



Hôpitaux
Universitaires
Genève



UNIVERSITÉ
DE GENÈVE
FACULTÉ DE MÉDECINE

Presa a carico della malattia coronarica nel 2025

Prof. Marco Roffi

Responsabile Unità di Cardiologia Interventistica

Ospedale Universitario di Ginevra

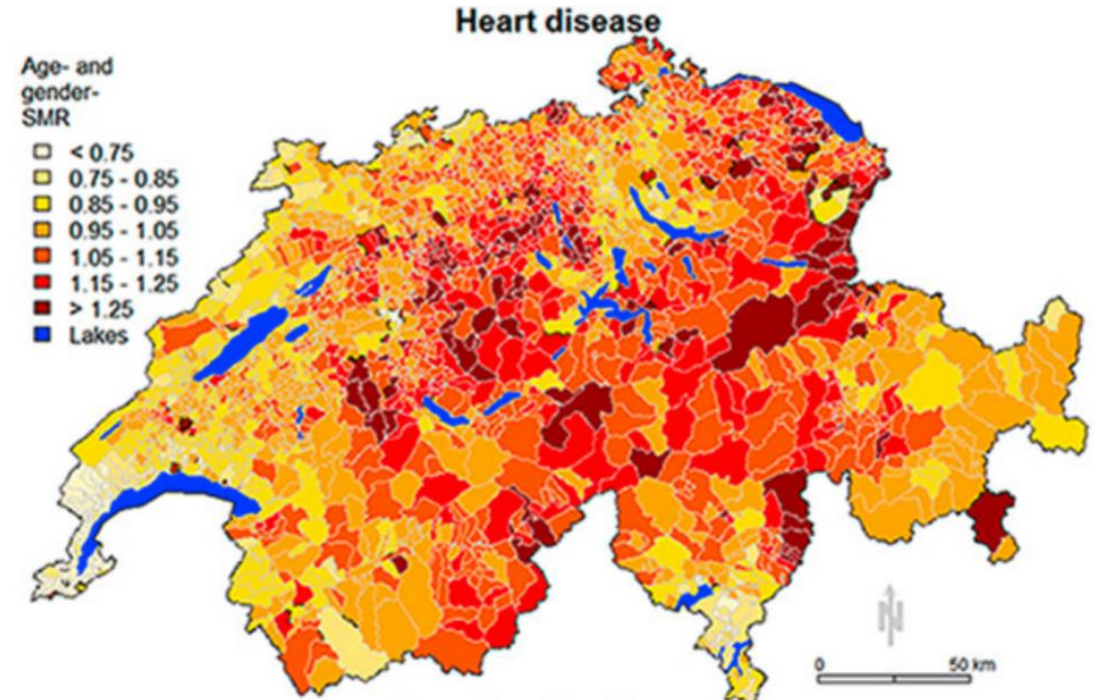
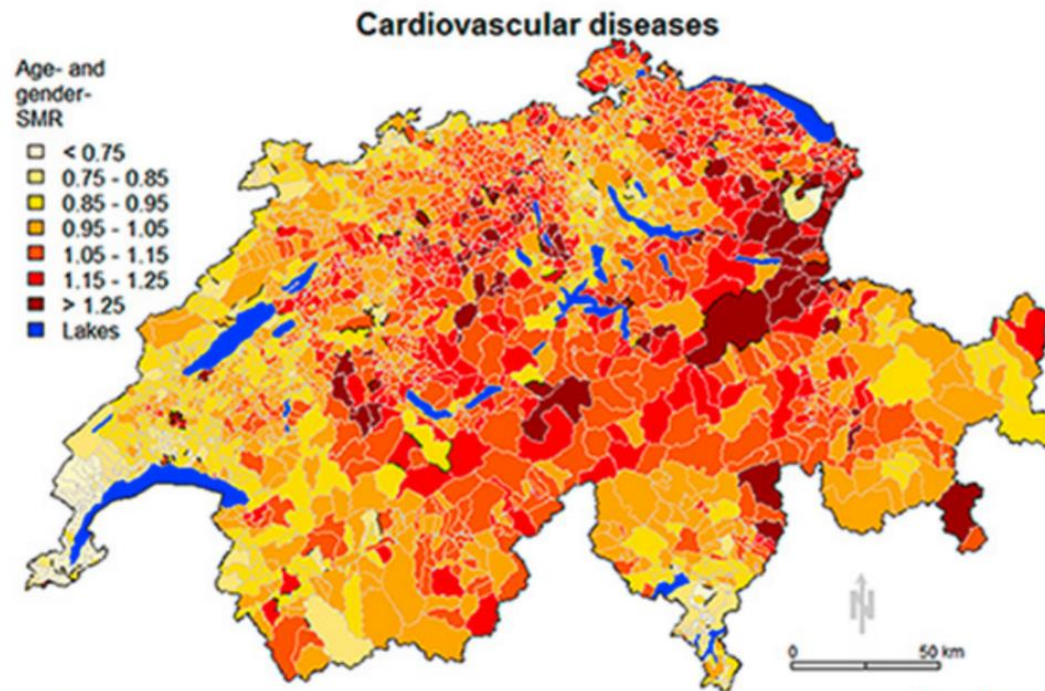


Declaration of interest

Institutional research grants from

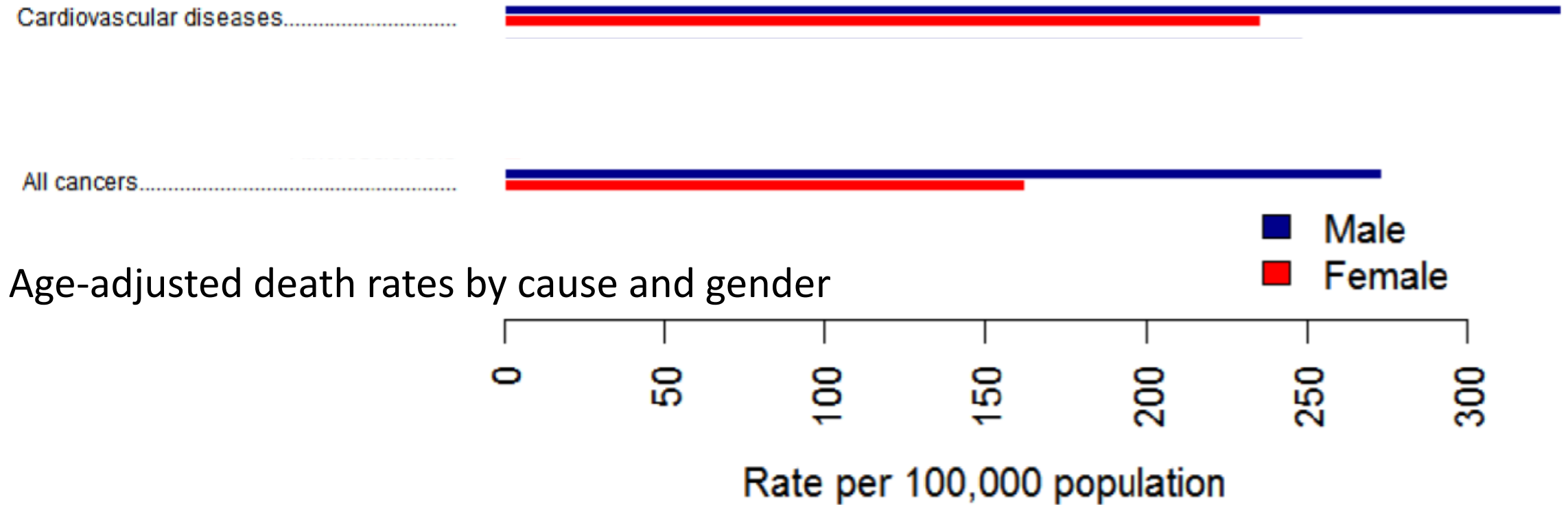
- Cordis, Terumo, Boston Scientific, Biotronik, Vascular Medical

Geographical distribution of mortality risk due to cardiovascular / heart disease in Switzerland 2008 – 2012



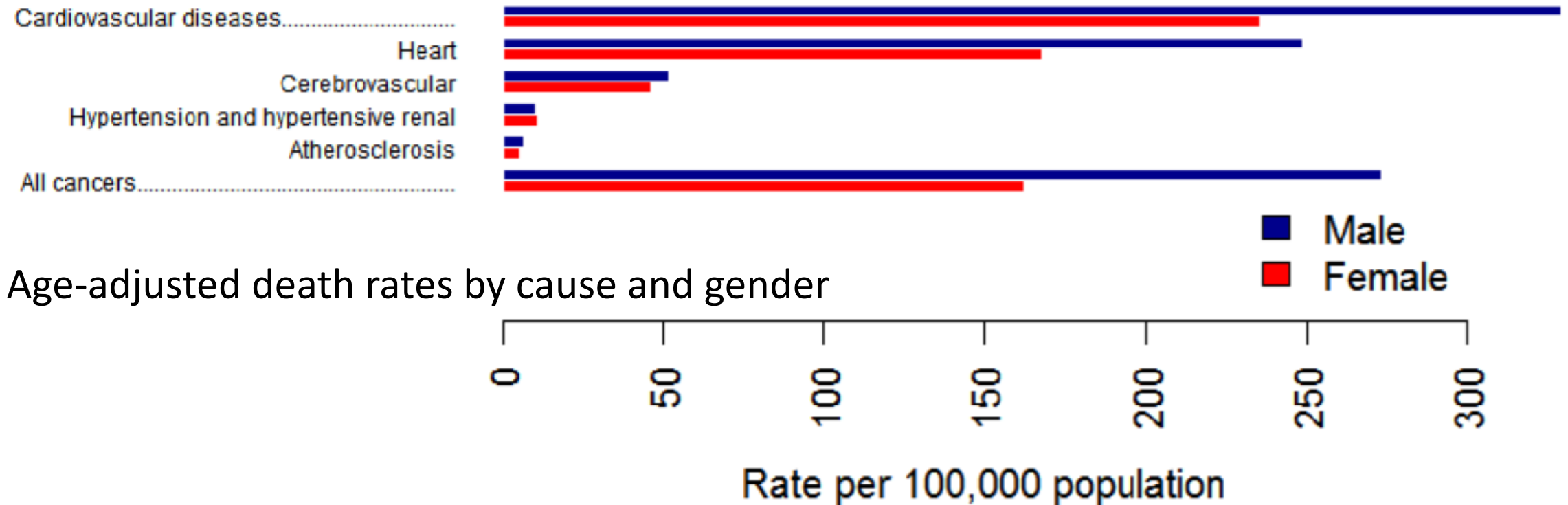
Cardiovascular diseases accounted for 36% of deaths in Switzerland 2008–2012 → leading cause of mortality

Cardiovascular Mortality in Women



Cardiovascular disease → leading cause of mortality among men and women in Switzerland 2008 – 2012

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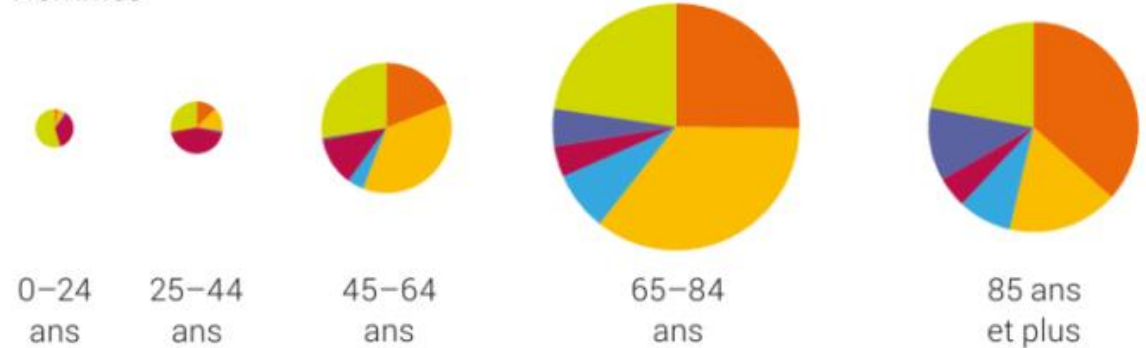
Mortalité cardiovasculaire chez la femme

Chez la femme la maladie coronarienne
se manifeste environ 10 ans plus tard
que chez l'homme

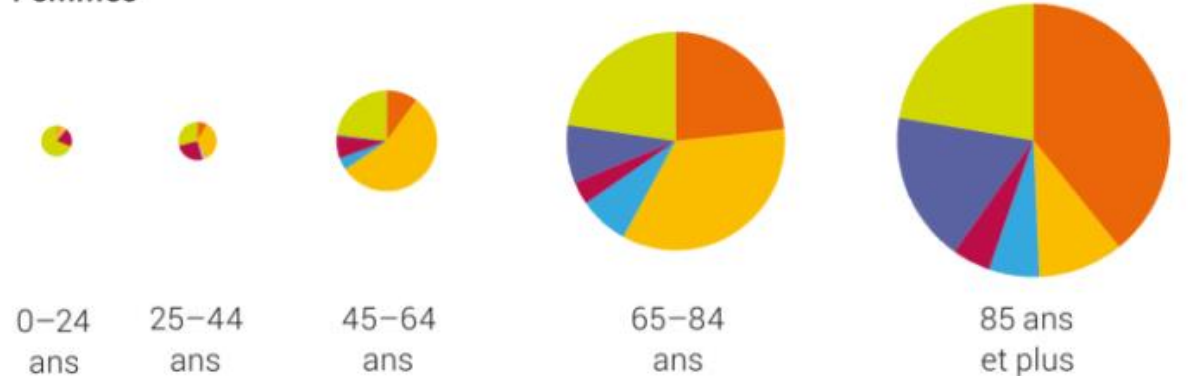


Principales causes de décès selon le groupe d'âge, en 2019

Hommes



Femmes



Les surfaces sont proportionnelles au nombre absolu de décès.

Mortalité cardiovasculaire chez la femme

Maladie CV comme cause de décès
Age 25 - 64 ans



hommes >> femmes*

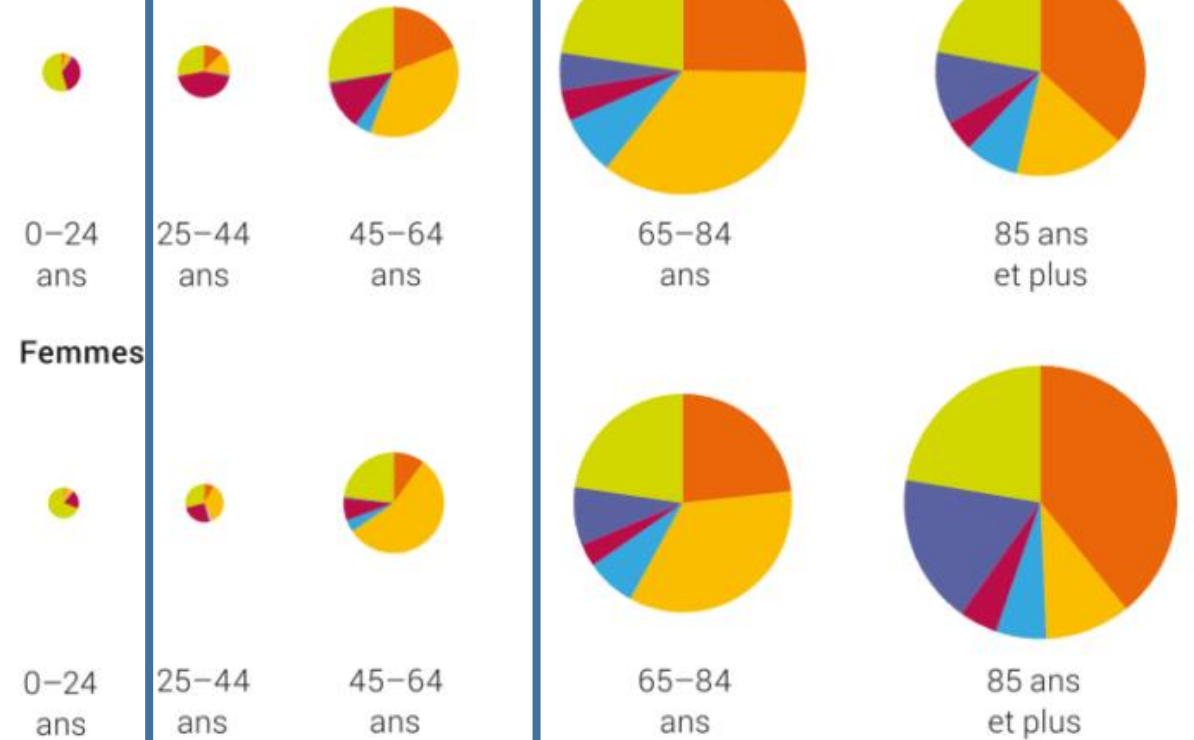
*Raisons de l'excès de mortalité chez les hommes

1. Plus de décès dans cette tranche d'âge
2. Proportion de décès CV plus importante



Principales causes de décès selon le groupe d'âge, en 2019

Hommes



Mortalité cardiovasculaire chez la femme

Maladie CV comme cause de décès
Age 65 - 85 ans



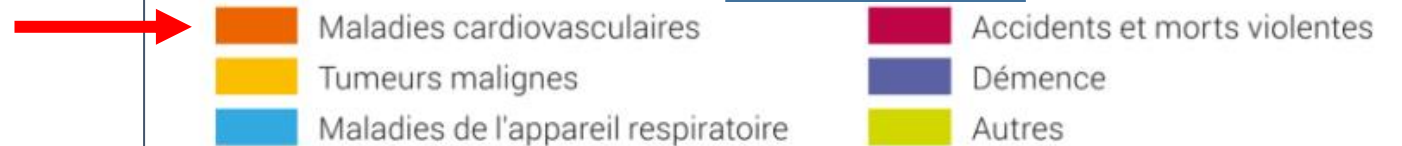
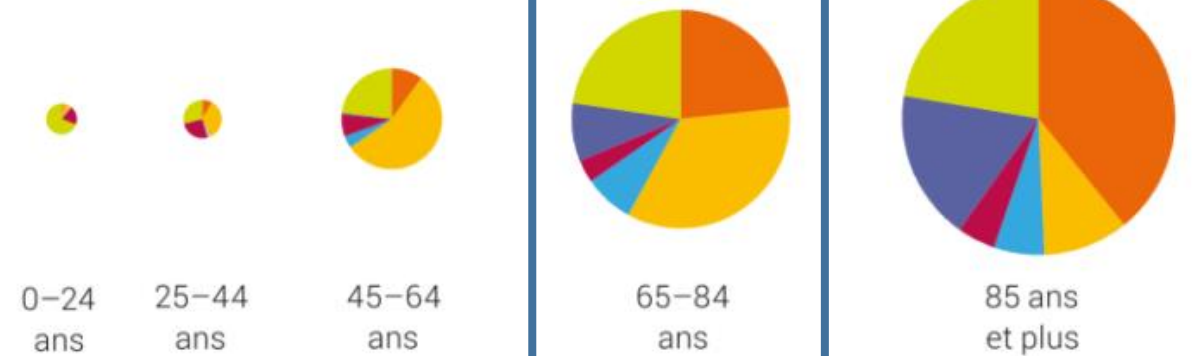
hommes > femmes

Principales causes de décès selon le groupe d'âge, en 2019

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Femmes



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Mortalité cardiovasculaire chez la femme

Maladie CV comme cause de décès
Age > 85 ans

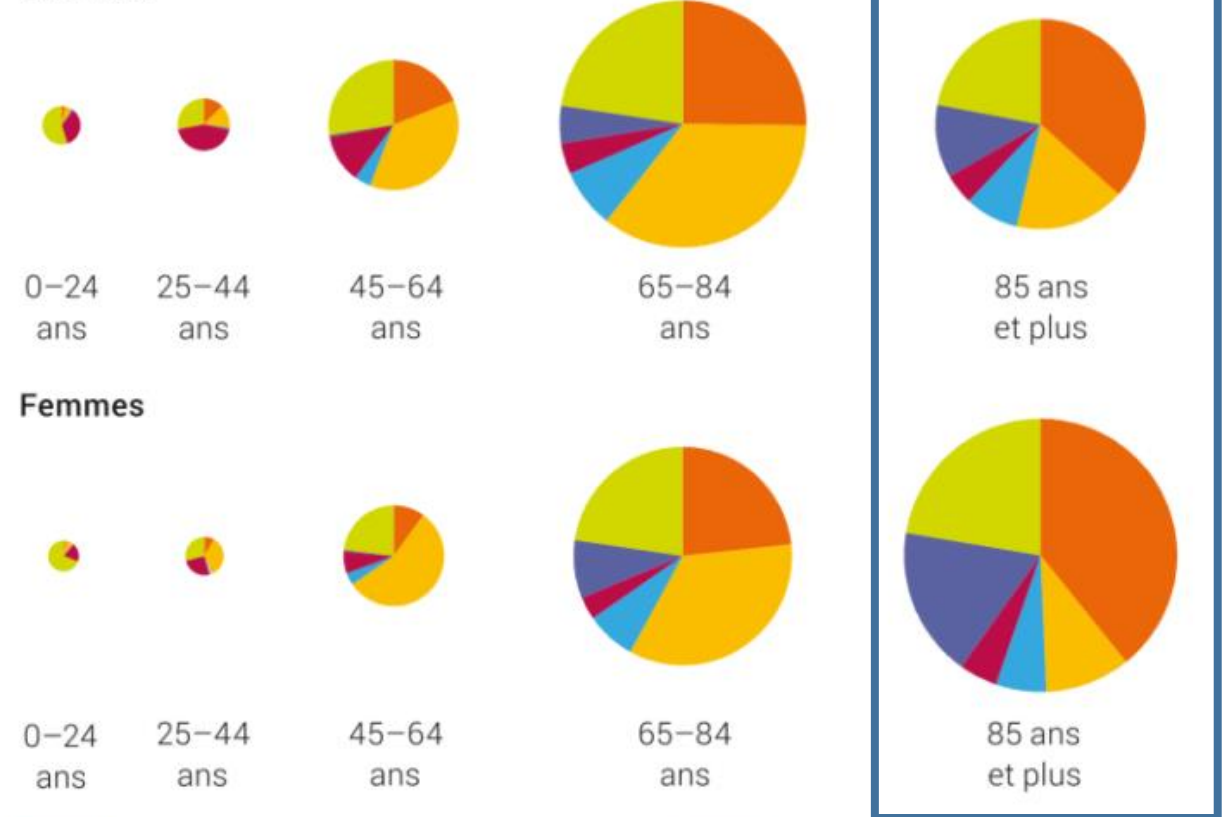


femmes >>> hommes

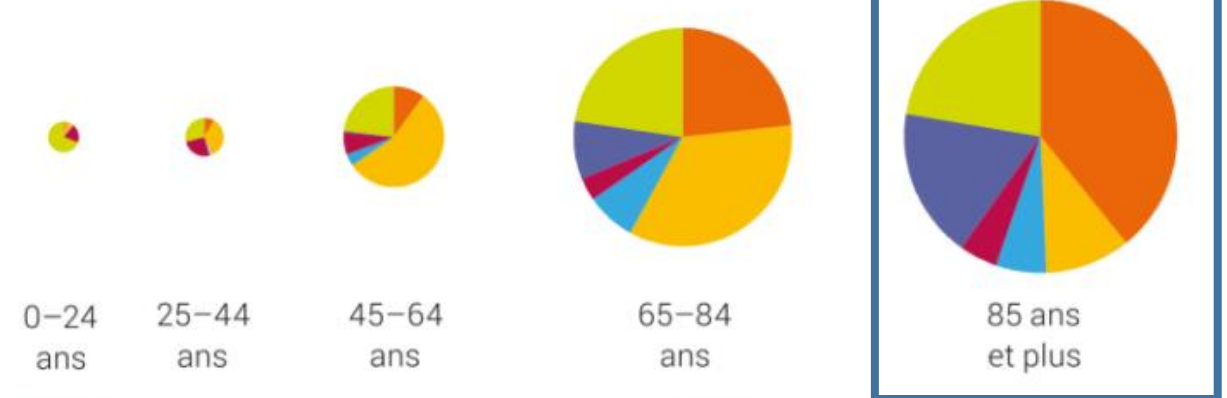


Principales causes de décès selon le groupe d'âge, en 2019

Hommes



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Les surfaces sont proportionnelles au nombre absolu de décès.

Malattia coronarica

- Malattia coronarica cronica (chronic coronary syndromes = CCS)
- Malattia coronarica acuta (acute coronary syndromes = ACS)
 - Infarto STEMI (ST-elevation myocardial infarction)
 - Infarto NSTEMI (non-ST-elevation myocardial infarction)
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ESC

European Society
of Cardiology

European Heart Journal (2024) **00**, 1–123

<https://doi.org/10.1093/eurheartj/ehae177>

ESC GUIDELINES

2024 ESC Guidelines for the management of chronic coronary syndromes

Vrints V et al. Eur Heart J 2024;45:3415-3537

www.escardio.org/Guidelines

Investigations in patients with suspected chronic coronary syndromes

- Step 1 rule out non cardiac causes of symptoms
- Step 2 establish the likelihood of obstructive coronary artery disease (CAD)
- Step 3 confirm the diagnosis of CAD and establish the risk of cardiovascular events

Clinical likelihood of obstructive coronary artery disease (CAD)

1

Symptom score (0–3 points)

Chest pain characteristics

Type and location

Constricting discomfort located retrosternally or in neck, jaw, shoulder or arm (1 point)

Aggravated by

Physical or emotional stress (1 point)

Relieved by

Rest or nitrates within 5 min (1 point)

Dyspnoea characteristics

Shortness of breath and/or trouble catching breath aggravated by physical exertion (2 points)

Symptom score

Main symptom either:

Chest pain
(0–3 points)

or

Dyspnoea
(2 points)

2

Number of risk factors for CAD (0–5):

Family history, smoking, dyslipidaemia, hypertension and diabetes

Clinical likelihood of obstructive coronary artery disease (CAD)

1

Symptom score (0–3 points)

Chest pain characteristics

Type and location

Constricting discomfort located retrosternally or in neck, jaw, shoulder or arm (1 point)

Aggravated by

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(2 points)

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Number of risk factors for CAD (0–5):

Family history, smoking, dyslipidaemia, hypertension and diabetes

Clinical likelihood of obstructive coronary artery disease (CAD)

3

Estimate the Risk Factor-weighted Clinical Likelihood (RF-CL)
of obstructive CAD

Symptom score

0–1 point

2 points

3 points

Number of
risk factors

 Women

 Men

 Women

 Men

 Women

 Men

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

Age 30–39

0 1 2

1 2 5

0 1 3

2 4 8

2 5 10

9 14 22

Age 40–49

1 1 3

2 4 8

1 2 5

3 6 12

4 7 12

14 20 27

Age 50–59

1 2 5

4 7 12

2 3 7

6 11 17

6 10 15

21 27 33

Age 60–69

2 4 7

8 12 17

3 6 11

12 17 25

10 14 19

32 35 39

Age 70–80

4 7 11

15 19 24

6 10 16

22 27 34

16 19 23

44 44 45

Clinical likelihood:

 Very low

 Low

 Moderate

Clinical likelihood of obstructive coronary artery disease (CAD)

3

Estimate the Risk Factor-weighted Clinical Likelihood (RF-CL)
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Symptom score

0–1 point

2 points

3 points



Women



Men



Women



Men



Women



Men

Number of
risk factors

0–1 2–3 4–5

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Age 30–39

0 1 2

1 2 5

0 1 3

2 4 8

2 5 10

9 14 22

Age 40–49

1 1 3

2 4 8

1 2 5

3 6 12

4 7 12

14 20 27

Age 50–59

1 2 5

4 7 12

2 3 7

6 11 17

6 10 15

21 27 33

Age 60–69

2 4 7

8 12 17

3 6 11

12 17 25

10 14 19

32 35 39

Age 70–80

4 7 11

15 19 24

6 10 16

22 27 34

16 19 23

44 44 45

Clinical likelihood:

● Very low

● Low

● Moderate



Clinical likelihood of obstructive coronary artery disease (CAD)

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Estimate the Risk Factor-weighted Clinical Likelihood (RF-CL)
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Symptom score

0–1 point

2 points

3 points

Number of
risk factors

Age 30–39

Age 40–49

Age 50–59

Age 60–69

Age 70–80

 Women

 Men

 Women

 Men

 Women

 Men

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0–1 2–3 4–5

0 1 2

1 2 5

0 1 3

2 4 8

2 5 10

9 14 22

1 1 3

2 4 8

1 2 5

3 6 12

4 7 12

14 20 27

1 2 5

4 7 12

2 3 7

6 11 17

6 10 15

21 27 33

2 4 7

8 12 17

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10 14 19

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15 19 24

6 10 16

22 27 34

16 19 23

44 44 45

Clinical likelihood:

 Very low

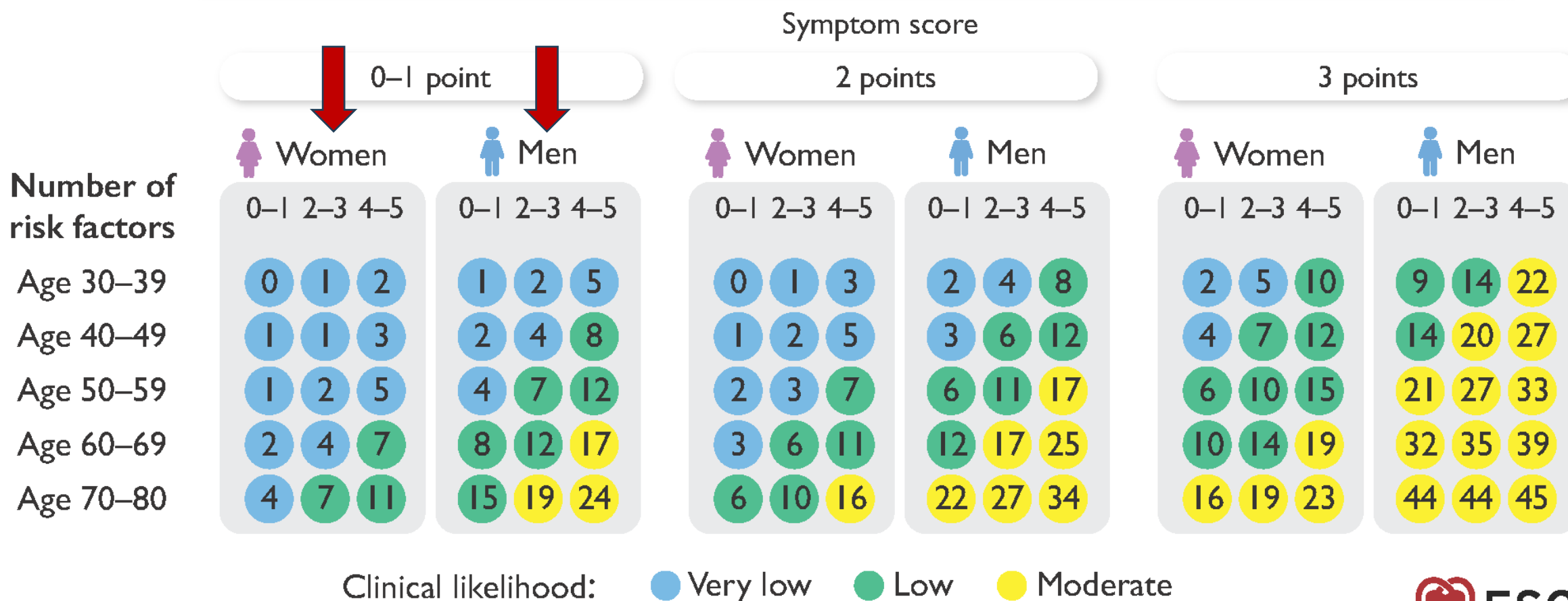
 Low

 Moderate

Clinical likelihood of obstructive coronary artery disease (CAD)

3

Estimate the Risk Factor-weighted Clinical Likelihood (RF-CL)
of obstructive CAD



Adjustment and reclassification of clinical likelihood of obstructive coronary artery disease (CAD)

2

Adjust clinical likelihood based on abnormal clinical findings

(Class I)

Resting ECG changes (Q-wave or ST-segment/T-wave changes)

Exercise ECG with abnormal findings

LV dysfunction (severe or segmental)

Ventricular arrhythmia

Peripheral artery disease

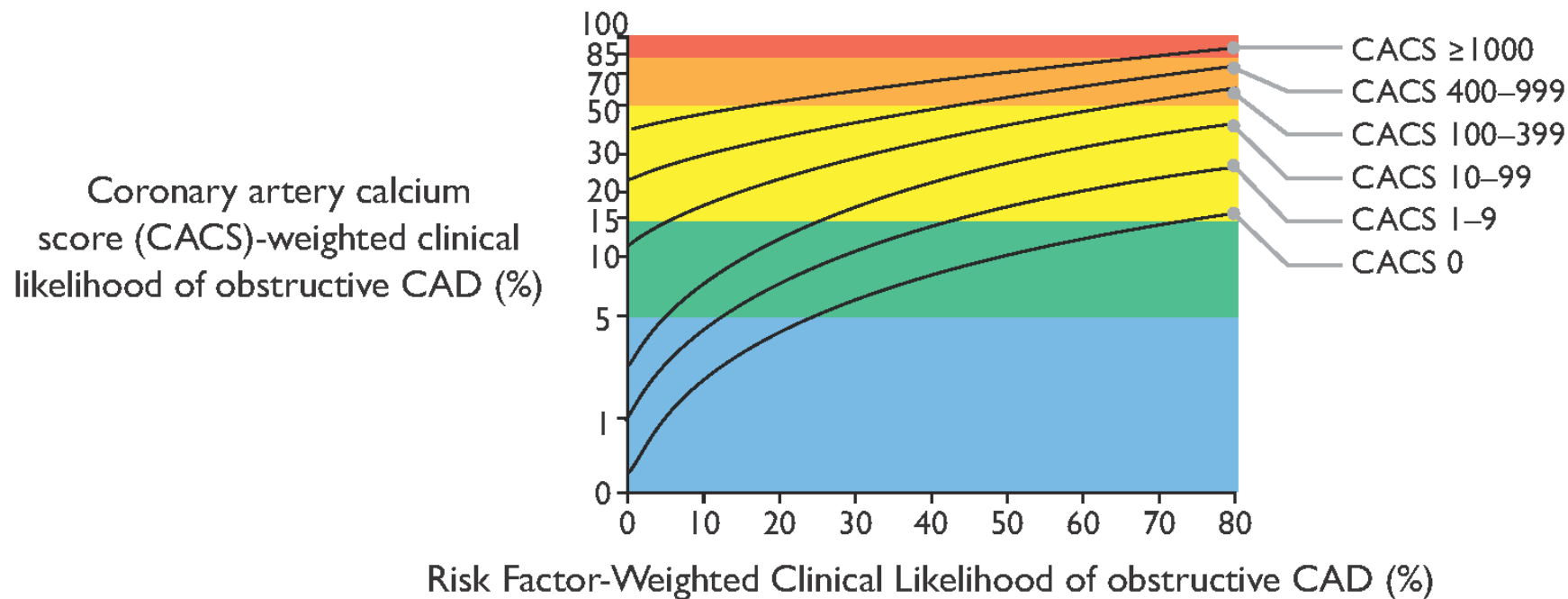
Coronary calcification on pre-existing chest CT

Adjustment and reclassification of clinical likelihood of obstructive coronary artery disease (CAD)

3

Consider reclassification of low RF-CL ($>5\text{--}15\%$) using CACS to identify very low ($\leq 5\%$) CACS-CL

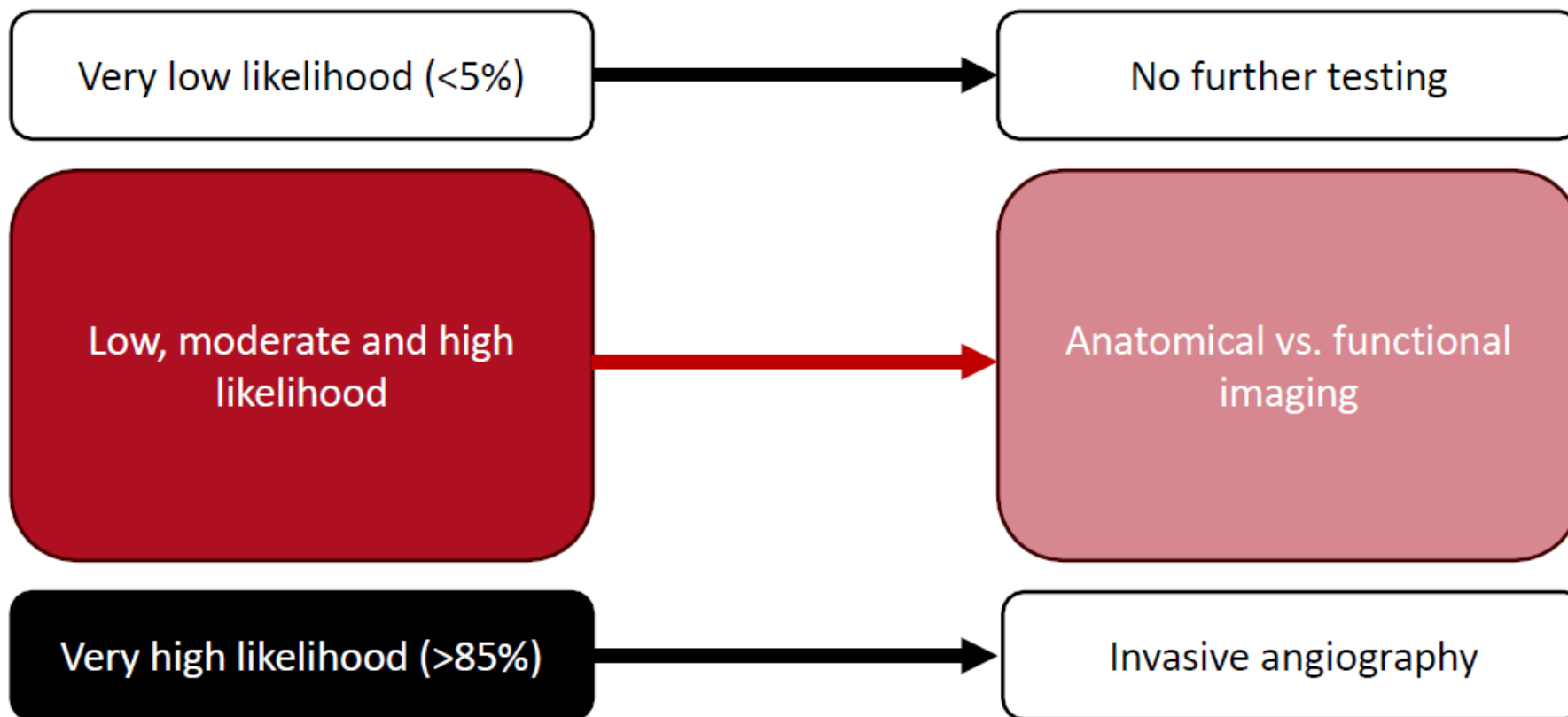
(Class IIa)



Investigations in patients with suspected CCS

Assessment of obstructive CAD likelihood

Diagnostic strategy



Treatment of patients with CCS

The 3 pillars of CCS treatment

Patient education
Lifestyle optimization
Risk factor control
Exercise

Symptom control

Event prevention

1st pillar of CCS treatment

Patient education
Lifestyle optimization
Risk factor control
Exercise

1. **Lifestyle counselling:** nutrition, stress, environmental pollution, mental health...
2. **Risk factor control:**
 - *BMI 18-25*
 - *Smoking cessation*
 - *SBP 120-129 mmHg*
 - *C-LDL <55 mg/dl (1,4 mMol/l)*
 - *HbA1c <7%*
3. **Physical activity**

2nd pillar of CCS treatment

Symptom control

Selection of antianginal medication

Short-acting nitrates are recommended for immediate relief of angina.^{536,537}

I

B

Initial treatment with beta-blockers and/or CCBs to control heart rate and symptoms is recommended for most patients with CCS.^{c 518,538}

I

B

If anginal symptoms are not successfully controlled by initial treatment with a beta-blocker or a CCB alone, the combination of a beta-blocker and a DHP-CCB should be considered, unless contraindicated.^{505,538,539}

IIa

B

Long-acting nitrates or ranolazine* should be considered as add-on therapy in patients with inadequate control of symptoms while on treatment with beta-blockers and/or CCBs, or as part of initial treatment in properly selected patients.^{d 513,540}

IIa

B

* Ranexa

- Ivabradine (Procoralan) in pts with angina and LVEF <40% (class IIa)

Nitroglycerin (Dilator) and Isosorbide dinitrate (Dilatol) are also options

Event prevention in CCS

3rd pillar of CCS treatment

Antithrombotic drugs

SAPT

Lipid lowering therapy

Statins

Ezetimibe

Bempedoic acid

PCSK9 inhibitors

Event prevention in CCS

3rd pillar of CCS treatment

Antithrombotic drugs

SAPT

Lipid lowering therapy

Statins

Ezetimibe

Bempedoic acid

PCSK9 inhibitors

Other drugs

ACE-I / ARB / NI



HF/DM

SGLT2 inh.



HF/DM

GLP-1 agonists



BMI>27

Colchicine

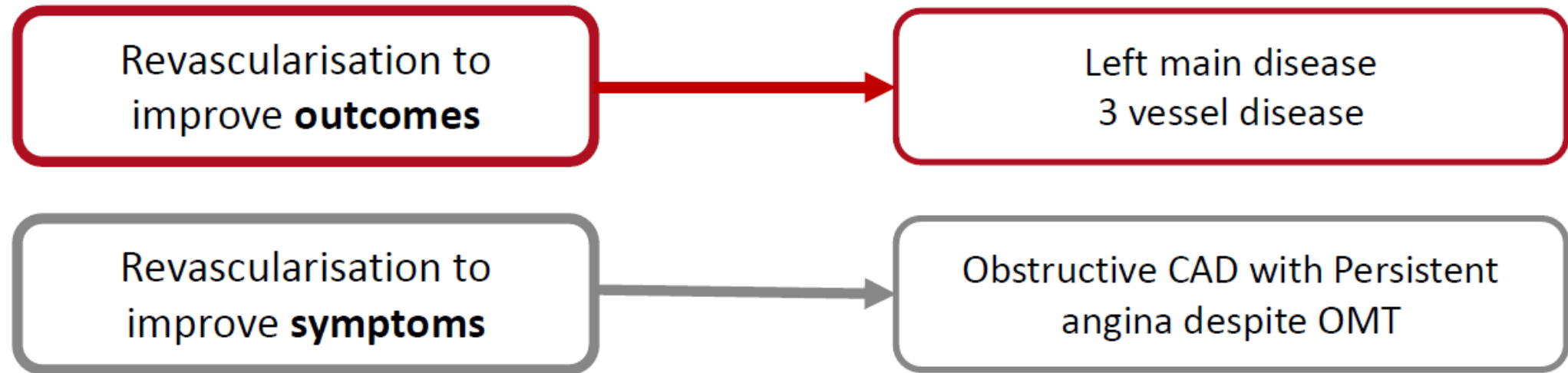
Aspirin: the end of an era for prevention in patients with chronic coronary syndromes?

In CCS patients with a prior MI or remote PCI, clopidogrel 75 mg daily is recommended as a safe and effective alternative to aspirin monotherapy.

I

A

When to consider revascularisation



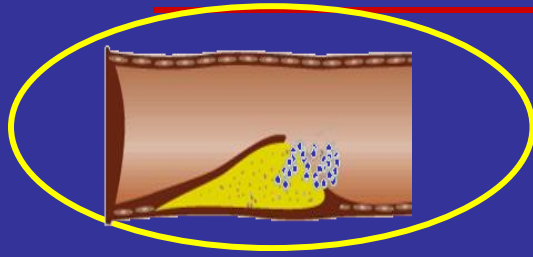
Risk / benefit assessment and patient perspective are critical

CAVE procedural complications in case of complex CAD

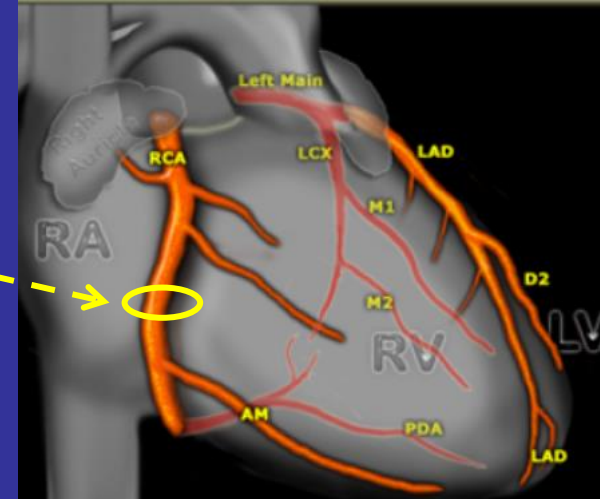
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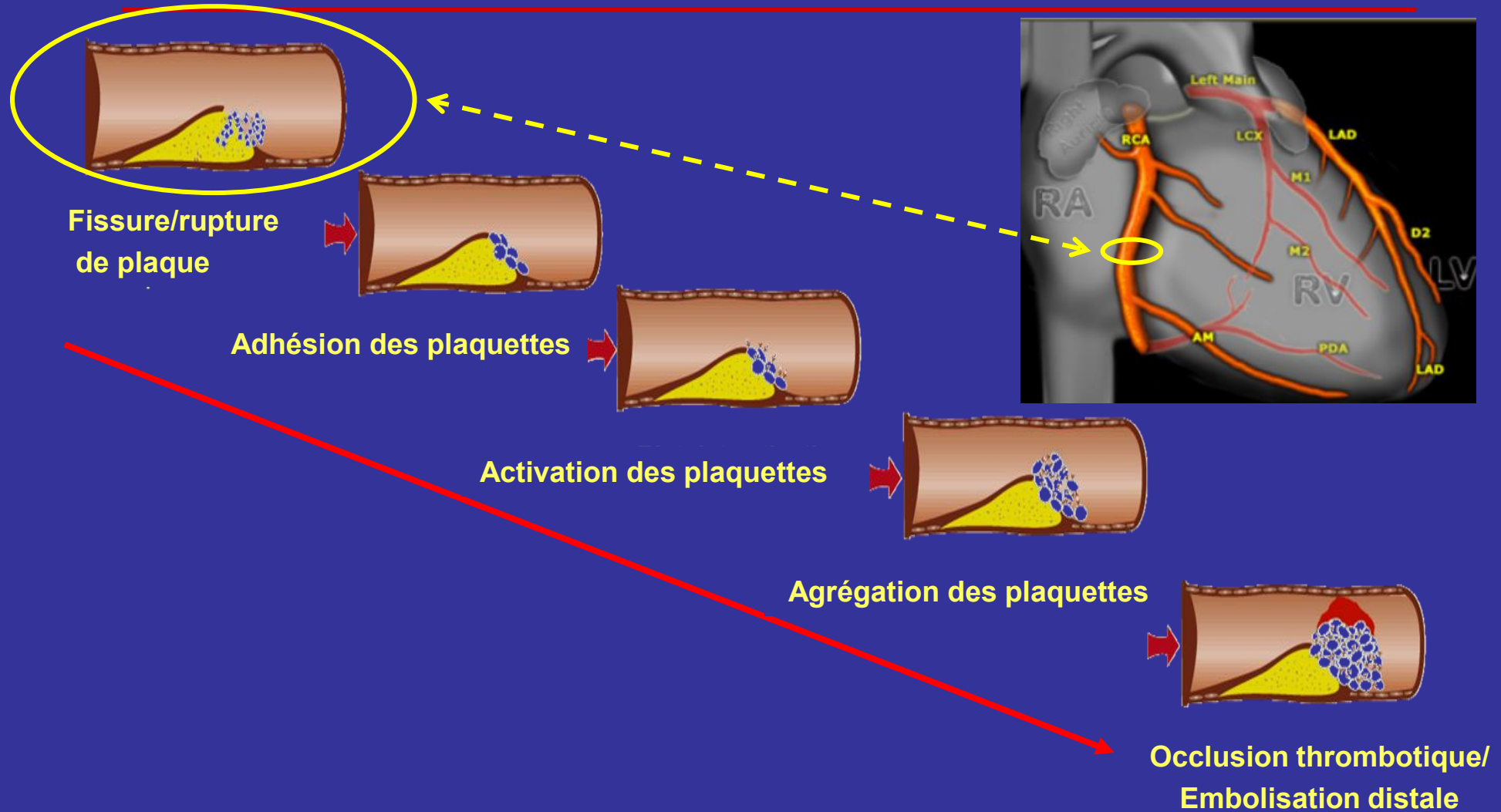
Physiopathologie du syndrome coronarien aigu



Fissure/rupture
de plaque

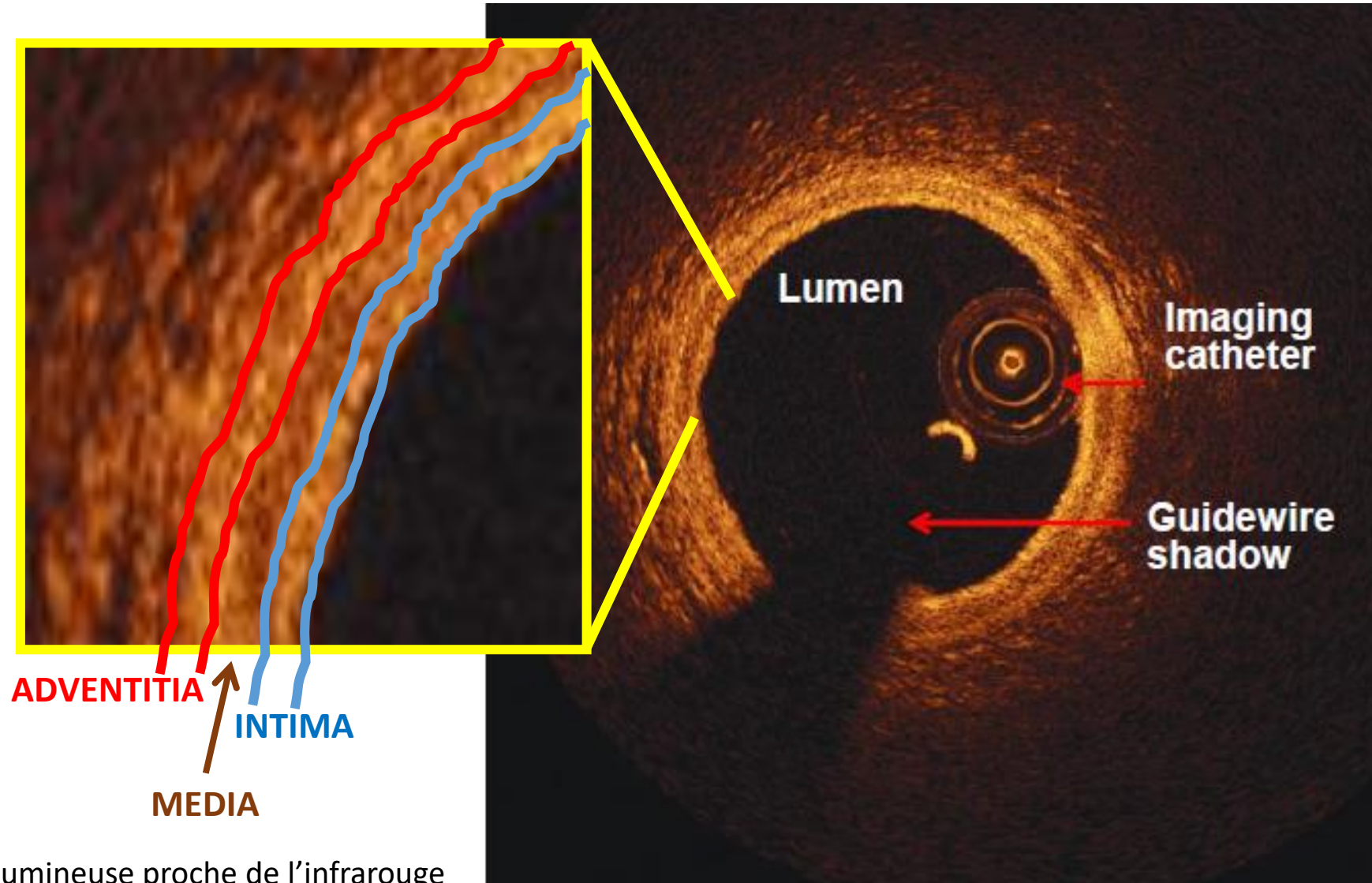


Physiopathologie du syndrome coronarien aigu

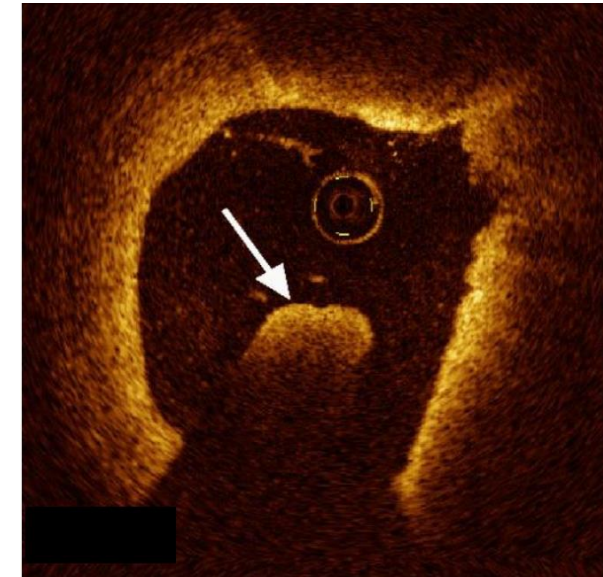


Imagerie Intracoronarienne invasive

OCT = optical coherence tomography



Thrombus



STEMI = ST-elevation myocardial infarction

- De règle associé avec l'occlusion complète d'une coronaire/d'une branche majeure (interruption du flux coronarien) → «ongoing ischemia» → urgence absolue
 1. Nécrose myocardique en fonction du temps d'ischémie
 2. Risque d'arythmie maligne (fibrillation ventriculaire → arrêt cardiaque
→ **coronarographie / revascularisation immédiate**

NSTEMI = non-ST-elevation myocardial infarction

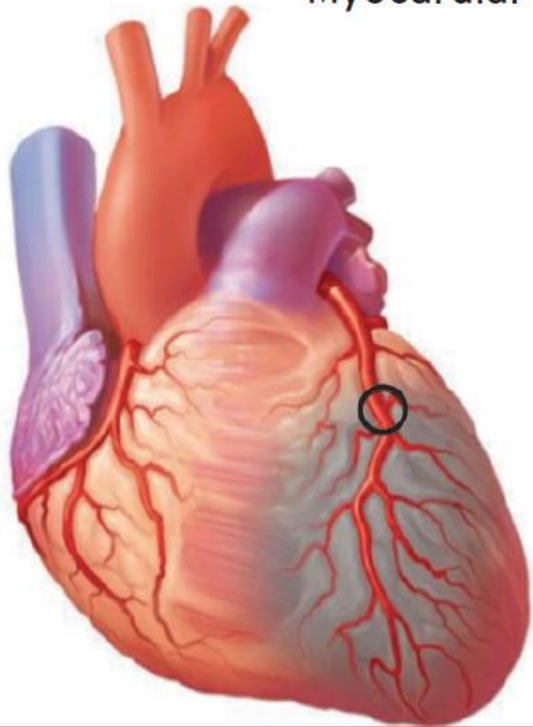
- De règle associé un rétrécissement serré d'une coronaire /d'une branche avec embolisation distale (flux coronarien résiduel) → pas de «ongoing ischemia»
- Risque (d'occlusion complète du vaisseau) en aigu faible
→ **coronarographie et revascularisation de préférence dans les 24 heures**

Angor instable

- Angor au repos/crescendo. De règle associé avec un rétrécissement serré d'une coronaire/d'une branche sans embolisation distale (sans nécrose myocardique)
→ **coronarographie ou test fonctionnel**

Classification of myocardial infarction

Myocardial Infarction Type 1

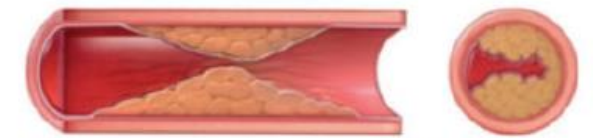
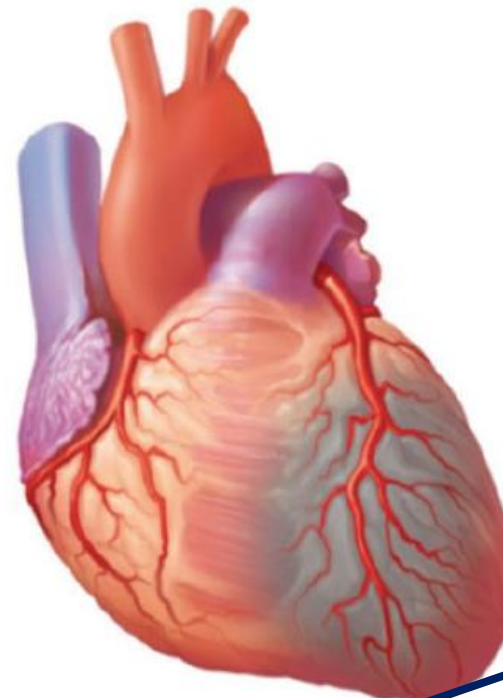


Plaque rupture/erosion with occlusive thrombus

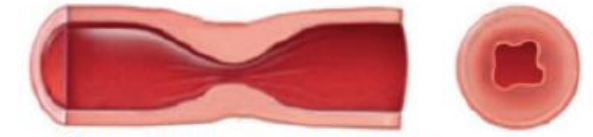


Plaque rupture/erosion with non-occlusive thrombus

Myocardial Infarction Type 2



Atherosclerosis and oxygen supply/demand imbalance



Vasospasm or coronary microvascular dysfunction



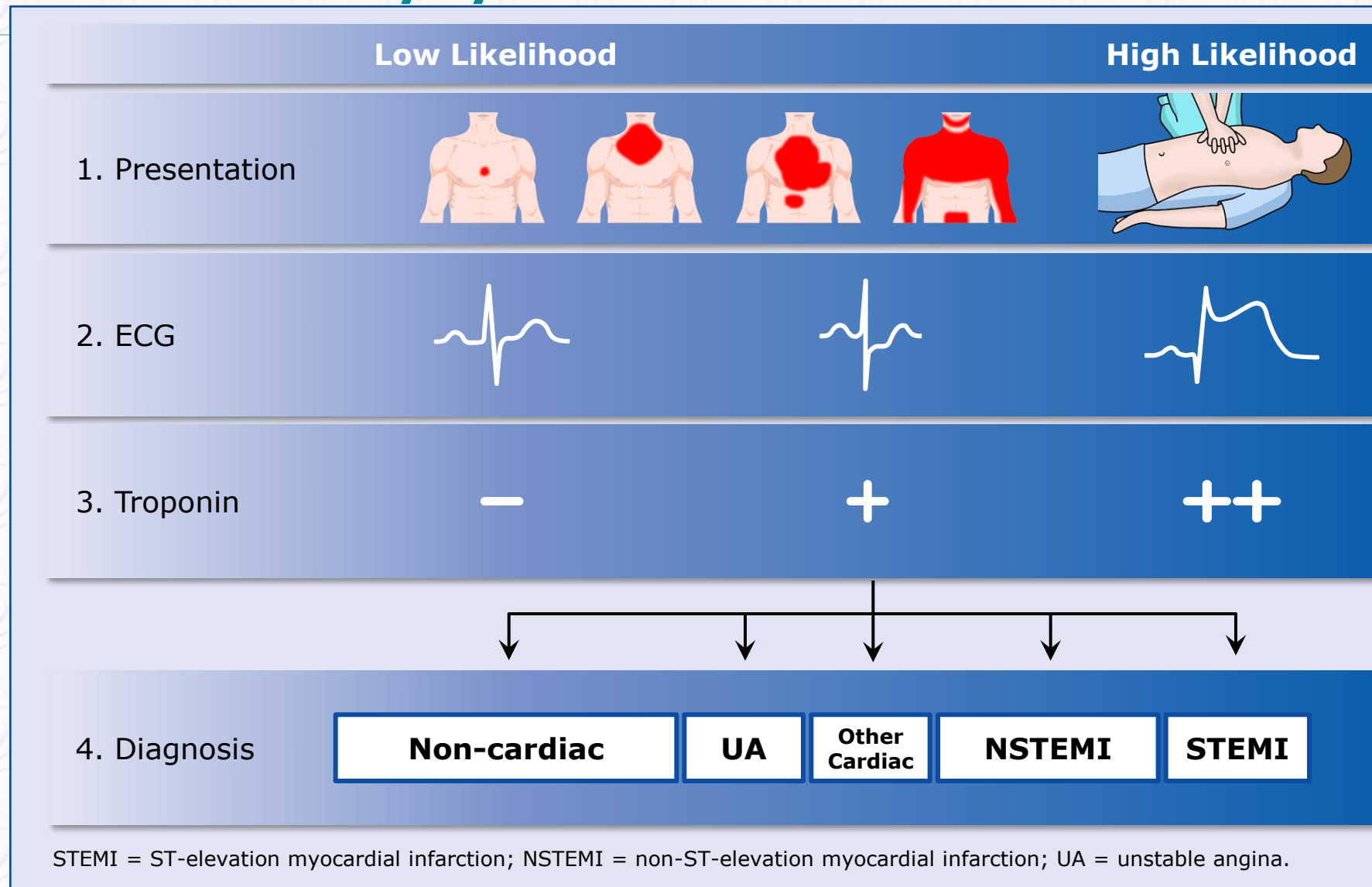
Non-atherosclerotic coronary dissection



Oxygen supply/demand imbalance alone

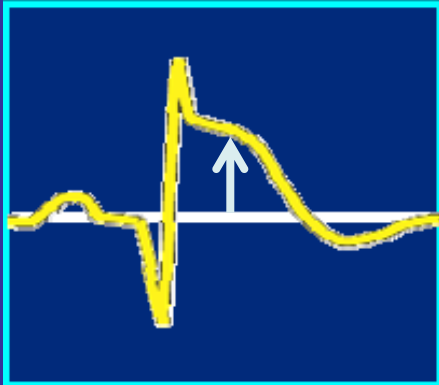
Rare cause d'infarctus, surtout y penser en cas d'infarctus chez la femme jeune et/ou sans facteurs de risque cardiovasculaire

Initial assessment of patients with suspected acute coronary syndromes



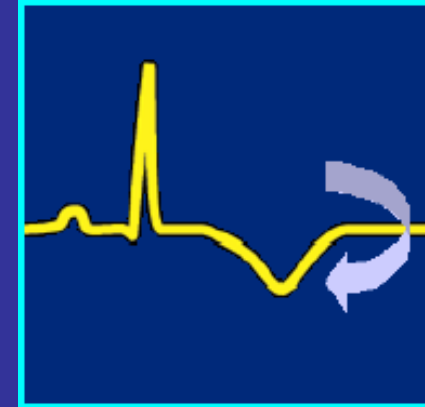
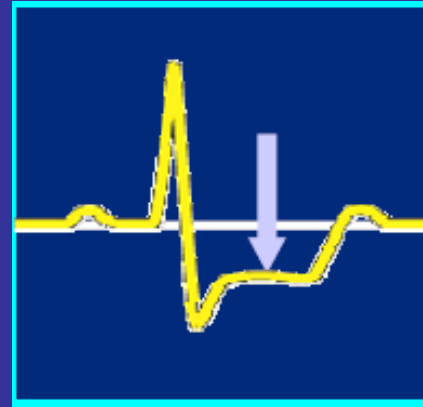
Troponines et diagnostic du syndrome coronarien aigu

**avec sus-décalage du
segment ST (STEMI)**



**Prise en charge pas influencée par
les troponines
→ reperfusion immédiate nécessaire!**

**sans sus-décalage du
segment ST (NSTEMI-ACS)**



Élévation dynamique des troponines
- Oui → **NSTEMI**
- Non → **Angor instable**

Prise en charge du syndrome coronarien aigu

- Traitement antithrombotique
- Reperfusion coronarienne
 - Angioplastie/pose de stent
 - (Chirurgie de pontage)

Prise en charge du syndrome coronarien aigu

Coronarographie

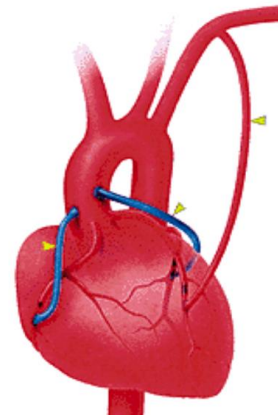
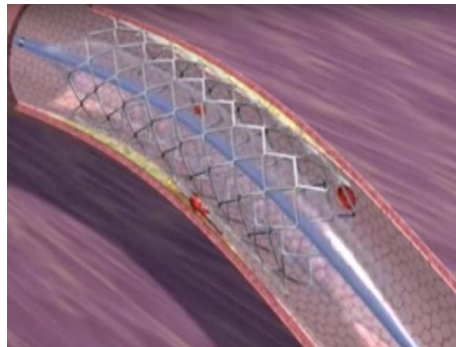
Revascularisation coronarienne
60-70%

Traitement conservateur
30-40%



Stent

Pontage



Angor instable/
NSTEMI

Stent > 80%

Pontage <20%

STEMI
(toujours traité par revascularisation)

Stent >95%

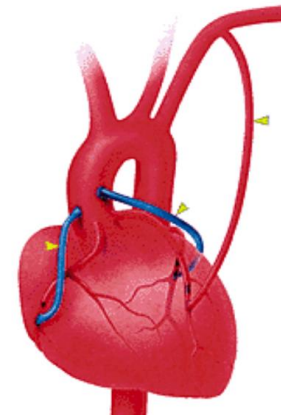
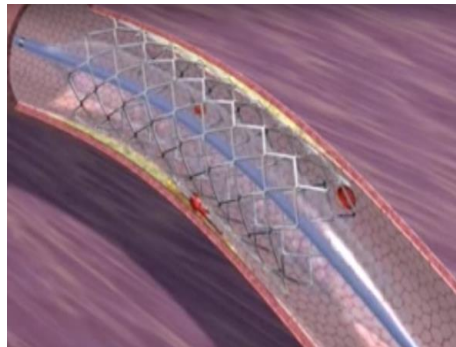
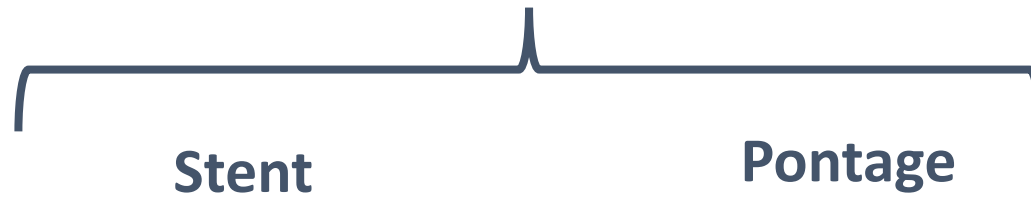
Pontage <5%

Prise en charge du syndrome coronarien aigu

Coronarographie

Revascularisation coronarienne
60-70%

Traitement conservateur
30-40%



Angor instable/
NSTEMI

Stent > 80%

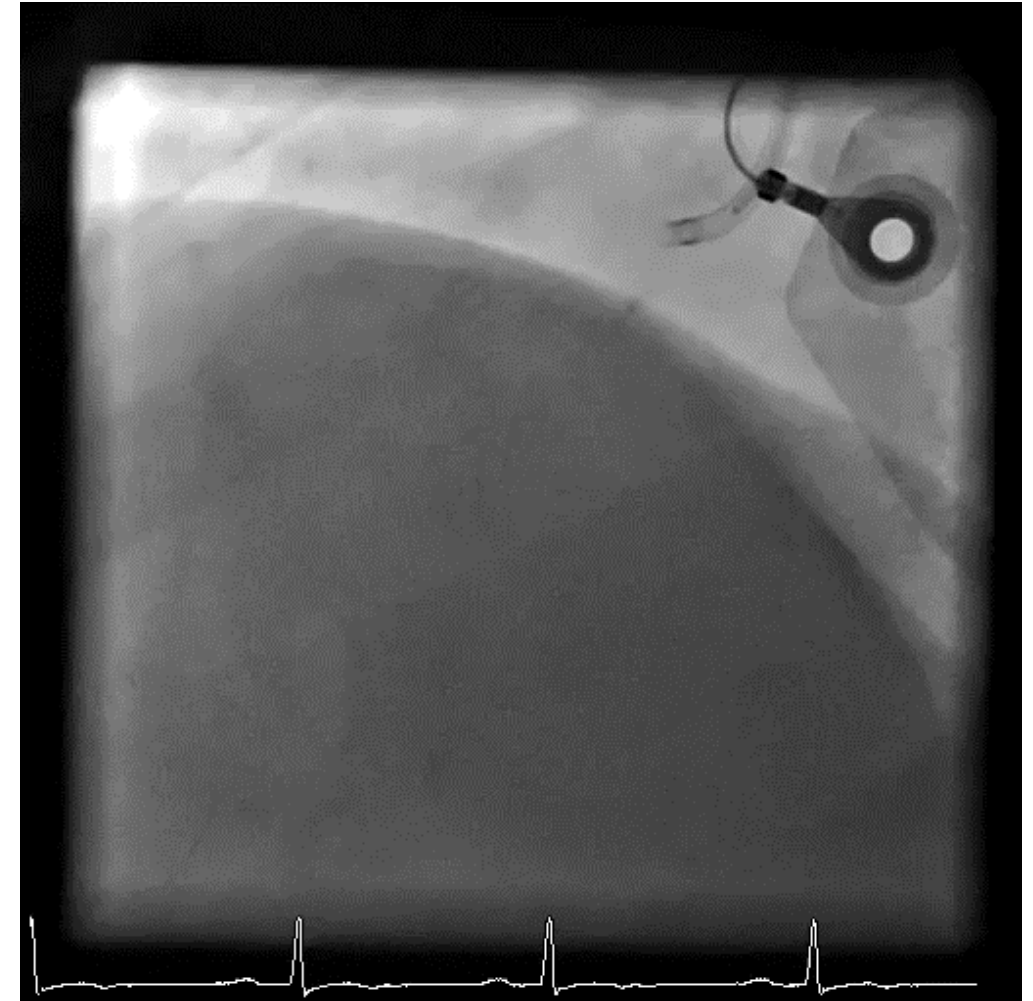
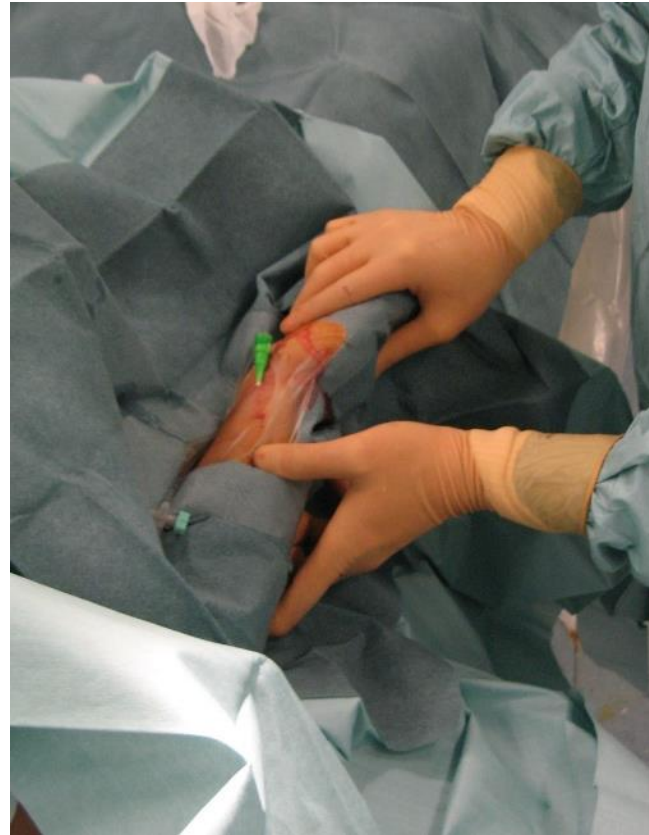
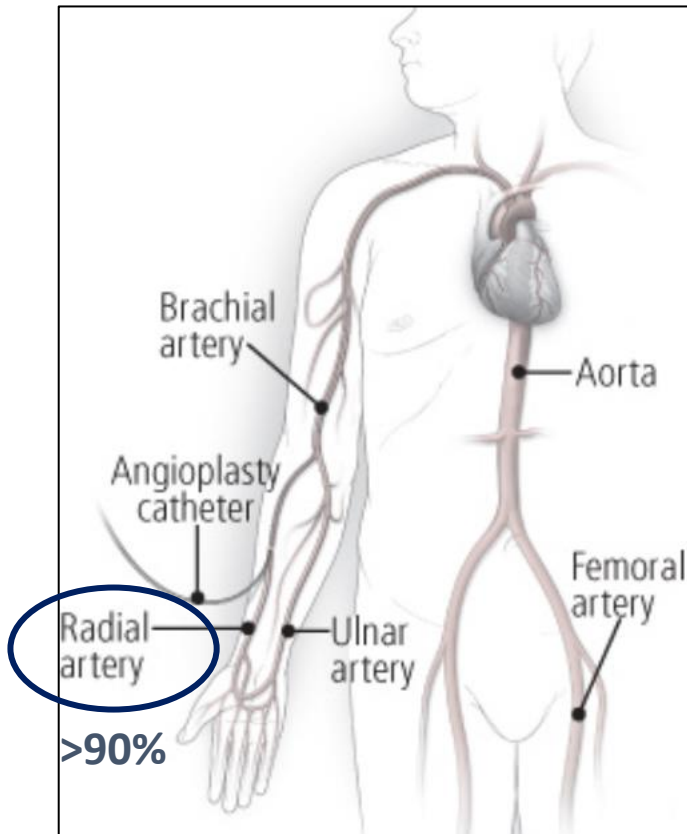
Pontage <20%

STEMI
(toujours traité par revascularisation)

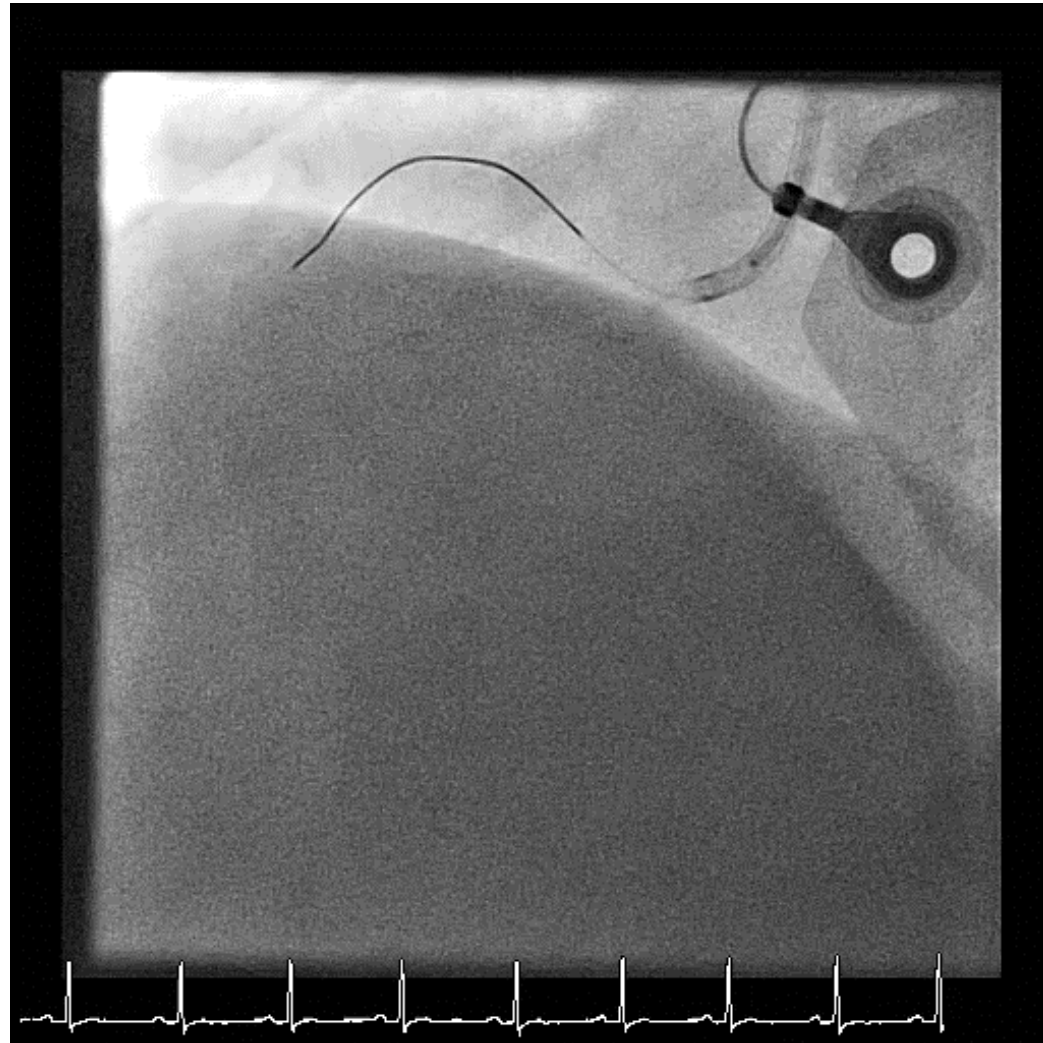
Stent >95%

Pontage <5%

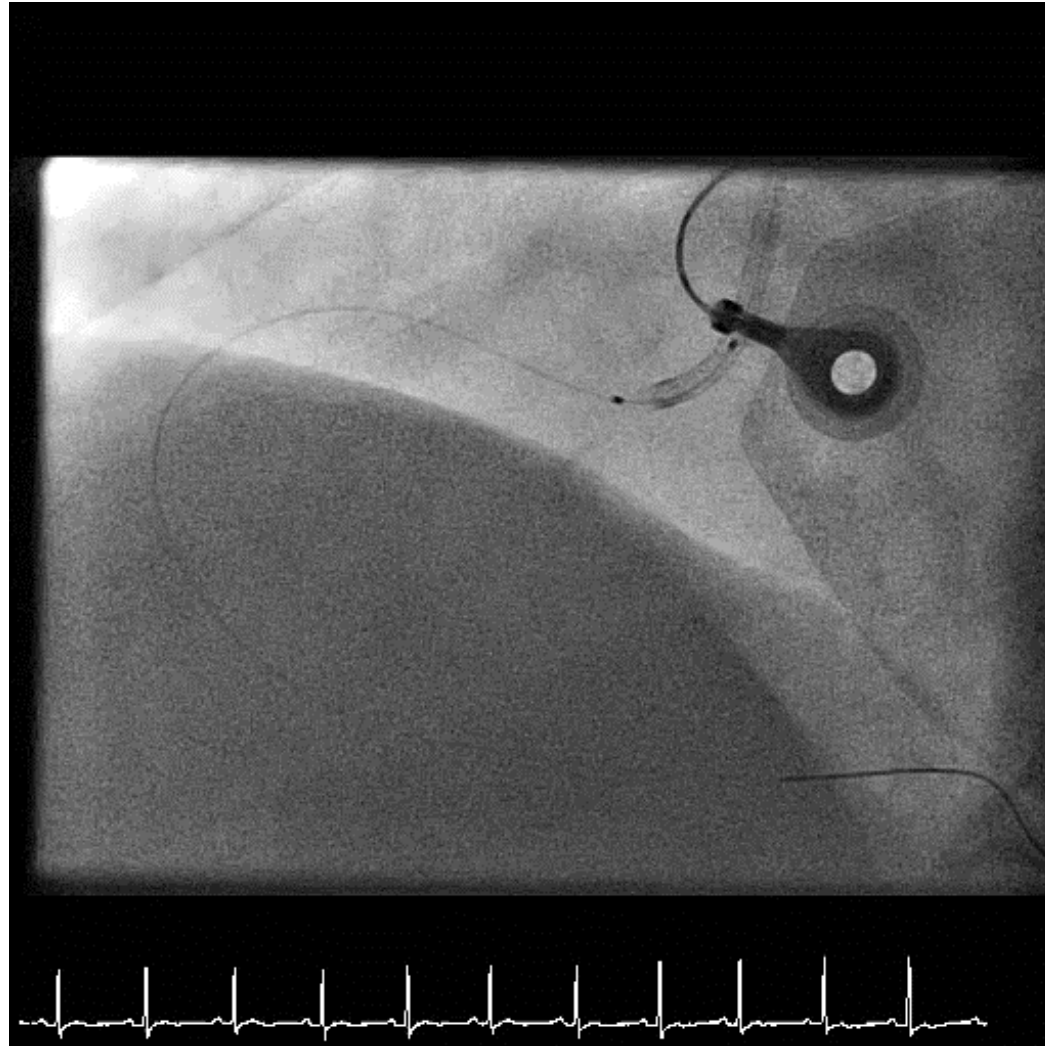
Angioplastie/pose de stent pour syndrome coronarien aigu



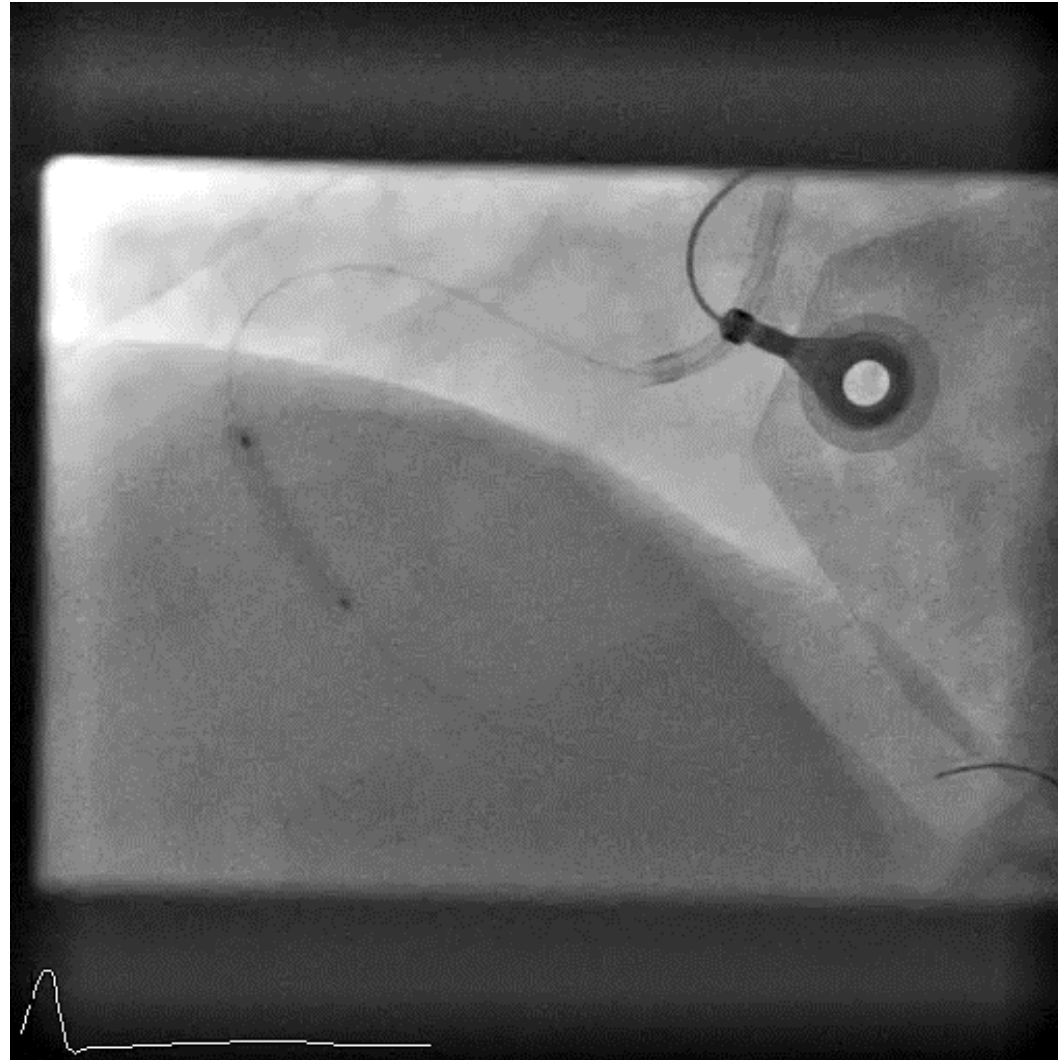
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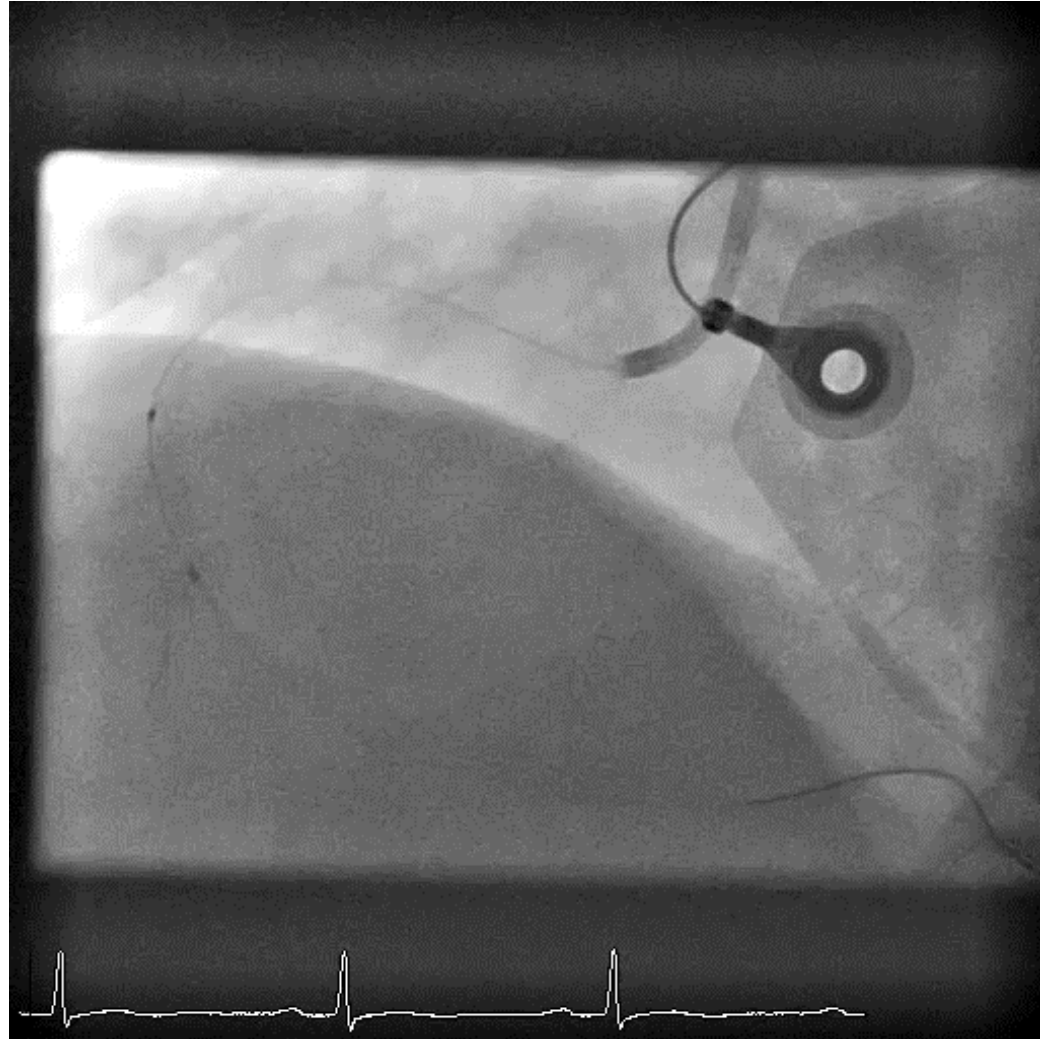
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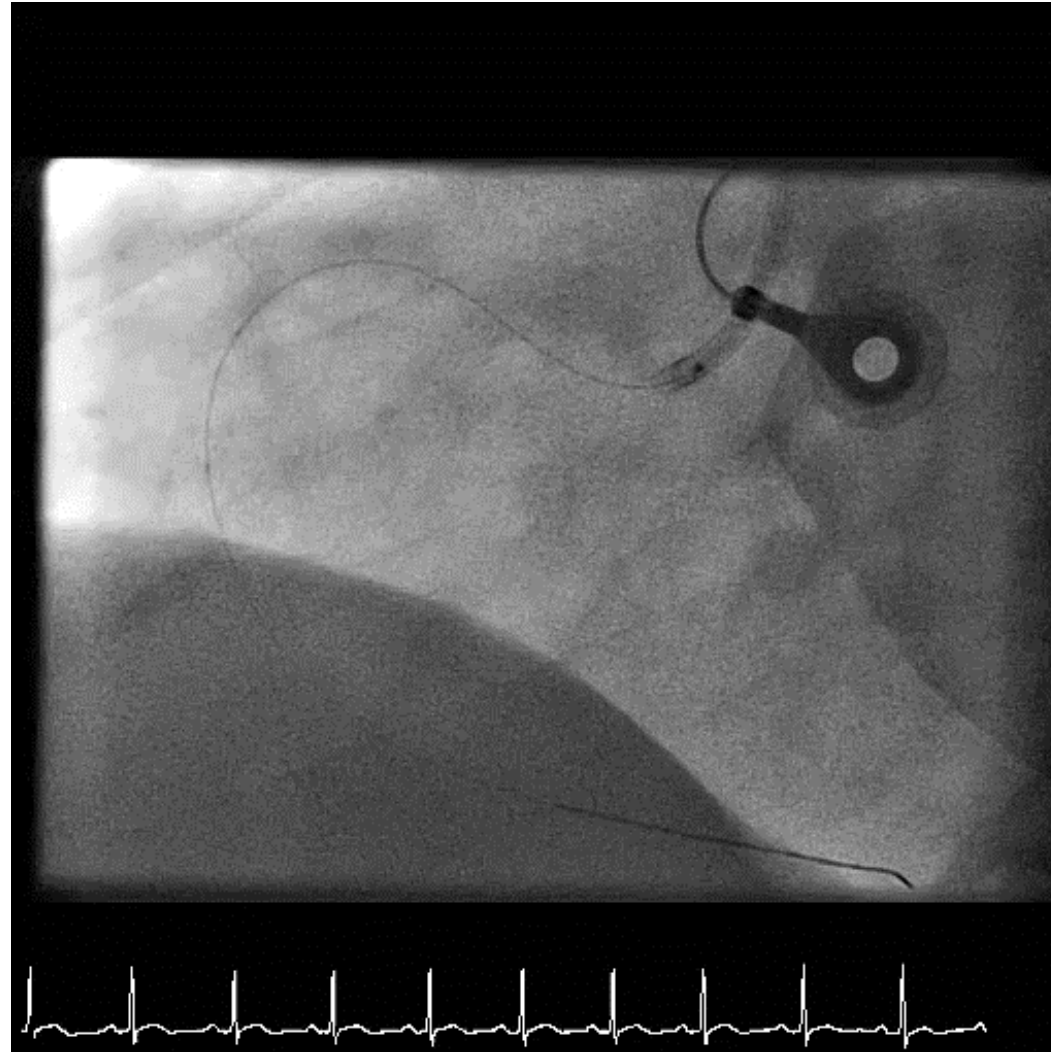
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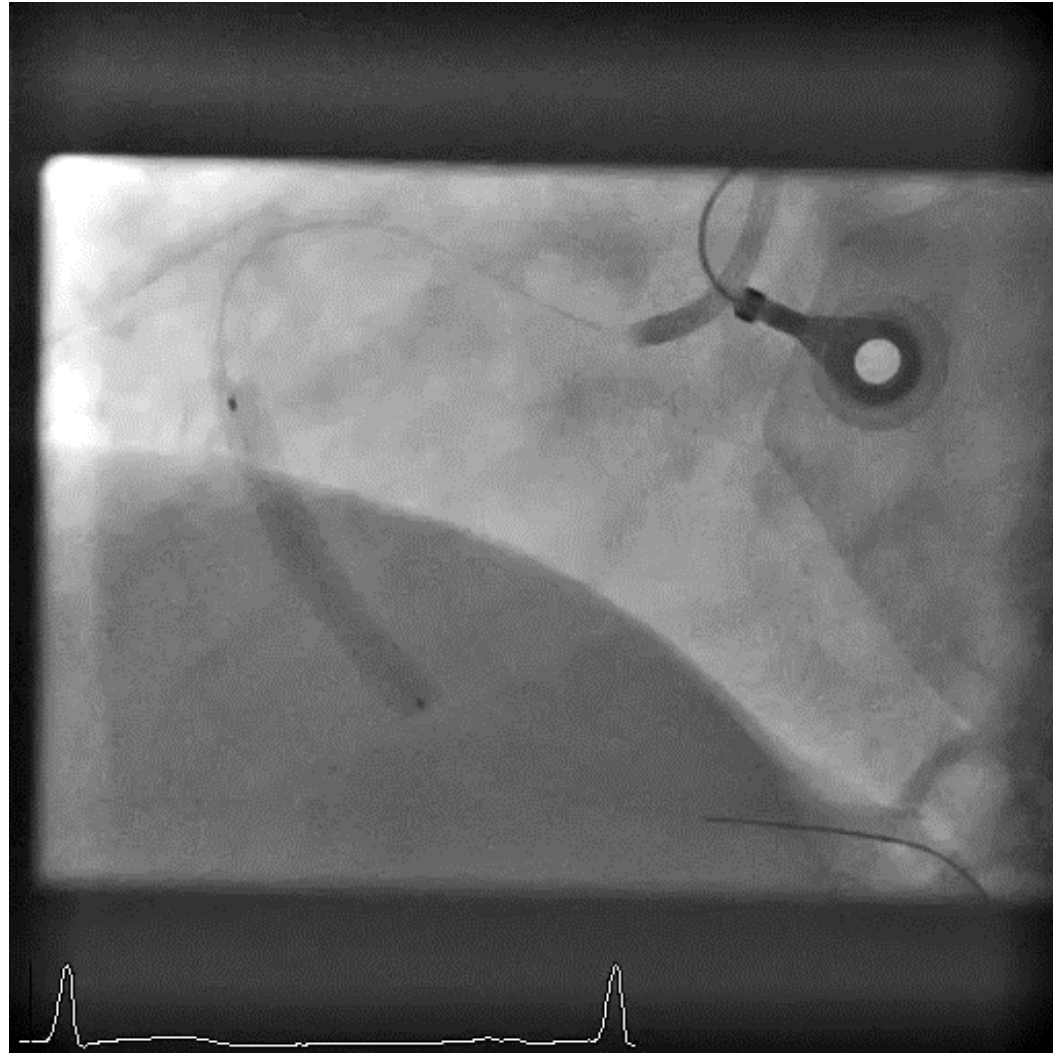
Angioplastie/pose de stent pour syndrome coronarien aigu



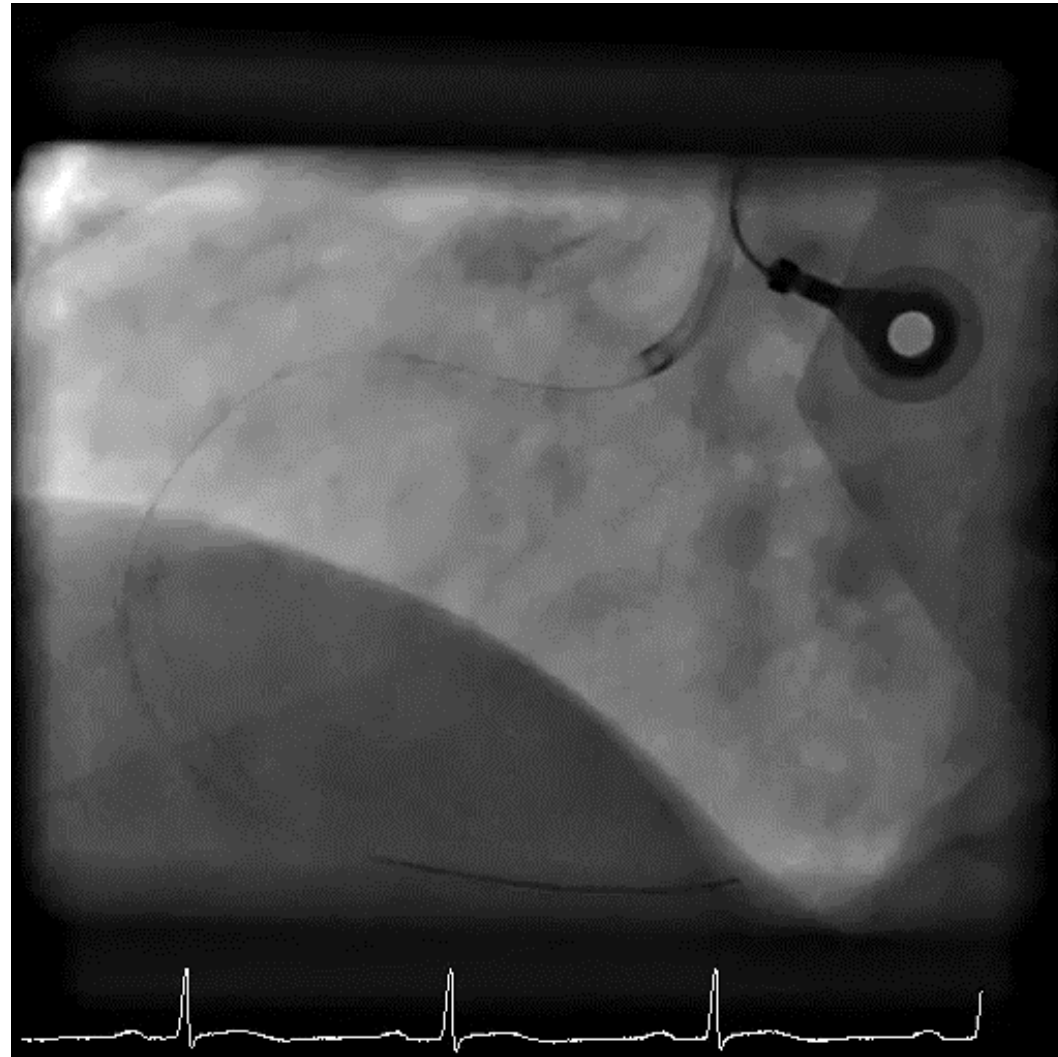
Angioplastie/pose de stent pour syndrome coronarien aigu



Angioplastie/pose de stent pour syndrome coronarien aigu



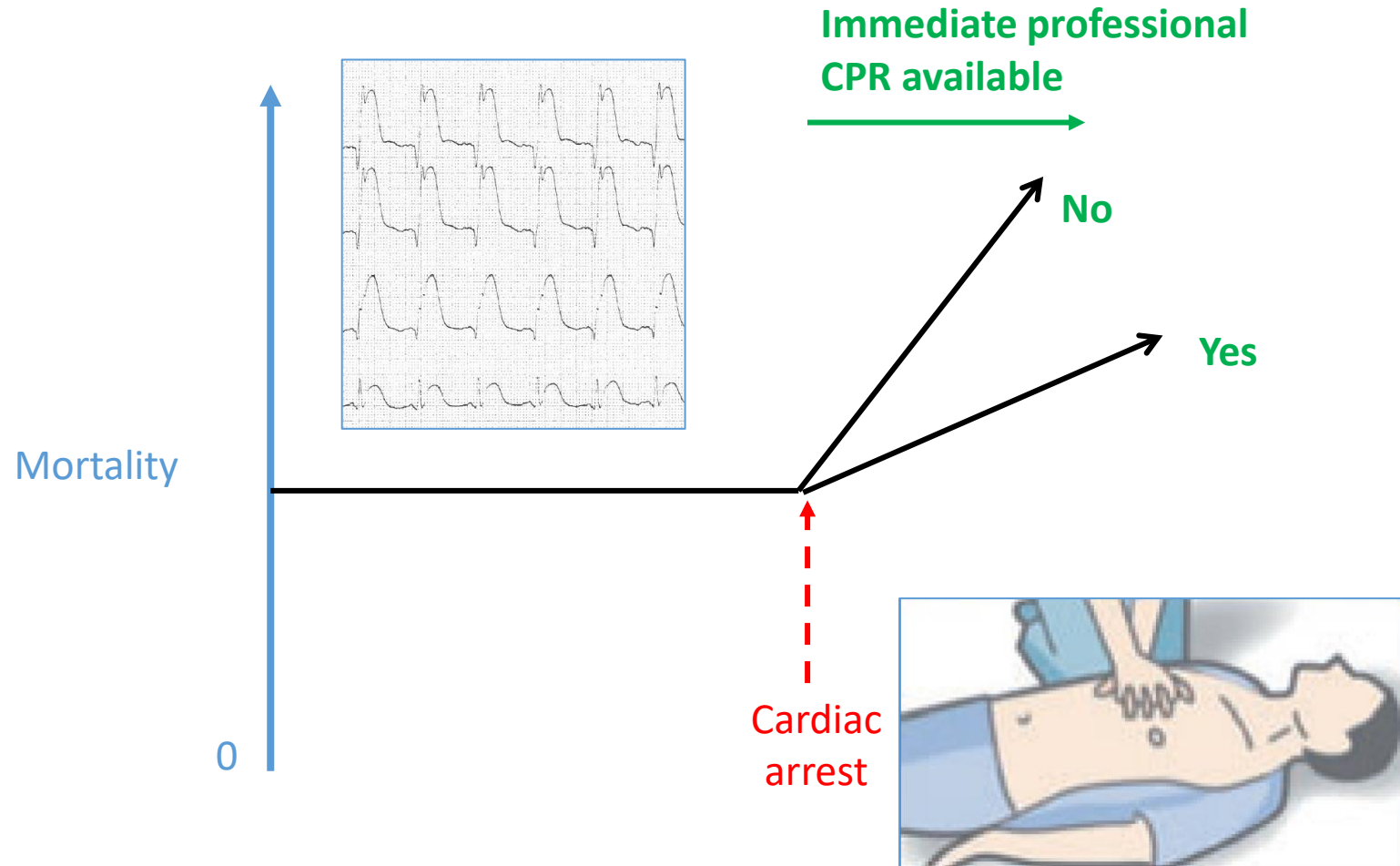
Angioplastie/pose de stent pour syndrome coronarien aigu



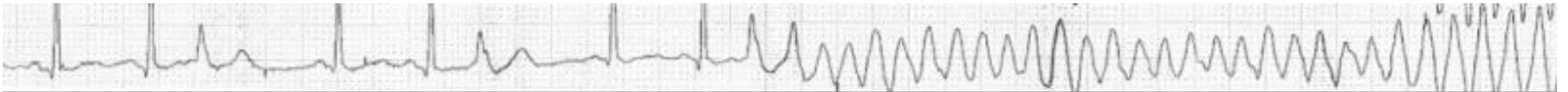
Deux bonnes raisons de ne pas passer à côté du diagnostic de STEMI / «ongoing myocardial ischemia»

1. Time is muscle
2. Time is life

STEMI: Time is muscle/time is life



Myocardial necrosis
Heart failure
Late mortality↑



Pièges dans le diagnostic du syndrome coronarien aigu

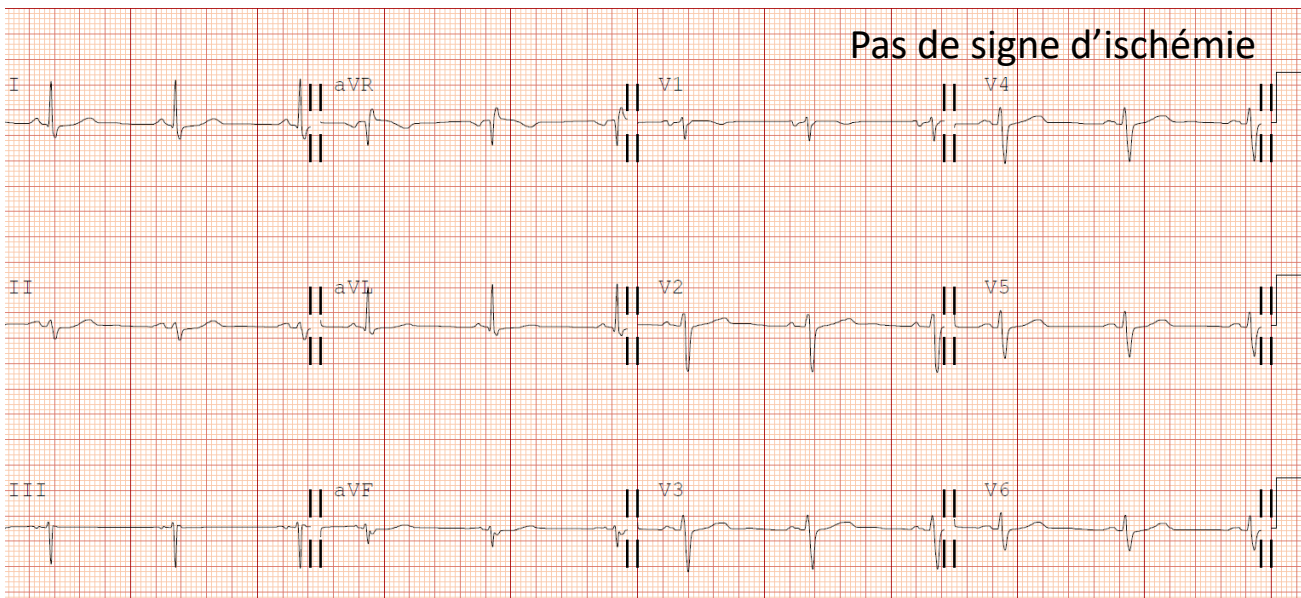
Douleurs typiques
ECG négatif
Troponines négatives!

(sténose très serrée mais
pas de embolisation distale)



Pièges dans le diagnostic du syndrome coronarien aigu

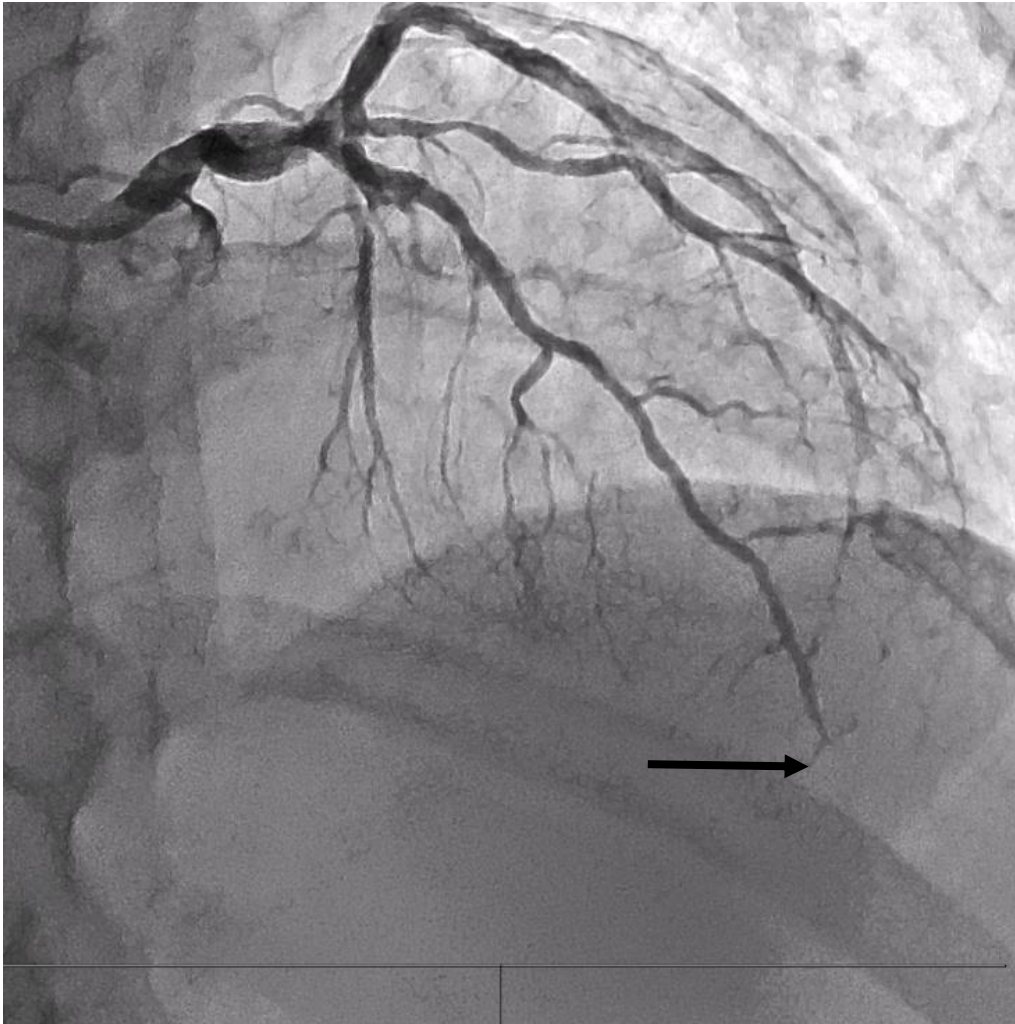
**Douleurs typiques
prolongés/persistants**



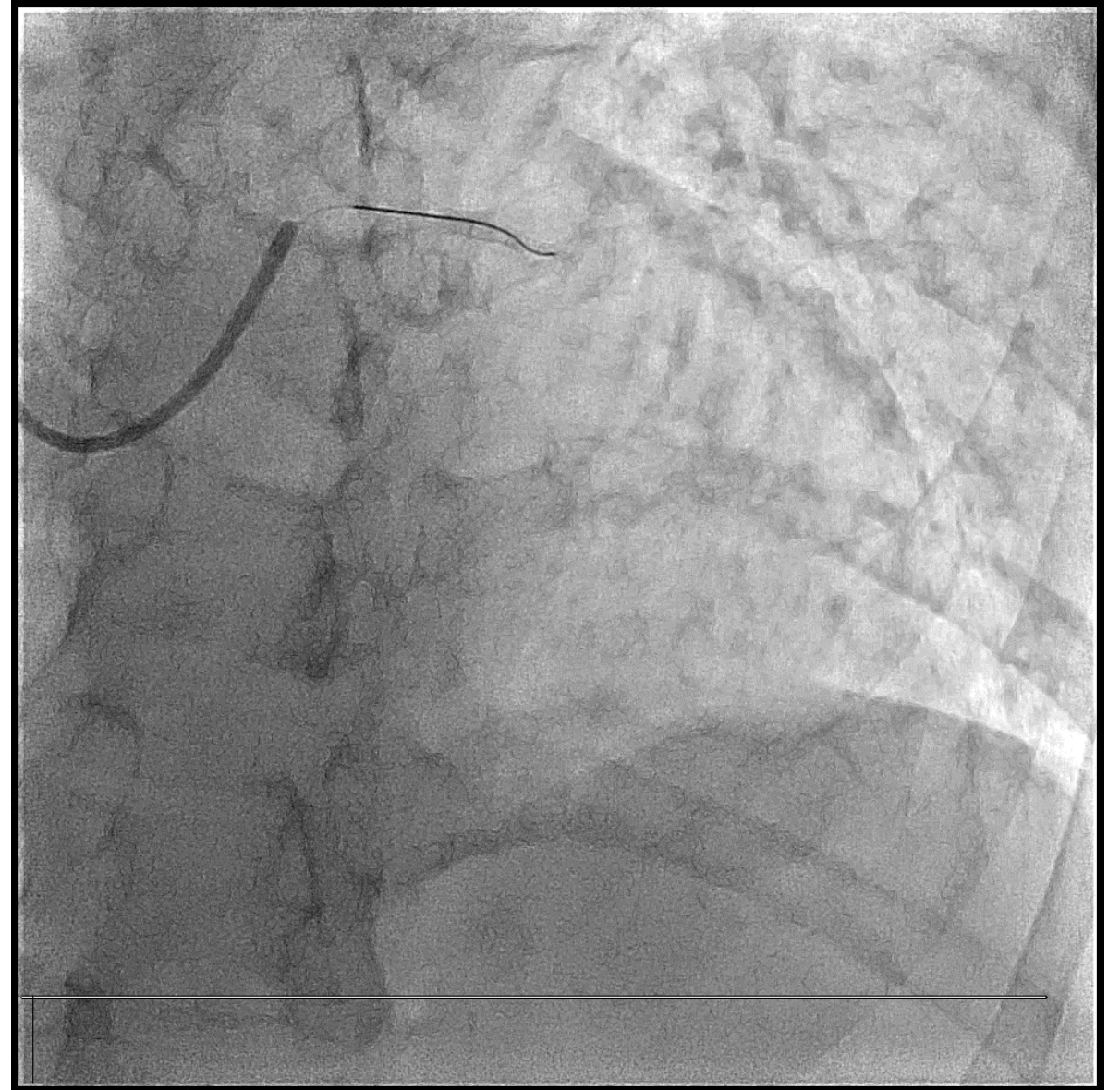
voir sous MS-Excel Copier les colonnes choisies pour MS-Word			15/02/2019 13:30:00 ROUGE-B 15 1541 sgv (*)	15/02/2019 13:30:00 ROUGE-B 15 1540 sgv (*)
Nombre de colonnes affichées :	16	Unité	Valeurs Réf./Seuil	
sodium	mmol/l	136 - 144	138	
potassium	mmol/l	3.6 - 4.6	3.8	
créatinine	μmol/l	62 - 106	87	
eGFR (CKD-EPI)	ml/min/1.73m ²	> 60	81 [A]	
créatine kinase totale	U/l	47 - 222	264	
Troponine T ultra sensible	ng/l	< 14		215 [B]

**Si l'on suspecte "ongoing ischemia"
il ne faut pas attendre les troponines!**

Pièges dans le diagnostic du syndrome coronarien aigu



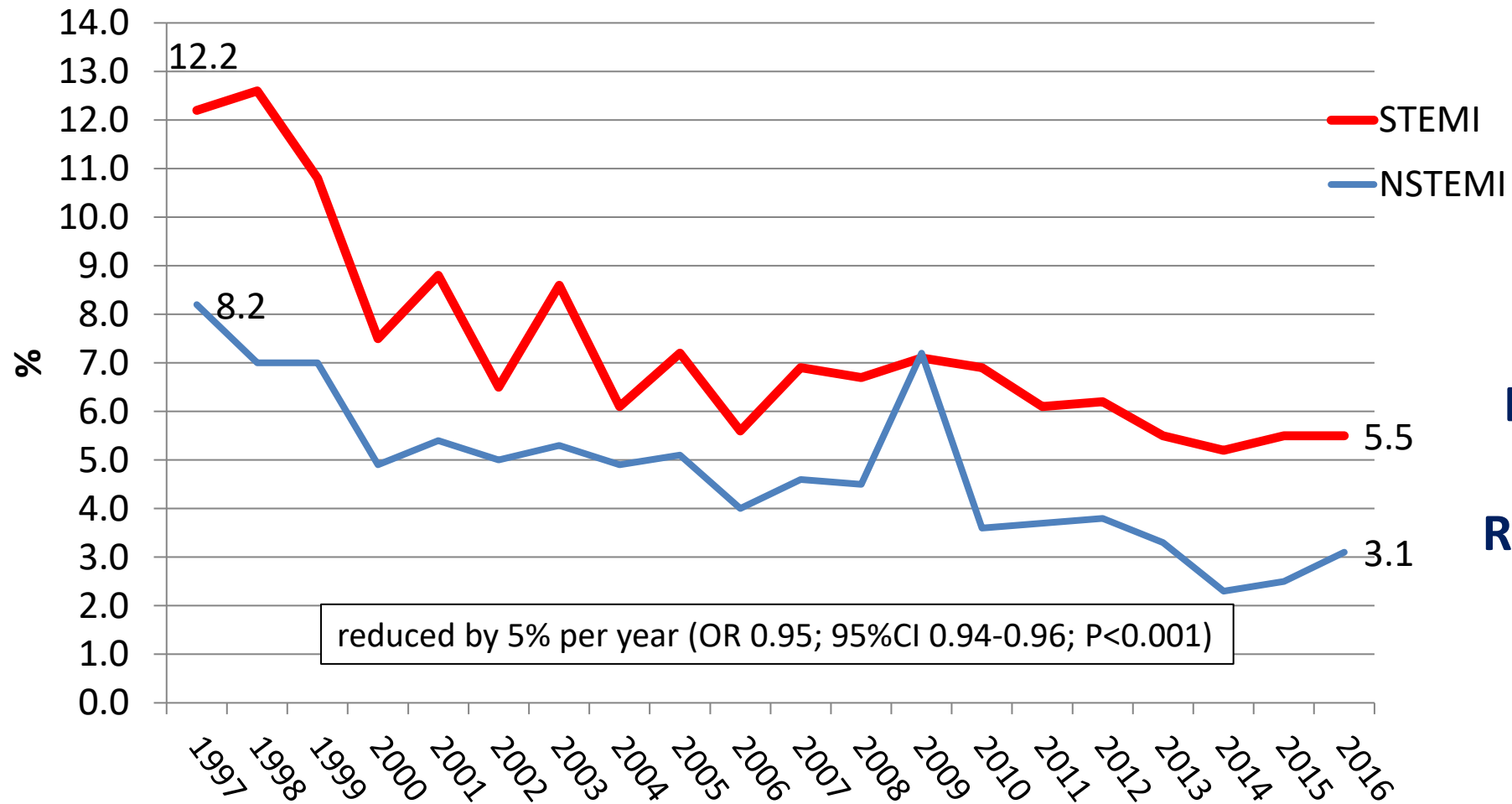
A risque de fibrillation ventriculaire!



20-year Trends of In-Hospital Mortality for Myocardial Infarction in Switzerland



AMIS
Acute Myocardial
Infarction
in Switzerland



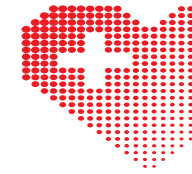
**Efficacy of
Drugs +
Reperfusion**

n=55'627

STEMI = ST-elevation myocardial infarction

NSTEMI = non-ST-elevation myocardial infarction

Syndrome coronarien aigu chez la femme



AMIS
Acute Myocardial
Infarction
in Switzerland

N= 51 720 On average women were 8 years older than men at presentation

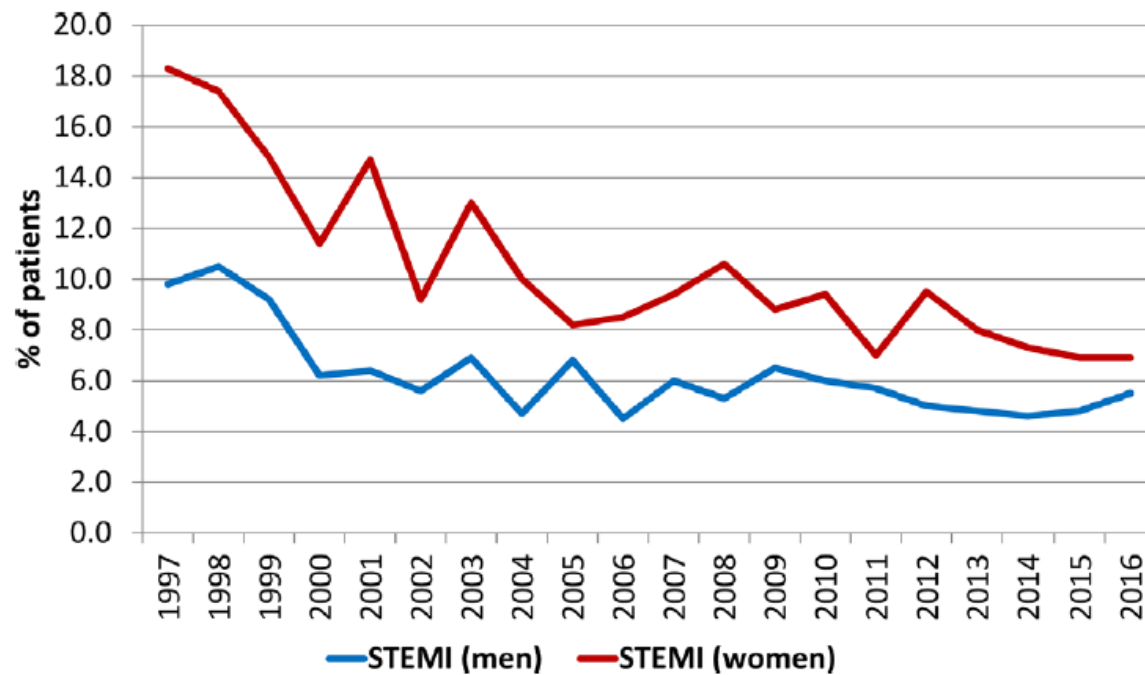


Figure 2 Crude in-hospital mortality of patients with STEMI according to admission year and gender from 1997 to 2016. STEMI, ST-segment elevation myocardial infarction.

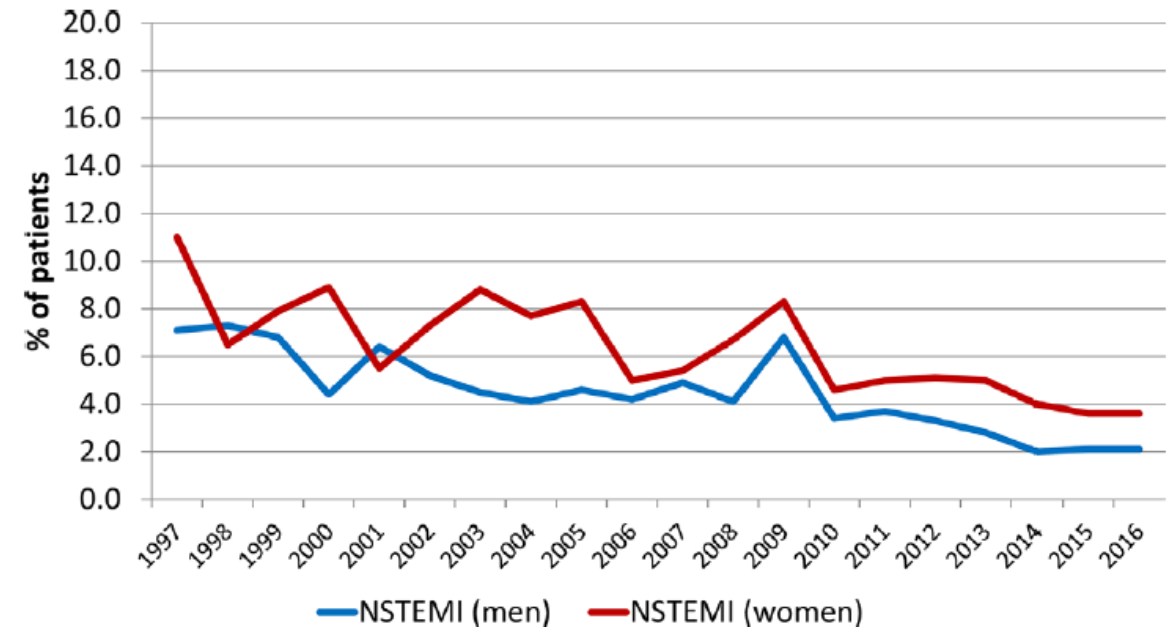
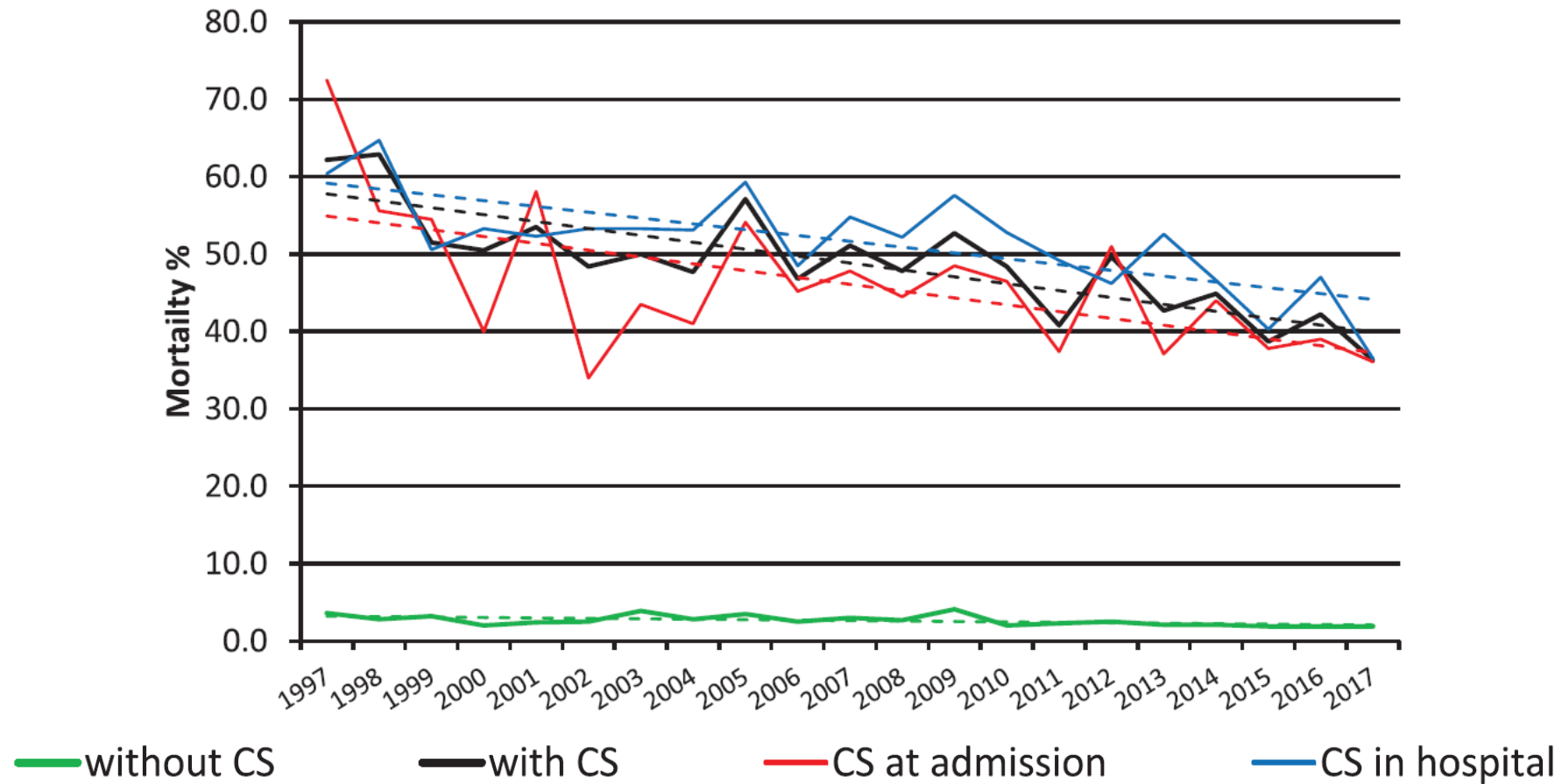


Figure 3 Crude in-hospital mortality of patients with NSTEMI according to admission year and gender from 1997 to 2016. NSTEMI, non-ST-segment elevation myocardial infarction.

Syndrome coronarien aigu chez la femme

- Chez la femme la maladie coronarienne se manifeste environ 10 ans plus tard que chez l'homme
- Symptômes plus fréquemment atypiques
- Délai prolongé de prise en charge
- Pronostic moins favorable que chez l'homme
 - Toutefois, ceci est largement dû au fait que les femmes sont plus âgées et ont plus de comorbidités quand elles développent un syndrome coronarien aigu
- Chez la femme jeune et/ou sans facteurs de risque cardiovasculaire
 - penser à la dissection coronarienne spontanée

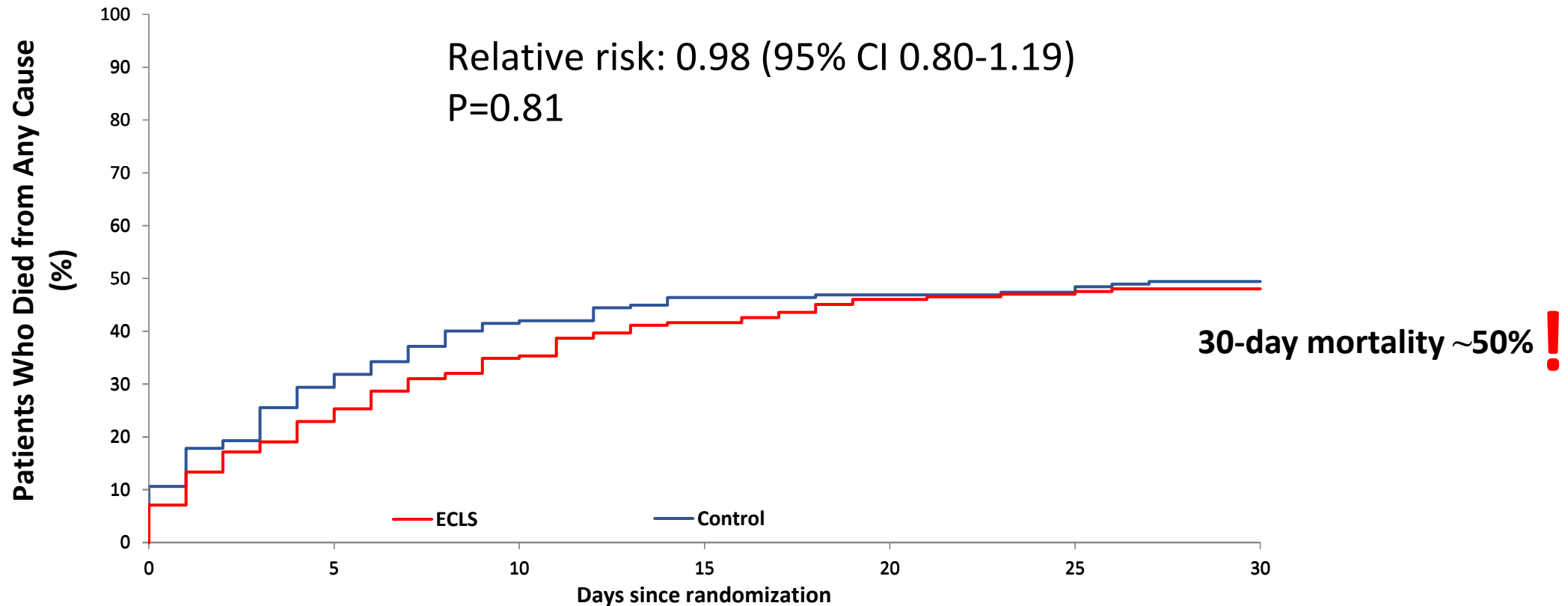
Twenty-Year Trends in Mortality of Cardiogenic Shock the SWISS AMIS Plus Registry



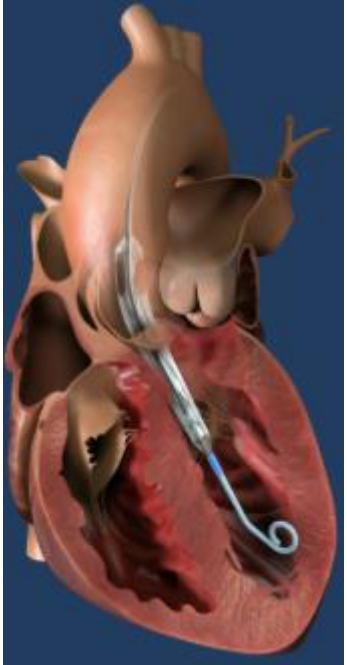
In-hospital mortality 62% in 1997 → 36% in 2017 ($P < 0.001$ for temporal trend)

ECLS-SHOCK Trial

Primary Endpoint – 30-Day All-Cause Mortality



- N=420, acute MI pts with shock randomized to ECMO vs standard of care
- Real shock patients (3/4 cardiac arrest, median lactate 6.9 mmol/l, median PH 7.2)

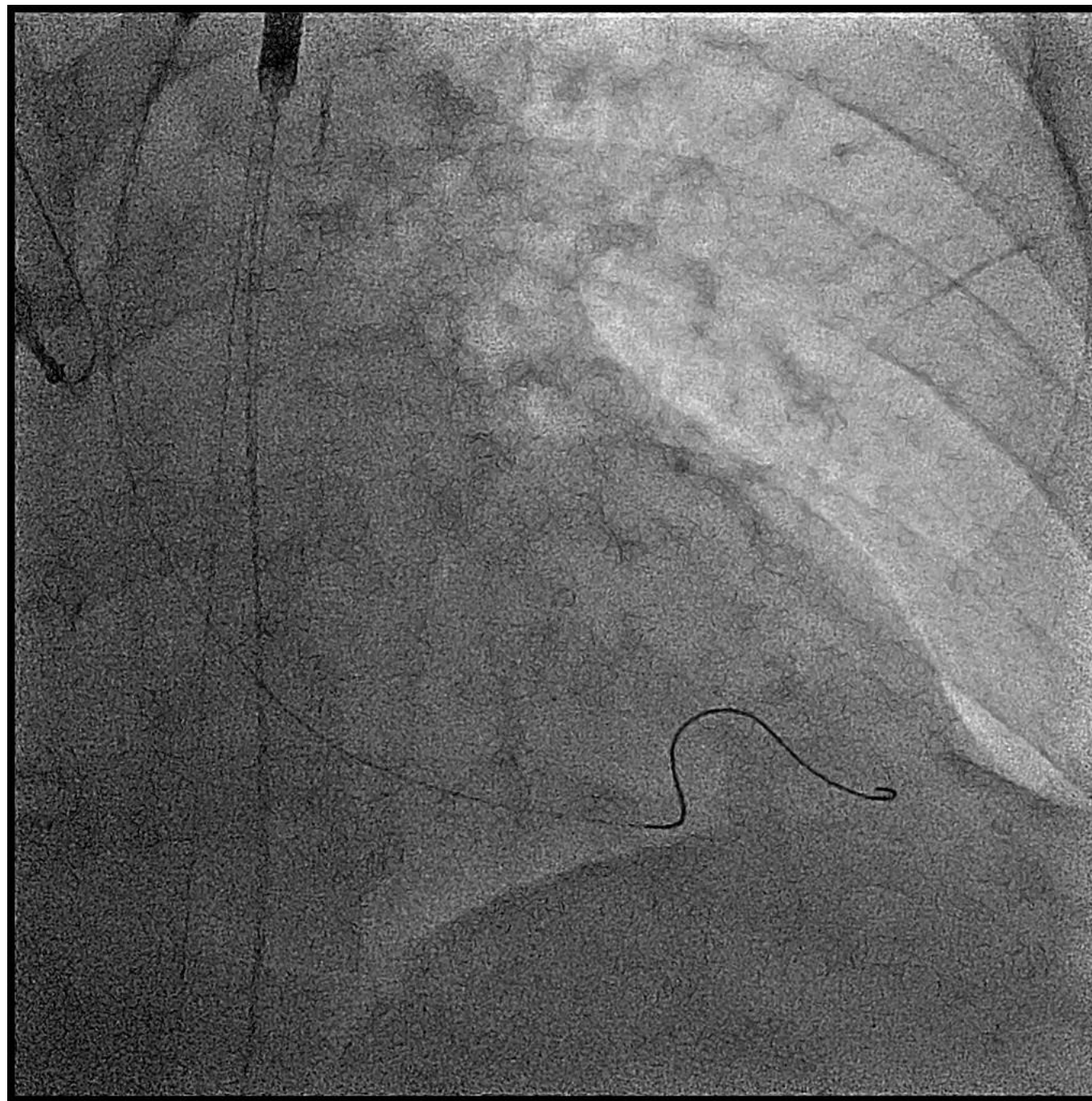


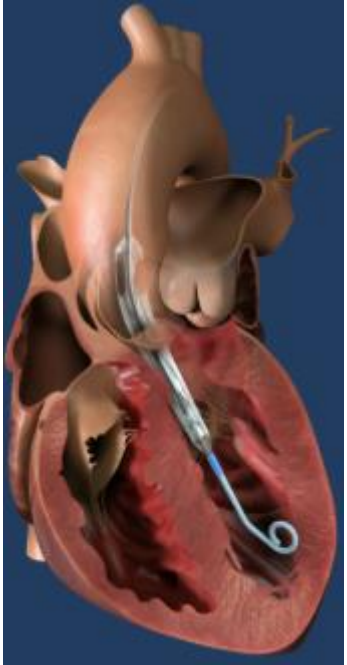
**Pompa micro-assiale
(Impella)**



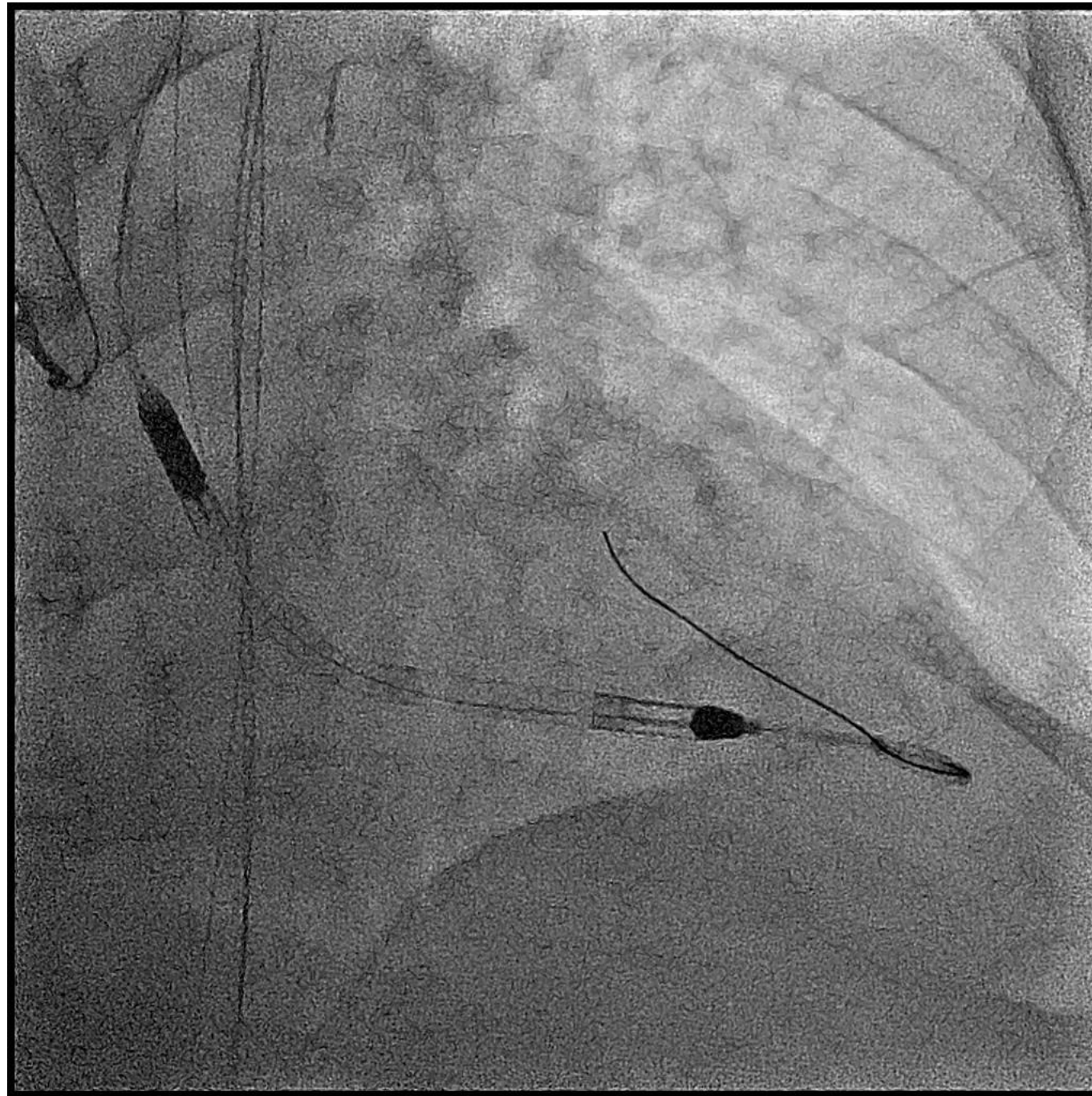


**Pompa micro-assiale
(Impella)**





**Pompa micro-assiale
(Impella)**



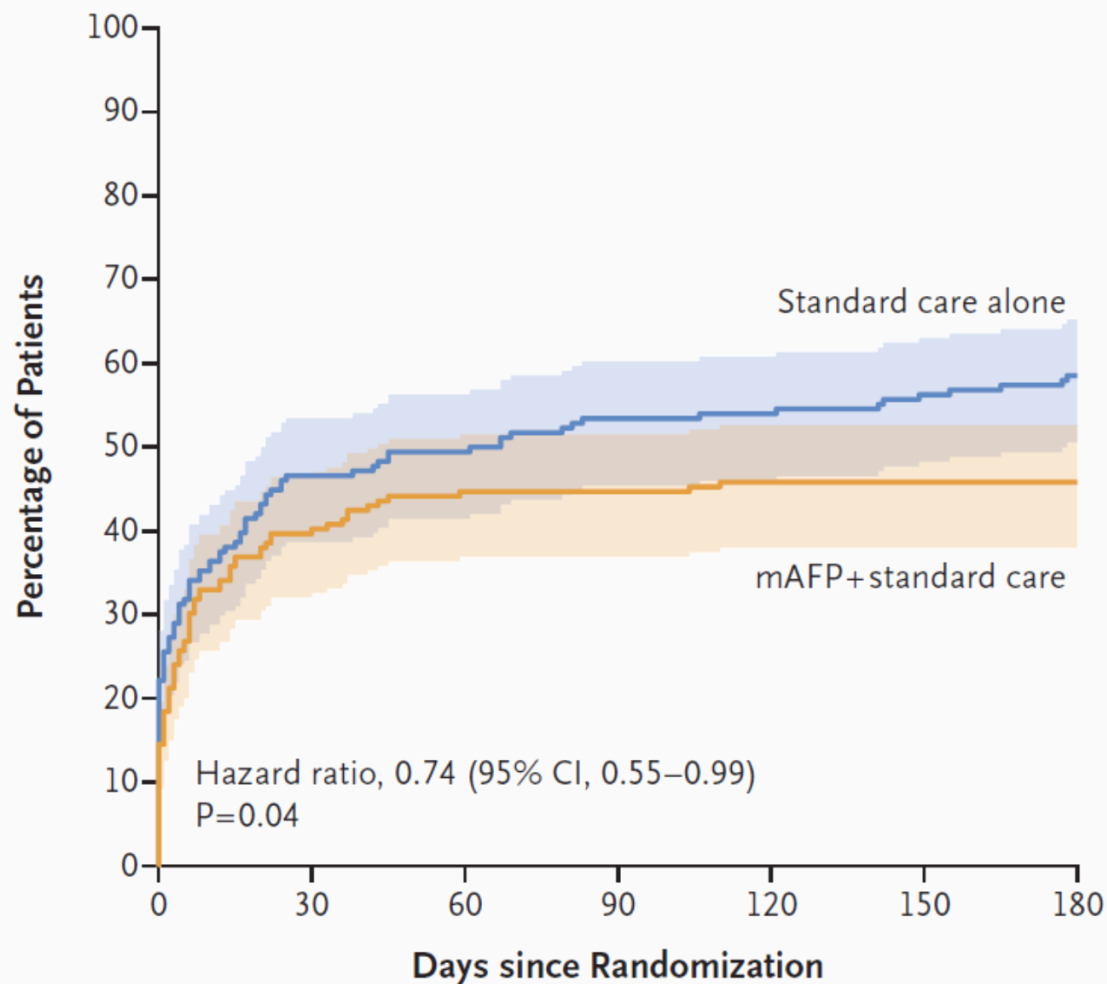
DanGer Shock

355 patients, **80%**
men, mean age **66**
years.

STEMI
LVEF <45%
Lactate >2.5 mM
Syst BP < 100 mmHg

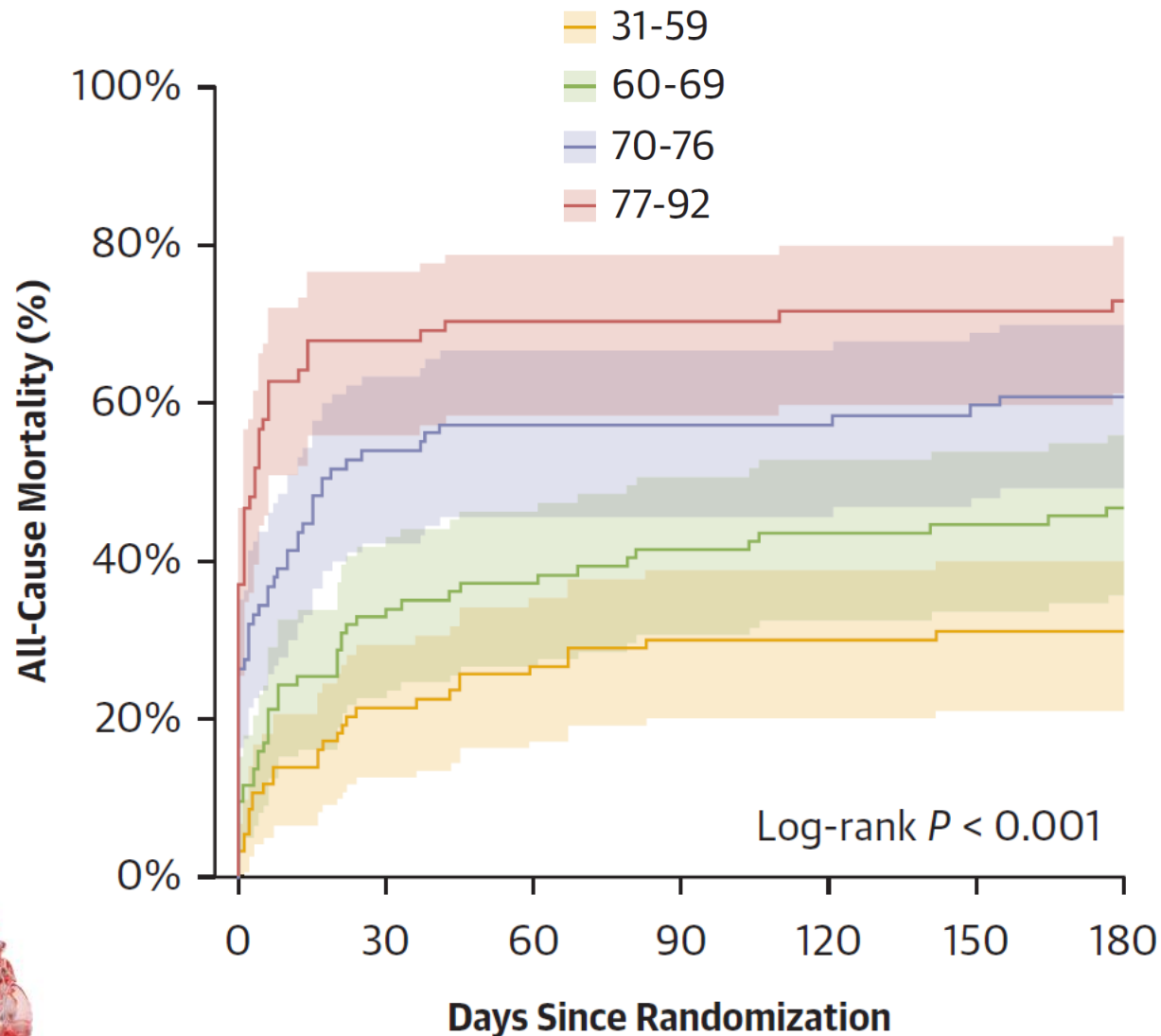
NO comatose cardiac
arrest

A Death from Any Cause



Complications ↑ (bleeding, limb ischemia, need for dialysis)

DanGer Shock Trial: Impact of Age



	Multivariable	
	OR (95% CI)	P Value
Age, y		
31-59	Ref.	
60-69	2.12 (1.01-4.53)	0.049
70-76	4.71 (2.25-10.2)	<0.001
77-92	7.85 (3.37-19.2)	<0.001

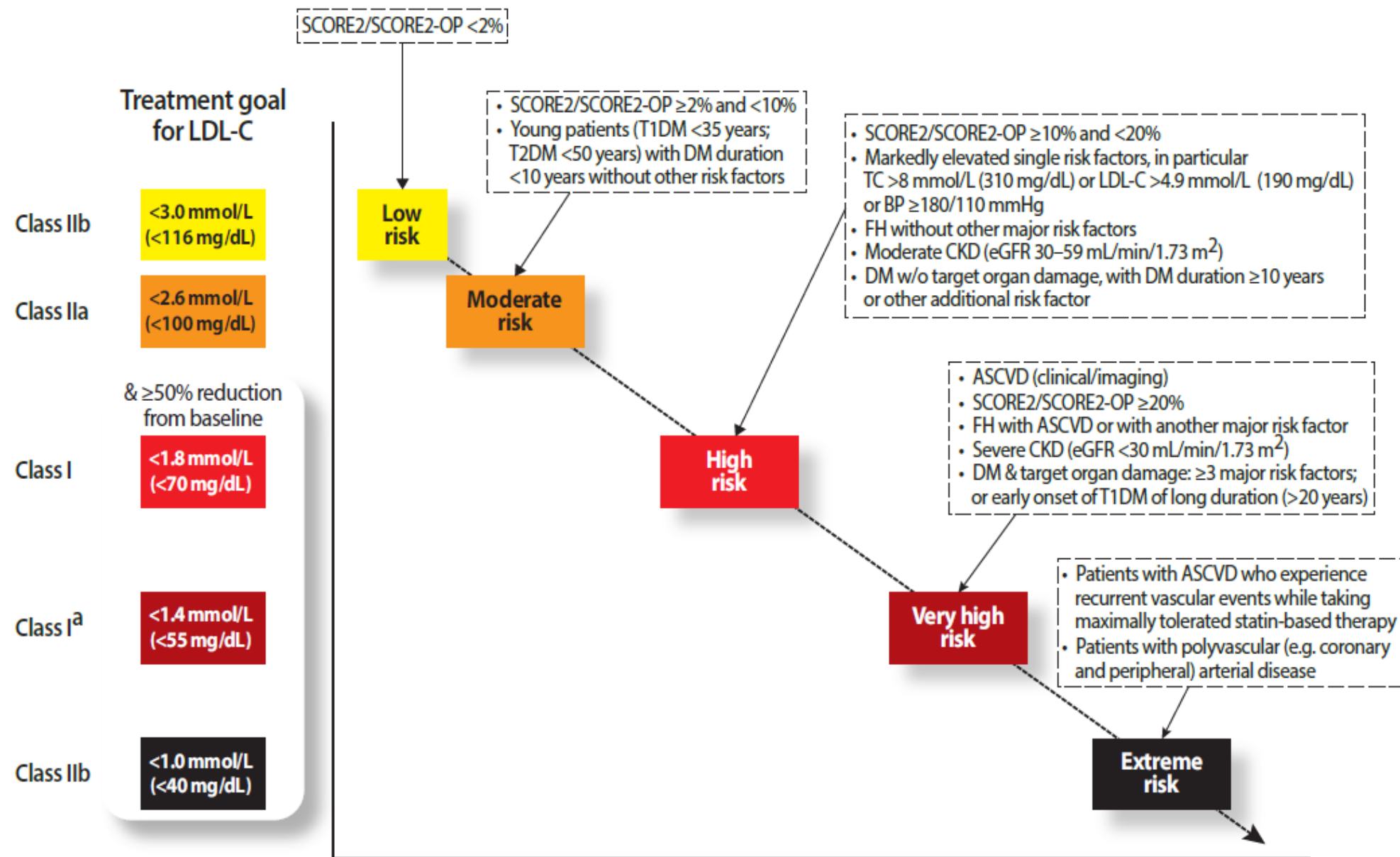


Conclusione: presa a carico della malattia coronarica nel 2025

- La malattia cardiovascolare resta il killer no 1 in CH per uomini e donne, benchè la mortalità legata all'infarto sia molto diminuita negli ultimi 20 anni
- 3 pilastri della presa a carico
 - Lifestyle e fattori di rischio cardiovascolare
 - Controllo dei sintomi (angor): betabloccanti o calcio-antagonisti -> combinazione BB+calcio-antag -> + nitrati/ranolazine
- La probabilità di una malattia coronarica ostruttiva si può calcolare/stimare sulla base dei sintomi, fattori di rischio, età e fattori aggravanti (score calcico)

Conclusione: presa a carico della malattia coronarica nel 2025

- Prevenzione secondaria
 - Aspirina o clopidogrel; doppia terapia antiaggregante dopo angioplastica
 - 6 mesi se malattia coronarica cronica
 - 12 mesi se sindrome coronarica acuta
 - IEC/sartani, soprattutto se insufficienza cardiaca o diabete
 - Inibitori SGLT2 se insufficienza cardiaca o diabete
 - Considerare agonisti GLP1 se BMI>27
- Rivascolarizzazione coronarica
 - Beneficio di mortalità nell'infarto STEMI
 - Beneficio prognostico nell'infarto NSTEMI
 - Malattia coronarica stabile → beneficio soprattutto in termini di sintomi
- Choc cardiogeno: mortalità resta molto elevata e cresce esponenzialmente con l'età (benché diminuita significativamente negli ultimi 20 anni)
 - in casi selezionati uno sostegno meccanico (pompa micro-assiale) migliora la sopravvivenza



^aClass IIa for individuals in primary prevention with FH at very high risk

CV Risk