Diabète et Maladie Coronarienne

Prof Nadia Debbas, MD, PhD

CHU Saint-Pierre
UMC Sint-Pieter

Prévalence du diabète

En 1985, 30 Millions, en 2014, 382 Millions

Projection 600 millions en 2045 (1/10)

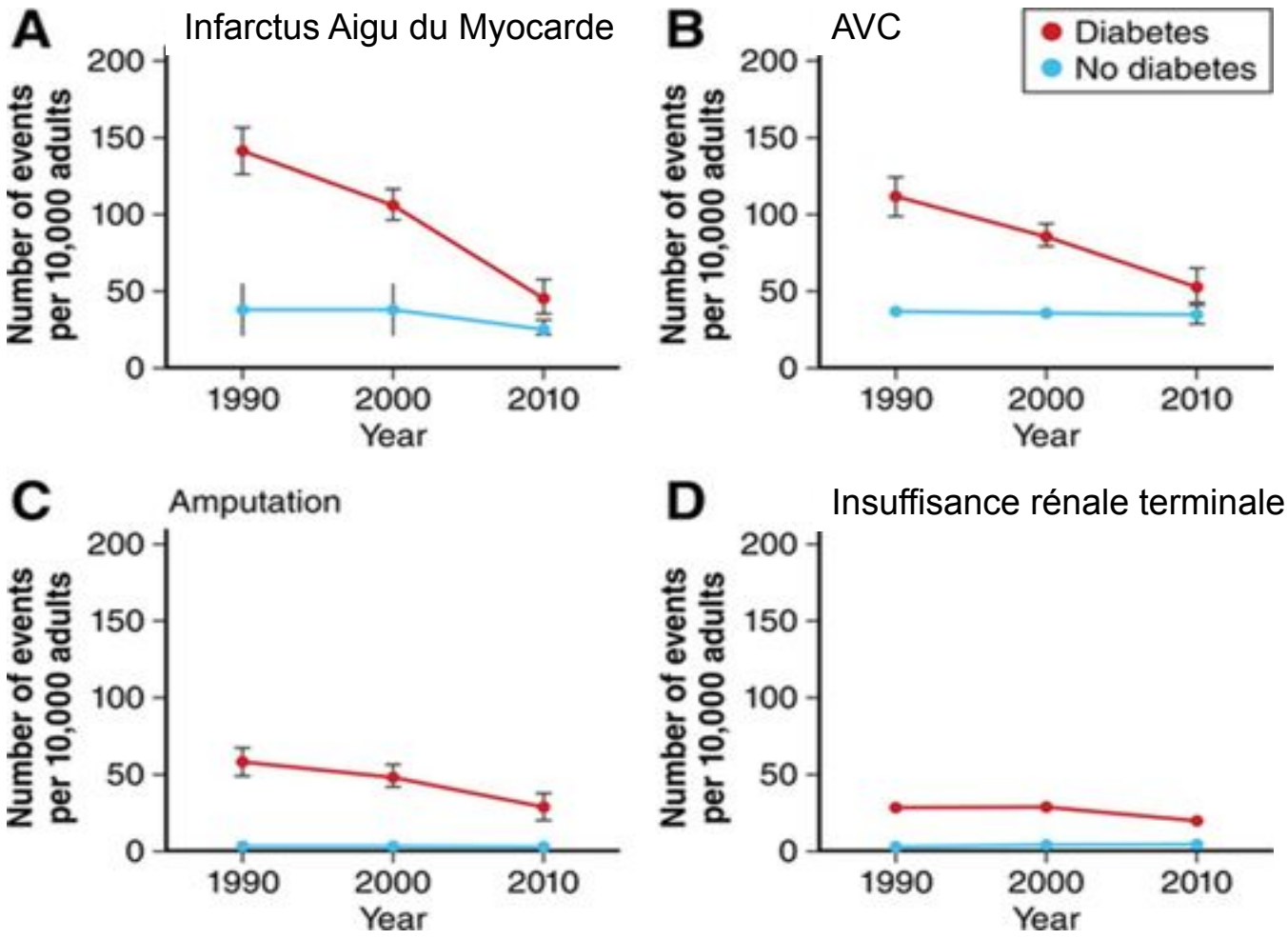
T1DM croît mais surtout T2DM

Aux USA, le coût d'un diabétique pour la société est le double du coût pour la société d'un non diabétique

Lien étroit entre diabète et maladies cardiovasculaires qui sont la cause majeure de morbi-mortalité chez les diabétiques.

Le goal du traitement du diabète est donc la prévention des maladies cardio vasculaires du diabétique

Taux élevé des Complications Cardiovasculaires Chez le Diabètique par rapport au Non Diabétique



Cecilia C. Low Wang. Circulation. Clinical Update: Cardiovascular Disease in Diabetes Mellitus, Volume: 133, Issue: 24, Pages: 2459-2502, DOI: (10.1161/CIRCULATIONAHA.116.022194)

Hazard ratios (HRs) for vascular outcomes in people with versus without diabetes at baseline, based on analyses of 530 083 patients

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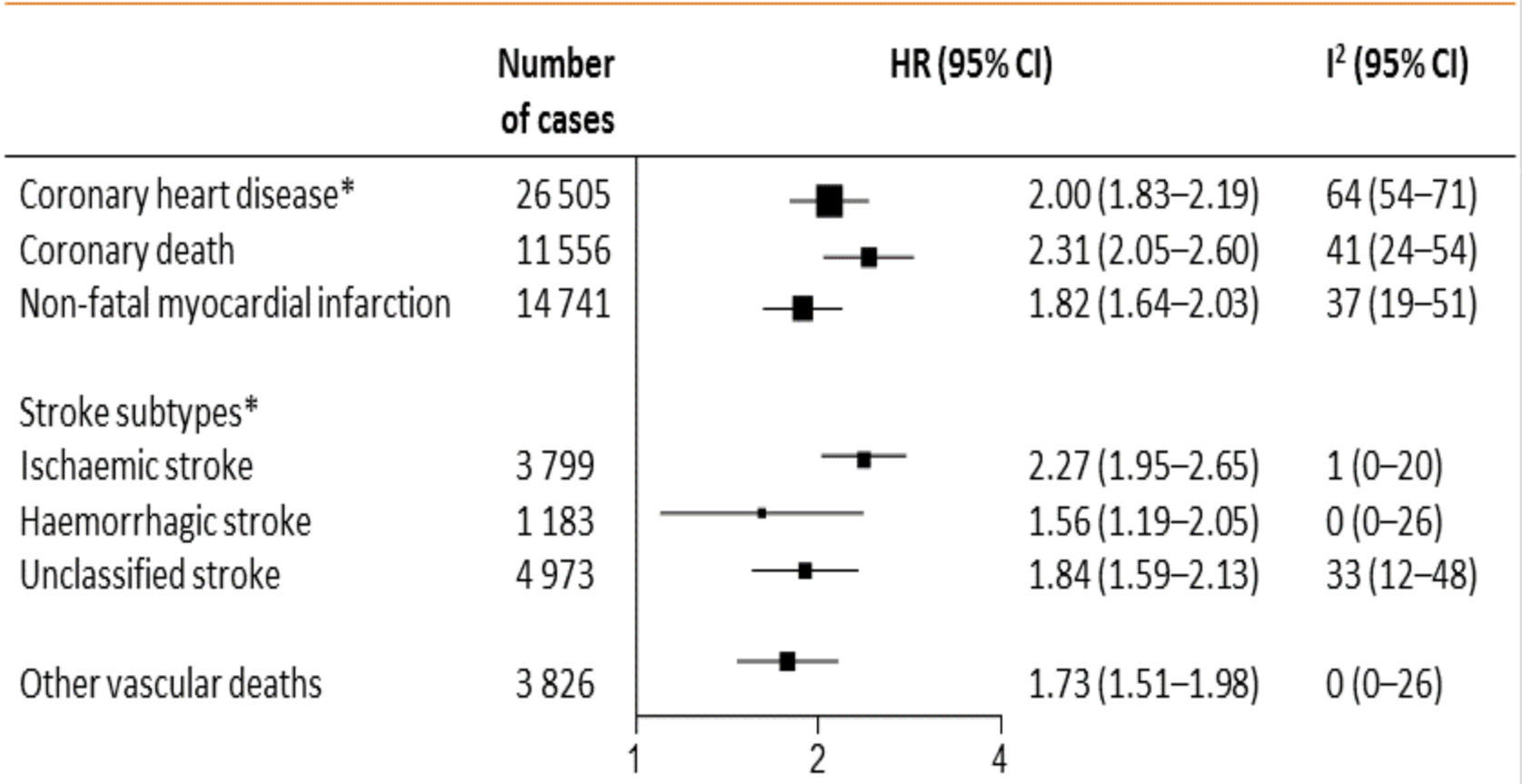

CI = confidence interval. *Includes both fatal and non-fatal events

ESC Guidelines on Diabetes, pre-diabetes and cardiovascular diseases in collaboration with EASD (European Heart Journal 2019 - doi/10.1093/eurheartj/ehz486)

Definitions

Pré-diabète, Diabète : un continuum

Pré-diabète:	glycémie à jeun (100 à 126mg/dl) et
	test de tolérance au glucose (2hPG ≥140 à 200 mg/dl)
Diabète:	HbA1c ≥ 6.5% ou glycémie à jeun (≥126mg/dl)

Le **diabète** type 1 (T1DM) est dû à une absence de sécrétion d'insuline par le pancréas. Il touche environ 10% des diabétiques et atteint surtout les personnes jeunes.

Le **diabète** type 2 (T2DM) est dû à une mauvaise utilisation de l'insuline par les cellules de l'organisme

Pévention de l'évolution du pré-diabète vers le diabète est essentiel (T2DM) par les modifications durables de l'hygiène de vie et le traitement de tous les FRCV. Rentré dans les recommandations

RECOMMANDATION: Tout patient ayant une maladie coronarienne établie doit être dépisté pour le diabète

Eur Heart J 2019

Prévention du diabète

2019 new recommendations (2)

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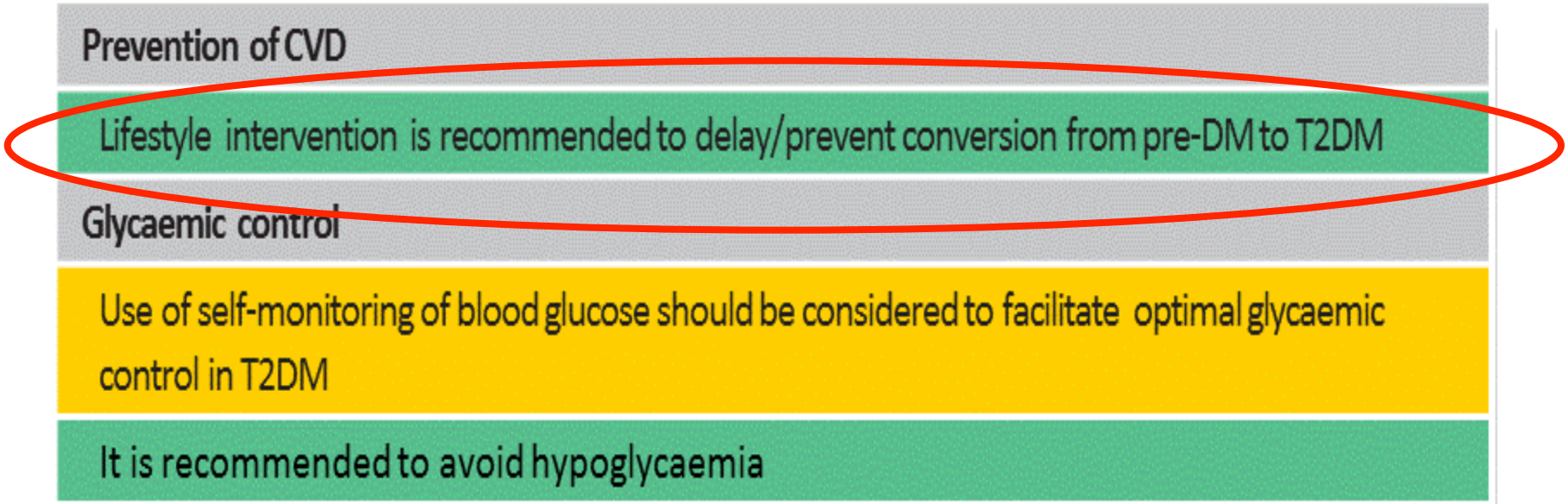
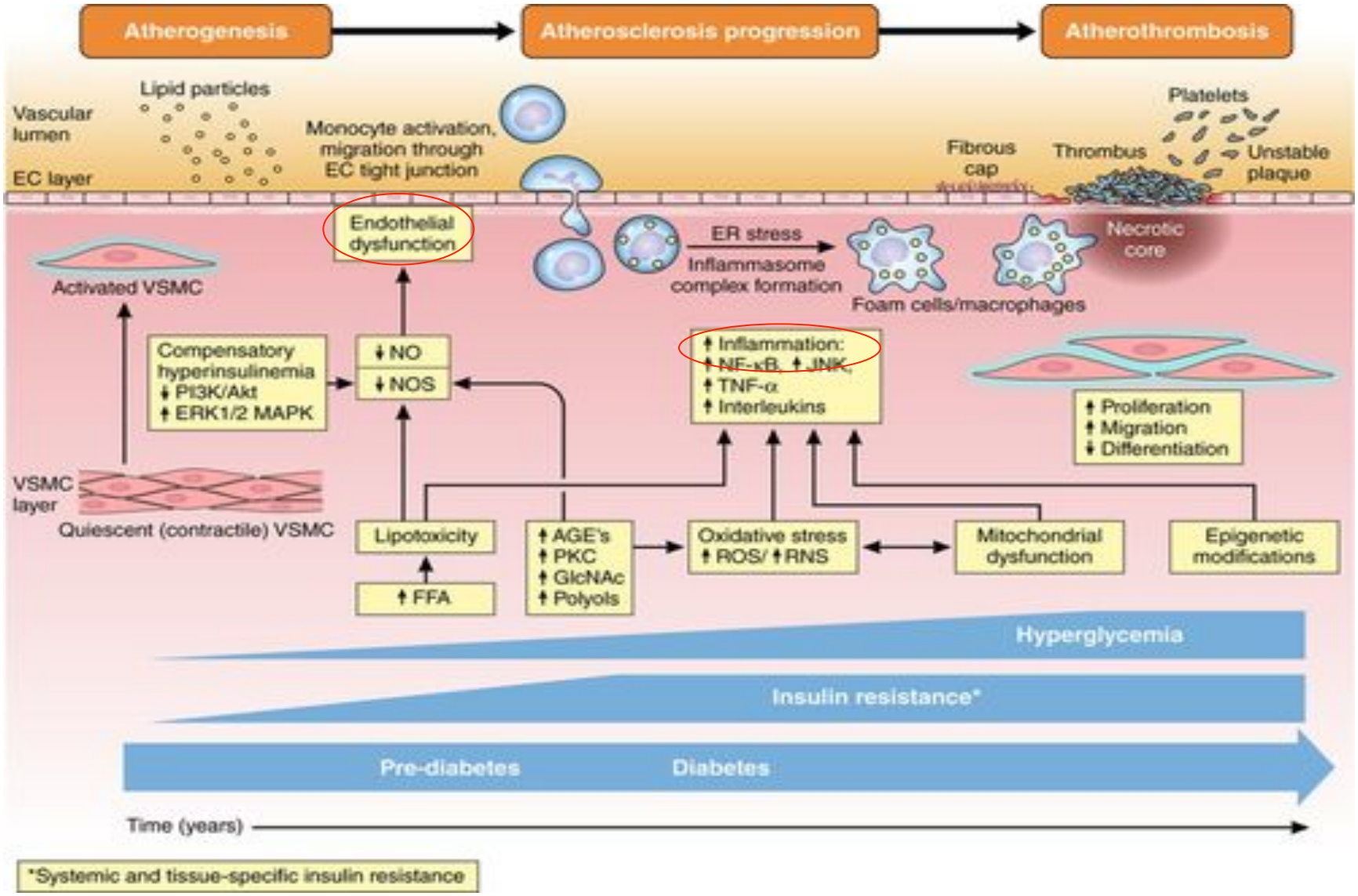


- Recommandé/indiqué
- Pourait être envisagé/considéré
- Devrait être envisagé/considéré
- N'est pas indiqué/Est contrindiqué

Dévelopement et progression de l'athérosclérose dans le diabète
Processus continu et progressif



Cecilia C. Low Wang. Circulation.2016 Volume: 133, Issue: 24: 2459-2502

Effet du diabète au niveau cardiaque

Dysfonction endothéliale et athérosclérose

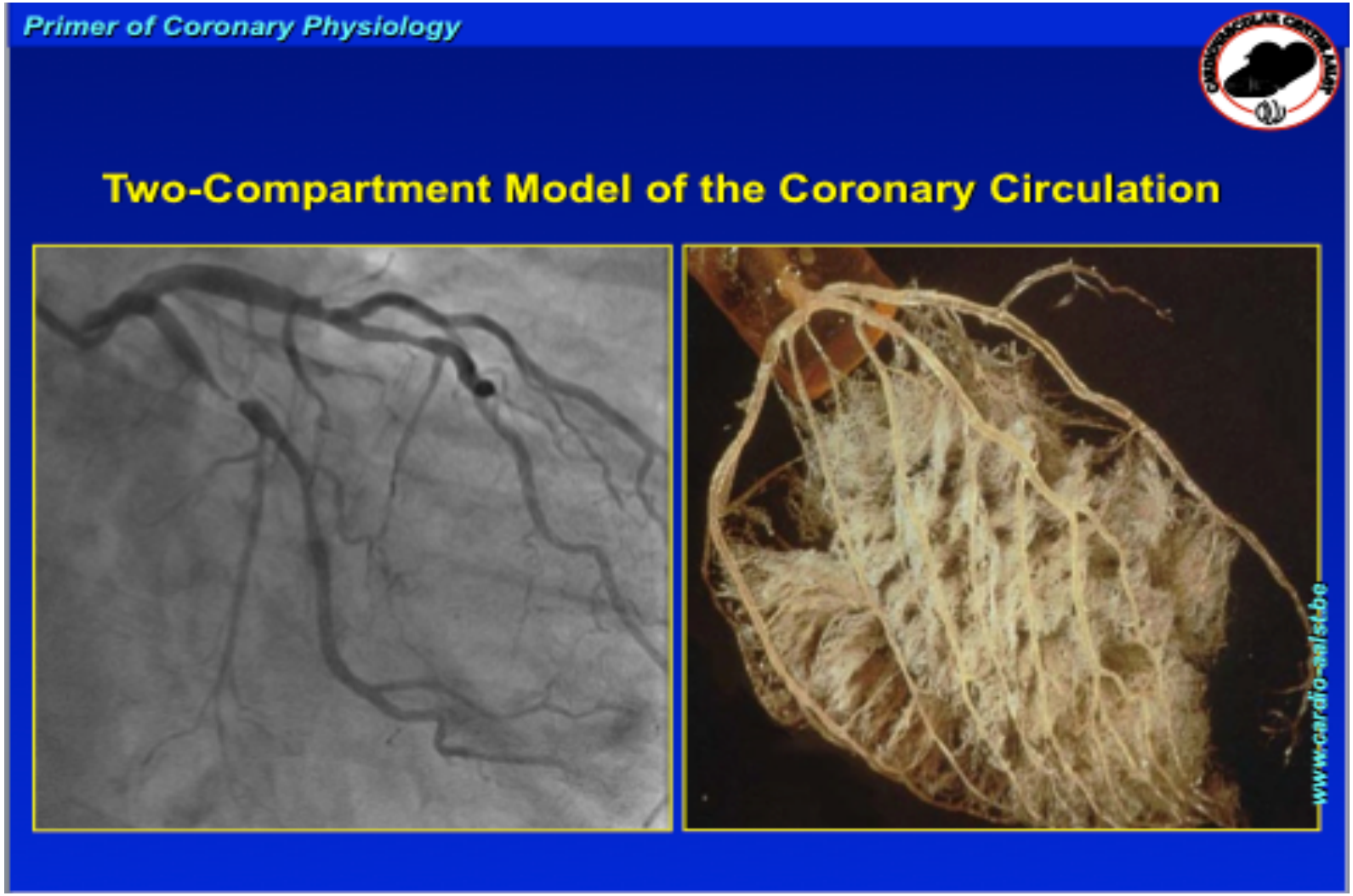
Aussi cellules musculaires lisses

Essentiellement artères épicardiques: mieux connu

Mais aussi microcirculation

Coronary microvascular **dysfunction** in diabetes mellitus.
Kibel A et al. J Int Med Res. (2017)

Réseau épicardique 5% et microcirculation 95%



Curtesy of B de Bruyne

Patient Diabétique
Prévention de la maladie coronarienne

Les multiples risques cardiovasculaires dont l'obésité, l'HTA, les dyslipidémies sont fréquemment rencontrés chez le diabétique (surtout T2DM). Et le tabac…

Traiter chaque FRCV isolément diminue certainement le risque de maladie cardiovasculaire athérosclérosante mais le contrôle simultané des multiples FRCV semblerait agir en synergie pour diminuer de façon plus intense les risques d'evènements CV.

Recommendations for multifactorial management in DM and pre-DM

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Recommendations	Class	Level
A multifactorial approach to DM management with treatment targets, as listed in Full Text document, should be considered in patients with DM and CVD.	IIa	B

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Maladie Coronarienne chez le Diabétique
Prévention

Traitement actif, systématique et synergique de tous les FRCV associés au DM avec des goals bien définis et sévères en fonction du risque coronarien de chaque patient.

Attention à l'aspirine en prévention primaire!

Change in recommendations (3)

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2013	2019
Antiplatelet therapy	
Aspirin for primary prevention is not recommended in DM at low CVD risk	Aspirin (75–100 mg/day) for primary prevention may be considered in patients with DM at very high/high risk in the absence of clear contraindications
	Aspirin for primary prevention is not recommended in patients with DM at moderate CV risk

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Maladie Coronarienne chez le Diabétique
Prévention par le contrôle de la Glycémie

1. Contrôle de la glycémie: médicaments habituels: Metformine (biguanide), Diamicron (sulfonylurés), Glitazone (thazolinediones), insuline: décevants en ce qui concerne la diminution des MACCE (Décès d'origine CV, IdM non fatal MI, AVC non fatal)

Pour la première fois, la preuve est faite par plusieurs essai thérapeutiques à visée cardiovasculaire du bénéfice de l'administration d'inhibiteurs du co-transporteur 2 du Sodium-Glucose et de Récepteurs du Glucagon Like Peptide 1 chez les diabétiques connus déjà connus cardiovasculaires ou à haut risque et très haut risque.

2. Glucagon-Like Peptide Receptor Agonist GLP1-RA : études randomisées démontrent la diminution significative des MACE: Liraglutide: LEADER, Semaglutide: SUSTAIN-6, PIONEER-6
3. Sodium-glucose co-transporter 2 inhibitor SGLT2 inhibitors: études randomisées démontrent la diminution significative des MACE: Empaglifozine, Canaglifozine, Dapaglifozine, etc
4. Mécanisme d'action en cours d'exploration pour 2 et 3

Maladie Coronarienne chez le Diabétique
Prévention par le contrôle de la Glycémie

DC toutes causes — IdM non fatal — DC cause cardiaque — AVC non fatal

	Drugs	Death because of any cause	CV death	Nonfatal MI	Nonfatal stroke	hHF	Renal outcome
Efficacy trials	Metformin/pioglitazone/ sulfonylurea/insulin	Neutral	Neutral	↓17%	Neutral	Neutral	↓20%
SAVOR	Saxagliptin	Neutral	Neutral	Neutral	Neutral	↑27%	Improved[a]
EXAMINE	Alogliptin	Neutral	Neutral	Neutral	Neutral	Neutral	ND
TECOS	Sitagliptin	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
ELIXA	Lixisenatide	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
LEADER	Liraglutide	↓15%	↓22%	Neutral	Neutral	Neutral	↓22%
SUSTAIN-6	Semaglutide	Neutral	Neutral	Neutral	↓39%	Neutral	↓36%
EMPAREG	Empagliflozin	↓32%	↓38%	Neutral	Neutral	↓35%	↓39%
CANVAS	Canagliflozin	Neutral	Neutral	Neutral	Neutral	↓33%	↓40%
EXSCEL	QW exenatide	↓14%	Neutral	Neutral	Neutral	Neutral	Neutral

CV, cardiovascular; hHF, hospitalization for heart failure; MI, myocardial infarction; QW, once-weekly.
[a]On the basis of changes of microalbuminuria.
ND, not determined.

2019 new recommendations (6)

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Glucose-lowering treatment
Empagliflozin, canagliflozin, or dapagliflozin are recommended in patients with T2DM and CVD or at very high/high CV risk to reduce CV events
Empagliflozin is recommended in patients with T2DM and CVD to reduce the risk of death
Liraglutide, semaglutide or dulaglutide are recommended in patients with T2DM and CVD or very high/ high CV risk to reduce CV events
Liraglutide is recommended in patients with T2DM and CVD or at very high/high CV risk to reduce the risk of death
Saxagliptin is not recommended in patients with T2DM and a high risk of HF

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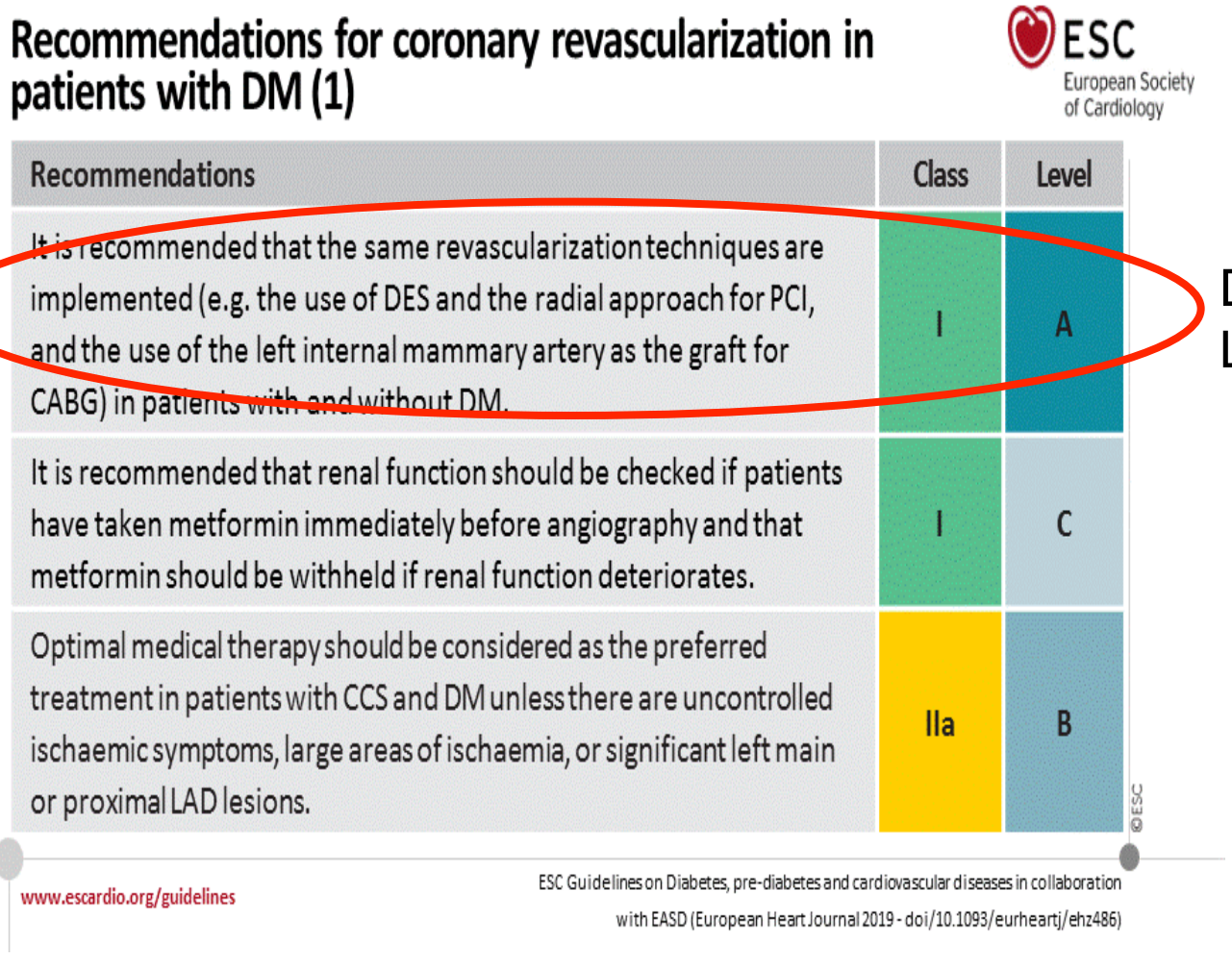
Traitement de la Maladie Coronaire chez le Diabétique

RECOMMANDATIONS DE REVASCULARISATION CORONAIRE CHEZ LE DIABETIQUE



Recommendations for coronary revascularization in patients with DM (1)

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Recommendations	Class	Level
It is recommended that the same revascularization techniques are implemented (e.g. the use of DES and the radial approach for PCI, and the use of the left internal mammary artery as the graft for CABG) in patients with and without DM.	I	A
It is recommended that renal function should be checked if patients have taken metformin immediately before angiography and that metformin should be withheld if renal function deteriorates.	I	C
Optimal medical therapy should be considered as the preferred treatment in patients with CCS and DM unless there are uncontrolled ischaemic symptoms, large areas of ischaemia, or significant left main or proximal LAD lesions.	IIa	B

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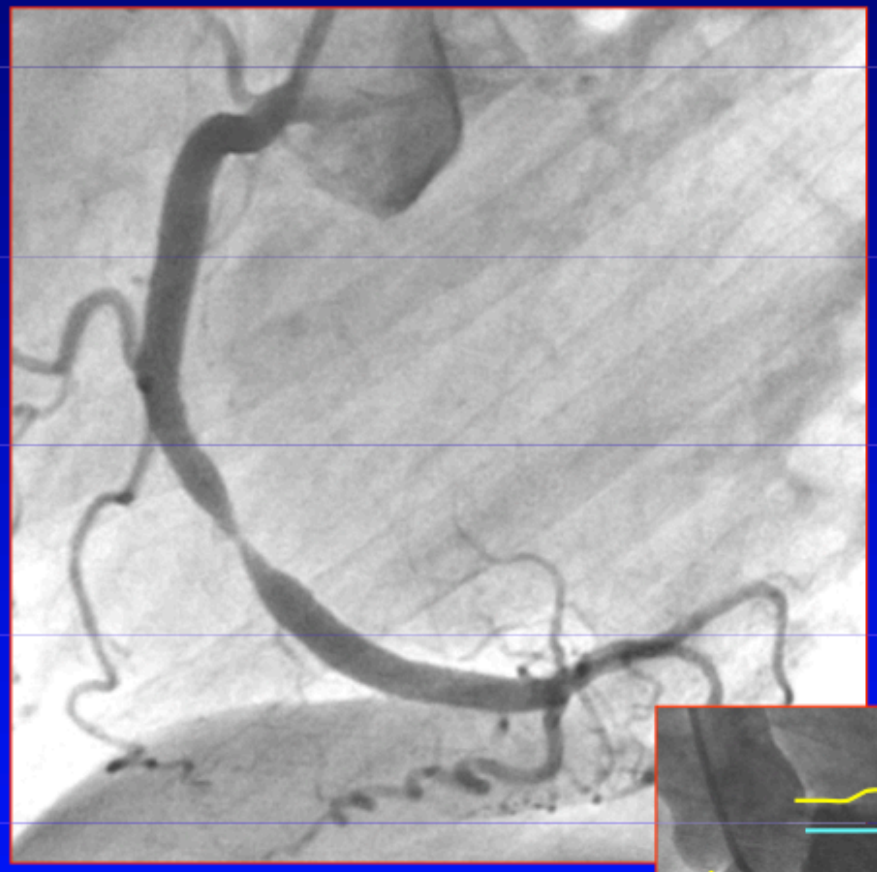
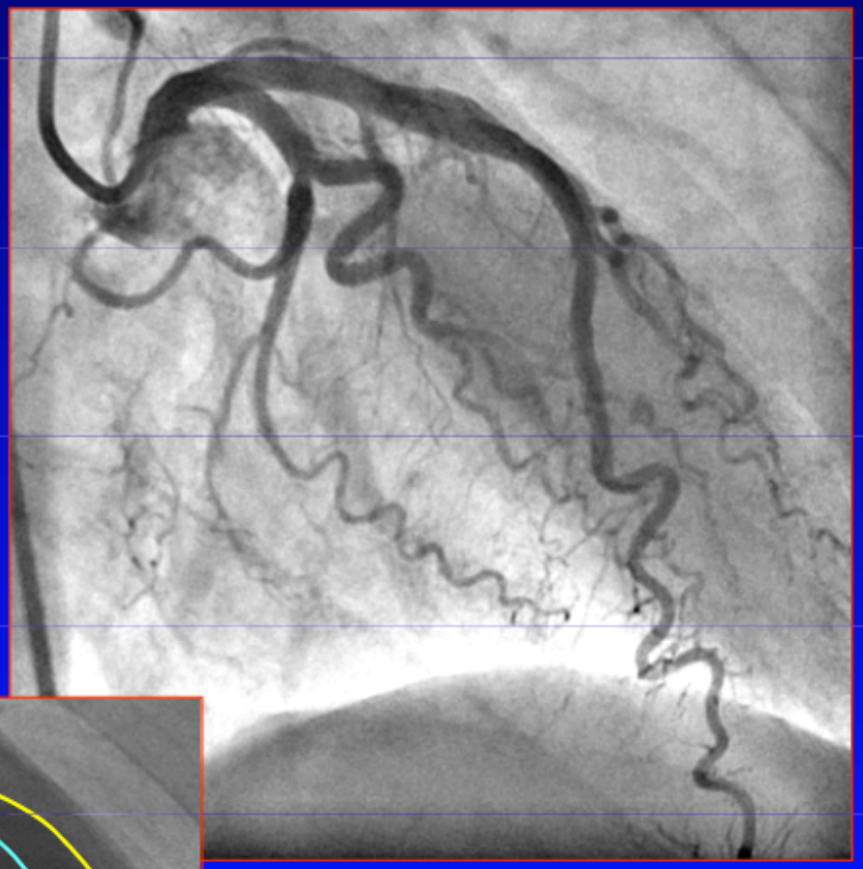
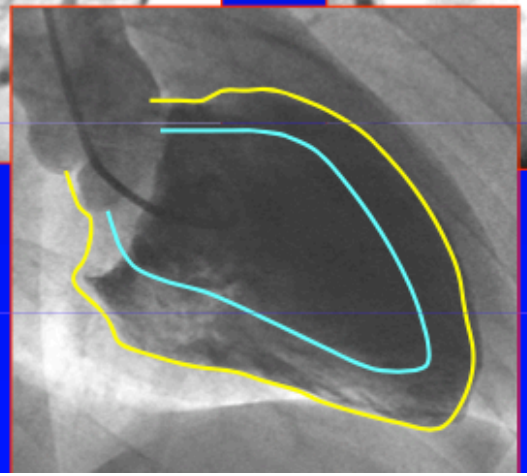
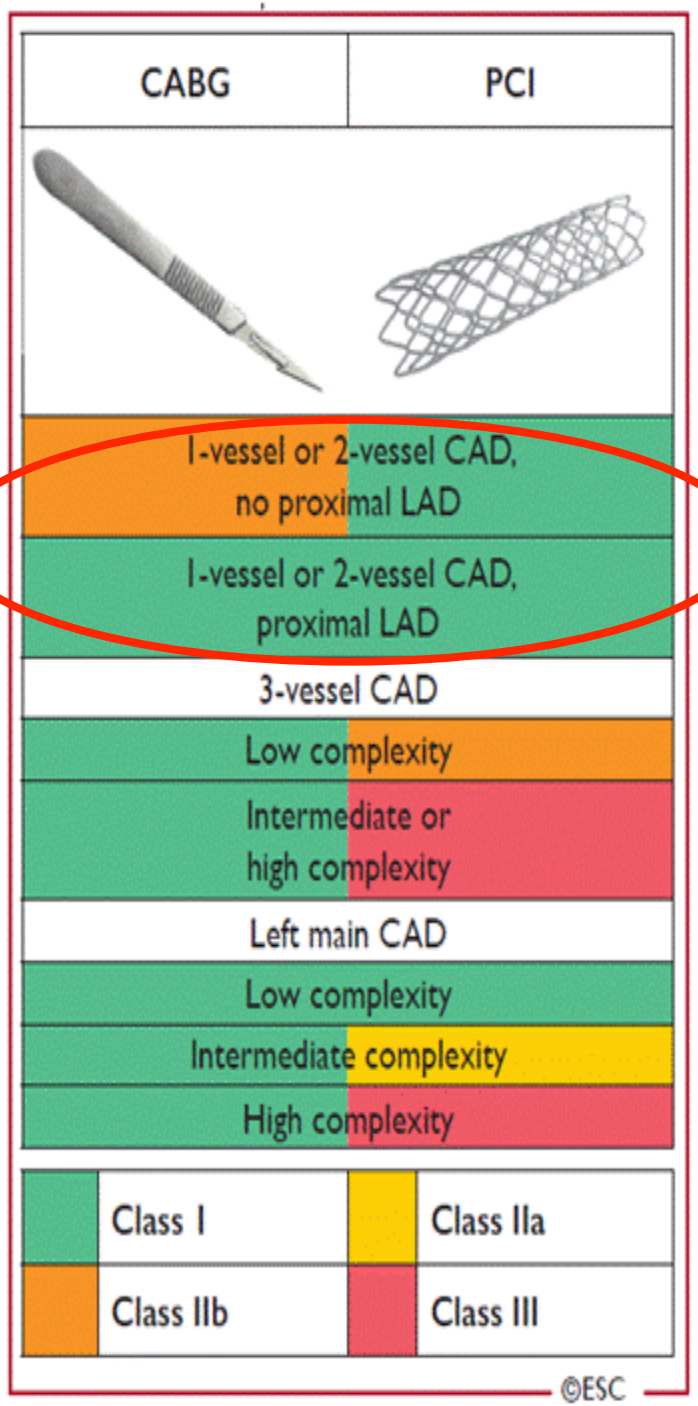
DES et abord radial
LIMA

REVASCULARISATION:
Maladie monotronculaire









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Recommendations for coronary revascularization

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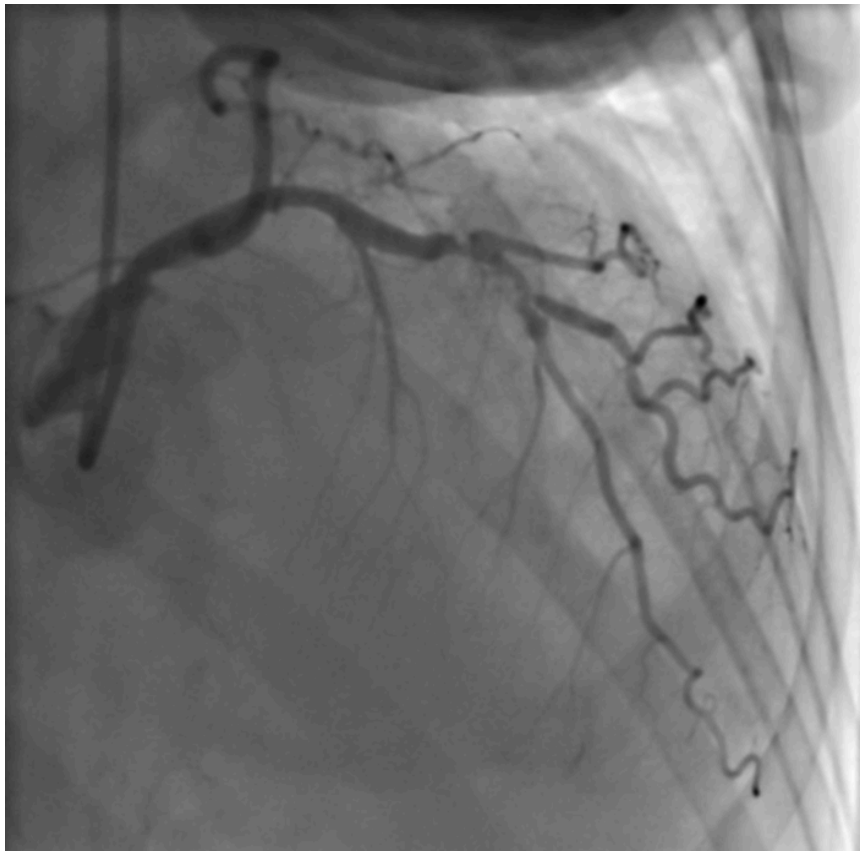
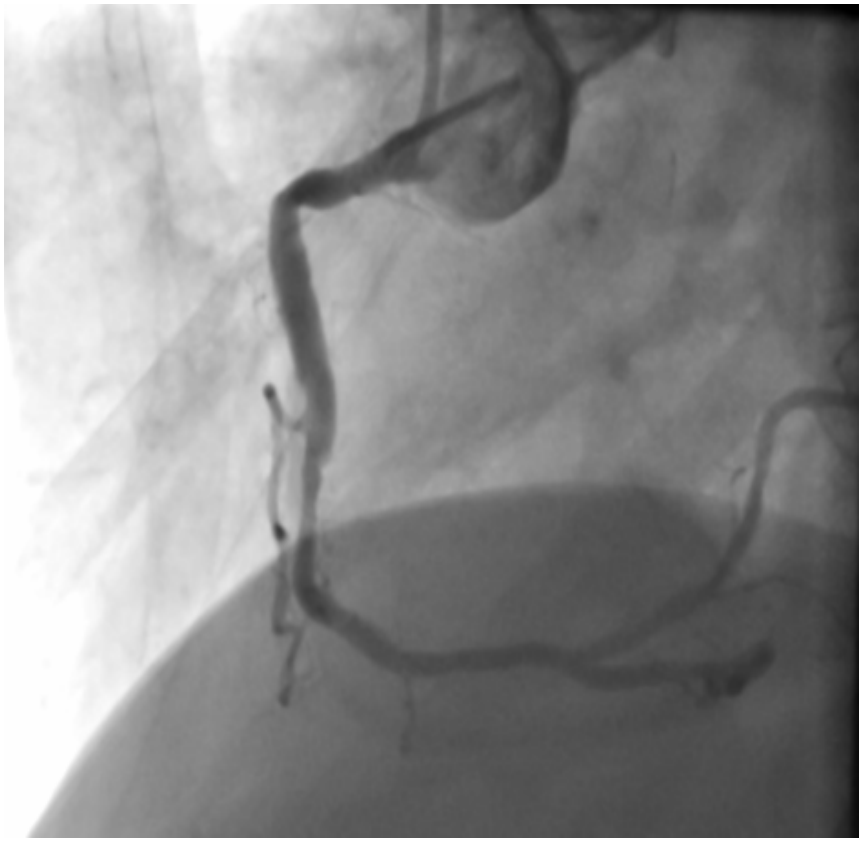
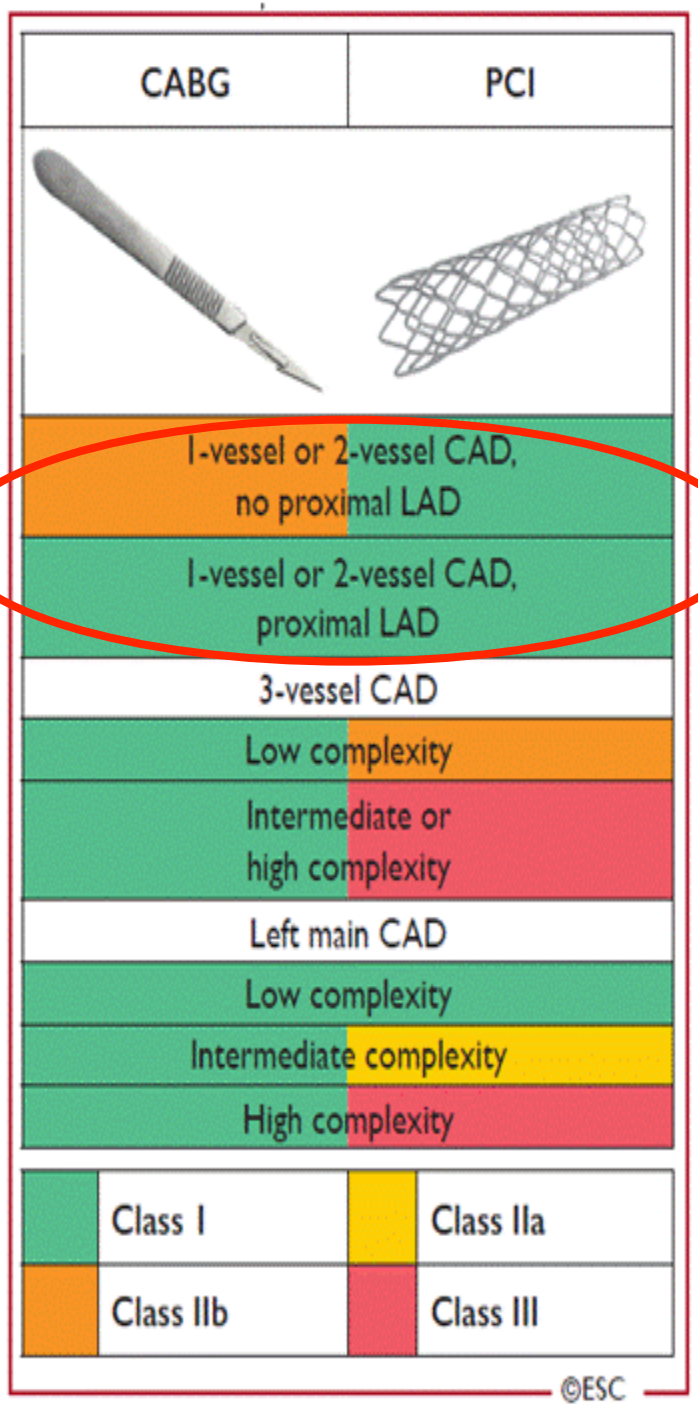
REVASCULARISATION:
Maladie bitronculaire
FFR positive ou ischémie démontrée







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Recommendations for coronary revascularization

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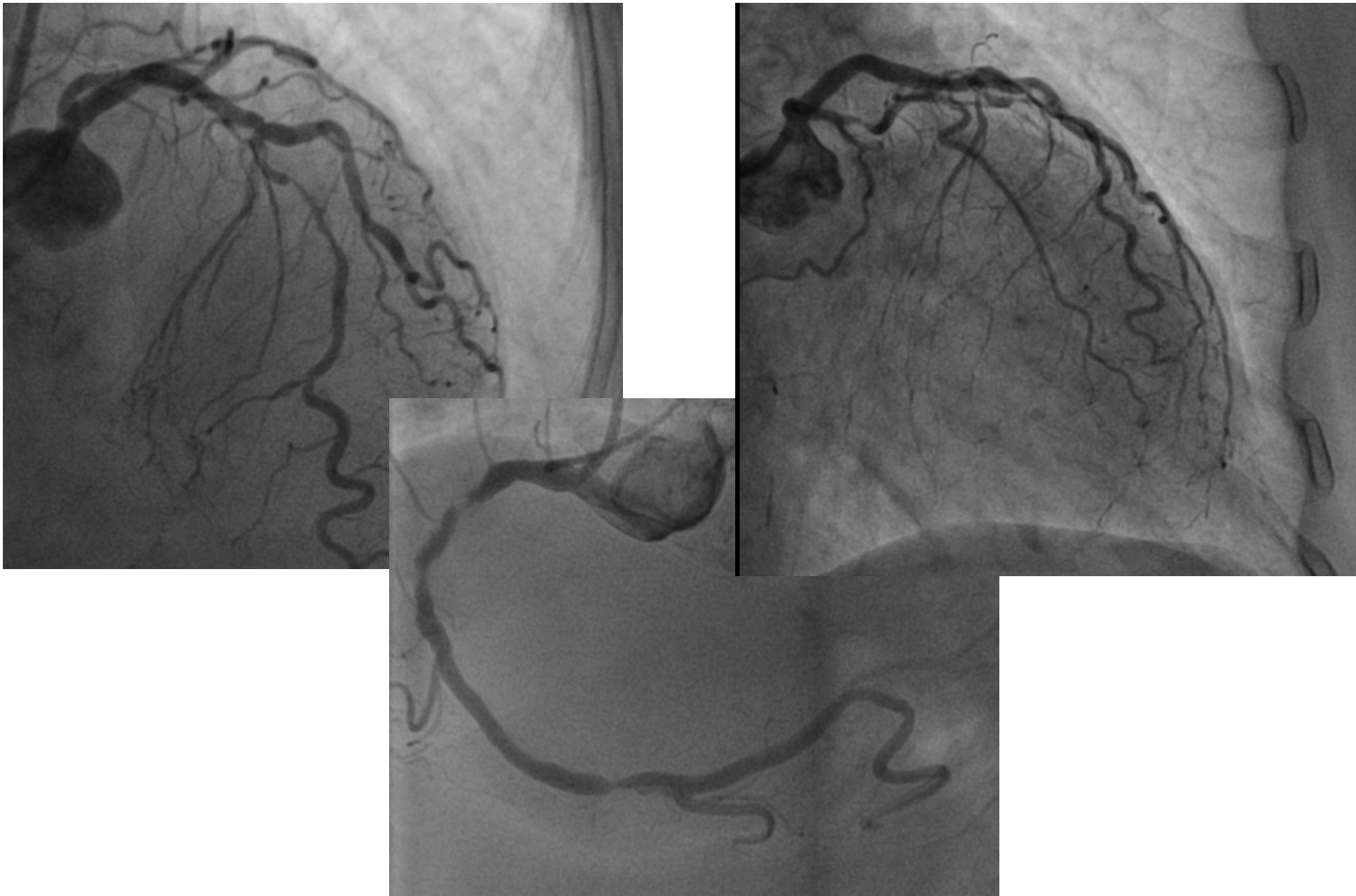
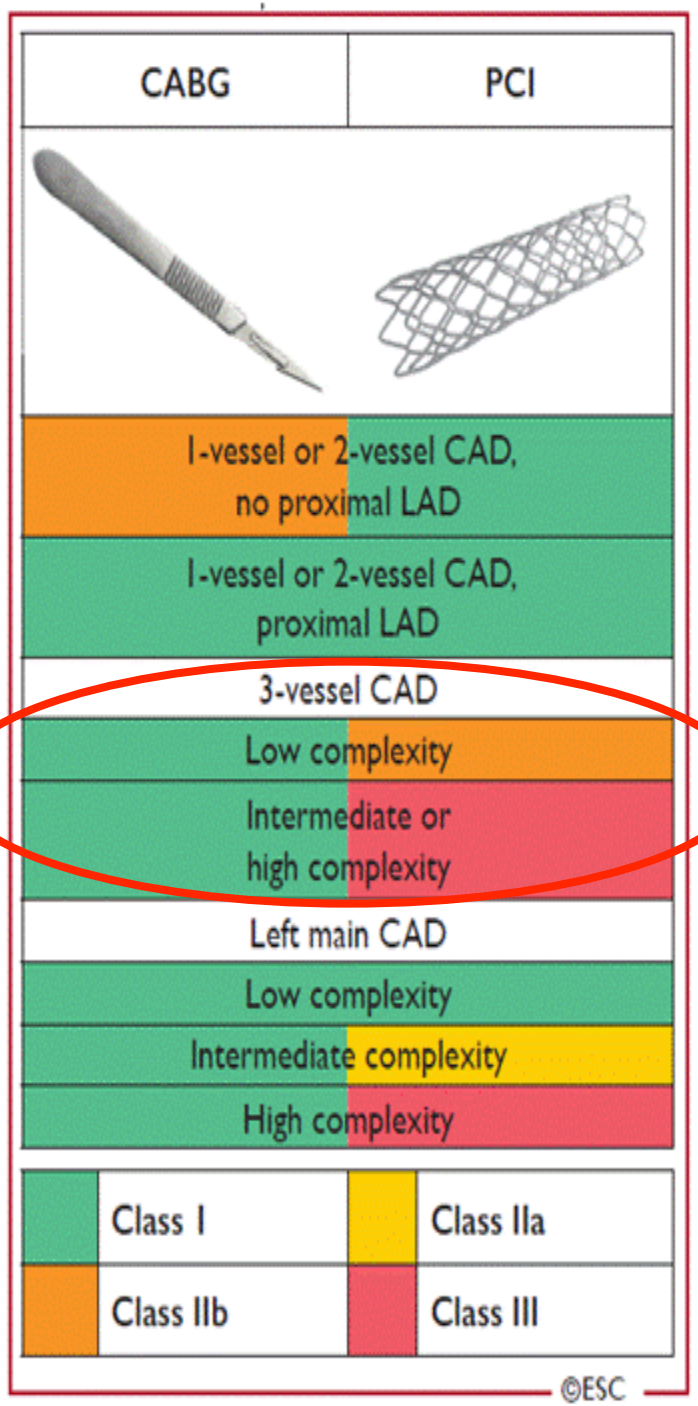
REVASCULARISATION: Maladie tritronculaire





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Recommendations for coronary revascularization

COMPLEXITE ???

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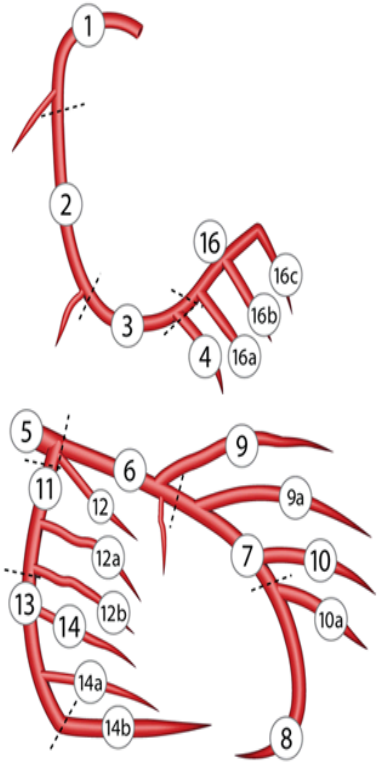
Score SYNTAX



3. Specify which segments are diseased for lesion 1.
Click on the coronary tree image to select or unselect segments.

		Lesion:	1
	Segments:		
RCA	RCA proximal	1	☐
	RCA mid	2	☐
	RCA distal	3	☐
	Posterior descending	4	☐
	Posterolateral from RCA	16	☐
	Posterolateral from RCA	16a	☐
	Posterolateral from RCA	16b	☐
	Posterolateral from RCA	16c	☐
LM	Left main	5	☐
LAD	LAD proximal	6	☐
	LAD mid	7	☐
	LAD apical	8	☐
	First diagonal	9	☐
	Add. first diagonal	9a	☐
	Second diagonal	10	☐
	Add. second diagonal	10a	☐
LCX	Proximal circumflex	11	☐
	Intermediate/anterolateral	12	☐
	Obtuse marginal	12a	☐
	Obtuse marginal	12b	☐
	Distal circumflex	13	☐
	Left posterolateral	14	☐
	Left posterolateral	14a	☐
	Left posterolateral	14b	☐

Please fill in the following variables :

4. Total occlusion (T.O.)
- a. (•) No
- b. ( ) Yes:

5. Trifurcation
- a. ( ) No
- b. (•) Yes
  - i. ( ) 1 diseased segment involved
  - ii. (•) 2 diseased segments involved
  - iii. ( ) 3 diseased segments involved
  - iv. ( ) 4 diseased segments involved

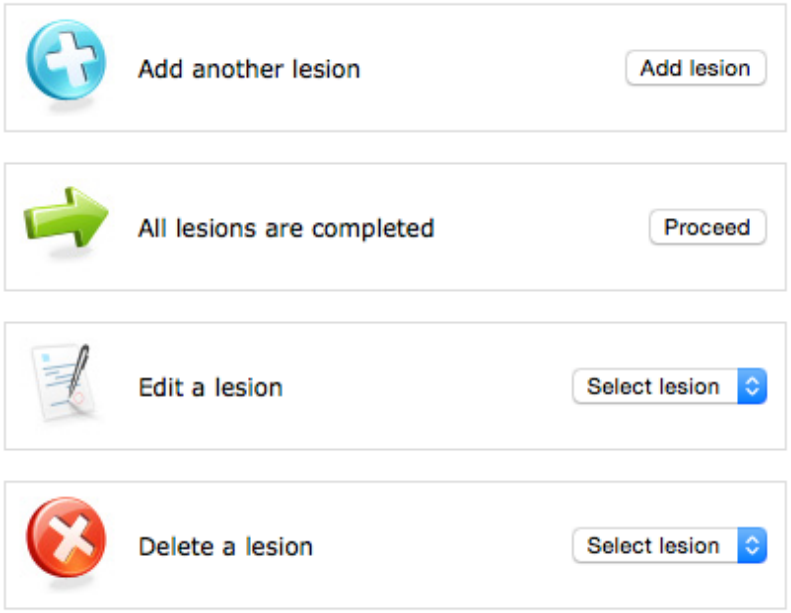
8. Severe Tortuosity
- a. (•) No
- b. ( ) Yes

9. Length >20 mm
- a. ( ) No
- b. (•) Yes

10. Heavy calcification
- a. ( ) No
- b. (•) Yes

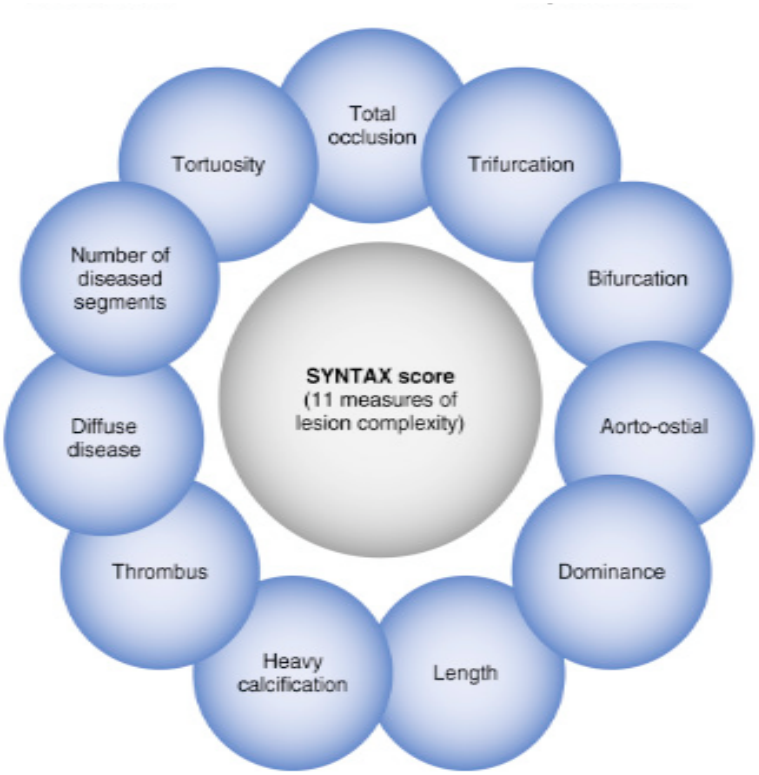
11. Thrombus
- a. (•) No
- b. ( ) Yes

Score SYNTAX



SYNTAX Score I

Lesion 1	
(segment 7): 2.5x2=	5
Trifurcation 2 diseased segment(s) involved	4
Length >20 mm	1
Heavy calcification	2
Sub total lesion 1	*12*
Lesion 2	
(segment 3): 1x2=	2
Sub total lesion 2	*2*
Diffuse disease/Small vessels	
Segment 7	1
Sub total diffuse disease/small vessels	*1*
TOTAL:	*13*



Score Syntax $\leq$ 13

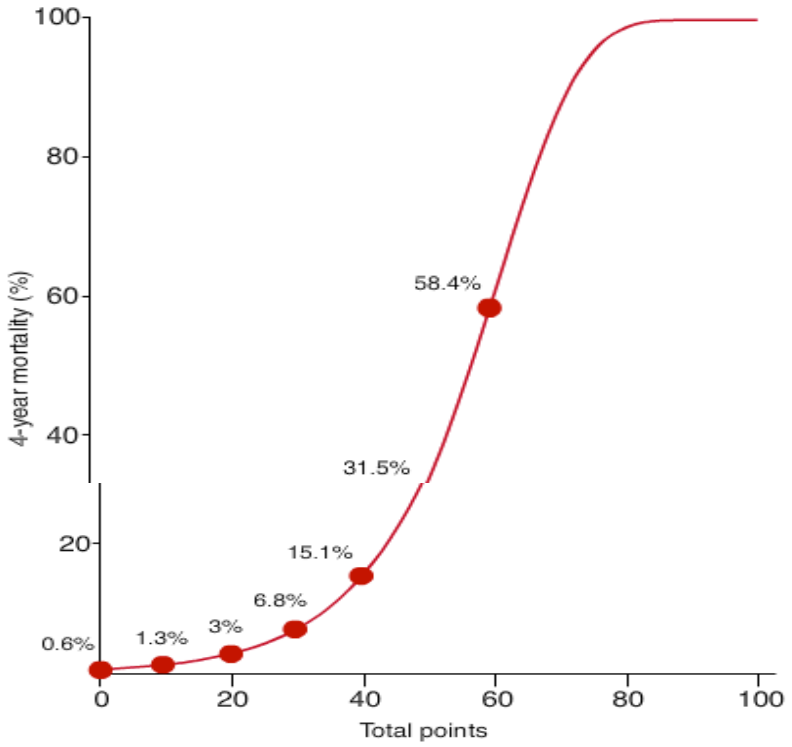
13 < Score Syntax < 23

Score Syntax $\geq$ 23

Score SYNTAX II

Etat général et risque opératoire

SYNTAX SCORE II 4-year mortality



Nomogram depicting predicted 4-year mortality as a function of the SYNTAX II Score for patients proposed to undergo myocardial revascularization (CABG or PCI).

Adapted from Farooq et al., The Lancet. 2013 Feb 23;381(9867):639-50

SYNTAX Score II questions

SYNTAX Score I

Age (years)

CrCl mL/min

LVEF (%)

Left Main ○ no ○ yes

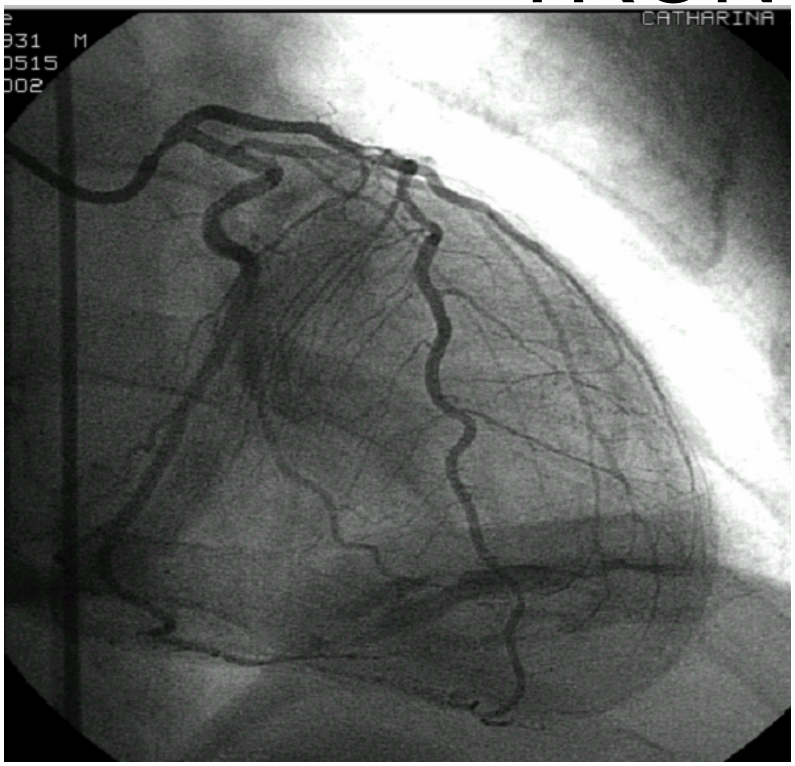
Gender ○ male ○ female

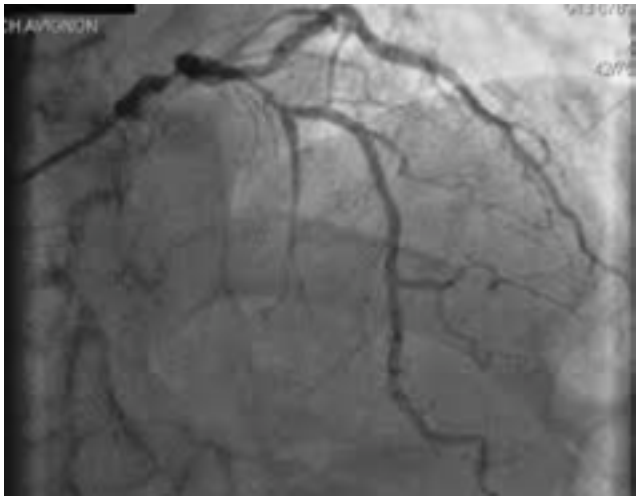
COPD ○ no ○ yes

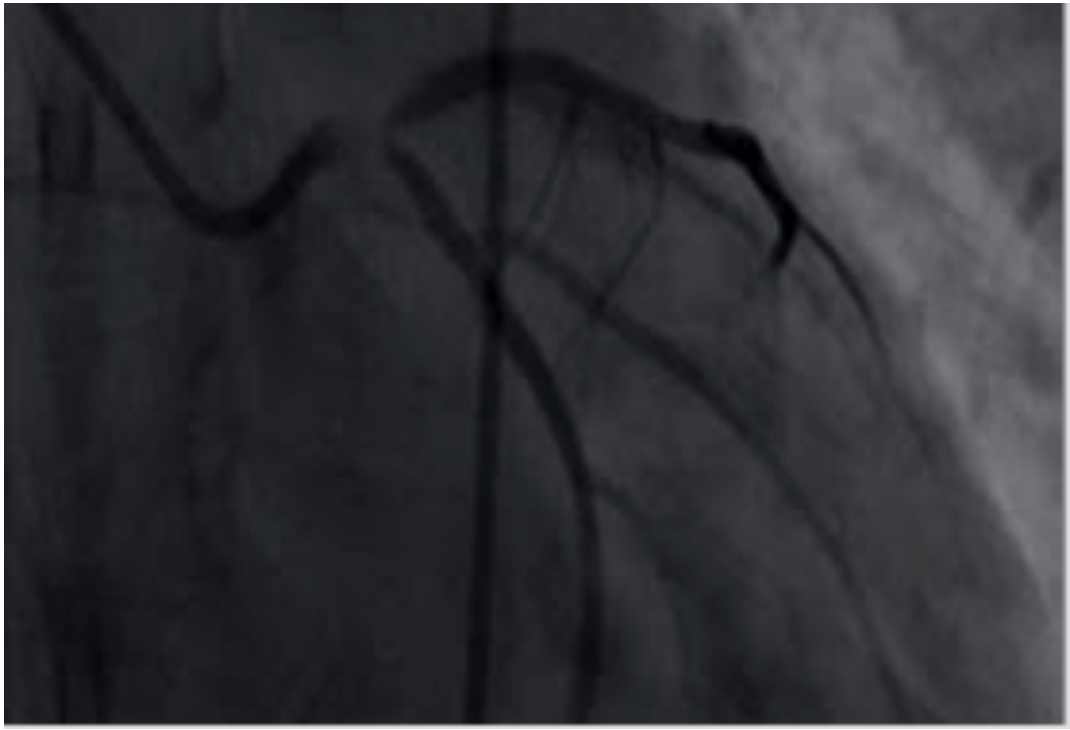
PVD ○ no ○ yes

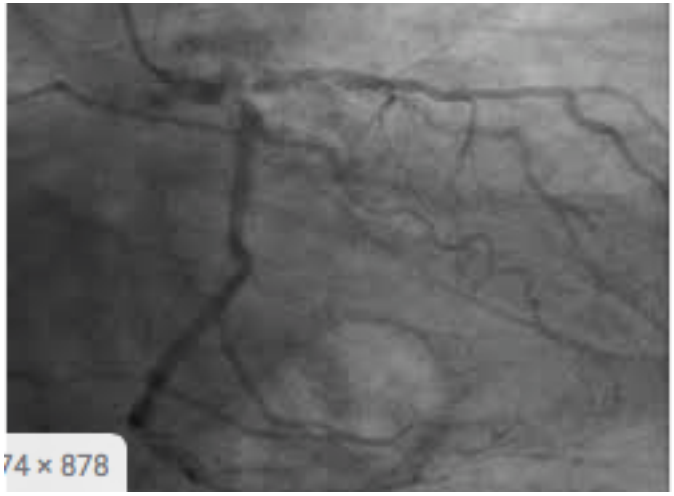
SYNTAX Score II Calculate

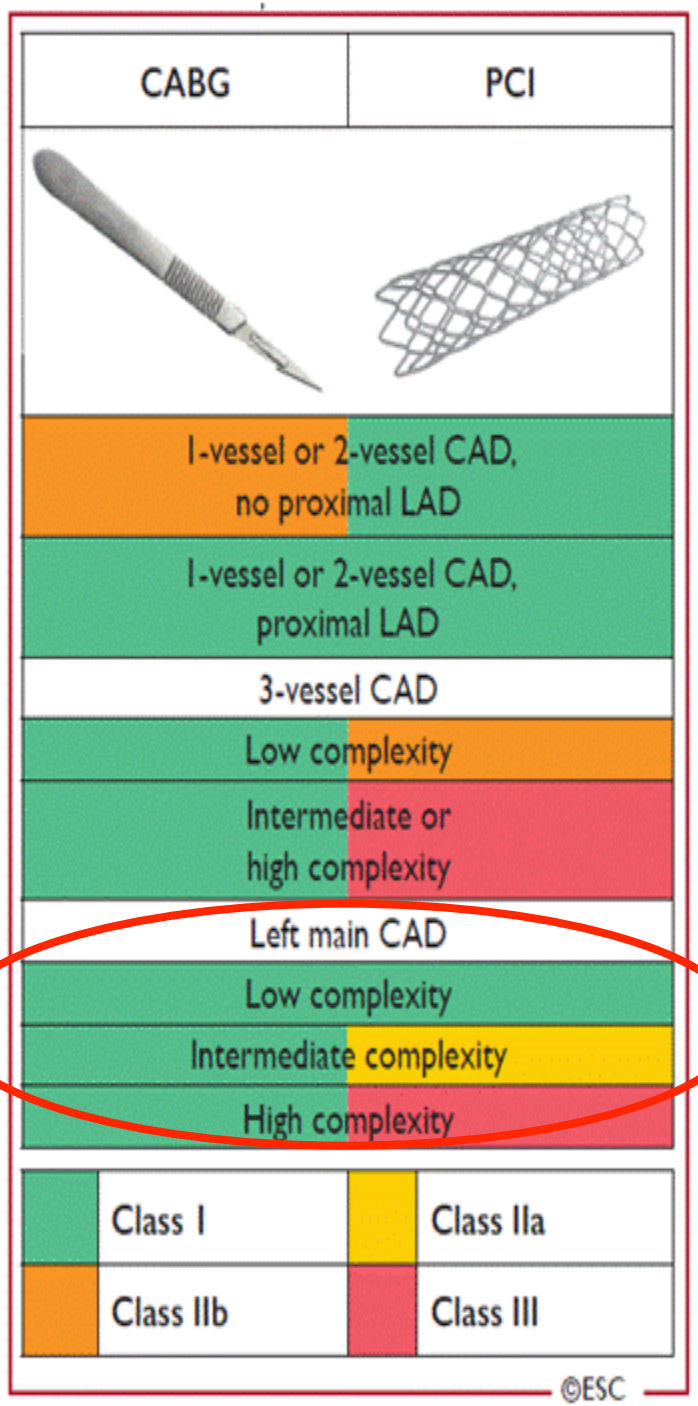
TRONC COMMUN











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Recommendations for coronary revascularization

COMPLEXITE ???

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The NEW ENGLAND JOURNAL of MEDICINE

Ticagrelor in Stable Coronary Disease and Diabetes

MULTICENTER, DOUBLE-BLIND, RANDOMIZED, CONTROLLED TRIAL

19,220
Patients with type 2 diabetes and stable coronary artery disease

	Ticagrelor 60 mg twice daily + low-dose aspirin 75–150 mg once daily		Placebo + low-dose aspirin 75–150 mg once daily
	 N=9619		 N=9601
Cardiovascular death, MI, or stroke (median follow-up, 39.9 mo)	7.7% (N=736)	P=0.04	8.5% (N=818)
TIMI major bleeding	2.2% (N=206)	P<0.001	1.0% (N=100)

Ticagrelor + aspirin decreased ischemic cardiovascular events but increased major bleeding

P.G. Steg et al. 10.1056/NEJMoa1908077

2019 new recommendations (5)

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Antiplatelet and antithrombotic drugs
Concomitant use of a proton pump inhibitor is recommended in patients receiving aspirin monotherapy, DAPT, or oral anticoagulant monotherapy who are at high risk of gastrointestinal bleeding
Prolongation of DAPT beyond 12 months should be considered for up to 3 years in patients with DM at very high risk who have tolerated DAPT without major bleeding complications

ESC Guidelines on Diabetes, pre-diabetes and cardiovascular diseases in collaboration with EASD (European Heart Journal 2019 - doi/10.1093/eurheartj/ehz486)

Recommendations for the management of patients with DM and ACS or CCS (3)

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Recommendations	Class	Level
The addition of a second antithrombotic drug on top of aspirin for long-term secondary prevention should be considered in patients without high bleeding risk.	IIa	A
Beta-blockers may be considered in patients with DM and CAD.	IIb	B

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Recommendations for the management of patients with DM and ACS or CCS (1)

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Recommendations	Class	Level
ACEIs or ARBs are indicated in patients with DM and CAD to reduce the risk of CV events.	I	A
Statin therapy is recommended in patients with DM and CAD to reduce the risk of CV events.	I	A
Aspirin at a dose of 75–160 mg/day is recommended as secondary prevention in DM.	I	A
Treatment with a $P2Y_{12}$ receptor blocker, ticagrelor or prasugrel, is recommended in patients with DM and ACS for 1year with aspirin, and in those who undergo PCI or CABG.	I	A

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Recommendations for the management of patients with DM and ACS or CCS (2)

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Recommendations	Class	Level
Concomitant use of a proton pump inhibitor is recommended in patients receiving DAPT or oral anticoagulant monotherapy who are at high risk of gastrointestinal bleeding.	I	A
Clopidogrel is recommended as an alternative antiplatelet therapy in case of aspirin intolerance.	I	B
Prolongation of DAPT beyond 12 months should be considered, for up to 3 years, in patients with DM who have tolerated DAPT without major bleeding complications.	IIa	A

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CV risk categories in patients with DM

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Very high-risk	Patients with DM **and** established CVD **or** other target organ damage[a] **or** three or more major risk factors[b] **or** early onset T1DM of long duration (>20 years)
High-risk	Patients with DM duration ≥10 years without target organ damage plus any other additional risk factor
Moderate-risk	Young patients (T1DM <35 years; T2DM <50 years) with DM duration <10 years, without other risk factors

[a]Proteinurea, renal impairment defined as eGFR < 30mL/min/1.73m^2, left ventricular hypertrophy, or retinopathy.
[b]Age, hypertension, dyslipidaemia, smoking, obesity

ESC Guidelines on Diabetes, pre-diabetes and cardiovascular diseases in collaboration with EASD (European Heart Journal 2019 - doi/10.1093/eurheartj/ehz486)

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