TOPIC study

Traitement des lésions tritronculaires et du tronc commun:

Recommandations et actualités

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2014 ESC/EACTS Guidelines on myocardial revascularization

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

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

ESC guidelines, Eur Heart J 2014

Indications de revascularisation

Extent of CAD (anatomical and/or functional)		Class[b]	Level[c]
For prognosis	Left main disease with stenosis >50%[a]	I	A
	Any proximal LAD stenosis >50%[a]	I	A
	Two-vessel or three-vessel disease with stenosis >50%[a] with impaired LV function (LVEF<40%)[a]	I	A
	Large area of ischaemia (>10% LV)	I	B
	Single remaining patent coronary artery with stenosis >50%[a]	I	C
For symptoms	Any coronary stenosis >50%[a] in the presence of limiting angina or angina equivalent, unresponsive to medical therapy	I	A

ESC guidelines, Eur Heart J 2014

Méthodes de revascularisation

Recommendations according to extent of CAD	CABG		PCI	
	Class[a]	Level[b]	Class[a]	Level[b]
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

ESC guidelines, Eur Heart J 2014

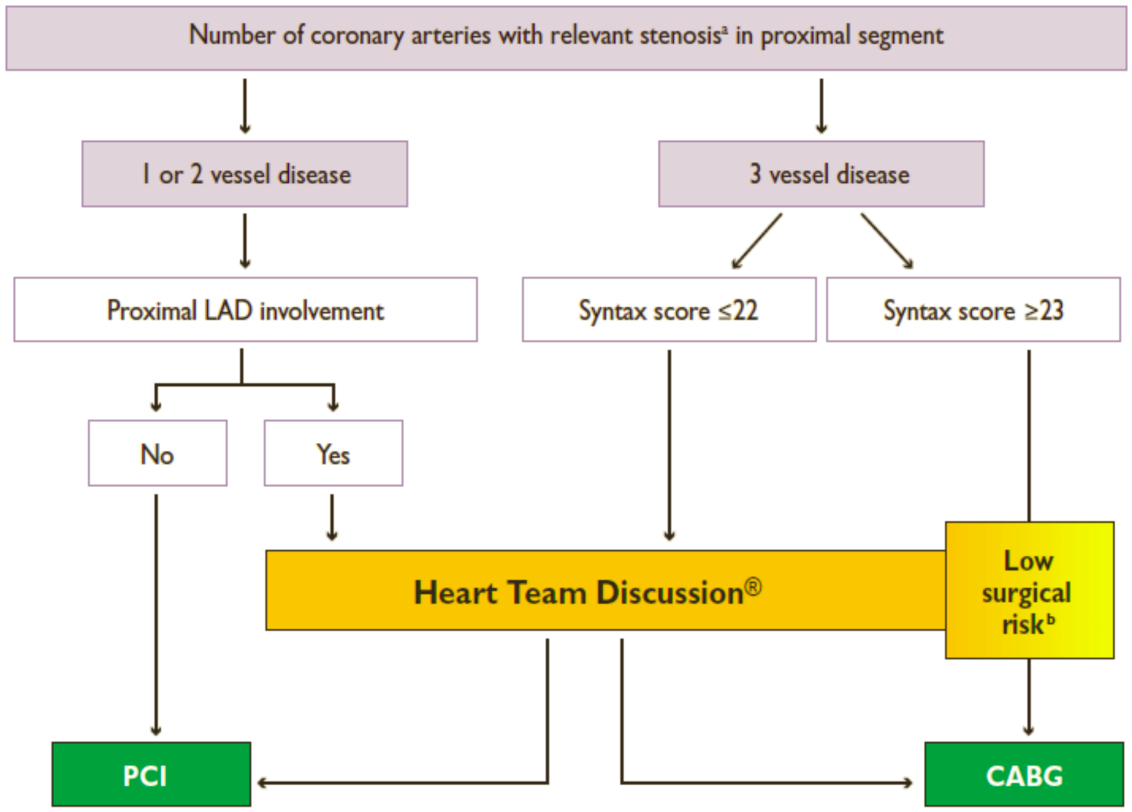
Score SYNTAX

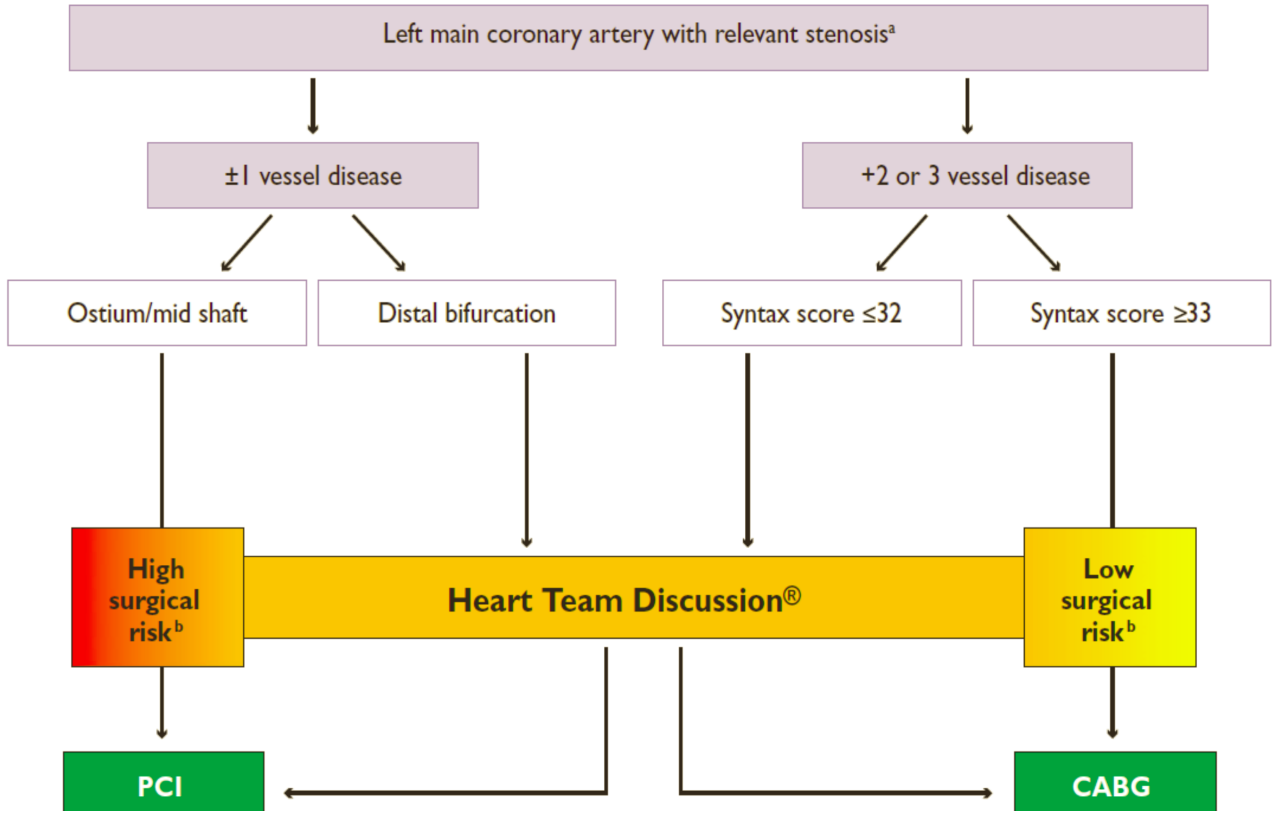
Table 1. The SYNTAX score algorithm

1. Dominance
2. Number of lesions
3. Segments involved per lesion, with lesion characteristics
4. Total occlusions with subtotal occlusions:
   a. Number of segments
   b. Age of total occlusions
   c. Blunt stumps
   d. Bridging collaterals
   e. First segment beyond occlusion visible by antegrade or retrograde filling
   f. Side branch involvement
5. Trifurcation, number of segments diseased
6. Bifurcation type and angulation
7. Aorto-ostial lesion
8. Severe tortuosity
9. Lesion length
10. Heavy calcification
11. Thrombus
12. Diffuse disease, with number of segments

Mohr, Lancet 2013

Guidelines ESC





Hybrid procedures		
Hybrid procedure, defined as consecutive or combined surgical and percutaneous revascularization may be considered in specific patient subsets at experienced centres.	IIb	C

ESC guidelines, Eur Heart J 2014

Indications: est ce vraiment un MVD ?

Recommendations	Class[a]	Level[b]
FFR to identify haemodynamically relevant coronary lesion(s) in stable patients when evidence of ischaemia is not available.	I	A
FFR-guided PCI in patients with multivessel disease.	IIa	B

Angio 3VD

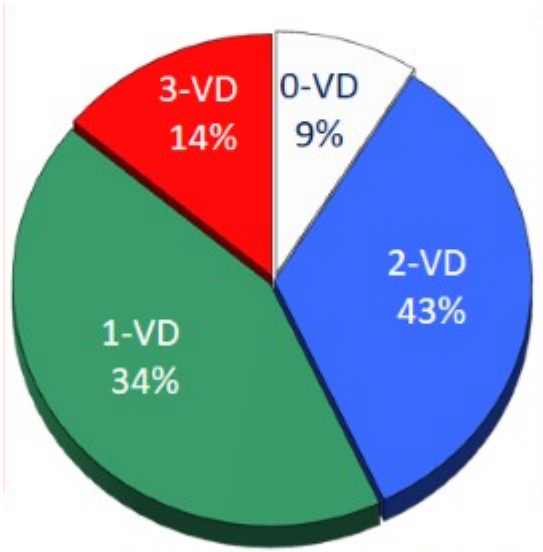
Fractional flow reserve, although in general not useful in very high grade lesions (angiographically >90%), which practically always have an FFR ≤0.8, may help the decision on when to revascularize in many uncertain clinical conditions. One such condition is 'multivessel disease', which occurs in a very heterogeneous population. In these patients, FFR measurement may change the strategy of revascularization (PCI vs. CABG) and the extent of revascularization according to the functional assessment

ESC guidelines, Eur Heart J 2013

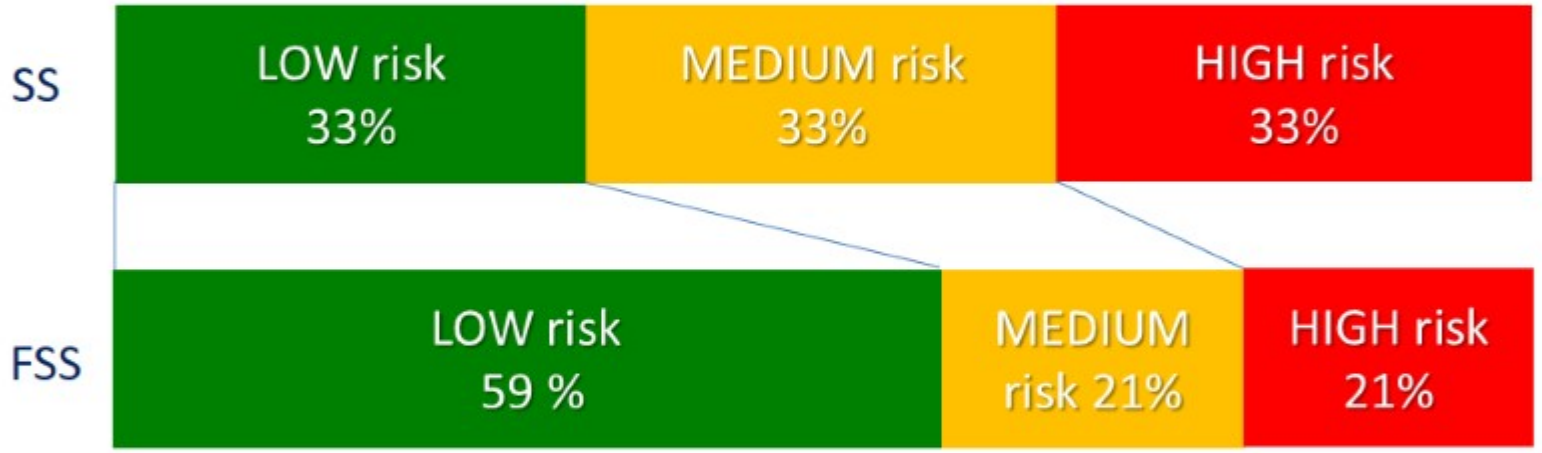
Indications: limites évidentes de l'angiographie

Intéret de la FFR dans l' évaluation de la maladie coronaire stable

Angiographic 3VD après FFR



FAME I

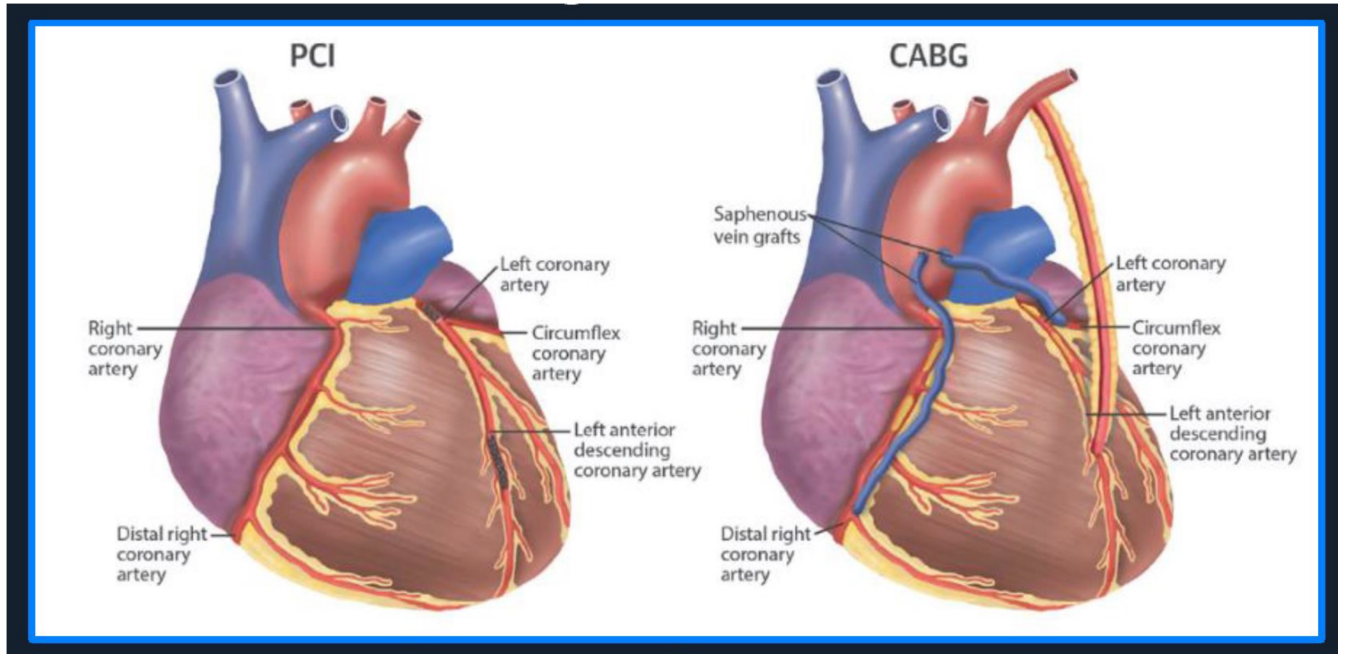


32% of patients moved to a lower-risk group

Torino et al, JACC 2010
Nam et al, JACC 2011

Techniques de revascularisation

- Angioplastie
- Chirurgie
- Hybride



- Heart Team si MVD et/ou LMS (Class I)
  - Définir la meilleure stratégie pour chaque patient
  - Discussion et information du patient / famille

ESC guidelines, Eur Heart J 2014

RCTs of percutaneous versus surgical revascularization

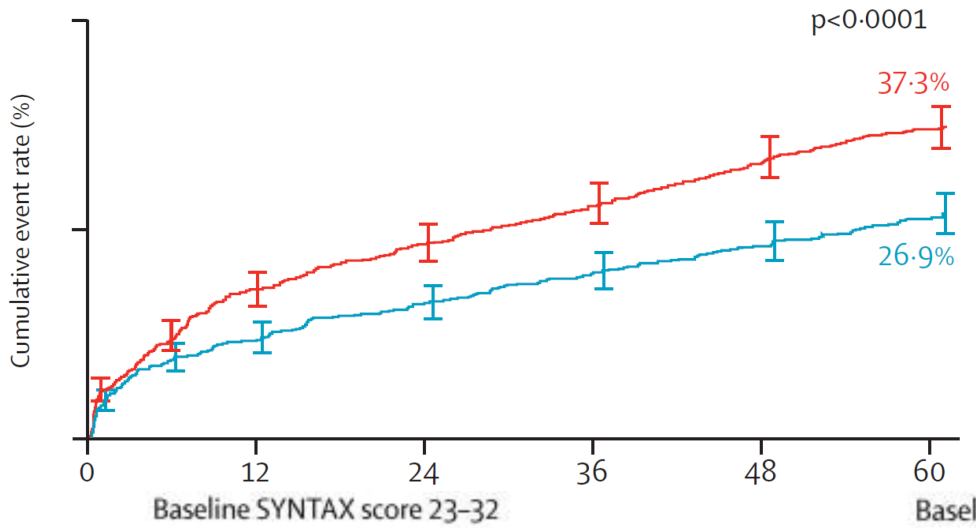
Year of publication	Study	N	Baseline characteristics					Primary endpoint			Max clinical Follow-up				
			Age (y)	Wo-men (%)	Dia-betes (%)	MVD (%)	EF (%)	Definition	y	Results	y	Death	MI	Revasc.	Stroke
Balloon angioplasty															
1993	RITA-I[146]	1011	-	19	6	55	-	Death or MI	2.5	9.8% vs. 8.6%	6.5	7.6% vs. 9.0%	10.8% vs. 7.4%	44.3% vs. 10.8%[a]	1.8% vs. 2.0% (at 2.5 y)
1994	GABI I[147]	359	-	20	12	100	-	Angina	1	29% vs. 26%	13	25.0% vs. 21.9%	4.3% vs. 5.6%	82.9% vs. 58.8%[a]	-
1994	EAST[148]	392	62	26	23	100	61	Death, MI, or a large defect at thallium scan	3	28.8% vs. 27.3%	8	20.7% vs. 17.3%	3.0% vs. 10.3%[a] (at 3 y)	65.3% vs. 26.5%[a]	0.5% vs. 1.5% (at 3 y)
1955	CABRI[149]	1054	60	22	12	99	63	Death	1	3.9% vs. 2.7%	4	10.9% vs. 7.4%	4.9% vs. 3.5% (at 1 y)	33.6% vs. 6.5%[a] (at 1 y)	-
1996	BARI[150]	1829	62	27	25	100	57	Death	5	13.7% vs. 10.7%	10	29.0% vs. 26.5%	-	76.8% vs. 20.3%[a]	0.2% vs. 0.8% (in hospital)
BMS															
2001	AWESOME[151]	454	67	-	31	82	45	Death	3	20% vs. 21%	3	20% vs. 21%	-	-	-
2001	ERACI II[152]	450	62	21	17	100	-	Death, MI, stroke, or repeat revascularization	0.1	3.6% vs. 12.3%[a]	5	7.1% vs. 11.5%	2.8% vs. 6.2%	28.4% vs. 7.2%[a]	0% vs. 0.9% (at 30 d)
2001	ARTS[153]	1205	61	23	17	99	61	Death, MI, stroke, or repeat revascularization	1	26.2% vs. 12.2%[a]	5	8.0% vs. 7.6%	6.7% vs. 5.6%	30.3% vs. 8.8%[a]	3.8% vs. 3.5%
2002	SoS[154]	988	61	21	14	100	57	Repeat revascularization	2	21% vs. 6%[a]	6	10.9% vs. 6.8%[a]	5% vs. 8% (at 2 y)	21% vs. 6%[a] (at 2 y)	-
2003	OCTOSTENT[155]	280	60	29	11	29	-	Death, MI, stroke, or repeat revascularization	1	14.5% vs. 8.5%	1	0% vs. 2.8%	4.4% vs. 4.9%	15.2% vs. 4.2%[a]	0% vs. 0%
2005	Thiele[156]	220	62	25	30	0	63	Cardiac death, MI, or TVR	0.5	31% vs. 15%[a]	5.6	10% vs. 12%	5% vs. 7%	32% vs. 10%[a] (TVR)	-
PES															
2009	SYNTAX[157]	1800	65	22	25	100	-	Death, MI, stroke, or repeat revascularization	1	17.8% vs. 12.4%[ac]	5	13.9% vs. 11.4%	9.7% vs. 3.8%[a]	25.9% vs. 13.7%[a]	2.4% vs. 3.7%
SES															
2011	Boudriot[158]	201	68	25	36	72	65	Death, MI, or repeat revascularization	1	13.9% vs. 19%[c]	1	2% vs. 5%	3% vs. 3%	14% vs. 5.9%	-
2011	PRECOMBAT[159]	600	62	24	32	90	61	Death, MI, stroke, or TVR	1	8.7% vs. 6.7%[b]	2	2.4% vs. 3.4%	1.7% vs. 1.0%	9.0% vs. 4.2%[a]	0.4% vs. 0.7%

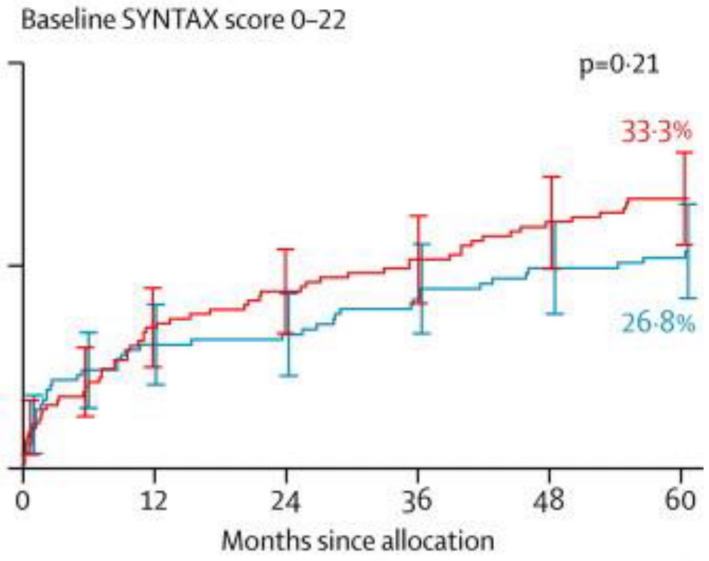
www.escardio.org/guidelines

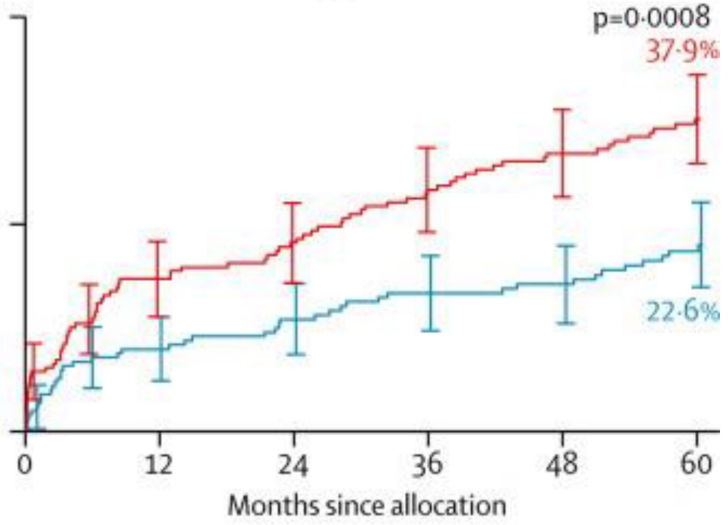
, Eur Heart J 2014

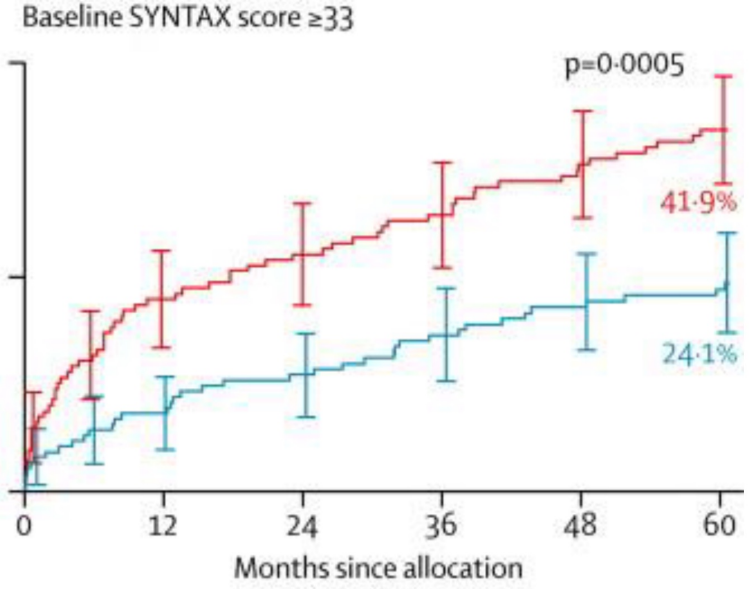
5-y SYNTAX MVD

MACCE: Death, MI, Stroke, or Repeat Revasc









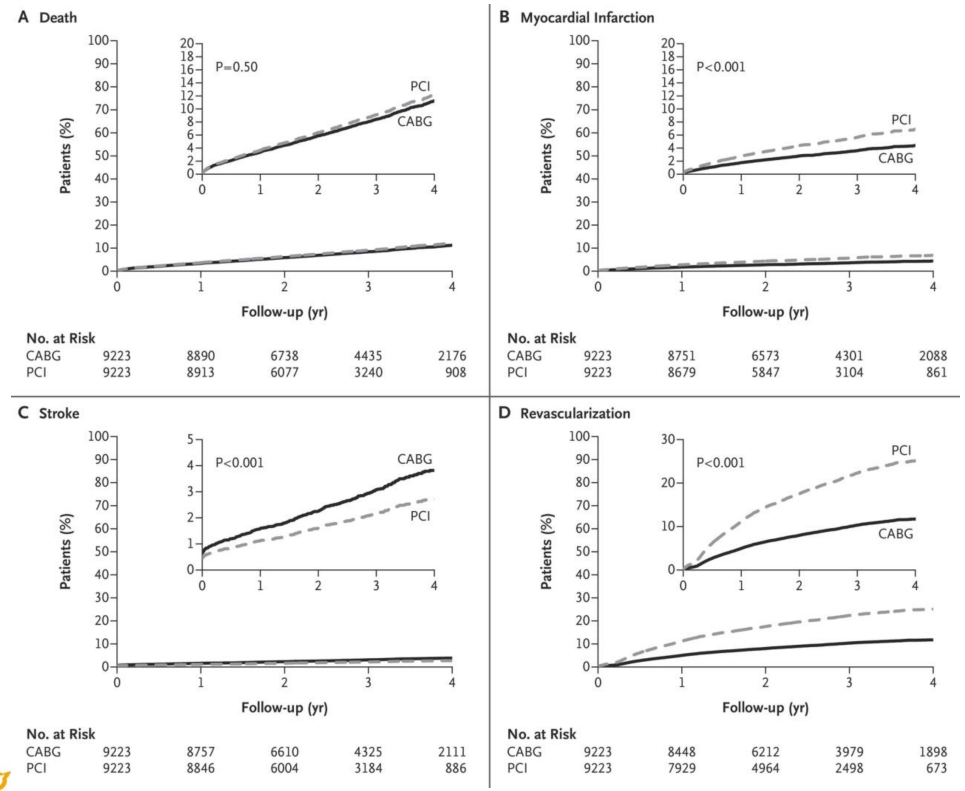
Mohr, Lancet 2013

Après SYNTAX: pas de revolution pour MVD !

NY registry

18446 pts

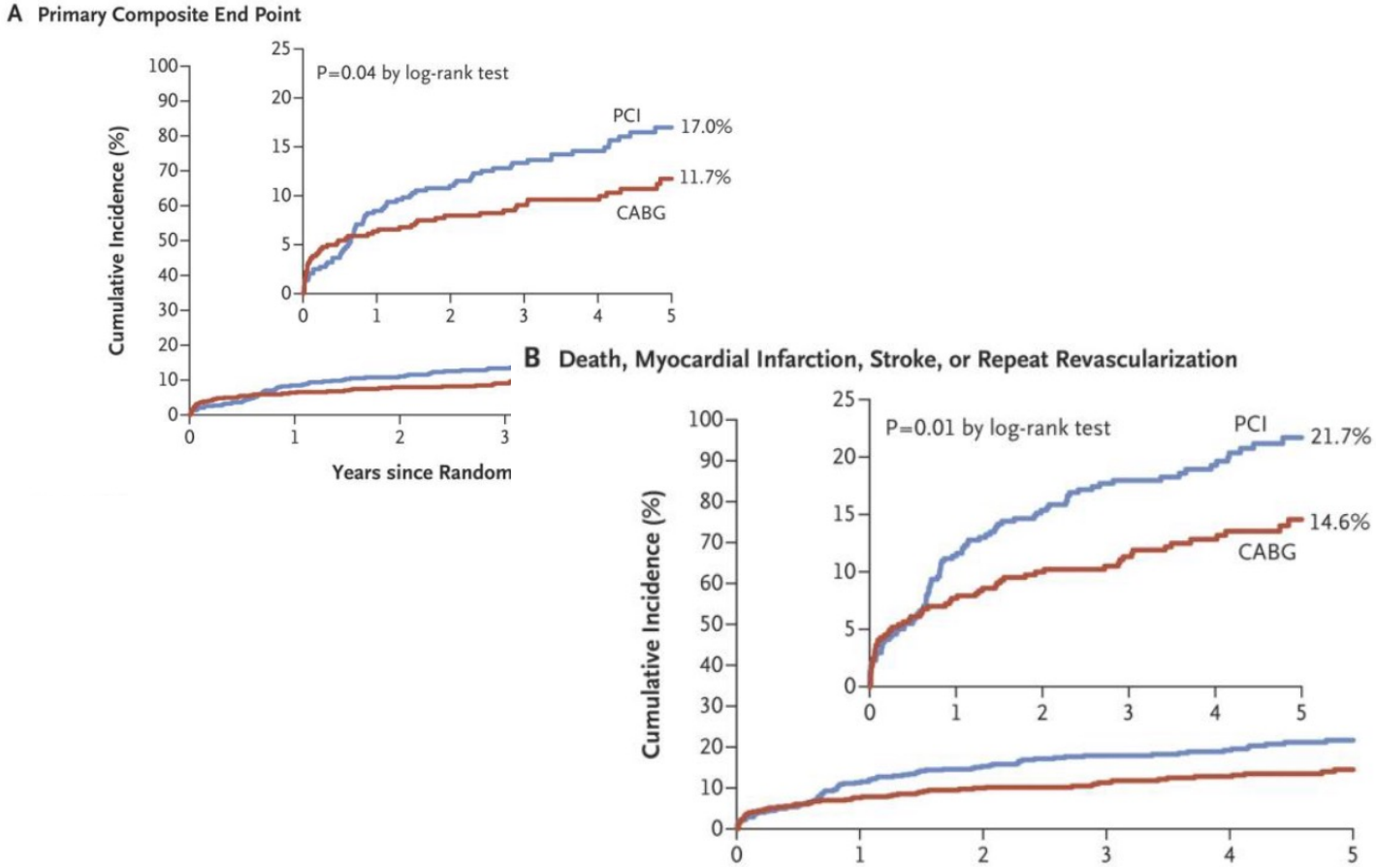
Propensity matched analysis



BEST

EES vs. CABG

Randomisé

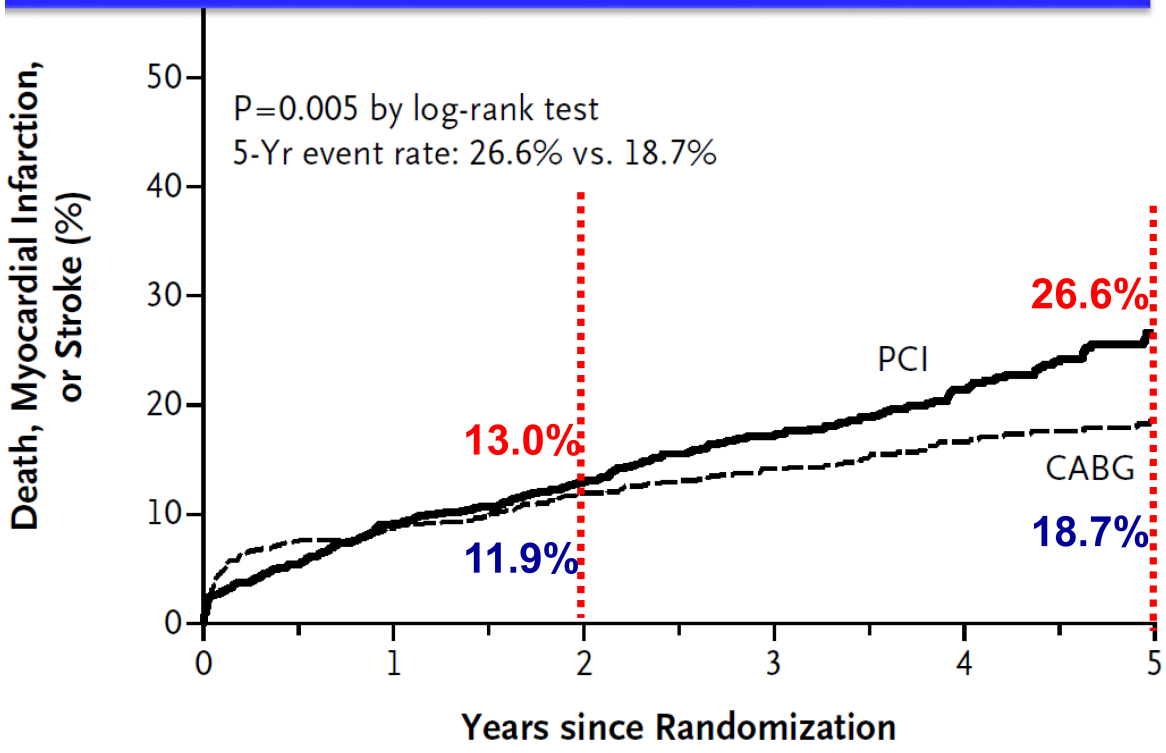


Park et al, NEJM 2015; Bangalore et al, NEJM 2015

Diabète et MVD

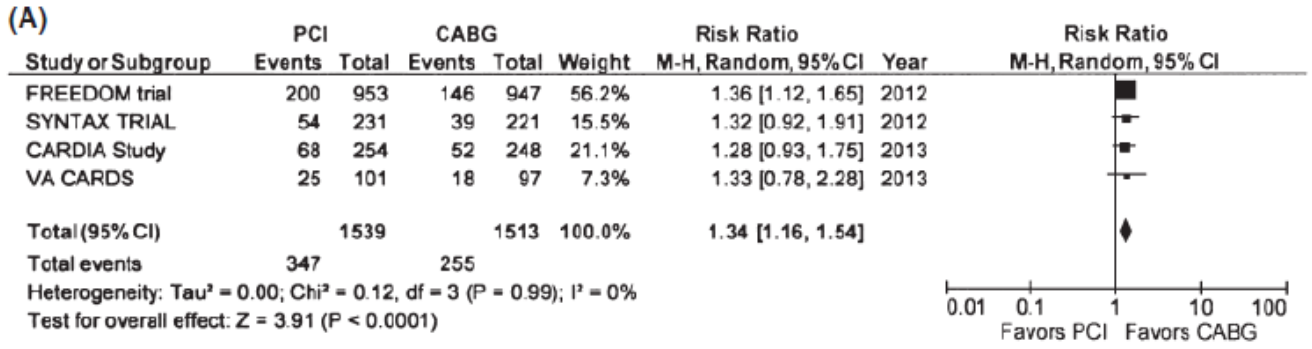
FREEDOM

Death, MI, or Stroke Through 5 Years



Métanalysis

1° EP MACE: Death, MI, or Stroke @ 4 Years



(A)

Study or Subgroup	PCI Events	PCI Total	CABG Events	CABG Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
FREEDOM trial	200	953	146	947	56.2%	1.36 [1.12, 1.65]	2012
SYNTAX TRIAL	54	231	39	221	15.5%	1.32 [0.92, 1.91]	2012
CARDIA Study	68	254	52	248	21.1%	1.28 [0.93, 1.75]	2013
VA CARDS	25	101	18	97	7.3%	1.33 [0.78, 2.28]	2013
Total (95% CI)		1539		1513	100.0%	1.34 [1.16, 1.54]	
Total events	347		255				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 0.12$, df = 3 (P = 0.99); $I^2 = 0\%$

Test for overall effect: Z = 3.91 (P < 0.0001)

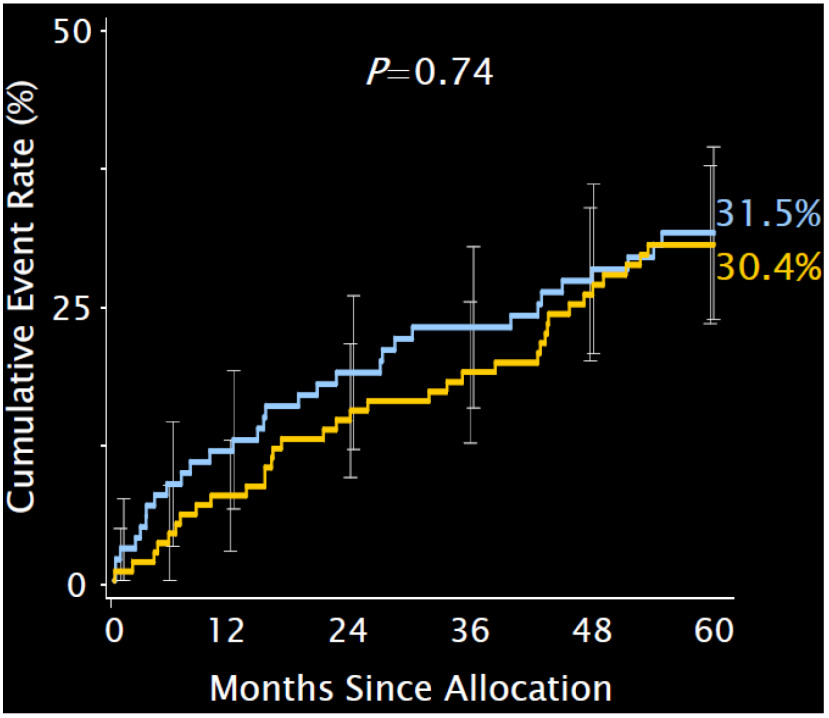
Sensitivity Analysis According to SYNTAX score

Variable		PCI	CABG	RR	P Value	Heterogeneity
MACE based on SYNTAX Score*	<22 (n=805)	22.2%	17.5%	1.27 (0.96 to 1.68)	0.09	0%; P=0.32
	23 to 32 (n=992)	26.1%	18.3%	1.32 (0.86 to 2.02)	0.21	48%; P=0.16
	>33 (n=541)	24.7%	14.4%	1.73 (1.21 to 2.46)	0.003	0%; P=0.81

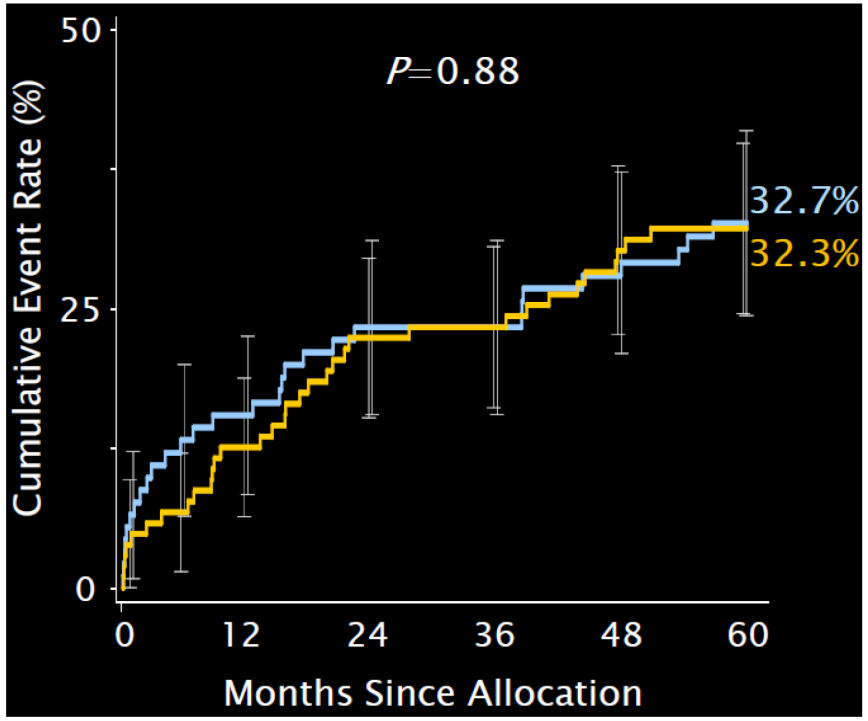
Farkouh et al, NEJM 2012; Hakeem et al, JAHA 2013

Tronc commun: evidence

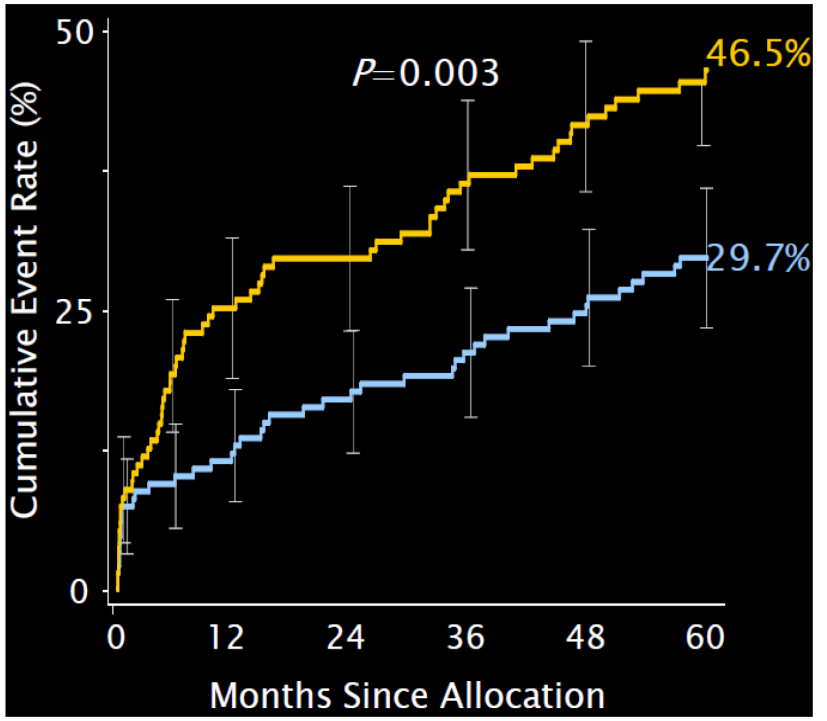
Low Scores (0–22)



Intermediate Scores (23–32)



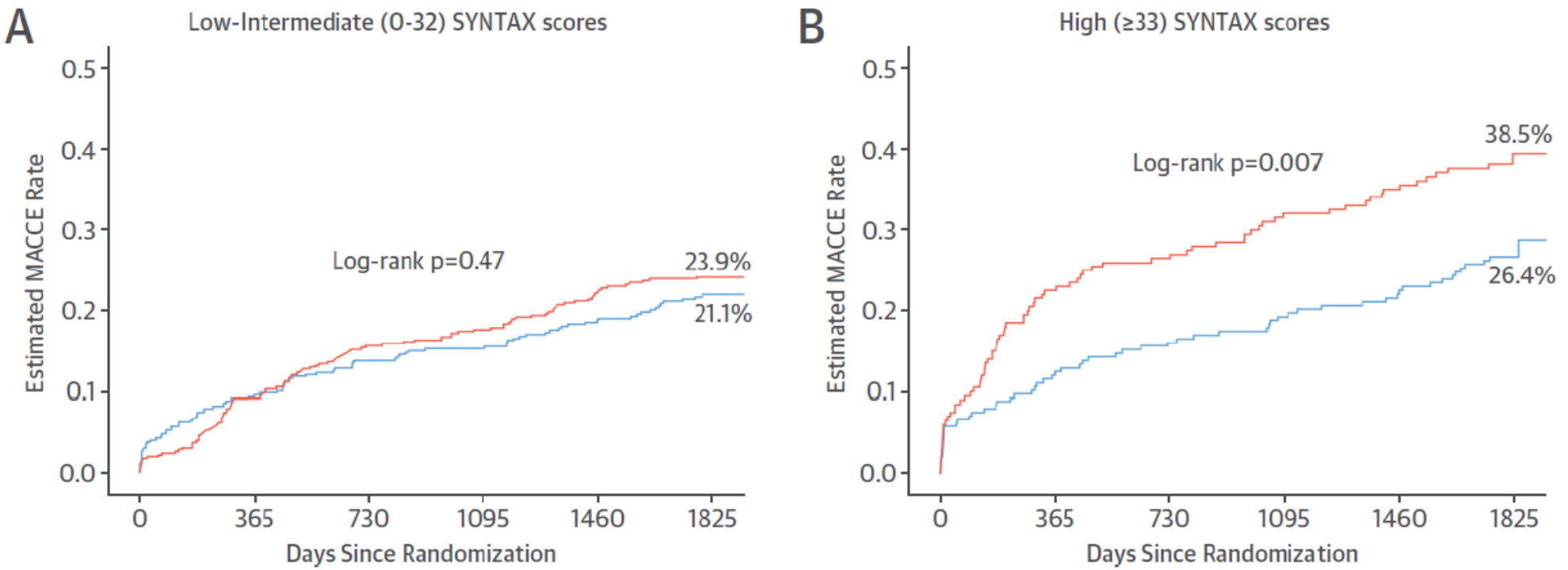
High Score ≥33



Moher et al, Lancet 2013

Tronc commun: evidence

5-y PRECOMBAT + SYNTAX LMS analyse



n= 1350p – PCI equivalent to CABG SYNTAX < 33

Cavalcante, JACC 2016

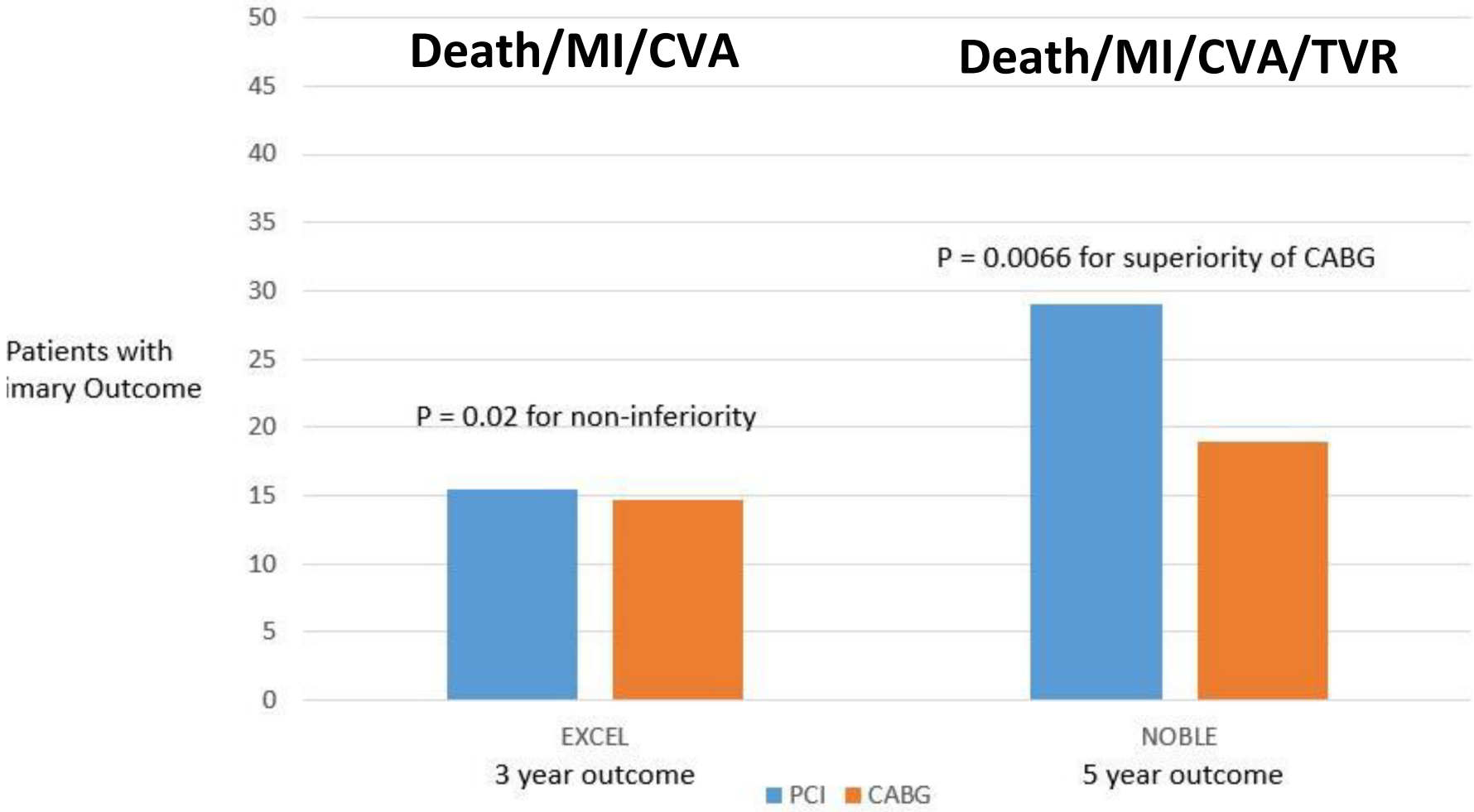
2016: la révolution EXCEL NOBLE !

	EXCEL	NOBLE
SYNTAX Score	20.6±6.2 vs 20.5±6.1	22.5 ±7.5 vs 22.4±8.0
DISTAL LEFT MAIN	82% (PCI arm)	81% vs 81%
STABLE ANGINA	53.1% vs 53.2%	82% vs 83%
EF	57.0±9.6% vs 57.3±9.0%	60% vs 60%
PATIENT NUMBERS	1905	1201
AGE	66.0±9.6 vs 65.9±9.5	66.2±9.9 vs 66.2±9.4
SEX (male)	76.2% vs 77.5%	80% vs 76%
Primary End-Point	Death/*MI/CVA	Death/#MI/CVA/TVR
Stent use	EES	BES
IVUS use	80%	47%-pre, 74%-post

*MI-periprocedural (EXCEL); #MI-non-procedural (NOBLE)

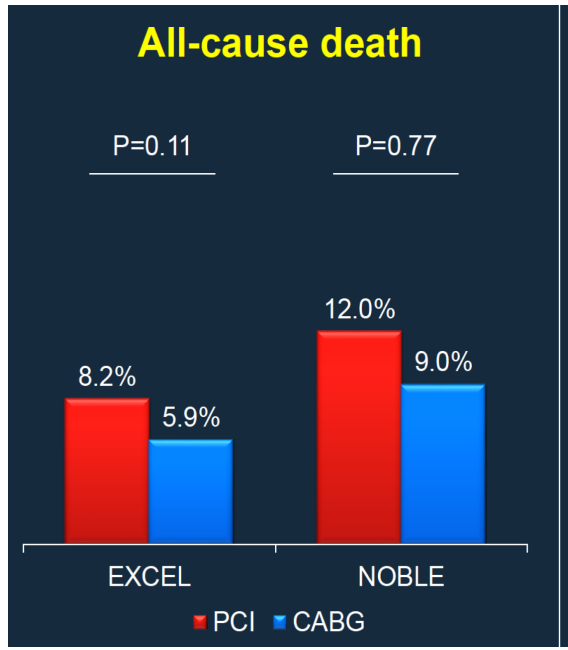
Stone, NEJM 2016
Makikallio, Lancte 2016

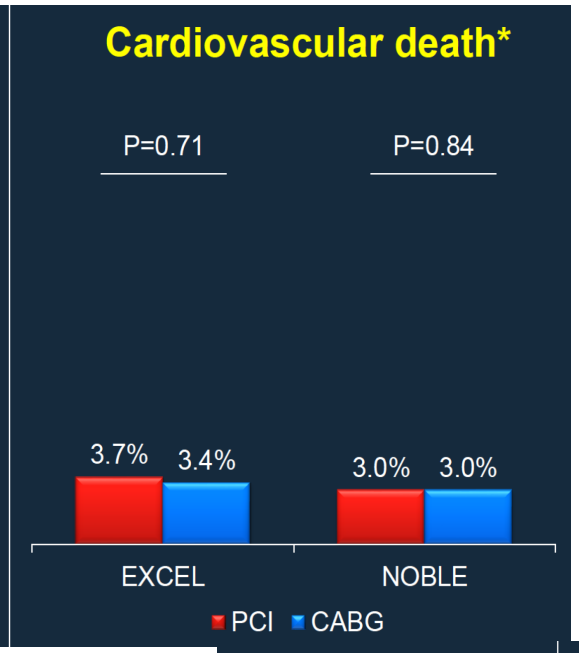
2016: la révolution EXCEL NOBLE

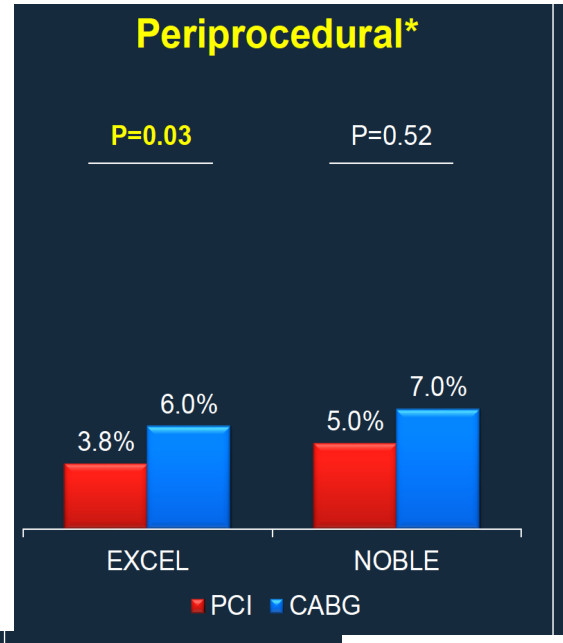


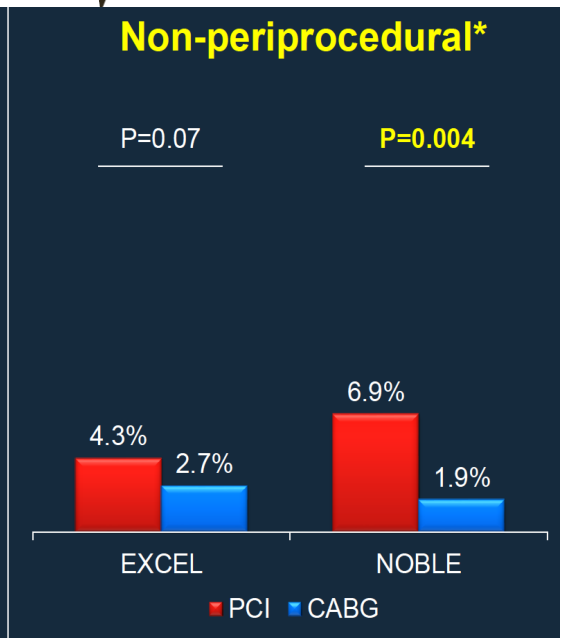
Stone, NEJM 2016
Makikallio, Lancet 2016

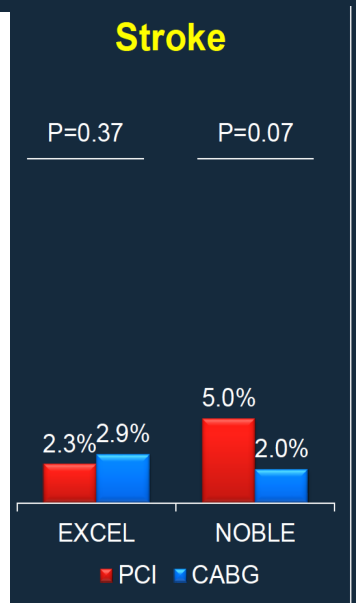
2016: la révolution EXCEL NOBLE

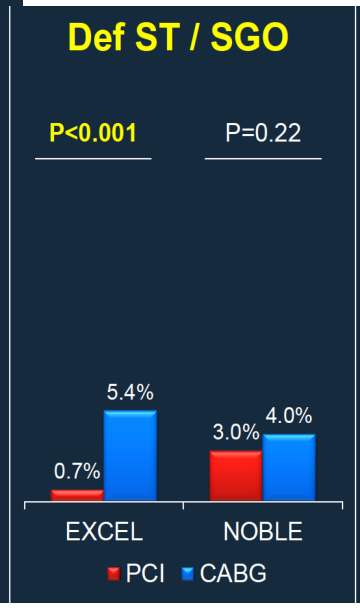


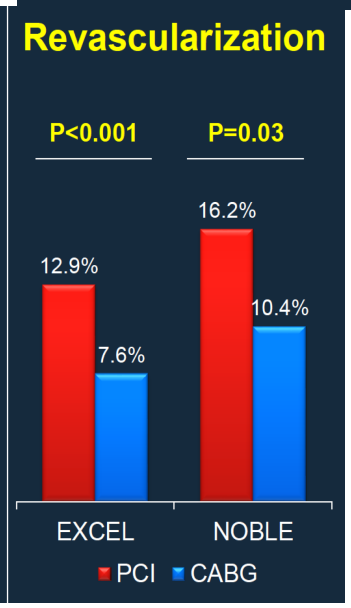












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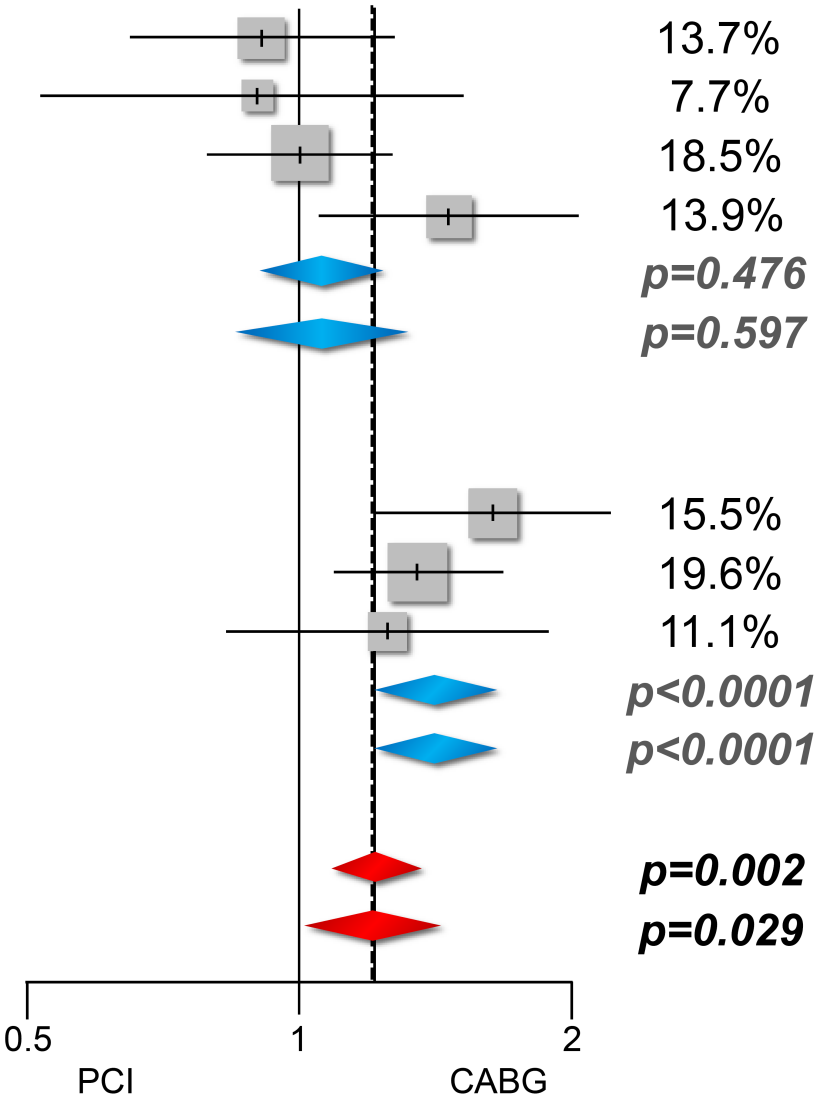
Stone, NEJM 2016
Makikallio, Lancte 2016

MVD et TC: metaanalyse la plus récente

Primary Endpoint: MACCE*

	HR [95% CI]	Weight*
Left Main		
SYNTAX	0.91 [0.65, 1.27]	13.7%
PRECOMBAT	0.89 [0.52, 1.52]	7.7%
EXCEL	1.00 [0.79, 1.26]	18.5%
NOBLE	1.47 [1.06, 2.05]	13.9%
Fixed-effect	**1.06 [0.90, 1.24]**	***p=0.476***
Random-effects	**1.06 [0.85, 1.32]**	***p=0.597***
Q=5.221, I^2=42.5%, τ^2=0.021, p=0.156		
Multi-Vessel		
SYNTAX	1.64 [1.22, 2.20]	15.5%
FREEDOM	1.36 [1.10, 1.68]	19.6%
BEST	1.26 [0.84, 1.89]	11.1%
Fixed-effect	**1.42 [1.21, 1.66]**	***p<0.0001***
Random-effects	**1.42 [1.21, 1.66]**	***p<0.0001***
Q=1.410, I^2=0%, τ^2=0, p=0.494		
Fixed-effect	**1.23 [1.10, 1.37]**	***p=0.002***
Random-effects	**1.21 [1.02, 1.45]**	***p=0.029***
Q=13.185, I^2=54.5%, τ^2=0.029, p=0.040		



Subgroups difference: p=0.011 [Fixed] / p=0.036 [Random]

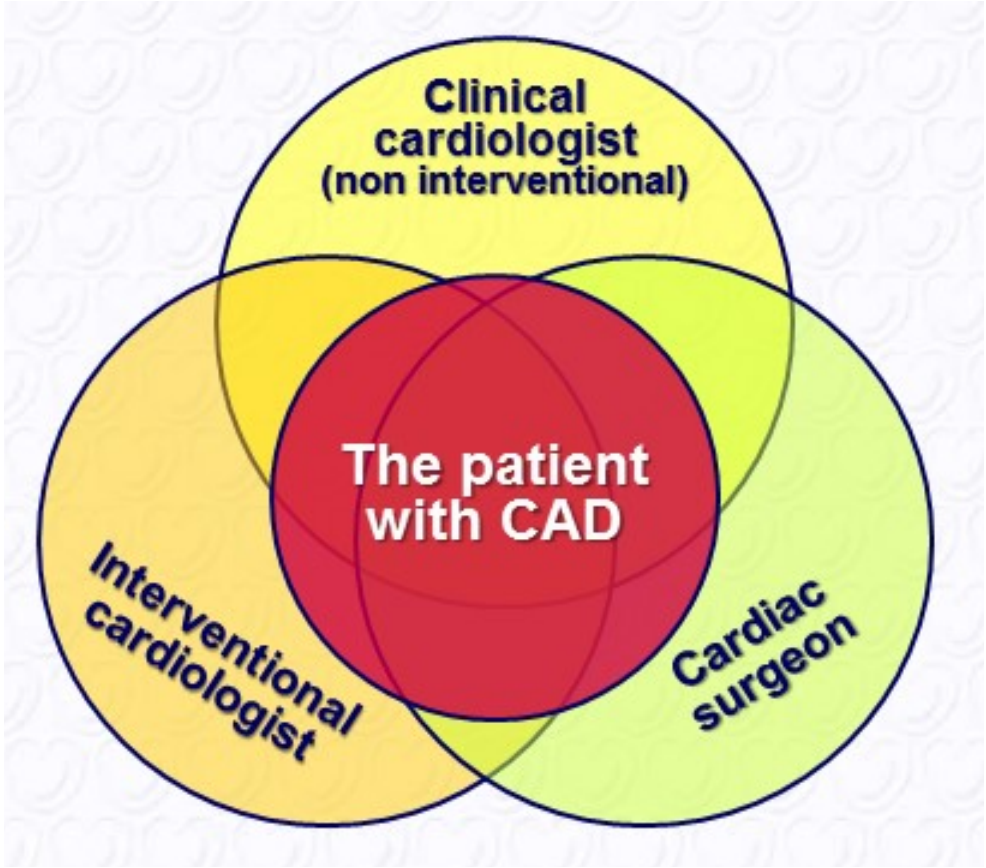
* MACCE = Composite of all-cause death, myocardial infarction or stroke.

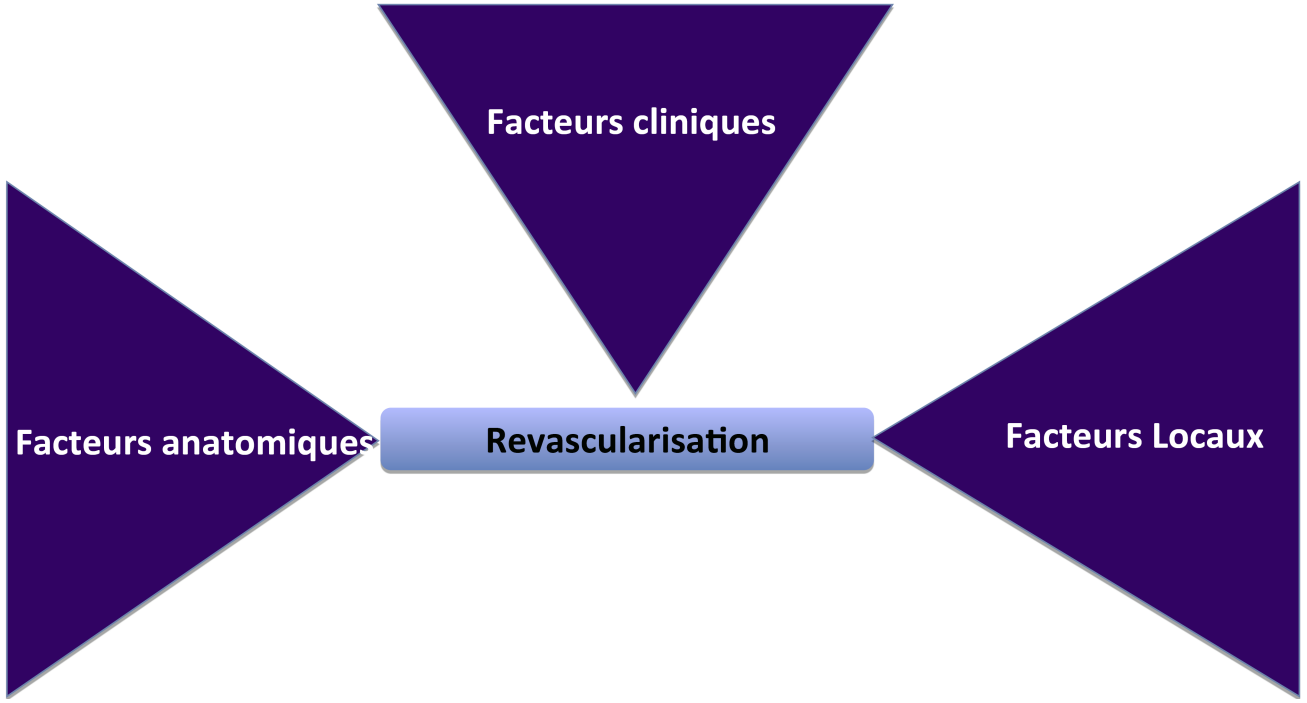
** Random-effects model.

Daniele Giacoppo, MD

Giacoppo et al, inpress

Techniques de revascularisation





ESC guidelines, Eur Heart J 2014

Facteurs cliniques

- Risque opératoire (STS, Euroscore II)
- Age
- Comorbidité
- Présentation Clinique (SCA vs. SCAD)
- Diabète
- FEVG
- Compliance DAPT

ESC guidelines, Eur Heart J 2014

Facteurs anatomiques

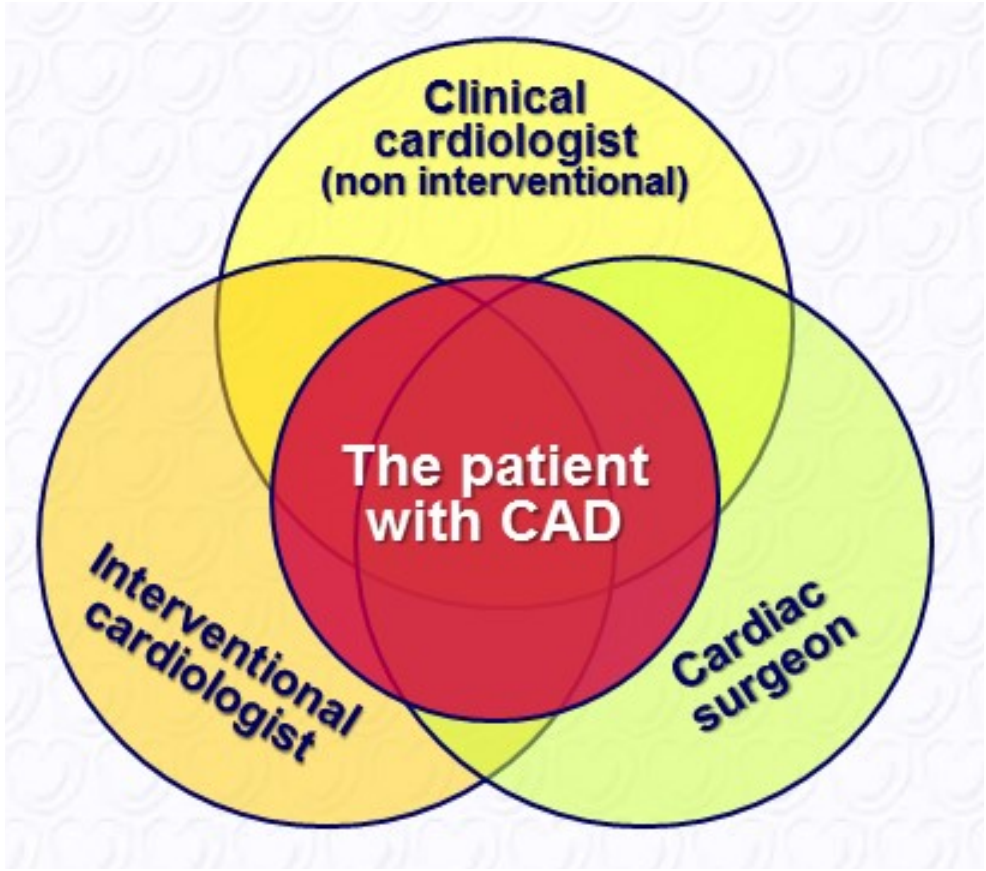
- Syntax score
- Localisation lesions (ostium TCG vs. TCG distal)
- Bifurcations
- CTO
- Antécédents d’ angioplastie (ISR)
- Antécédents de CABG (Artériel)

ESC guidelines, Eur Heart J 2014

Facteurs locaux

- Délai, disponibilité
- Expertise du cardiologue interventionnel (CTOs …)
- Expertise du centre chirurgical (Tout artériel…)
- Volume du centre (CEC, TCG)
- Préférences du patient et cout

ESC guidelines, Eur Heart J 2014



Anatomie

Compliance DAPT

Comorbidités

Risque chirurgical

Expérience du centre

Bleeding risk

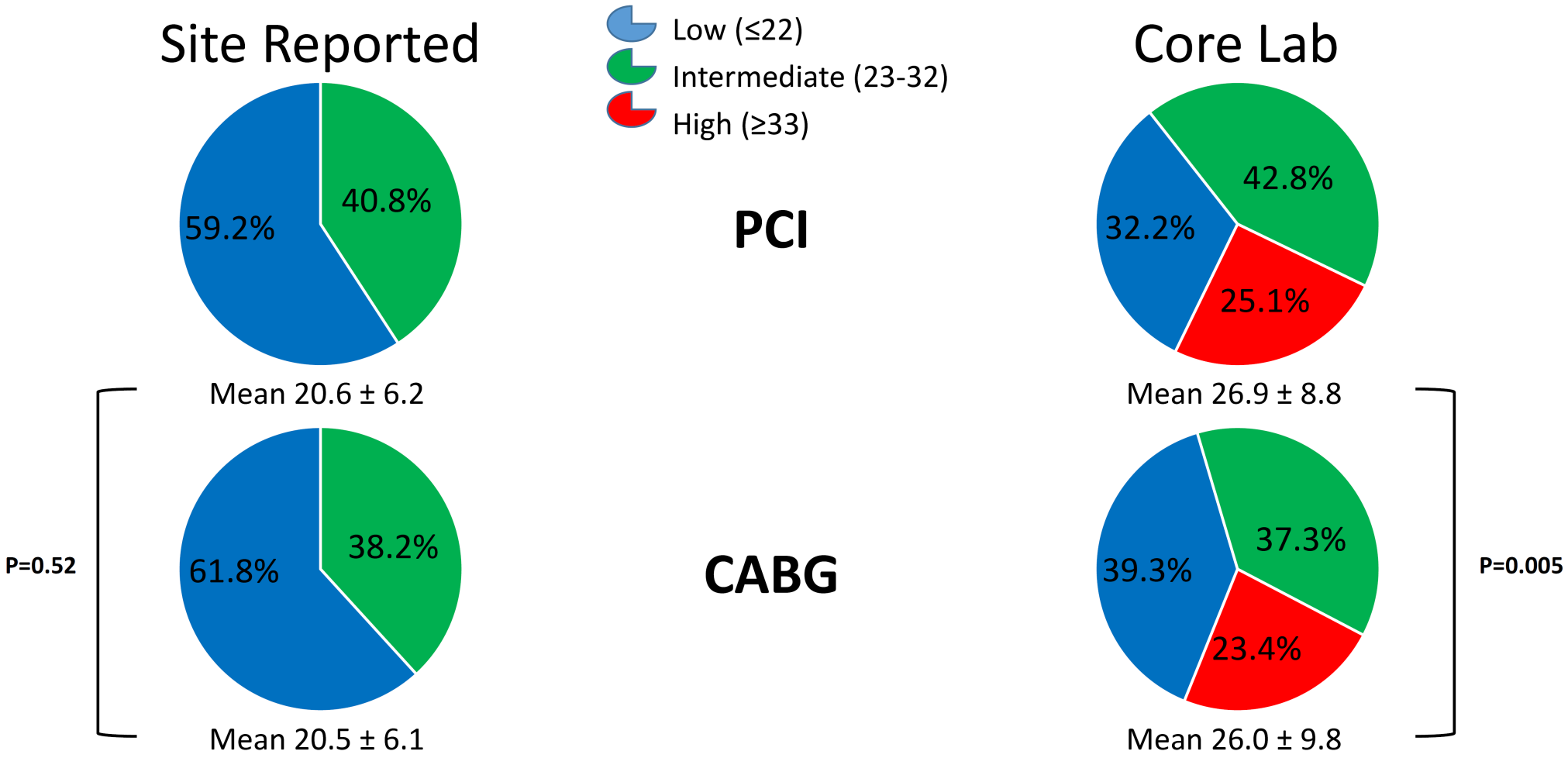
CABG – ACT - Hybride

Décision finale adaptée à **MON** patient

ESC guidelines, Eur Heart J 2014

Les questions en 2018

Limites du score SYNTAX

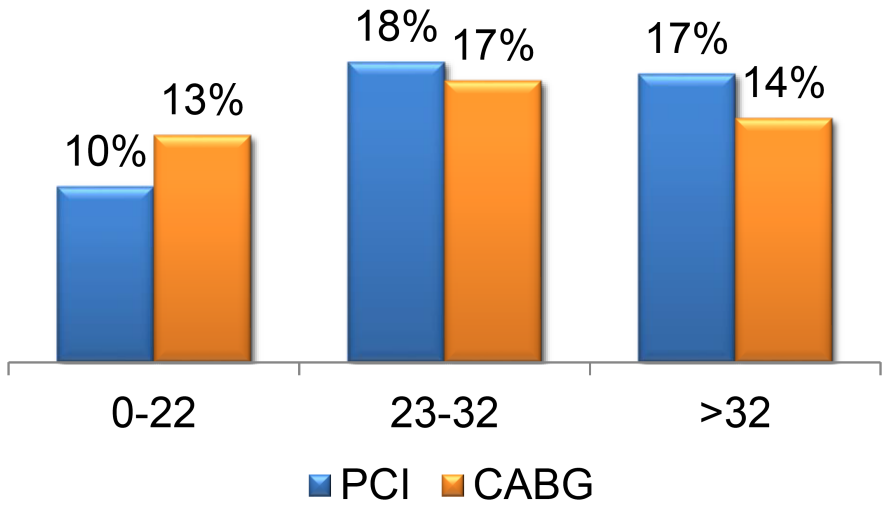


Stone, NEJM 2016

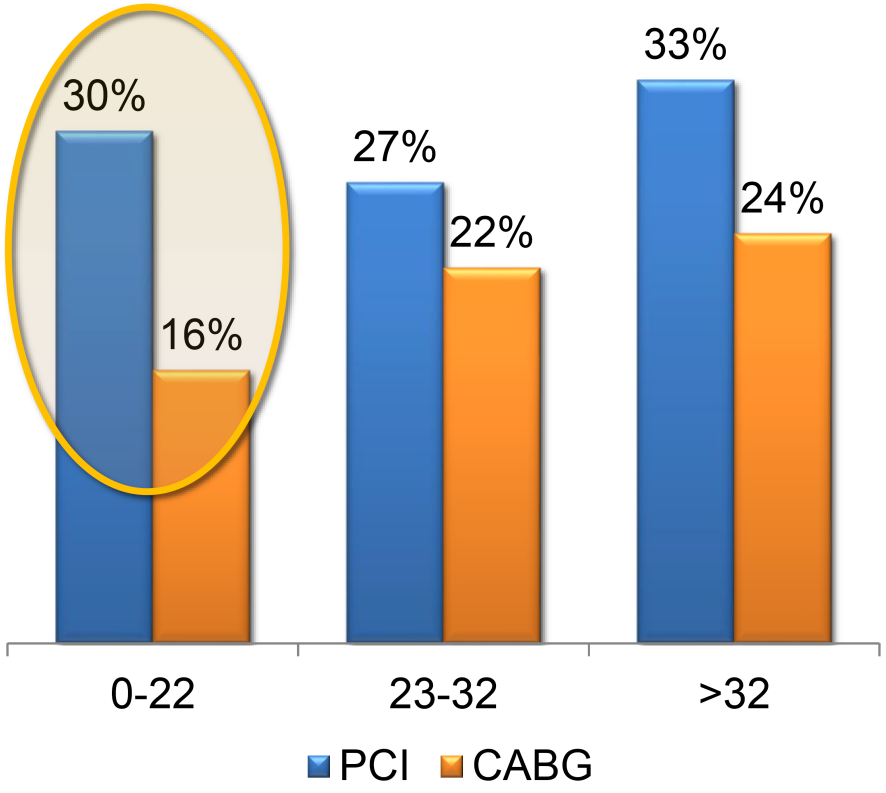
Evaluation SYNTAX 2016

EXCEL

Interaction p Value = 0.49



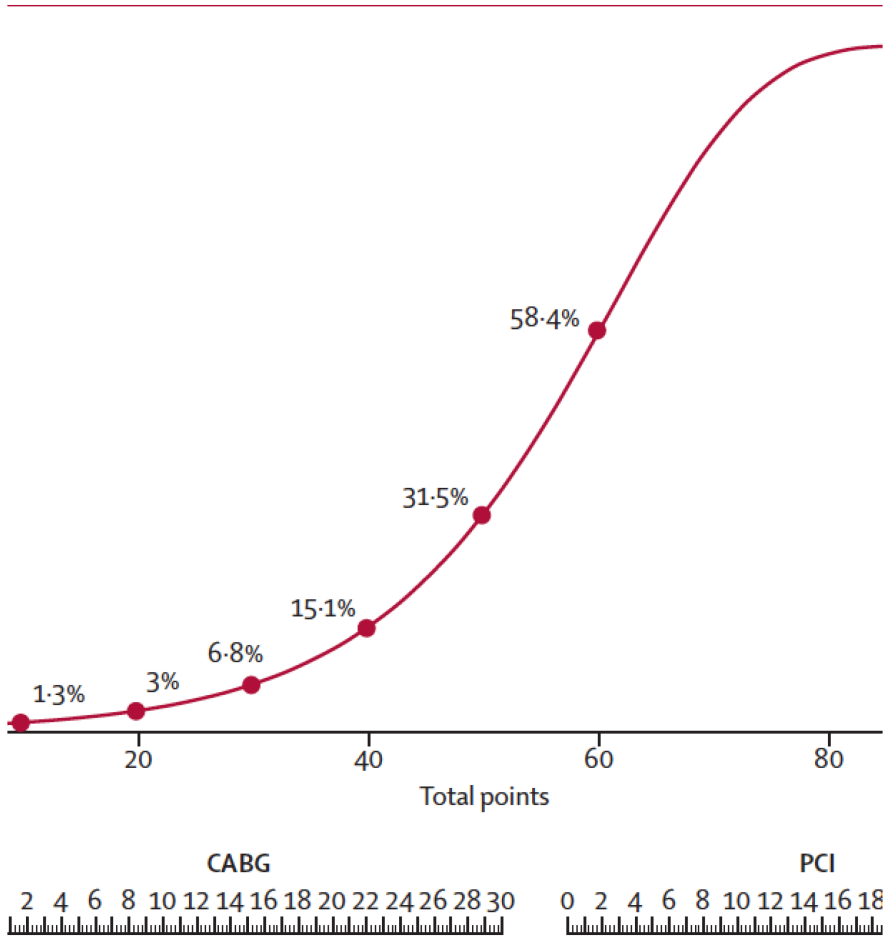
NOBLE



Stone, NEJM 2016
Makikallio, Lancte 2016

Score SYNTAXII

- The anatomical SYNTAX score is advocated in European and US guidelines
- However, the absence of an individualised approach and of clinical variables to guide decision making between CABG and PCI are limitations of the SYNTAX score
- SYNTAX score 2 was developed by applying a Cox proportional hazards model to results of the randomised all comers SYNTAX trial
- **SYNTAX score 2 contained eight predictors: anatomical SYNTAX score, age, creatinine clearance, LVEF, presence of unprotected LMCA disease, peripheral vascular disease, female sex, and COPD**
- SYNTAX score2 significantly predicted a difference in 4-year mortality between patients undergoing CABG and those undergoing PCI



Amélioration constant des devices

- Impact des stents de dernière generation chez le diabétique ?
- Utilisation “systematique” de l’ imagerie endocoronaire
- Angioplastie moins invasive (6 Fr radiale)
- Revascularisation CTOs

Conclusions

- Angioplastie TC: alternative validée a la chirurgie sauf complexité anatomique

- MVD: utilité FFR en sus de l' angiographie
- CABG toujours devant sauf pour les « scores SYNTAX < 22 »

Conclusions

- Heart Team
- Centres experts

- Nécessité d'optimisation des résultats de l'angioplastie (OCT/IVUS, nouveaux DES, techniques de bifurcations)

Aix*Marseille université

Merci de votre attention

AP HM
Assistance Publique
Hôpitaux de Marseille

Généralisations sur PCI vs. CABG

PCI vs. CABG

- PCI = +

Revascularisations itératives, infarctus spontanés, revascularisation anatomique incomplete

- PCI = -

AVC, infarctus peri proceduraux, morbidité

Sur les 20 dernières années

- PCI =

Meilleurs DES, amelioration des techniques d'implantation (imagerie)

- CABG =

Plus de revascularisation artérielle

Facteurs favorables

CABG

- Syntax > 33 si TCG
- Syntax > 22 si MVD
- *Diabète et MVD*

Angioplastie

- 1VD (non IVA prox)
- Syntax < 22
- Haut risque chirurgical

MVD et Syntax < 22 et faible risque chirurgical
LMS et Syntax < 33 et faible risque chirurgical

ESC guidelines, Eur Heart J 2014

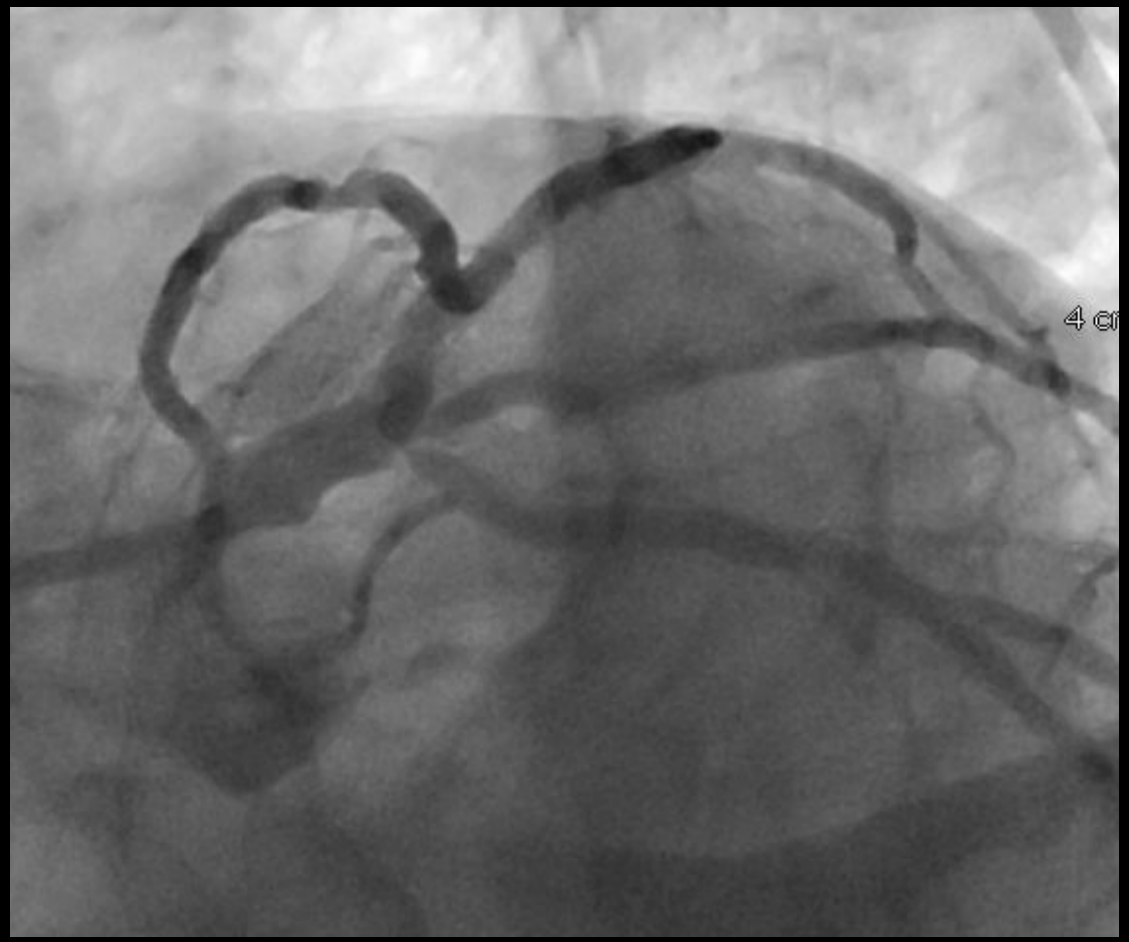
ESC guidelines, Eur Heart J 2015

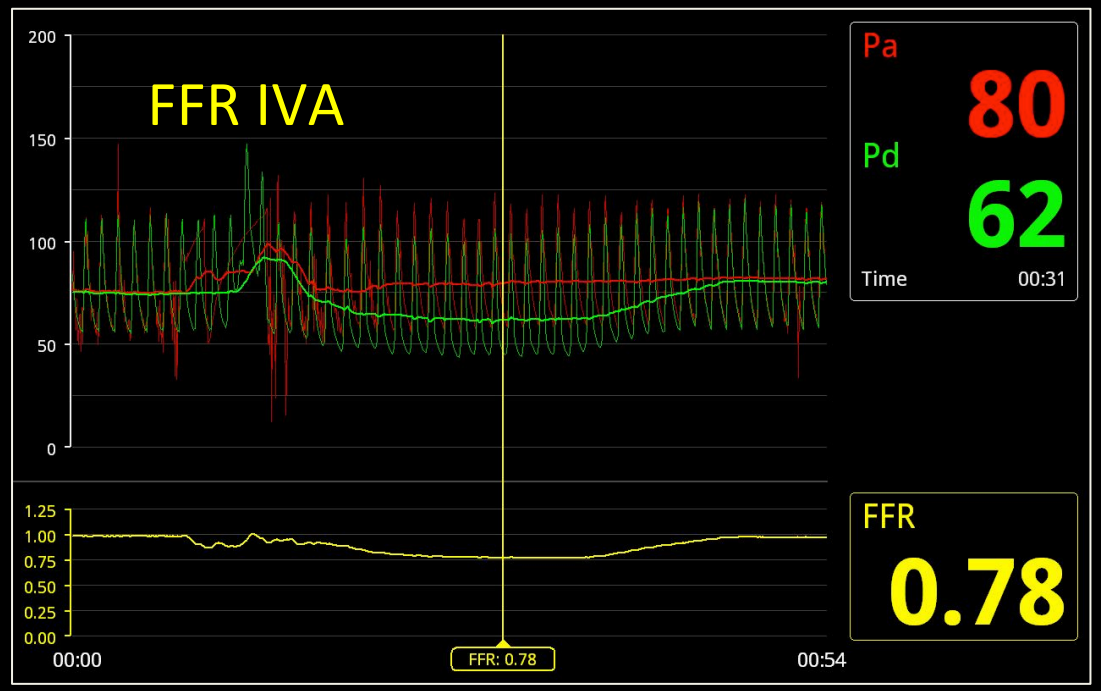
ESC guidelines, Eur Heart J 2015

ESC guidelines, Eur Heart J 2015

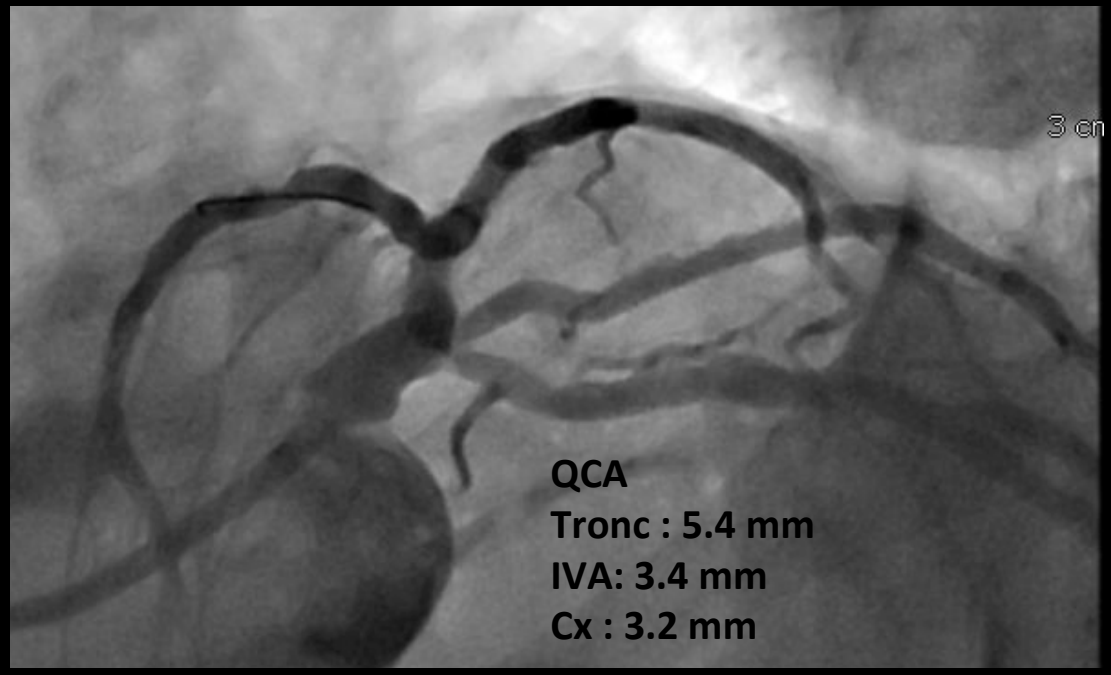
Mr Lom… 72 ans

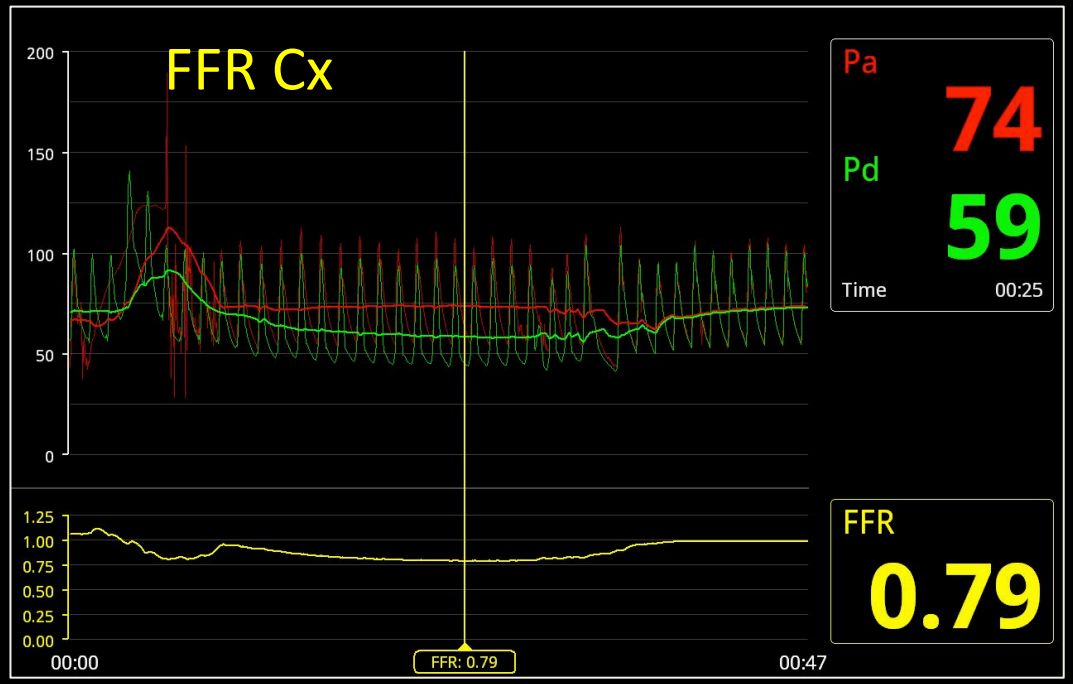
CMNO découverte en 2006, longtemps bien compensée sous OMT. FE : 40%
ATCD d'angioplastie D1 et Cx moyenne
Détérioration du statut fonctionnel…

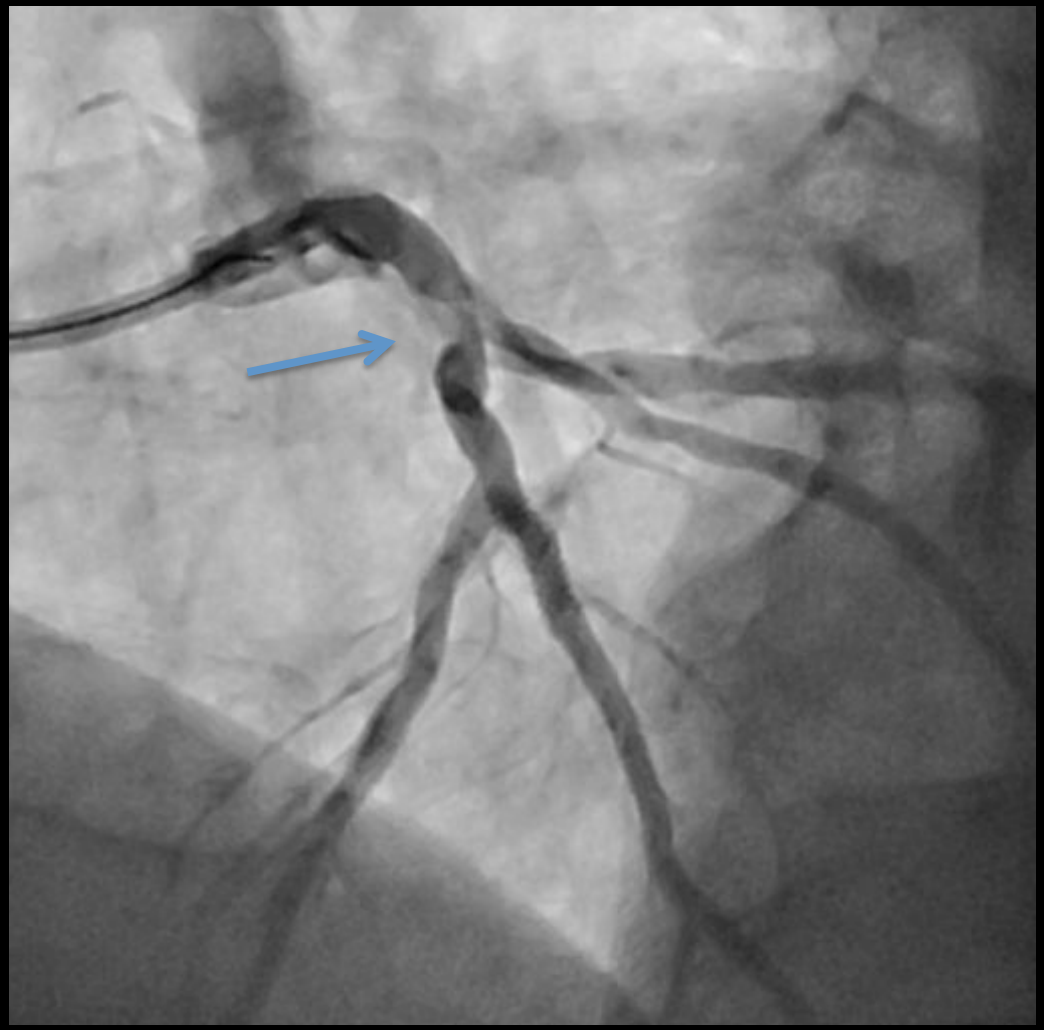



FFR IVA
Pa
80
Pd
62
Time
00:31
FFR
0.78
200
150
100
50
0
1.25
1.00
0.75
0.50
0.25
0.00
00:00
FFR: 0.78
00:54


FFR Bissectrice
Pa
76
Pd
69
Time
00:21
FFR
0.91
200
150
100
50
0
1.25
1.00
0.75
0.50
0.25
0.00
00:00
FFR: 0.91
00:36

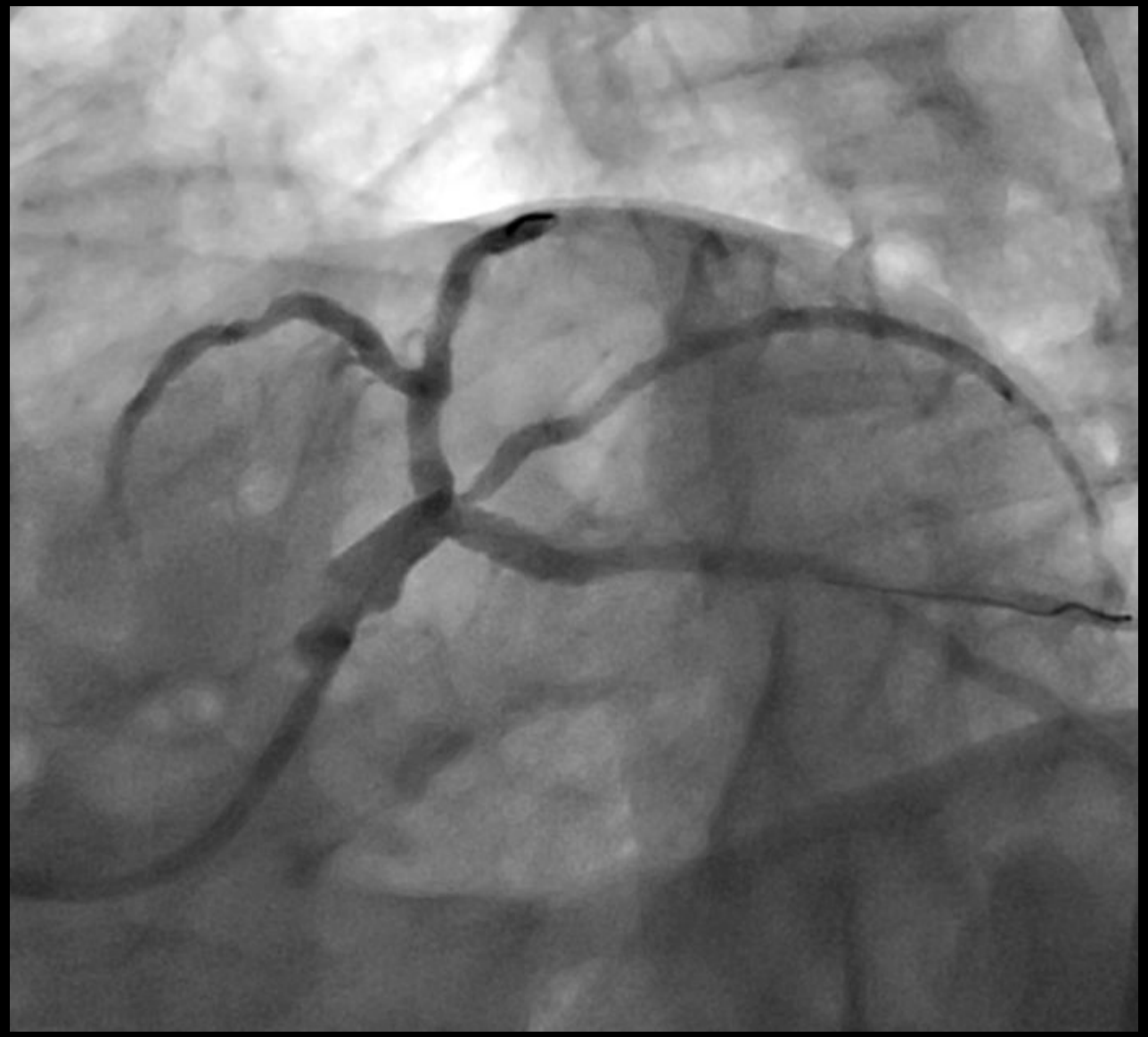

QCA
Tronc : 5.4 mm
IVA: 3.4 mm
Cx : 3.2 mm


FFR Cx
Pa
74
Pd
59
Time
00:25
FFR
0.79
200
150
100
50
0
1.25
1.00
0.75
0.50
0.25
0.00
00:00
FFR: 0.79
00:47

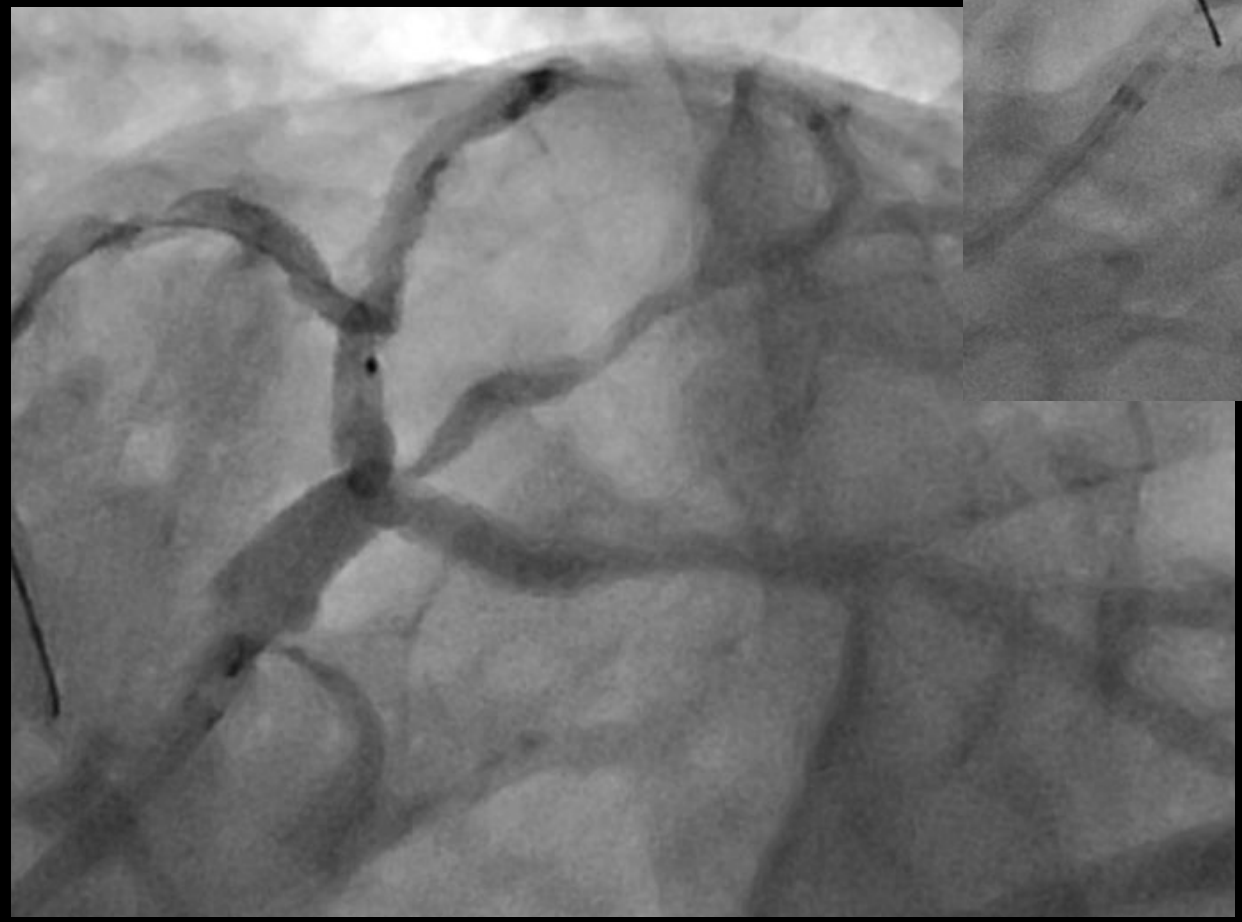


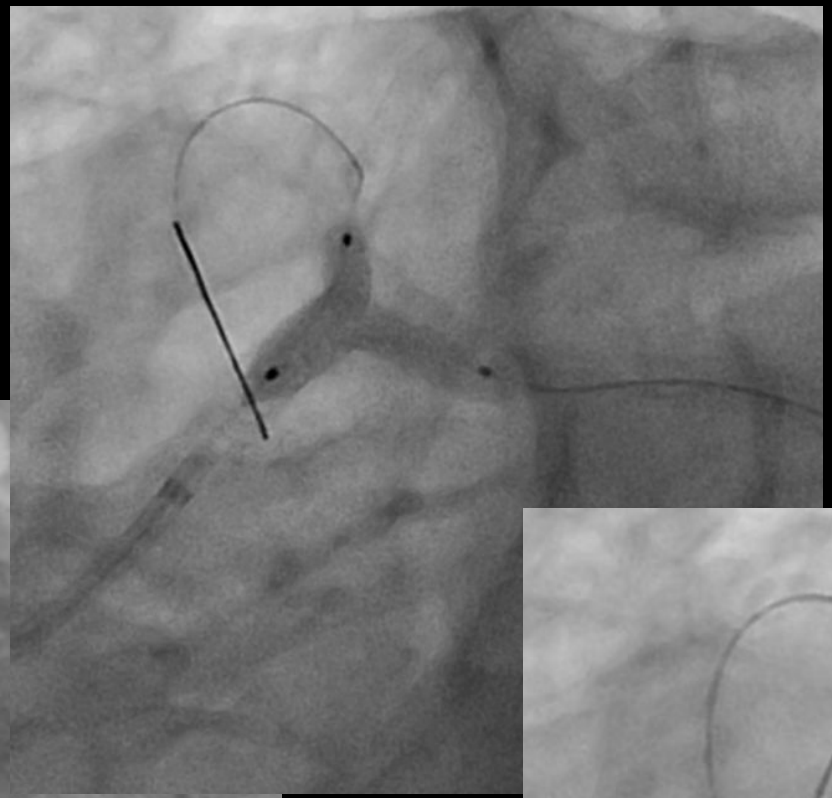
6F EBU 4.0. Whisper et Runthrough. Prédilatation par un sapphire 3.0 x 20 de la Cx
puis stent stent Xience Alpine 3.5x23 mm à 20B.

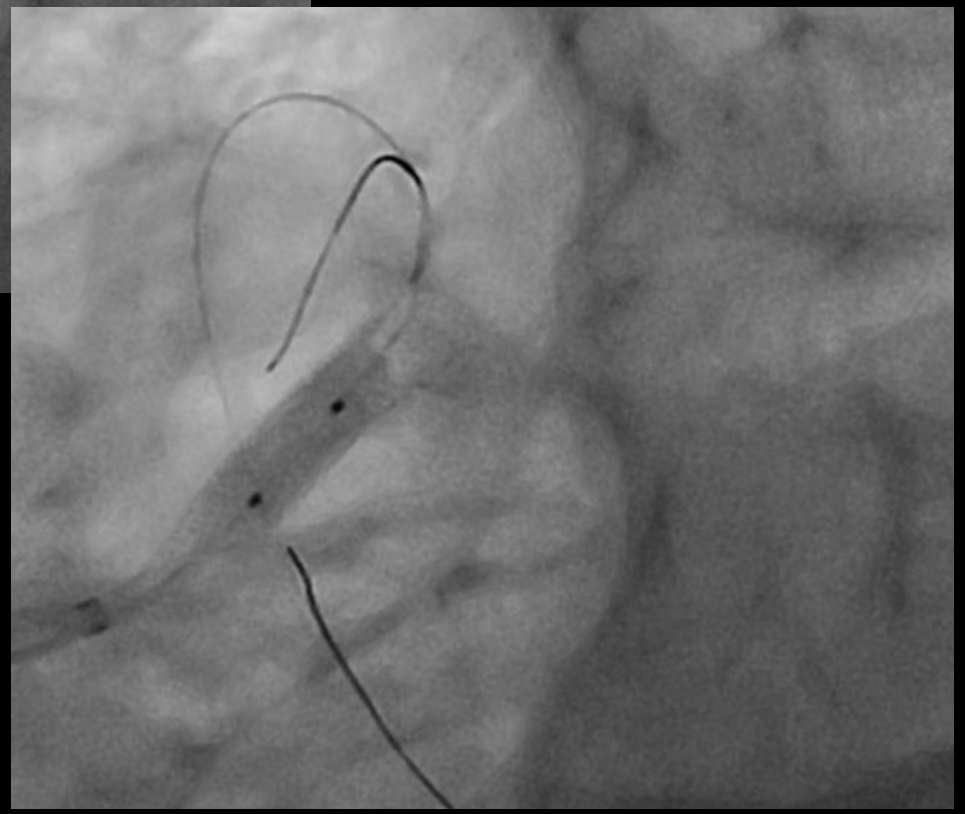
POT (Proximal Optimization Technique) par un ballon 5 x 10 à 18B puis ouverture de la maille couvrant l'iVA par le sapphire après avoir repassé le guide 014 et implantation d'un 2° stent en culotte.

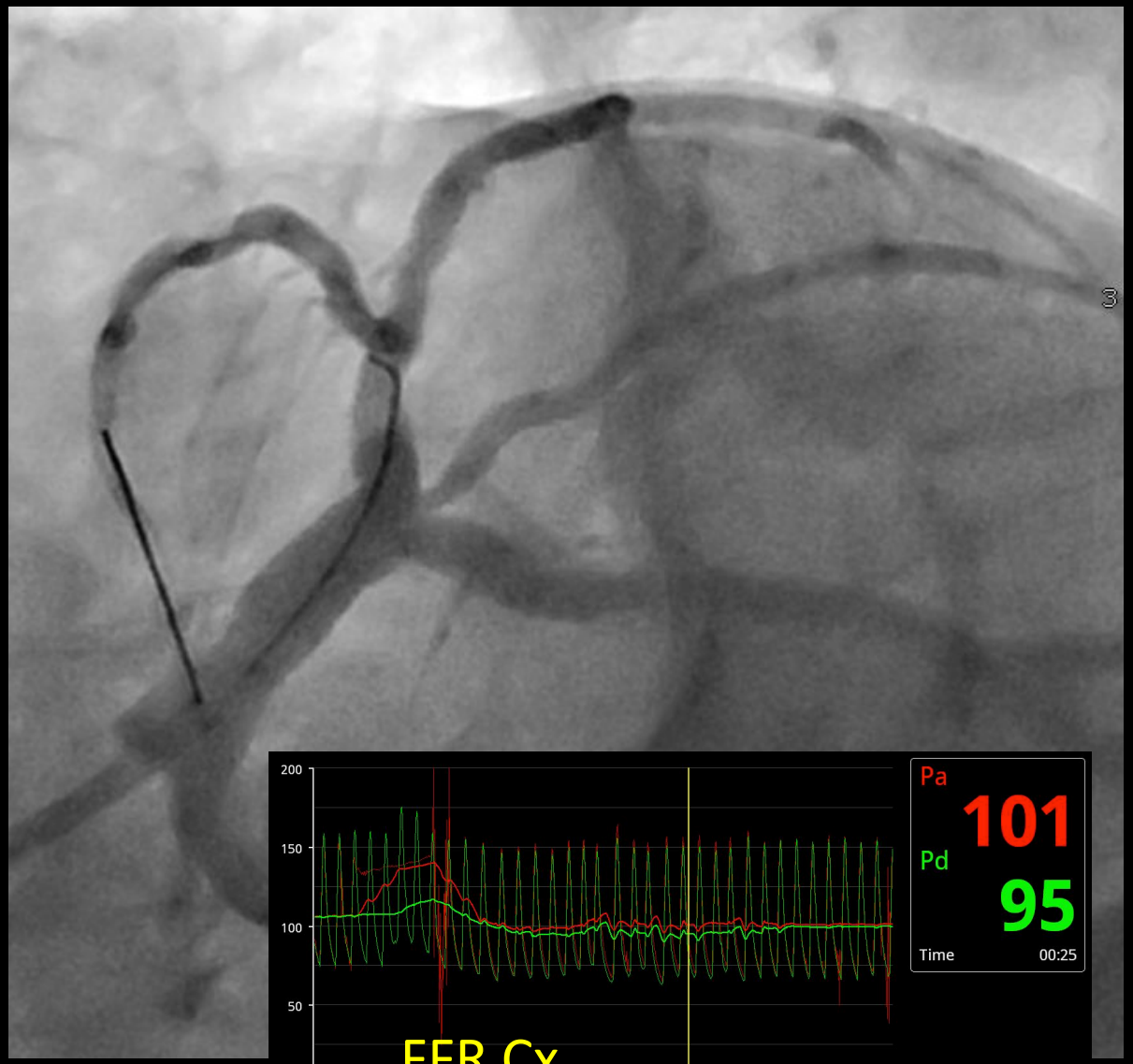


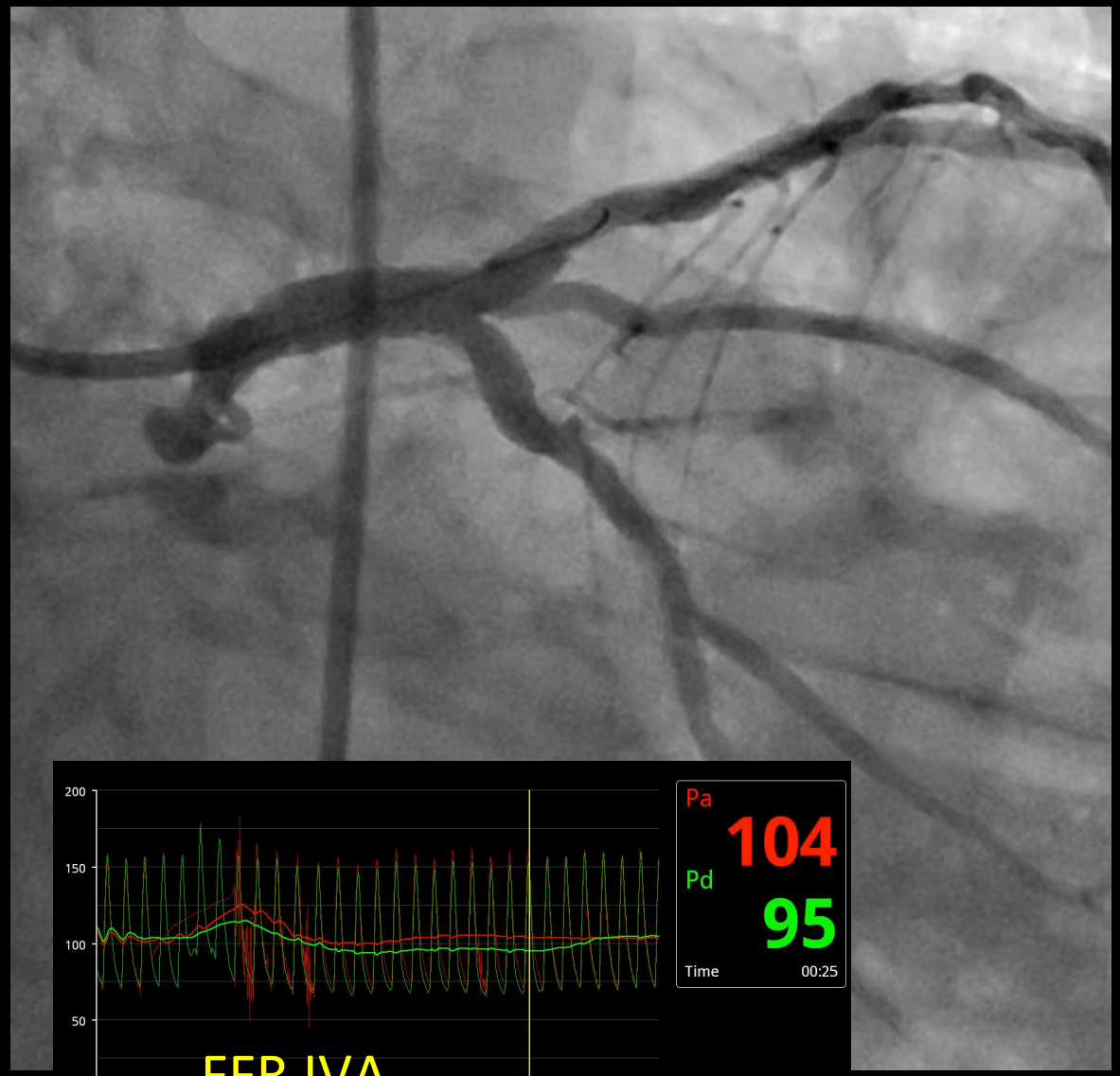
stent Abbott Xience Alpine 4.0 x 28 à 18 B sur le tronc depuis son ostium et sur l'iVA, puis refranchissement de maille Cx, kissing et POT final…








200
150
100
50
0
Pa
101
Pd
95
Time
00:25
FFR Cx
1.25
1.00
0.75
0.50
0.25
0.00
00:00
FFR: 0.94
00:38
FFR
0.94


200
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
00:00
FFR: 0.91
00:32
FFR
0.91


200
150
100
50
0
Pa
102
Pd
82
Time
00:22
1.25
1.00
0.75
0.50
0.25
0.00
FFR
0.80
00:00
FFR: 0.80
00:45

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