

Stratégie : angioplastie du vaisseau natif ou du pontage veineux

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DÉCLARATION DE LIENS D'INTÉRÊT AVEC LA PRÉSENTATION

Intervenant : Cédric Delhaye, Lille

Je déclare les liens d'intérêt suivants :

Consulting fees / Honoraria: Astrazeneca, Medtronic, MSD, Novartis

Grant / research Support: Medtronic

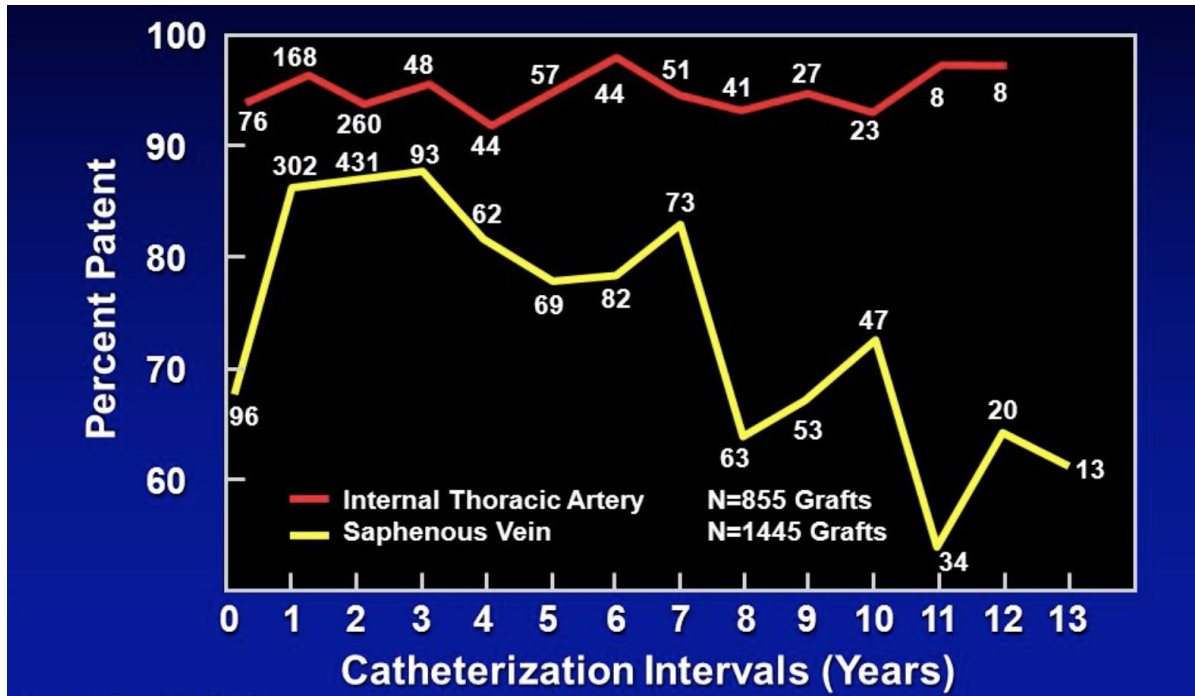
Mes premières impressions

- Traiter le pontage veineux:
souvent plus simple, quoi que...
- Traiter le vaisseau natif:
Plus complexe
« un pontage qui commence à dégénérer finit toujours par se boucher »

Arguments pour traiter le vaisseau natif

Perméabilité à long terme du greffon saphène

Patency of internal-Mammary-Artery and SVG at 1-yr intervals



Loop, NEJM 1986

Table 1. Coronary Artery Bypass Graft Patency Rates

Conduit	Early Patency (1-Year) (%)	Midterm Patency (5-7 Years) (%)	Late Patency (≥10 Years) (%)
Saphenous vein graft	81-97.9	75-86	50-60
Internal thoracic artery	93-96	88-98	85-95
Radial artery	89-92	90-98	89-91
Right gastroepiploic artery	92-97	80-90	62

Gaudino M, circulation 2017

PCI chez les patients aux ATCD de CABG

Comparaison PCI du réseau natif vs PCI du Pontage

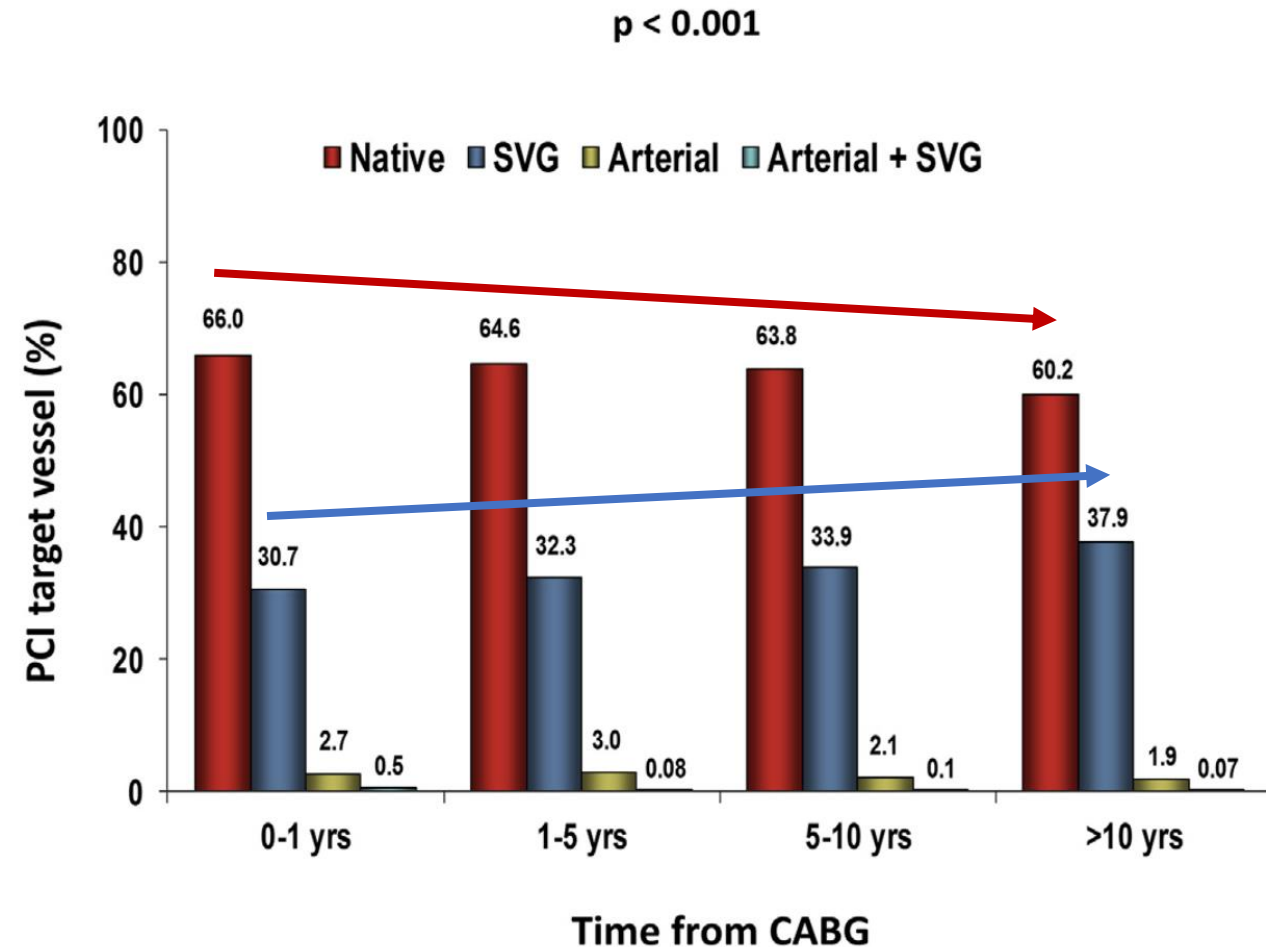
Percutaneous Coronary Intervention
in Native Coronary Arteries Versus
Bypass Grafts in Patients With Prior
Coronary Artery Bypass Graft Surgery

VA Health Care System PCI Registry
(oct 2005 – Sept 2013): 60 171 pts

18.5% (n=11 118) of pts have history of CABG

16 440 lesions:

- Native coronary artery, n=12 073 (73.4%)
- **SVG, n=4 114 (25.0%)**
- Arterial graft, n=253 (1.5%)



Angioplastie du pontage veineux

Plus de complications peri-procedurales

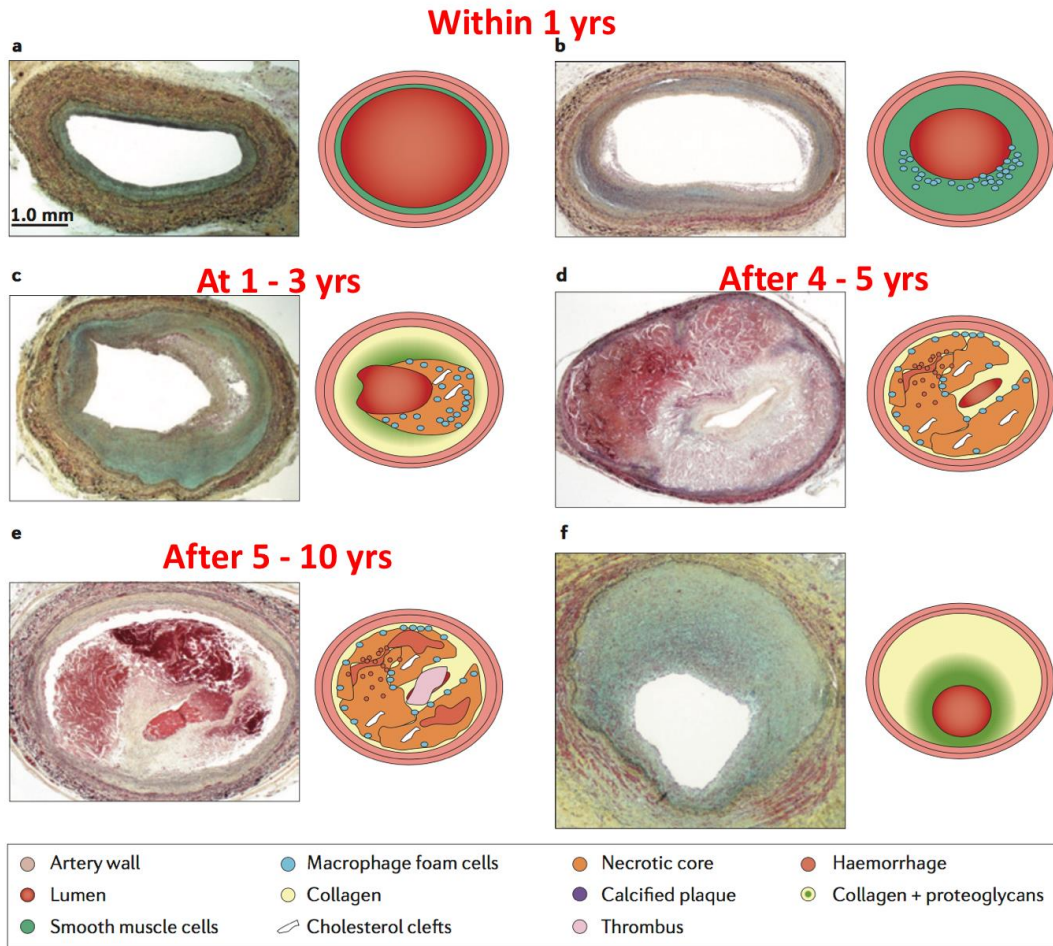
TABLE 4 Procedure-Related Complications in Patients With Prior Coronary Bypass Graft Surgery Undergoing Percutaneous Coronary Intervention Classified According to the Type of Vessel That Was Treated

Outcome	Native Only (n = 7,469)	SVGs (n = 3,346)	p Value	Adjusted Odds Ratio (95% CI)	p Value
In-hospital mortality	0.83%	1.79%	<0.001	6.6 (0.7-60.0)	0.094
Procedural complications	5.80%	7.7%	<0.001	1.5 (1.2-1.9)	0.001
Dysrhythmia	0.68%	0.77%	0.633	1.5 (0.8-2.8)	0.241
Periprocedural MI	0.43%	1.00%	0.001	2.3 (1.1-4.7)	0.024
Cardiogenic shock	0.13%	0.36%	0.013	2.1 (0.6-7.0)	0.219
Stroke	0.00%	0.06%	0.098	Not estimable	
No-reflow	0.40%	3.37%	<0.0001	7.0 (4.8-10.0)	0.0001
Dissection	2.08%	0.94%	<0.0001	0.4 (0.3-0.7)	0.0001
Perforation	0.20%	0.30%	0.302	1.1 (0.5-2.2)	0.822
Acute closure	0.44%	0.36%	0.640	0.8 (0.4-1.6)	0.488
Successful reopening	0.25%	0.25%	1.000	1.1 (0.5-2.6)	0.760
Bleeding	0.49%	0.44%	0.773	0.6 (0.2-1.8)	0.406
Other complications	4.11%	5.23%	0.009	1.5 (1.2-2.0)	0.003

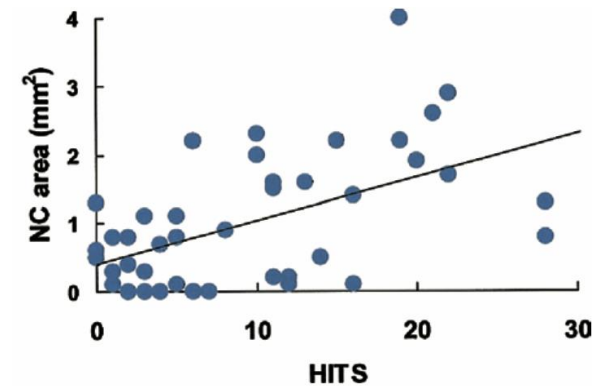
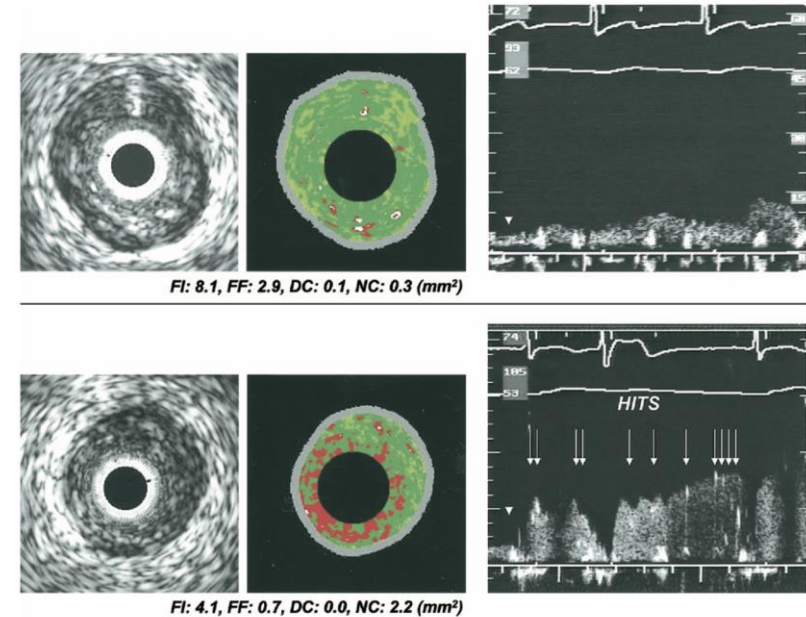
CI = confidence interval; MI = myocardial infarction; SVG = saphenous vein graft.

Histologie de la maladie du greffon

Accelerated atherosclerotic disease in Saphenous Vein Graft



Correlation of necrotic Cores & Doppler « Hits »



Histologie de la maladie du greffon



MJ Davies, Atlas of Coronary Artery Disease, 1998

Angioplastie du pontage veineux

Plus de complications à long terme

FIGURE 3 Long-Term Clinical Outcomes of Patients With Prior Coronary Artery Bypass Graft Who Underwent Percutaneous Coronary Intervention, Classified According to the Percutaneous Coronary Intervention Target Vessel (Native Coronary Artery vs. Bypass Graft)

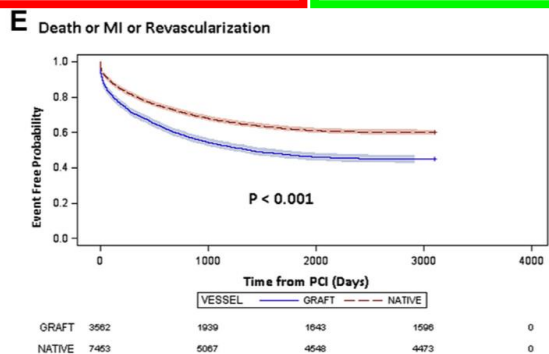
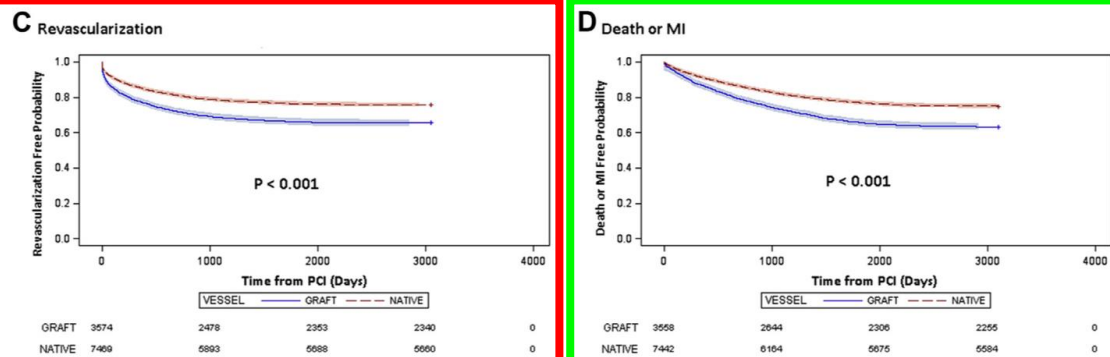
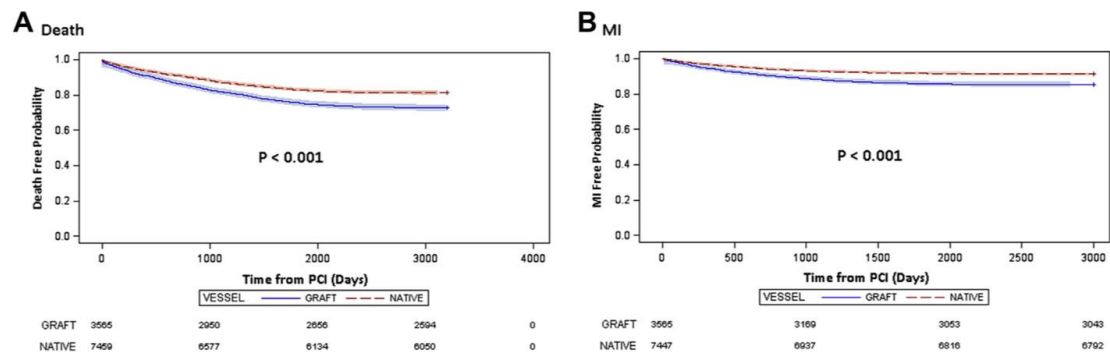


TABLE 5 Long-Term Clinical Outcomes of Patients With Prior Coronary Bypass Graft Surgery Who Underwent Percutaneous Coronary Artery Intervention Classified According to the Type of Vessel That Was Treated

	Native Only (n = 7,930)	Bypass Graft (n = 3,616)	p Value
Death			
1-yr	439 (5.85)	306 (8.57)	<0.001
3-yr	954 (12.71)	644 (18.03)	<0.001
5-yr	1,280 (17.05)	871 (24.39)	<0.001
MI			
1-yr	270 (3.6)	211 (5.91)	<0.001
3-yr	536 (7.15)	418 (11.71)	<0.001
5-yr	622 (8.3)	504 (14.11)	<0.001
Revascularization			
1-yr	1,082 (14.4)	813 (22.7)	<0.001
3-yr	1,596 (21.24)	1,121 (31.3)	<0.001
5-yr	1,747 (23.25)	1,207 (33.71)	<0.001
Death or MI			
1-yr	667 (8.91)	479 (13.44)	<0.001
3-yr	1,369 (18.28)	956 (26.83)	<0.001
5-yr	1,722 (22.99)	1,214 (34.07)	<0.001
Death or MI or revascularization			
1-yr	1,529 (20.39)	1,102 (30.89)	<0.001
3-yr	2,466 (32.88)	1,663 (46.62)	<0.001
5-yr	2,845 (37.93)	1,885 (52.85)	<0.001

Values are n (%).

MI = myocardial infarction.

Angioplastie du pontage veineux Plus de revascularisations

- **Plus de resténose intra-stent:** $\approx 1/3$ des pts à 5 ans dans « ISAR-CABG trial »

Colleran, J Am Coll Cardiol. 2018

- **Athérosclérose accélérée:** Progression de la maladie dans les sgts non traités (lésion intermédiaires)

Abdel-karim, International Journal of Cardiology (2013)

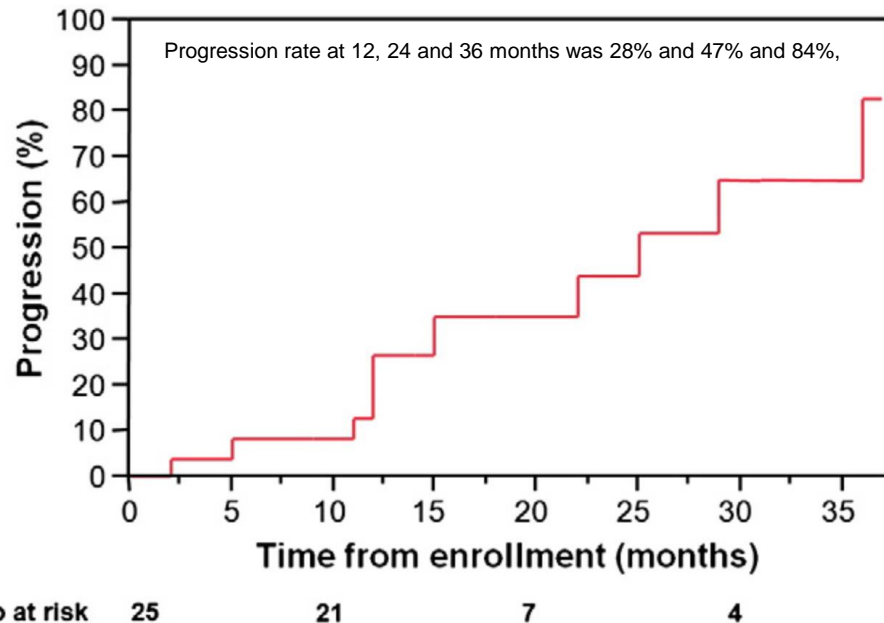


Fig. 4. Kaplan–Meier curve of the intermediate saphenous vein graft lesion progression rate in the SOS trial.

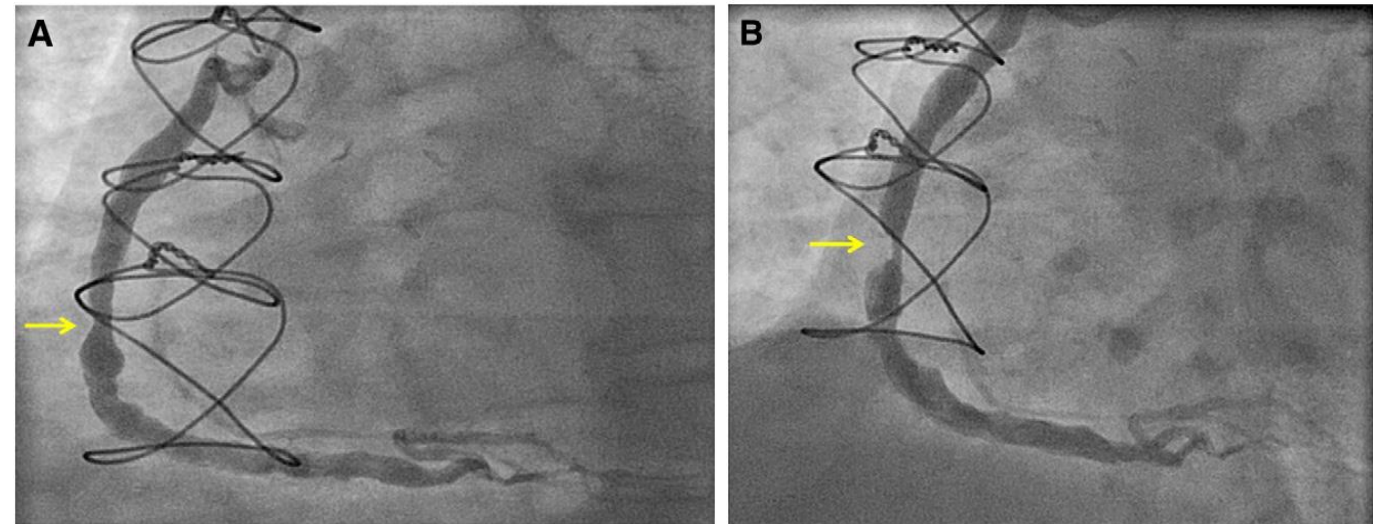


Fig. 2. Example of an intermediate saphenous vein graft lesion progression from baseline (panel A) to follow-up performed 15 months later (panel B).

Arguments pour traiter le Pontage veineux

Lésions natives souvent complexes

- Calcifiés ++
- Tortueuses
- Bifurcations
- **CTO +++**

Les pontages coronaires créent des CTO

Coro pré-op: au moins une CTO d'un vaisseau natif chez 62% des pts (n=240)

A 1 an du pontage: au moins une nouvelle CTO d'un vaisseau natif chez 44% des pts (n=169)

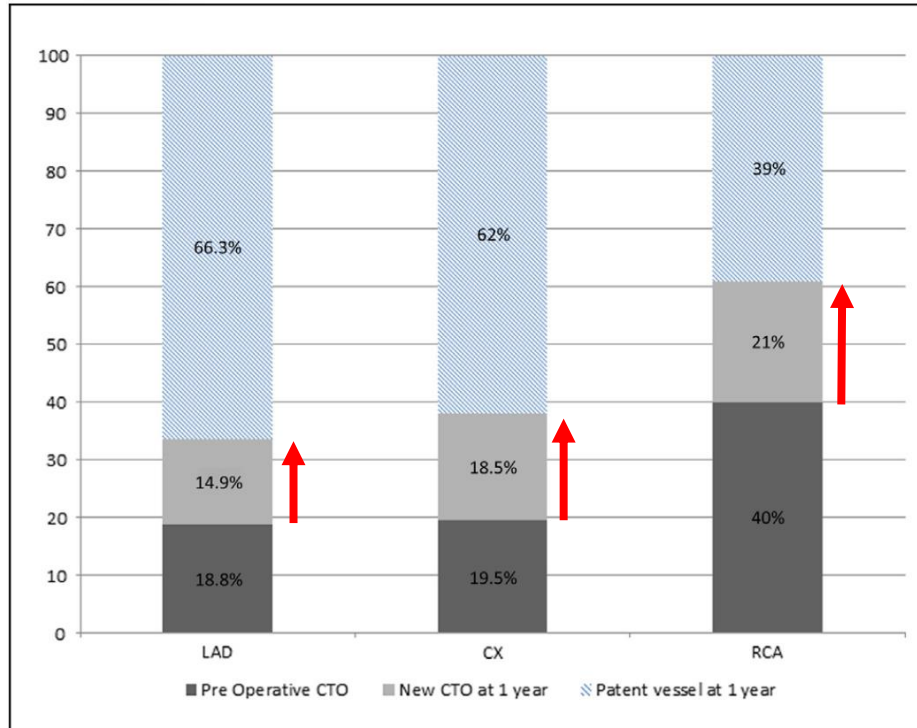


Figure 1. Native Coronary Artery Patency Pre-CABG and at 1-Year Follow-up

CTOs were most common in the RCA pre-CABG and lowest in the LAD. New CTOs also were more frequent in the RCA during the first year. LAD and CX occlusions were similar pre-CABG and at 1 year. CABG = coronary artery bypass grafting; CTO = chronic total occlusion; CX = left circumflex artery; LAD = left anterior descending artery; RCA = right coronary artery.

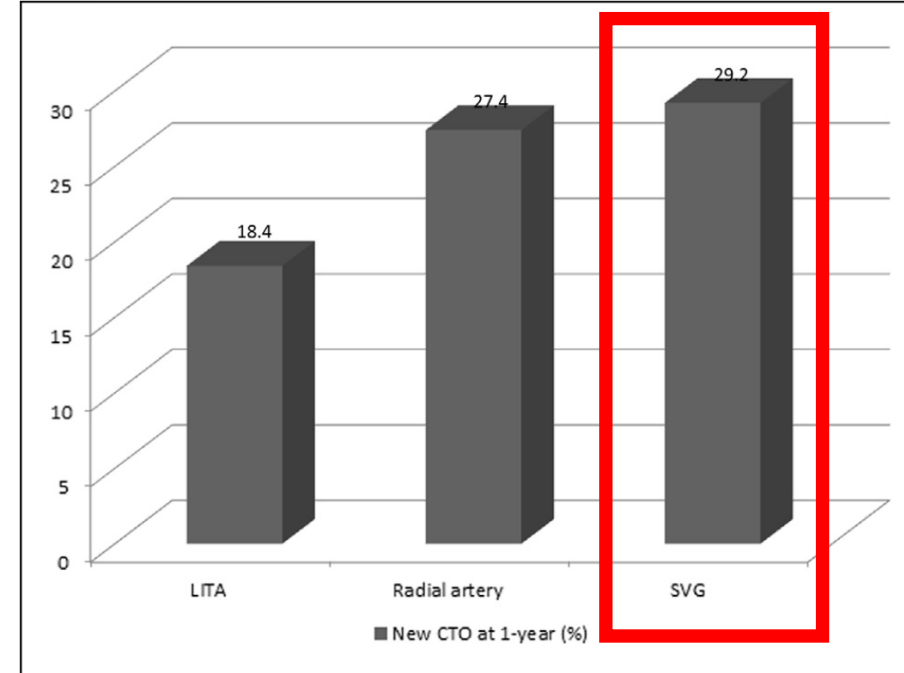


Figure 3. New Native Coronary Artery Occlusion at 1 Year After CABG According to the Graft Type

The risk of the development of a new CTO at 1 year was significantly lower in the LAD grafted by the left internal thoracic artery (LITA) compared with the CX and RCA that were grafted by either a radial artery graft or saphenous vein graft (SVG) ($p = 0.01$ for a comparison of radial artery and LITA graft; $p = 0.0025$ for a comparison of an SVG and LITA graft). There were no differences in native artery patency in arteries grafted with an SVG compared with the radial artery ($p = 0.7$). Other abbreviations as in Figure 1.

Les CTO des patients pontées sont différentes

Table 3 Comparison of plaque components between chronic total occlusion with coronary artery bypass graft, long-duration chronic total occlusion, and short-duration chronic total occlusion without coronary artery bypass graft lesions

	CTO with CABG n = 34 (IQR)	Long-duration CTO n = 49 (IQR)	Short-duration n = 12 (IQR)	P-value
Proximal segments plaque area (mm ²)	8.10 (6.37–11.79) [†]	6.53 (4.97–8.19)	6.90 (5.19–10.46)	0.006
CTO segments plaque area (mm ²)	8.20 (5.59–11.58) [†]	5.65 (3.80–7.50) [§]	8.30 (5.92–10.90)	<0.001
Distal segments plaque area (mm ²)	4.68 (3.41–8.03) [†]	3.22 (1.90–4.90)	3.74 (1.54–6.63)	0.001
Proximal segments % organized thrombus area	9.3 (1.2–14.5)	5.0 (0–15.6)	7.0 (0–26.6)	0.67
CTO segments % organized thrombus area	27.7 (19.8–35.4)	23.2 (15.1–33.2) [§]	36.9 (25.9–48.0)	0.02
Distal segments % organized thrombus area	11.2 (6.3–16.3)	9.0 (2.7–25.9)	12.7 (5.8–33.3)	0.81
Proximal segments % necrotic core area	1.1 (0–4.1)	2.4 (0–10.6)	8.7 (0–20.9)	0.08
CTO segments % necrotic core area	4.5 (0–23.2)[‡]	7.8 (0–15.0)[§]	18.6 (6.4–48.0)	0.02
Distal segments % necrotic core area	0 (0–5.6)	0 (0–1.7)	0 (0–4.1)	0.29
Proximal segments % calcification area	31.5 (7.8–52.2) [‡]	12.1 (0–40.6)	0 (0–18.1)	0.001
CTO segments % calcification area	29.2 (19.5–49.5)[†]	16.8 (1.9–39.9)	12.1 (0.4–37.0)	0.009
Distal segments % calcification area	28.8 (9.7–44.4) ^{†‡}	1.2 (0–13.9)	0 (0–6.7)	<0.001

CTO des patients pontées: plus complexes

Table 2 Angiographic and procedural characteristics and outcomes of 1363 patients undergoing CTO PCI, classified according to whether they had undergone CABG

Variable	Overall (n=1363)	With prior CABG (n=508)	Without prior CABG (n=855)	p Value	Antegrade approach (n=901)	Retrograde approach (n=462)	p Value
CTO target vessel				<0.001			<0.001
Right coronary artery (%)	55	56.2	54.7		48.9	66.4	
Circumflex (%)	23	27.4	20.1		25.6	17.8	
Left anterior descending artery (%)	21	14.2	25.0		24.5	14.7	
Left main/bypass graft (%)	1.0	2.2	0.2		0.9	1.1	
Prior failed attempt for CTO PCI (%)	15	13.0	16.6	0.820	13.9	17.1	0.123
Antegrade wire escalation attempt (%)	96.7	94.2	97.5	0.206	100	85.9	<0.001
Antegrade dissection/re-entry attempt (%)	28.9	29.4	28.7	0.912	23.2	48.4	<0.001
Retrograde approach attempt (%)	34	46.7	27.1	<0.001	NA	NA	
Collateral vessel used for retrograde approach (%) (n=462)				<0.001			NA
Septal (%)	68	52.8	77.6		NA	68	
Epicardial (%)	24	31.0	22.4		NA	24	
Bypass graft (%)	8	17.2	NA		NA	8	
Technical success rate (%)	85.5	79.7	88.3	<0.001	87.8	80.9	<0.001
Procedural success rate (%)	84.2	78.1	87.2	<0.001	87.1	78.5	<0.001
Total procedure time (min)*	113±61	125±65	106±58	<0.001	87.8	80.9	<0.001
Total fluoroscopy time (min)*	42±29	49±30	38±27	<0.001	87.1	78.5	<0.001
Total air kerma radiation exposure (Gray)*	4.7±3.8	5.5±5.0	4.3±3.0	0.003	3.7±3.8	6.4±3.2	<0.001
Total contrast volume (ml)*	294±158	296±156	293±160	0.762	268±146	343±168	<0.001
Inhospital major complication, %	1.8	2.1	1.5	0.392	0.89	3.46	0.001

Alors que fait-on?

Les recommandations ?



ESC

European Society
of Cardiology

European Heart Journal (2018) 00, 1–96
doi:10.1093/eurheartj/ehy394

ESC/EACTS GUIDELINES

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)

higher risk of procedural mortality with redo CABG long-term outcome, PCI is the preferred revascularization strategy in patients with amenable anatomy.³⁴⁰ PCI via the bypassed native artery should be the preferred approach. If PCI in the native vessel fails or is not an option, PCI in the diseased SVG should be considered. CABG should be considered for patients with extensively diseased or occluded bypass grafts and diffuse native vessel disease, especially in the absence of patent arterial grafts.³⁴⁰

PCI of the bypassed native artery should be considered over PCI of the bypass graft.

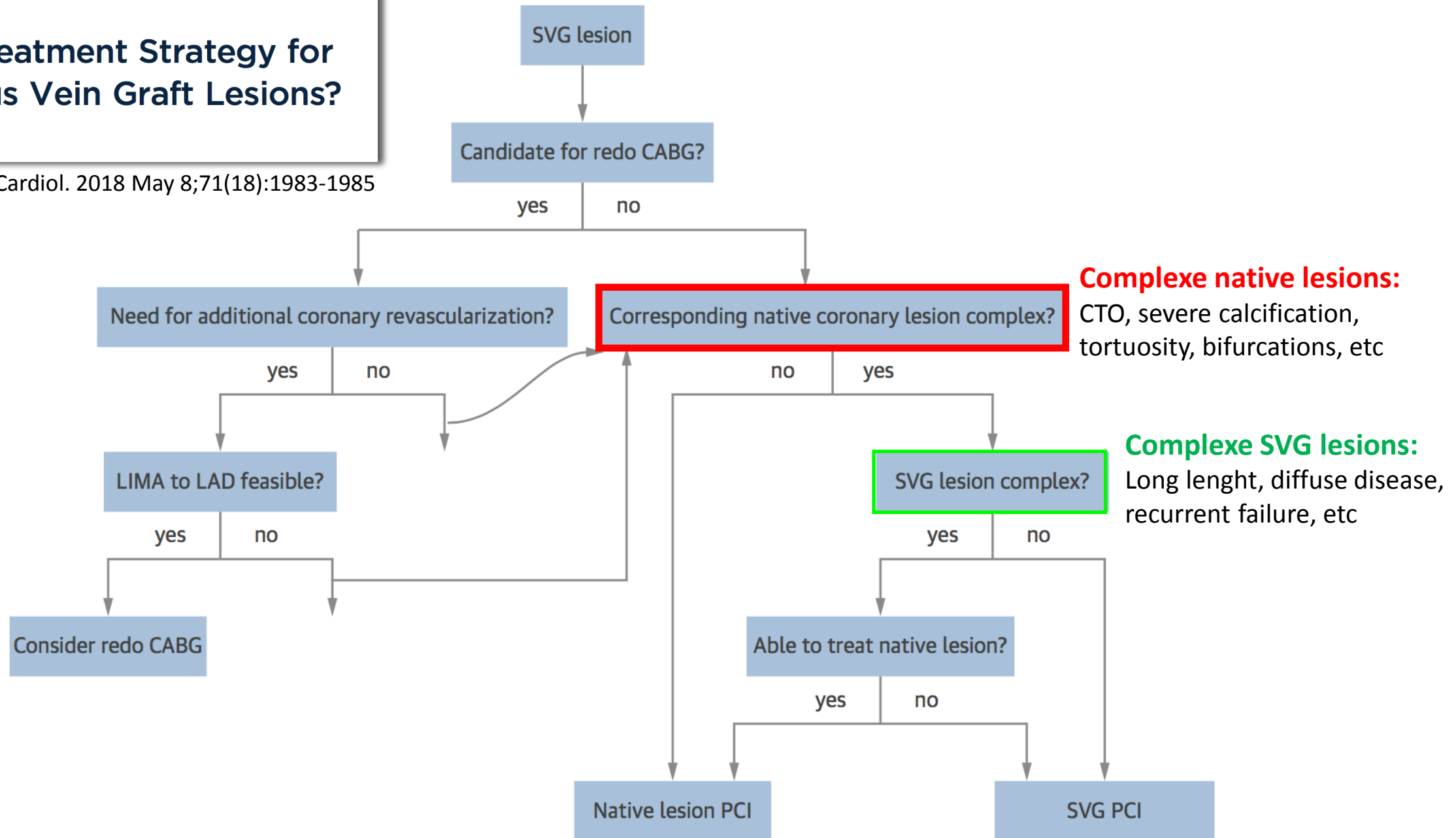
Ila

C

A New Treatment Strategy for Saphenous Vein Graft Lesions?

Letting it Go*

Brilakis, J Am Coll Cardiol. 2018 May 8;71(18):1983-1985



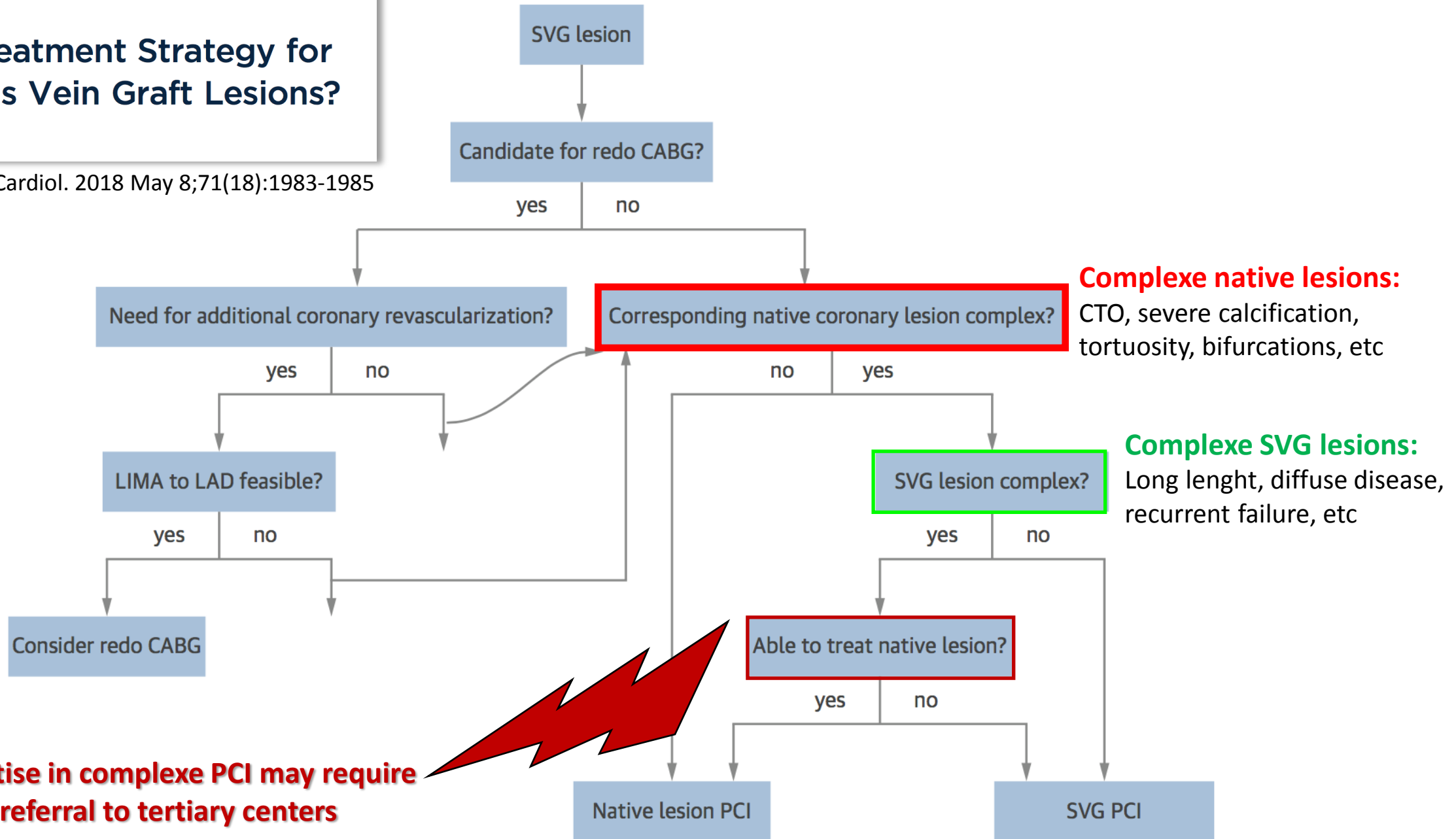
Complex native lesions:
CTO, severe calcification, tortuosity, bifurcations, etc

Complex SVG lesions:
Long length, diffuse disease, recurrent failure, etc

A New Treatment Strategy for Saphenous Vein Graft Lesions?

Letting it Go*

Brilakis, J Am Coll Cardiol. 2018 May 8;71(18):1983-1985



Ce n'est pas toujours si simple...

Madame C

60 ans

HTA, Dyslipidémie

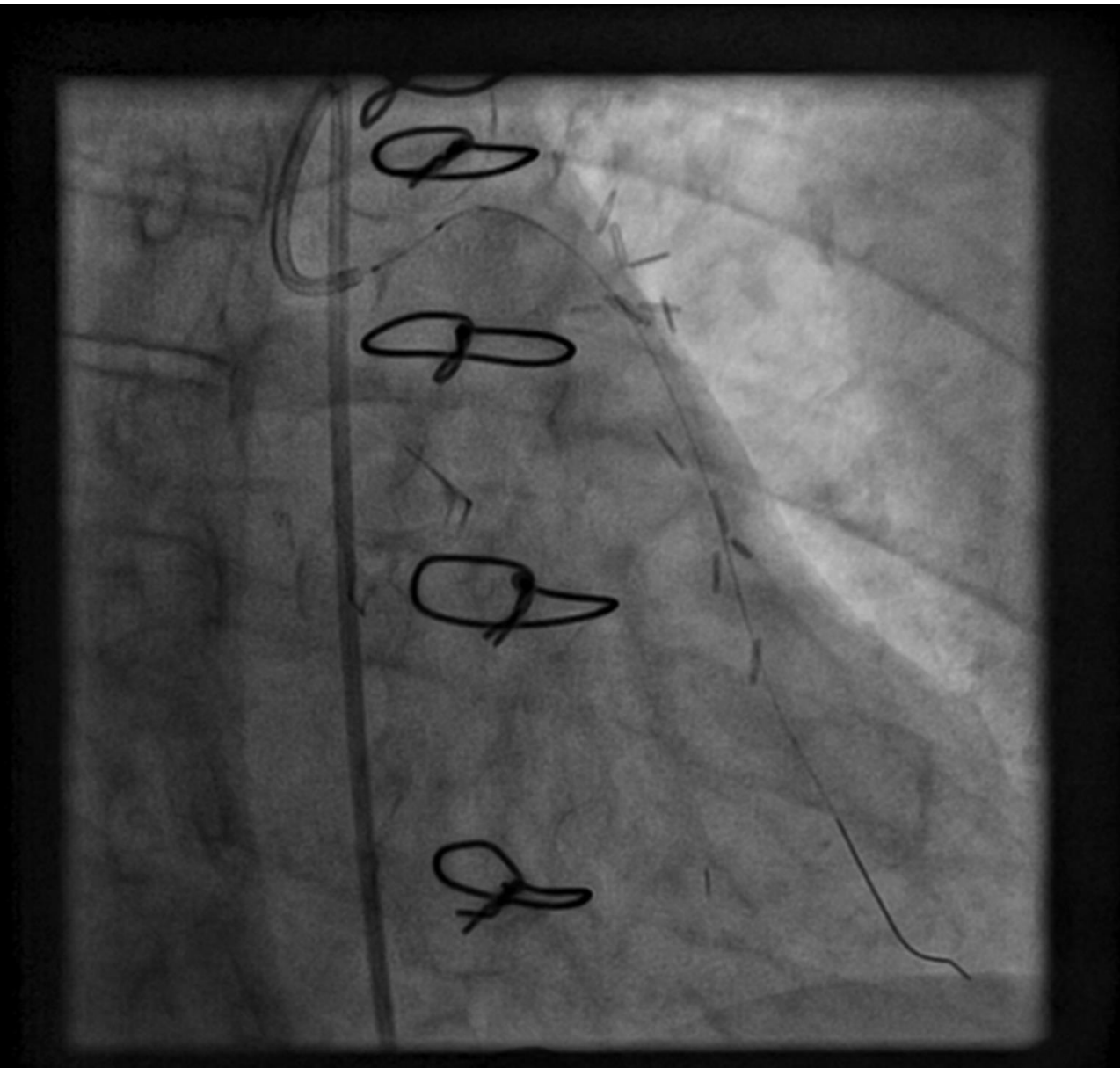
Bioprothèse aortique et CPI pontée MIg / IVA et GVS Marg 1 en 2015

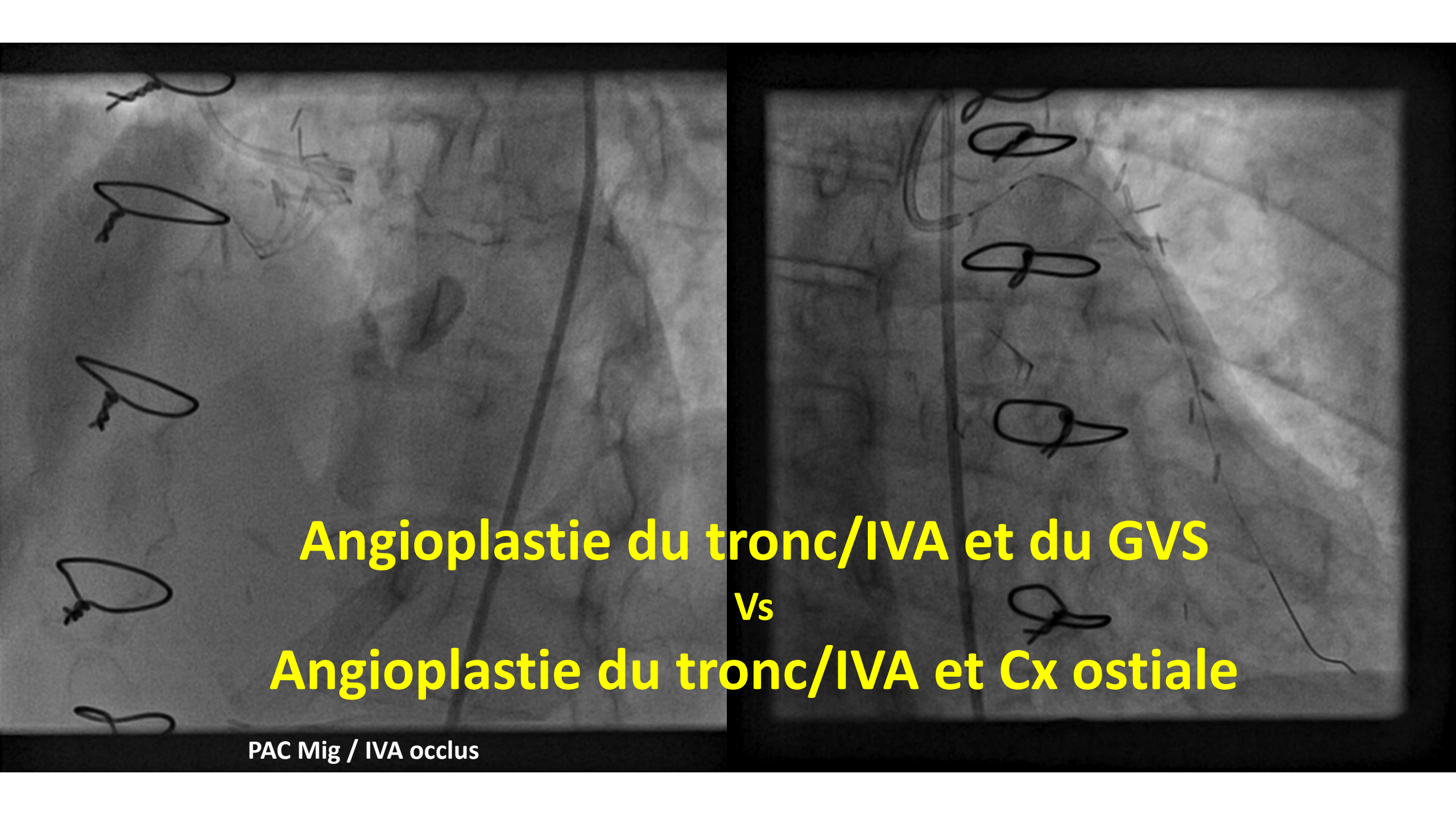
Angor d'effort typique, dysfonction VG globale à l'effort en ETT

→ Coro



PAC MIg / IVA occlus



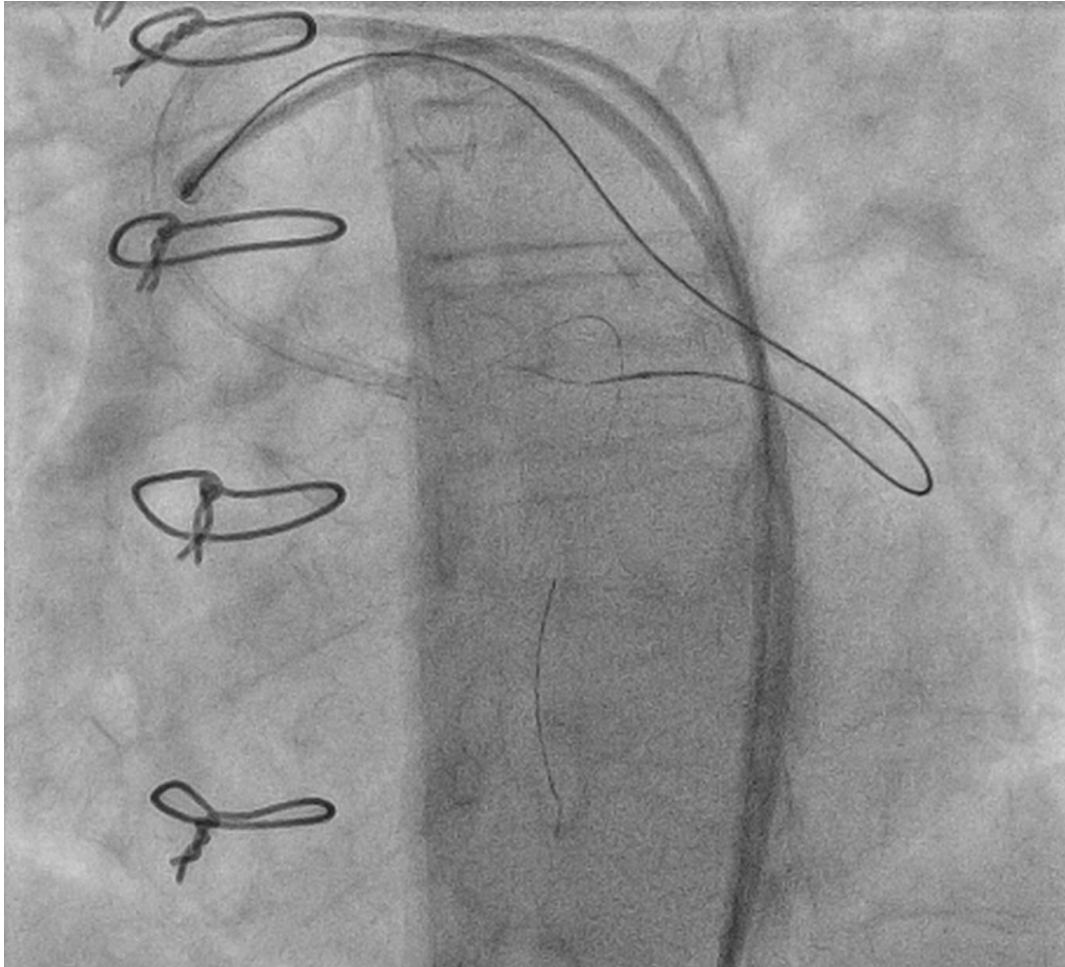


Angioplastie du tronc/IVA et du GVS
Vs
Angioplastie du tronc/IVA et Cx ostiale

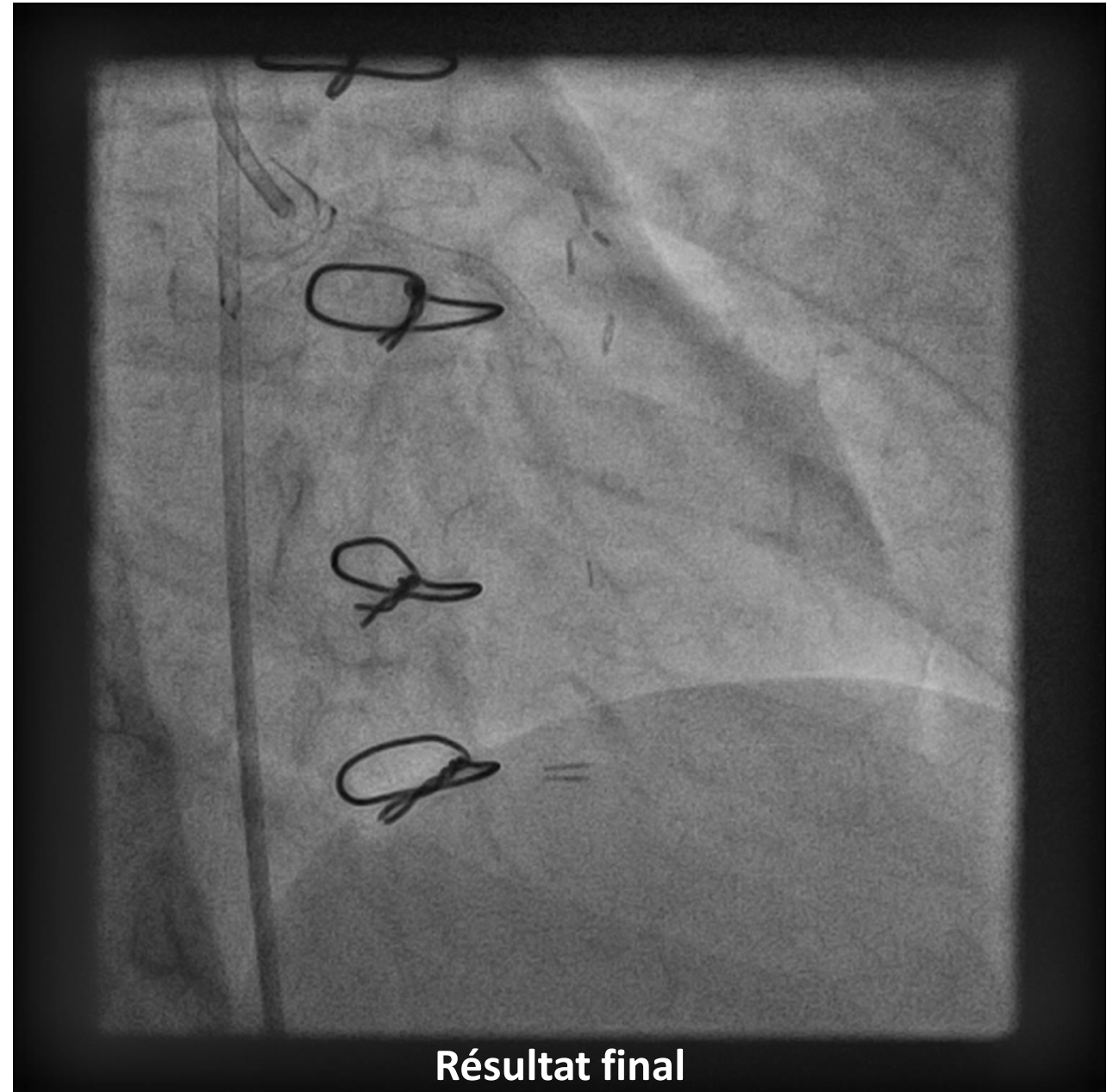
PAC Mig / IVA occlus

Angioplastie du tronc/IVA et Cx ostiale

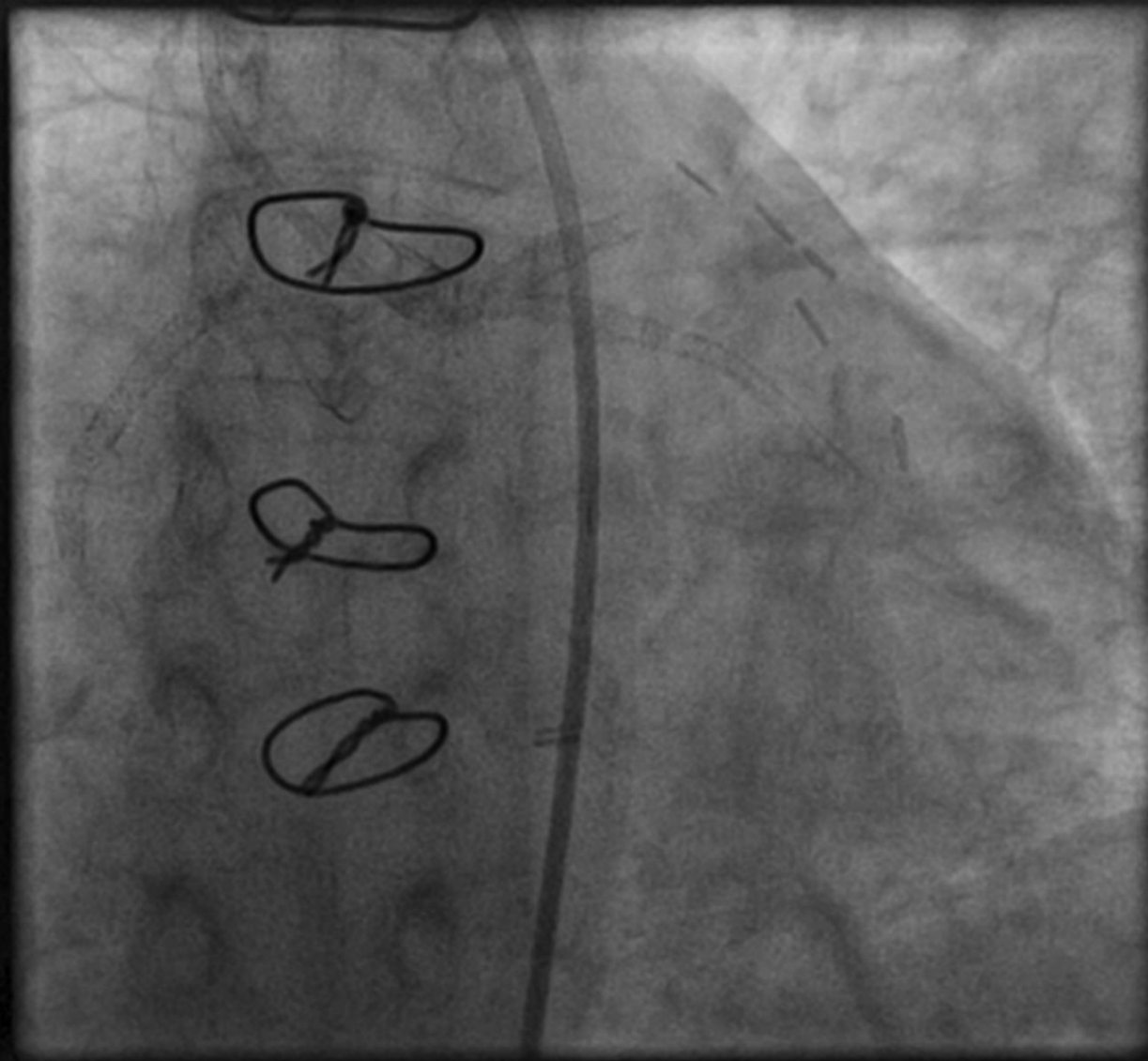
Franchissement de la CTO de Cx à rétro



Stratégie à 2 stents:
DK crush pour la bifurcation TC / IVA, Cx



Résultat final



Contrôle à 8 mois

Conclusion

- **L'angioplastie des pontages veineux est associée à un mauvais pronostic à court et à long terme.**
- **Les lésions natives sont souvent complexes et se présentent fréquemment comme des CTO.**
- **Dans la mesure du possible, privilégier la revascularisation du vaisseau natif à l'exception d'une lésion simple de GVS associée à une lésion très complexe du vaisseau natif.**

« After all, the most effective way to prevent bypass graft disease of the saphenous vein is to leave it in the leg »

Michael P Savage

Circ Cardiovasc Interv. 2018

Merci

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