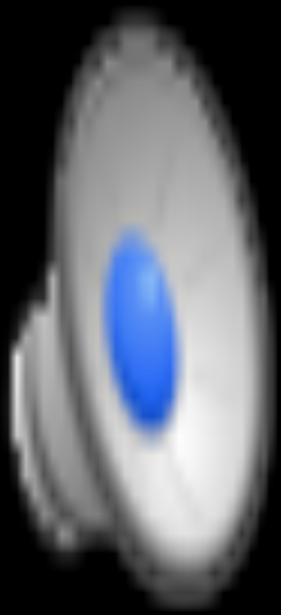
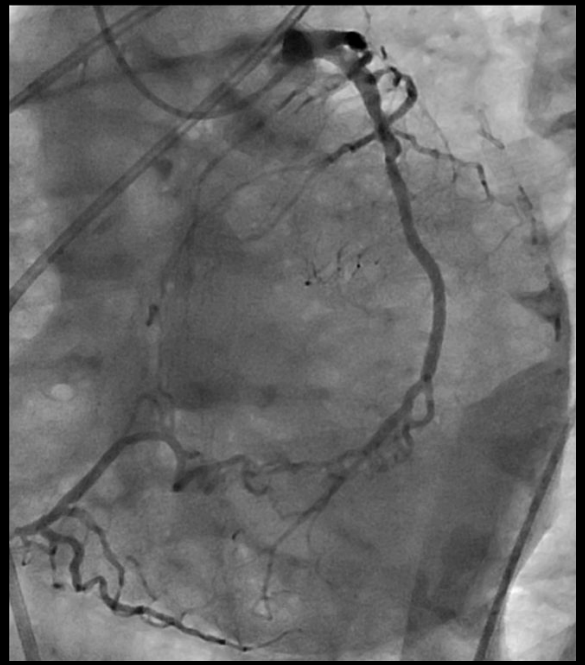
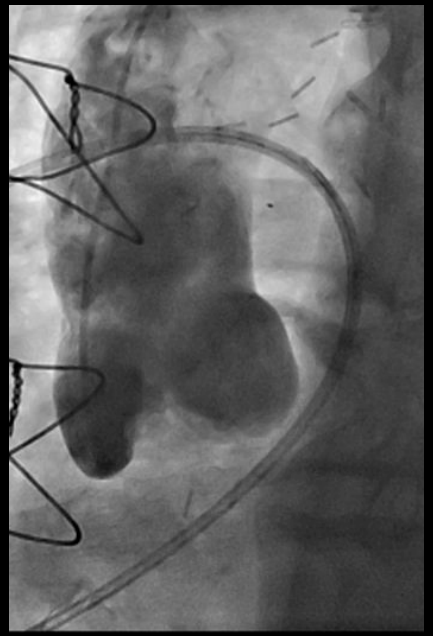
0.25
0.00
FFR
0.80
00:00
FFR: 0.80
00:45

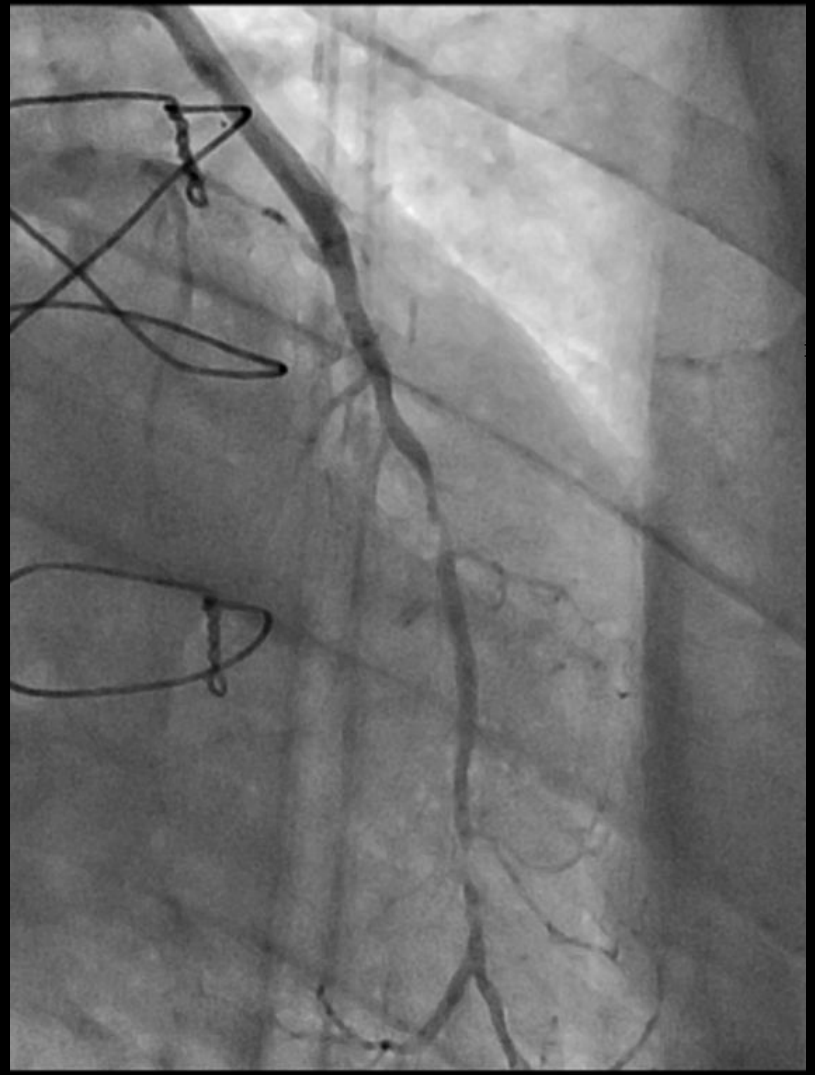


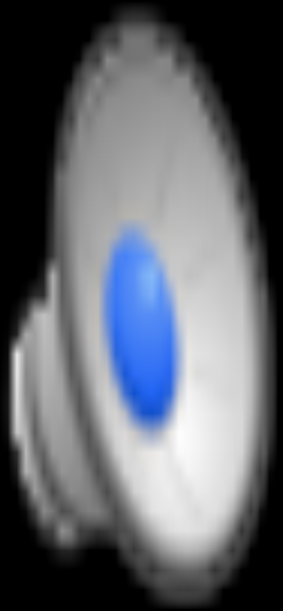
stent **Terumo Ultimaster**
4.0x28 à 20 B après
prédilatation

Mr T…68 ans. Diabétique obése, ex fumeur, dyslipidémique et hypertendu.
Pontages du réseau gauche au CCM en 2002 après un infarctus post.
Angioplastie du pont saphène…Cx quelques semaines avant, sur SCA et RAC serré : Gdt moyen 50 mm Hg, V max 4.7 m/s. Garde un angor au moindre effort.
FE : 52%. Séquelle transmurale post…

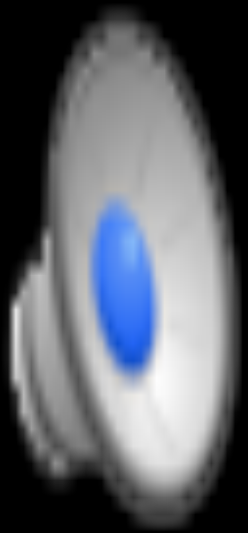








ATC utilisant un intro long Cook 5F et une IM launcher 5F.
Guide 014 Whisper extra support
Après prédilatation par un ballon sapphire puis 2 stents Boston Synergy 2.5 x 28 et 2.75 X 24



Prochaine étape : désobstruction de la Cx native, puis TAVI…