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2019 ESC Guidelines on the diagnosis and management of chronic coronary syndromes

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2019 ESC Guidelines on the diagnosis and management of chronic coronary syndromes

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What is new in the 2019 Guidelines?

New/revised concepts (1)

The Guidelines have been revised to focus on CCS instead of stable CAD.

This change emphasizes the fact that the clinical presentations of CAD can be categorized as either ACS or CCS.

In the current Guidelines on CCS, six clinical scenarios most frequently encountered in patients are identified:

(i) patients with suspected CAD and 'stable' anginal symptoms, and/or dyspnoea;
(ii) patients with new onset of HF or LV dysfunction and suspected CAD;
(iii) asymptomatic and symptomatic patients with stabilized symptoms <1 year after an ACS or patients with recent revascularization;
(iv) asymptomatic and symptomatic patients >1 year after initial diagnosis or revascularization;
(v) patients with angina and suspected vasospastic or microvascular disease;
(vi) asymptomatic subjects in whom CAD is detected at screening.

Patients with angina and/or dyspnoea and suspected coronary artery disease

Diagnostic approach (1)

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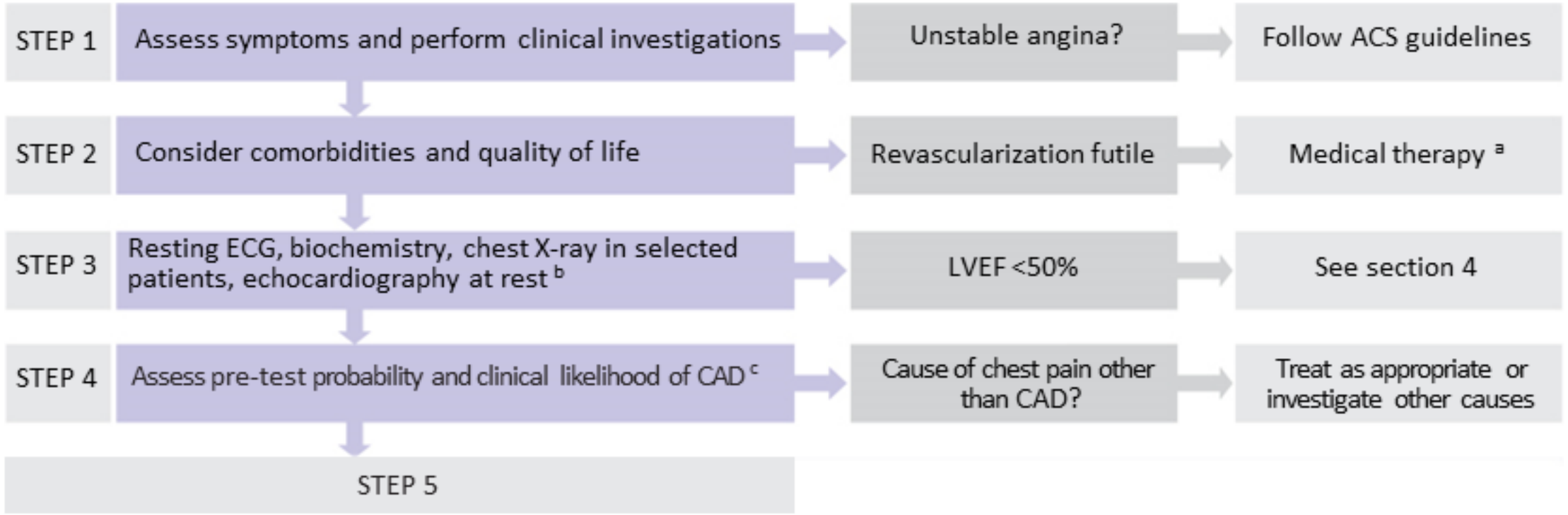
Patients with angina and/or dyspnoea and suspected coronary artery disease

Diagnostic approach (1)



[a] If the diagnosis of CAD is uncertain, establishing a diagnosis using non-invasive functional imaging for myocardial ischaemia before treatment may be reasonable.
[b] May be omitted in very young and healthy patients with a high suspicion of an extracardiac cause of chest pain, and in multimorbid patients in whom the echocardiography result has no consequence for further patient management. [c] Consider exercise ECG to assess symptoms, arrhythmias, exercise tolerance, BP response, and event risk in selected patients.

Patients with angina and/or dyspnoea and suspected coronary artery disease

Clinical classification of suspected angina

Typical angina	Meets the following three characteristics: 1. Constricting discomfort in the front of the chest or in the neck, jaw, shoulder, or arm; 2. Precipitated by physical exertion; 3. Relieved by rest or nitrates within 5 min.
Atypical angina	Meets two of these characteristics.
Non-anginal chest pain	Meets only one or none of these characteristics.

Patients with angina and/or dyspnoea and suspected coronary artery disease

Resting electrocardiogram

Recommendations	Class	Level
A resting 12-lead ECG is recommended in all patients with chest pain without an obvious non-cardiac cause.	I	C
A resting 12-lead ECG is recommended in all patients during or immediately after an episode of angina suspected to be indicative of clinical instability of CAD.	I	C
ST-segment alterations recorded during supraventricular tachyarrhythmias should not be used as evidence of CAD.	III	C

Patients with angina and/or dyspnoea and suspected coronary artery disease – Basic biochemistry testing

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Recommendations	Class	Level
If evaluation suggests clinical instability or ACS, repeated measurements of troponin, preferably using high-sensitivity or ultrasensitive assays, are recommended to rule out myocardial injury associated with ACS.	I	A
The following blood tests are recommended in all patients:		
• Full blood count (including haemoglobin);	I	B
• Creatinine measurement and estimation of renal function;	I	A
• A lipid profile (including LDL-C);	I	A
It is recommended that screening for type 2 diabetes mellitus in patients with suspected and established CCS is implemented with HbA1c and fasting plasma glucose measurements, and that an oral glucose tolerance test is added if HbA1c and fasting plasma glucose results are inconclusive.	I	B
Assessment of thyroid function is recommended in case of clinical suspicion of thyroid disorders.	I	C

Patients with angina and/or dyspnoea and suspected coronary artery disease

Resting echocardiography and CMR

Recommendations	Class	Level
A resting transthoracic echocardiogram is recommended in all patients for: 1. Exclusion of alternative causes of angina; 2. Identification of regional wall motion abnormalities suggestive of CAD; 3. Measurement of LVEF for risk stratification purpose; 4. Evaluation of diastolic function.	I	B
Ultrasound of the carotid arteries should be considered, and be performed by adequately trained clinicians, to detect plaque in patients with suspected CCS without known atherosclerotic disease.	IIa	C
CMR may be considered in patients with an inconclusive echocardiographic test.	IIb	C

Patients with angina and/or dyspnoea and suspected coronary artery disease

Chest X-ray

Recommendations	Class	Level
Chest X-ray is recommended for patients with atypical presentation, signs and symptoms of HF, or suspicion of pulmonary disease.	I	C

Patients with angina and/or dyspnoea and suspected coronary artery disease

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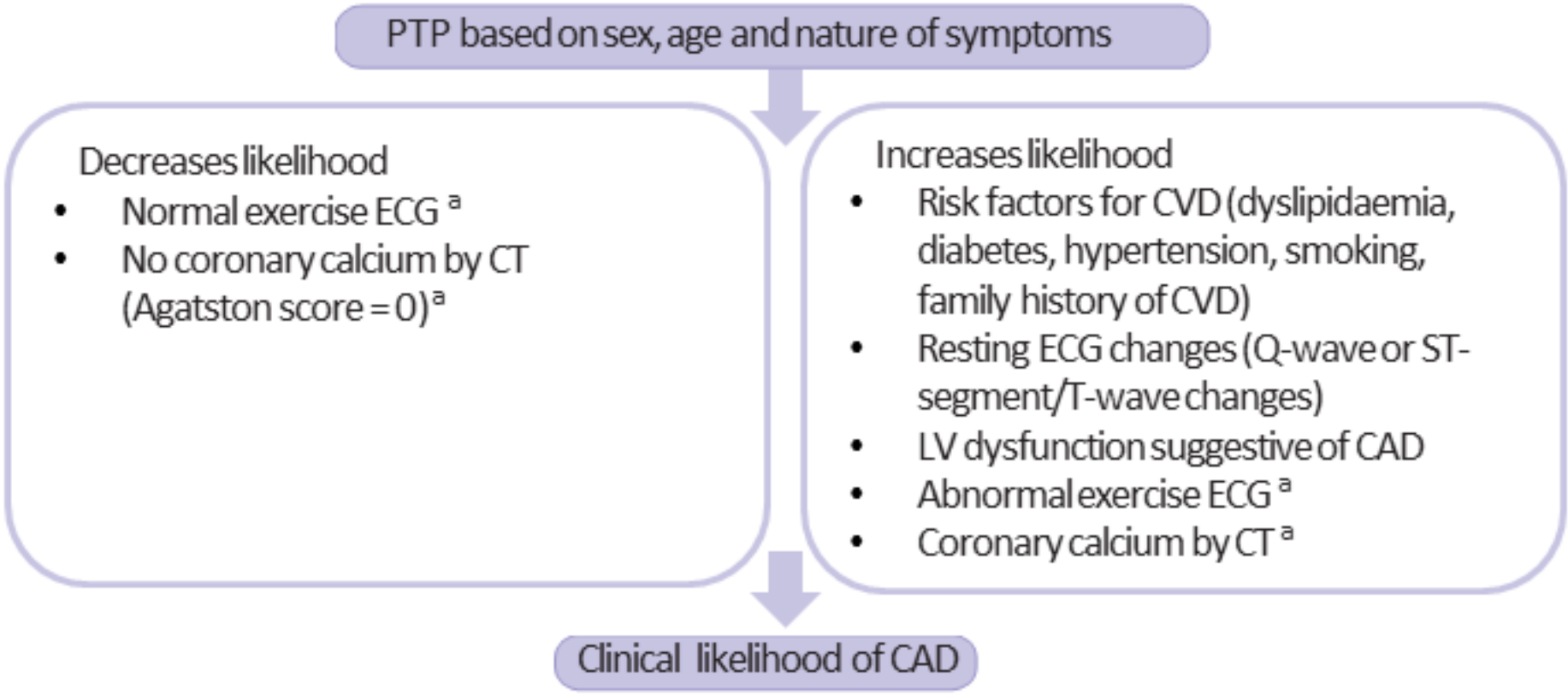
Pre-test probability of coronary artery disease

	Typical		Atypical		Non-anginal		Dyspnoea[a]	
Age	M	W	M	W	M	W	M	W
30–39	3%	5%	4%	3%	1%	1%	0%	3%
40–49	22%	10%	10%	6%	3%	2%	12%	3%
50–59	32%	13%	17%	6%	11%	3%	20%	9%
60–69	44%	16%	26%	11%	22%	6%	27%	14%
70+	52%	27%	34%	19%	24%	10%	32%	12%

[a] In addition to the classic Diamond and Forrester classes, patients with dyspnoea only or dyspnoea as the primary symptom are included. The dark green shaded regions denote the groups in which non-invasive testing is most beneficial (pre-test probability >15%). The light green shaded regions denote the groups with pre-test probability of CAD between 5-15% in which the testing for diagnosis may be considered after assessing the overall clinical likelihood based on modifiers of pre-test probability.

Patients with angina and/or dyspnoea and suspected coronary artery disease

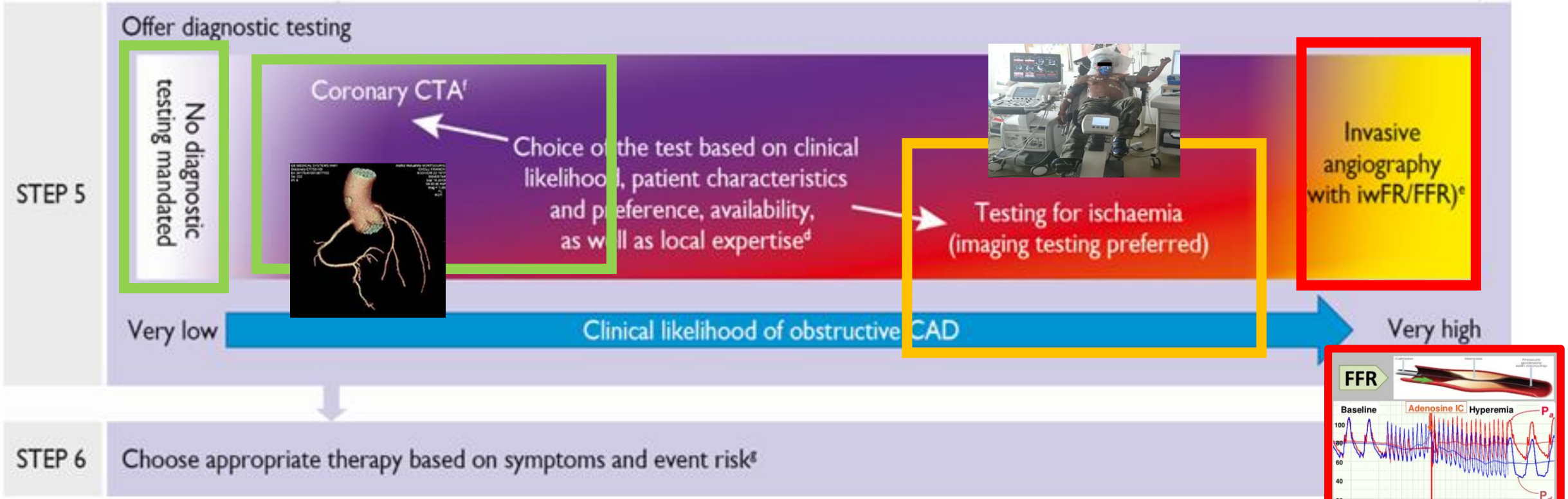
Determinants of clinical likelihood of CAD



[a] if available.

Patients with angina and/or dyspnoea and suspected coronary artery disease

Diagnostic approach (2)



[d] Ability to exercise, individual test-related risks, and likelihood of obtaining diagnostic test result. [e] High clinical likelihood and symptoms inadequate to medical treatment, high event risk based on clinical evaluation (such as ST-segment depression, combined with symptoms at a low workload or systolic dysfunction indicating CAD), or uncertain diagnosis on non-invasive testing. [f] Functional imaging for myocardial ischaemia if coronary CTA has shown CAD of uncertain grade or is non-diagnostic. [g] Consider also angina without obstructive disease in the epicardial coronary arteries (see section 6 of full text).

Patients with angina and/or dyspnoea and suspected coronary artery disease - Use of diagnostic imaging tests (1)

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Recommendations	Class	Level
Non-invasive functional imaging for myocardial ischaemia[a] or coronary CTA is recommended as the initial test to diagnose CAD in symptomatic patients in whom obstructive CAD cannot be excluded by clinical assessment alone.	I	B
It is recommended that selection of the initial non-invasive diagnostic test is done based on the clinical likelihood of CAD and other patient characteristics that influence test performance,[b] local expertise, and the availability of tests.	I	C
Functional imaging for myocardial ischaemia is recommended if coronary CTA has shown CAD of uncertain functional significance or is not diagnostic.	I	B
Invasive angiography is recommended as an alternative test to diagnose CAD in patients with a high clinical likelihood, severe symptoms refractory to medical therapy or typical angina at a low level of exercise, and clinical evaluation that indicates high event risk. Invasive functional assessment must be available and used to evaluate stenoses before revascularization, unless very high grade (>90% diameter stenosis).	I	B

[a] Stress echocardiography, stress cardiac magnetic resonance, single-photon emission CT, or positron emission tomography. [b] Characteristics determining ability to exercise, likelihood of good image quality, expected radiation exposure, and risks or contraindications.

What is new in the 2019 Guidelines?

Changes in major recommendations (1)

2013		2019	
Exercise ECG for diagnosis of stable CAD in patients with intermediate PTP.	I	Exercise ECG for risk assessment.	I
		Exercise ECG to rule-in or rule-out CAD.	IIb
Exercise ECG to evaluate control of symptoms and ischaemia.	IIa	Exercise ECG to evaluate control of symptoms and ischaemia.	IIb
For second-line treatment add long-acting nitrates, ivabradine, nicorandil, or ranolazine.	IIa	Long-acting nitrates for second-line treatment after attempts with BB and/or a non-DHP-CCB	IIa
For second-line treatment, add trimetazidine.	IIb	Nicorandil, ranolazine, ivabradine, or trimetazidine for second-line treatment after attempts with BB, CCB and long-acting nitrates.	IIa
		Combination of a BB or a CCB with second-line drugs as a first-line treatment.	IIb

ESC Guidelines on the diagnosis and management of chronic coronary syndromes (European Heart Journal 2019; 10.1093/eurheartj/ehz425)

Patients with angina and/or dyspnoea and suspected coronary artery disease

Use of exercise electrocardiogram

Recommendations	Class	Level
Exercise ECG is recommended for the assessment of exercise tolerance, symptoms, arrhythmias, BP response, and event risk in selected patients.[a]	I	C
Exercise ECG may be considered as an alternative test to rule-in or rule-out CAD when non-invasive imaging is not available.	IIb	B
Exercise ECG may be considered in patients on treatment to evaluate control of symptoms and ischaemia.	IIb	C
Exercise ECG is not recommended for diagnostic purposes in patients with ≥0.1 mV ST-segment depression on resting ECG or who are being treated with digitalis.	III	C

[a] When this information will have an impact on diagnostic strategy or management.

Patients with angina and/or dyspnoea and coronary artery disease

Lifestyle recommendations

Smoking cessation	Use pharmacological and behavioural strategies to help patients quit smoking. Avoid passive smoking.
Healthy diet	Diet high in vegetables, fruit, and wholegrains. Limit saturated fat to <10% of total intake. Limit alcohol to <100 g/week or 15 g/day.
Physical activity	30 - 60 min moderate physical activity most days, but even irregular activity is beneficial.
Healthy weight	Obtain and maintain a healthy weight (<25 kg/m^2), or reduce weight through recommended energy intake and increased physical activity.
Other	Take medications as prescribed. Sexual activity is low risk for stable patients not symptomatic at low-to-moderate activity levels.

Patients with angina and/or dyspnoea and coronary artery disease

The five As of smoking cessation

Patients with angina and/or dyspnoea and coronary artery disease –

Long term anti-ischaemic drug therapy.

The proposed stepwise approach must be adapted to ea

Le choix doit tenir compte de : FC, PA et de la FEVG

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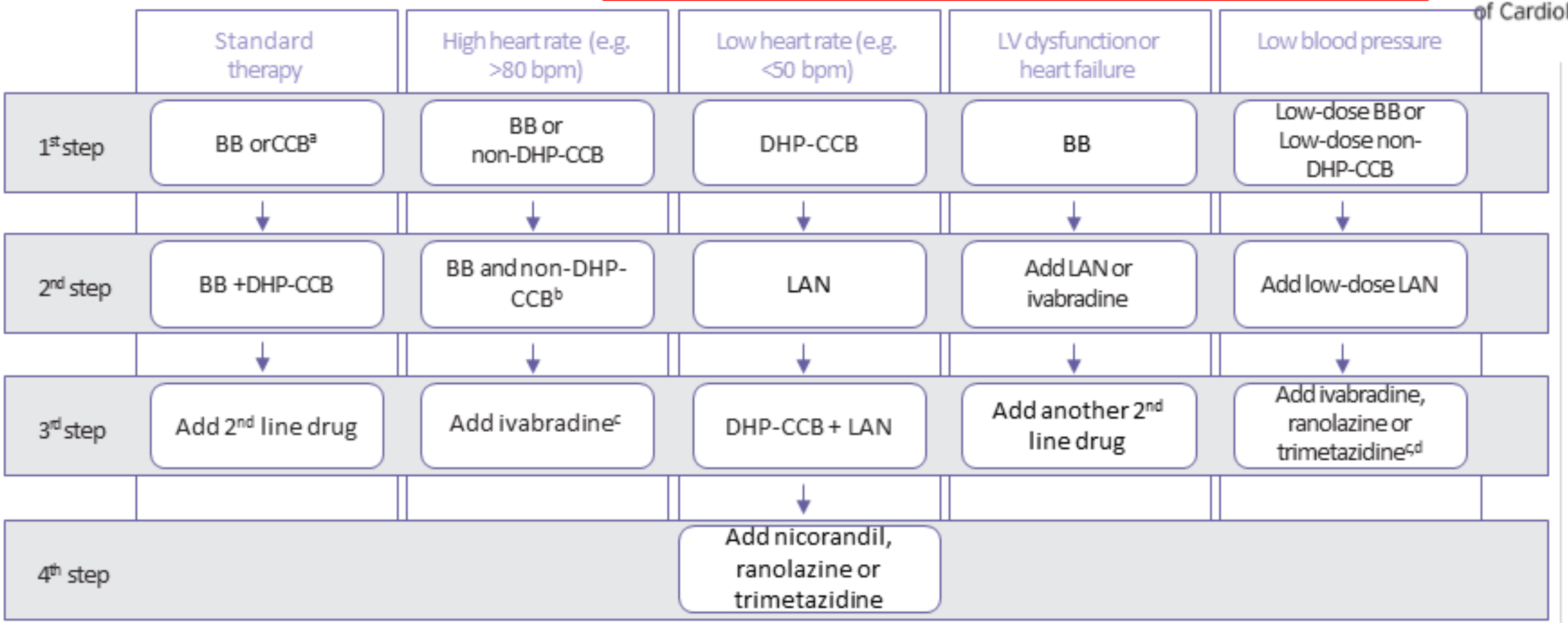

BB = beta-blocker; bpm = beats per minute; CCB = [any class of] calcium channel blocker; DHP-CCB = dihydropyridine calcium channel blocker; HF = heart failure; LAN = long-acting nitrate; LV = left ventricular; NDHP-CCB = non-dihydropyridine calcium channel blocker.

[a]Combination of a BB with a DHP-CCB should be considered as first step; combination of a BB or a CCB with a second-line drug may be considered as a first step; [b]The combination of BB and non-DHP-CCB should initially use low doses of each drug under close monitoring of tolerance, particularly heart rate and blood pressure; [c]Low dose of ivabradine (2.5 mg) should first be tested, and should not be combined with non-DHP-CCB; [d]Addition of ivabradine may only be considered if heart rate is > 80 bpm and tolerance is good at step 2.

www.escardio.org/guidelines

ESC Guidelines on the diagnosis and management of chronic coronary syndromes (European Heart Journal 2019; 10.1093/eurheartj/ehz425)

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (1)

Recommendations	Class	Level
Antithrombotic therapy in patients with CCS and in sinus rhythm		
Aspirin 75-100 mg daily is recommended in patients with a previous MI or revascularization.	I	A
Clopidogrel 75 mg daily is recommended as an alternative to aspirin in patients with aspirin intolerance.	I	B
Clopidogrel 75 mg daily may be considered in preference to aspirin in symptomatic or asymptomatic patients, with either PAD or a history of ischaemic stroke or transient ischaemic attack.	IIb	B
Aspirin 75-100 mg daily may be considered in patients without a history of MI or revascularization, but with definitive evidence of CAD on imaging.	IIb	C

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (3)

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Recommendations	Class	Level
Antithrombotic therapy post-PCI in patients with CCS and in sinus rhythm		
Aspirin 75-100 mg daily is recommended following stenting.	I	A
Clopidogrel 75 mg daily following appropriate loading (e.g. 600 mg or >5 days of maintenance therapy) is recommended, in addition to aspirin, for 6 months following coronary stenting, irrespective of stent type, unless a shorter duration (1-3 months) is indicated due to risk or the occurrence of life-threatening bleeding.	I	A
Clopidogrel 75 mg daily following appropriate loading (e.g. 600 mg or >5 days of maintenance therapy) should be considered for 3 months in patients with a higher risk of life-threatening bleeding.	IIa	A

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (5)

Recommendations	Class	Level
Antithrombotic therapy in patients with CCS and AF		
When oral anticoagulation is initiated in a patient with AF who is eligible for a NOAC,[a] a NOAC is recommended in preference to a VKA.	I	A
Long-term OAC therapy (NOAC or VKA with time in therapeutic range >70%) is recommended in patients with AF and a CHA_2DS_2-VASc score[b] ≥2 in males and ≥3 in females.	I	A

[a] See Summary of Product Characteristics for reduced doses or contraindications for each NOAC in patients with CKD, body weight <60 kg, age >75–80 years, and/or drug interactions.
[b] Congestive HF, hypertension, age ≥75 years (2 points), diabetes, prior stroke/transient ischaemic attack/embolus (2 points), vascular disease (CAD on imaging or angiography, prior MI, PAD, or aortic plaque), age 65-74 years, and female sex.

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (9)

Recommendations	Class	Level
Antithrombotic therapy in post-PCI patients with AF or another indication for an OAC		
After uncomplicated PCI, early cessation (≤1 week) of aspirin and continuation of dual therapy with an OAC and clopidogrel should be considered if the risk of stent thrombosis[a] is low, or if concerns about bleeding risk prevail over concerns about the risk of stent thrombosis,[a] irrespective of the type of stent used.	IIa	B
Triple therapy with aspirin, clopidogrel, and an OAC for ≥1 month should be considered when the risk of stent thrombosis[a] outweighs the bleeding risk, with the total duration (≤6 months) decided according to assessment of these risks and clearly specified at hospital discharge.	IIa	C
In patients with an indication for a VKA in combination with aspirin and/or clopidogrel, the dose intensity of the VKA should be carefully regulated with a target international normalized ratio in the range of 2.0-2.5 and with time in therapeutic range >70%.	IIa	B

[a] Risk of stent thrombosis encompasses (i) the risk of thrombosis occurring and (ii) the risk of death should stent thrombosis occur, both of which relate to anatomical, procedural, and clinical characteristics. Risk factors for CCS patients include stenting of left main stem, proximal LAD, or last remaining patent artery; suboptimal stent deployment; stent length >60 mm; diabetes mellitus; CKD; bifurcation with two stents implanted; treatment of chronic total occlusion; and previous stent thrombosis on adequate antithrombotic therapy.

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (12)

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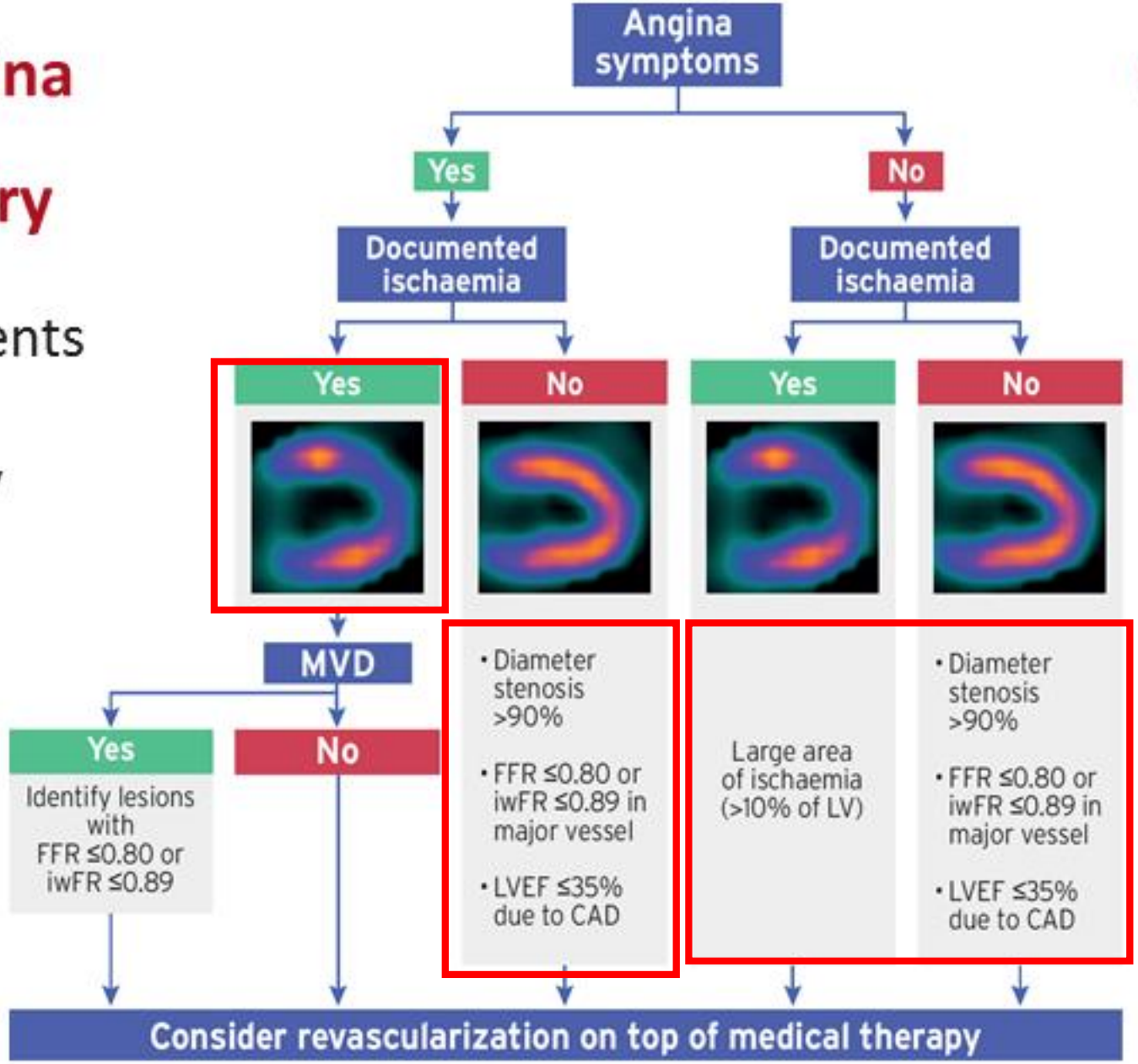
Recommendations	Class	Level
Lipid-lowering drugs		
Statins are recommended in all patients with CCS.	I	A
If a patient's goal is not achieved with the maximum tolerated dose of statin, combination with ezetimibe is recommended.	I	B
For patients at very high risk who do not achieve their goal on a maximum tolerated dose of statin and ezetimibe, a combination with a PCSK9 inhibitor is recommended.	I	A
ACE inhibitors		
ACE inhibitors (or ARBs) are recommended if a patient has other conditions (e.g. heart failure, hypertension, or diabetes).	I	A
ACE inhibitors should be considered in CCS patients at very high risk of cardiovascular events.	IIa	A

Patients with angina and/or dyspnoea and coronary artery disease

Decision tree for patients undergoing invasive coronary angiography

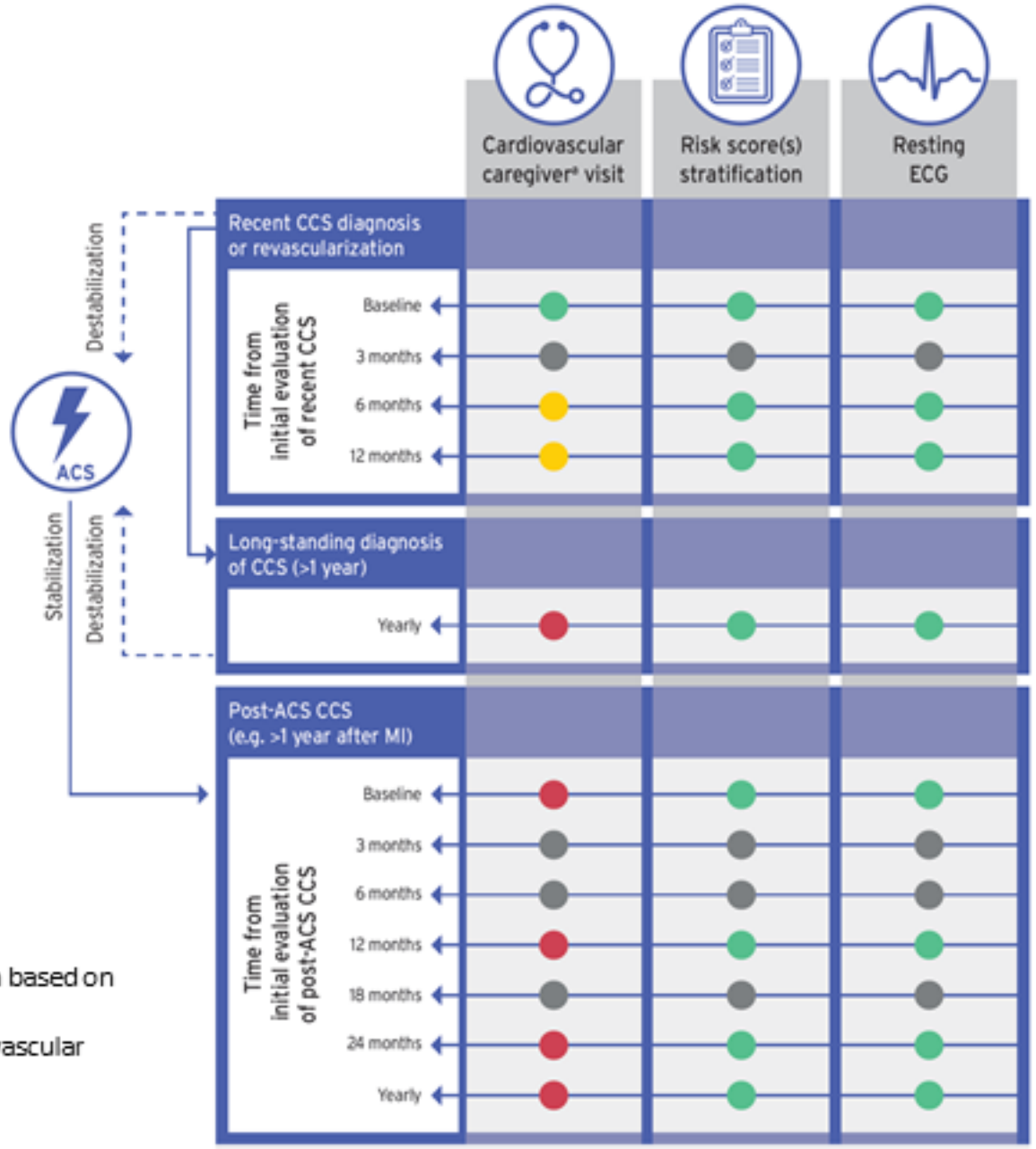


CAD = coronary artery disease;
FFR = fractional flow reserve;
iwFR = instantaneous wave-free ratio;
LV = left ventricle;
LVEF = left ventricular ejection fraction;
MVD = multivessel disease.

ESC Guidelines on the diagnosis and management of chronic coronary syndromes (European Heart Journal 2019; 10.1093/eurheartj/ehz425)

Patients with a long-standing diagnosis of chronic coronary syndromes

Follow-up (1)

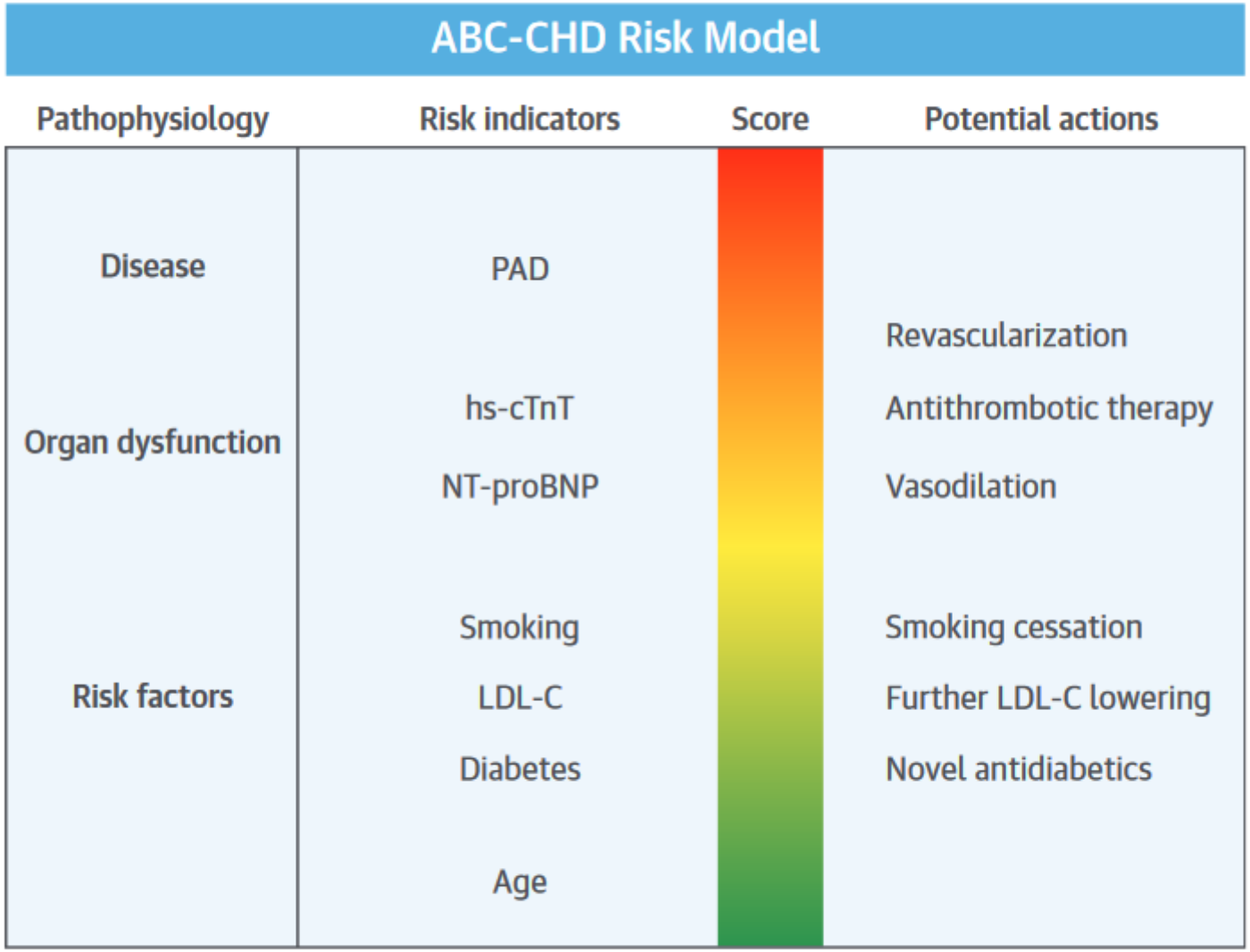


- Time for decision making on optional dual antithrombotic therapy
- Time for decision making on DAPT continuation in PCI patients
- Advisable timepoint
- Optional timepoint

The frequency of follow-up may be subject to variation based on clinical judgement.

[a] Cardiologist, internist, general practitioner, or cardiovascular nurse.

CENTRAL ILLUSTRATION **The ABC-CHD Risk Model**



ABC = Age, Biomarkers, Clinical history

Lindholm, D. et al. J Am Coll Cardiol. 2017;70(7):813-26.

Patients with a long-standing diagnosis of chronic coronary syndromes - Follow-up (2)

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 Echocardiography at rest	Early (e.g. 1-3 months) after revascularization to set as a reference and/or periodically (e.g. at 1 year if previously abnormal and/or every 3-5 years) to evaluate LV function, valvular status and haemodynamic status.
 Stress test for inducible ischaemia	As necessary, to investigate changes in symptoms level, and/or early (e.g. 1-3 months) after revascularization to set as a reference
 Invasive coronary angiography	As necessary, for patients at high risk based on noninvasive ischaemia testing, or severe angina symptoms (e.g. CCS class 3-4). Not recommended solely for risk stratification.

Patients with a long-standing diagnosis of chronic coronary syndromes - Asymptomatic patients

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Patients with a long-standing diagnosis of chronic coronary syndromes - Asymptomatic patients

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Recommendations	Class	Level
A periodic visit to a cardiovascular healthcare professional is recommended to reassess any potential change in the risk status of patients, entailing clinical evaluation of lifestyle-modification measures, adherence to targets of cardiovascular risk factors, and the development of comorbidities that may affect treatments and outcomes.	I	C
In patients with mild or no symptoms receiving medical treatment in whom non-invasive risk stratification indicates a high risk, and for whom revascularization is considered for improvement of prognosis, invasive coronary angiography (with FFR when necessary) is recommended.	I	C
Coronary CTA is not recommended as a routine follow-up test for patients with established CAD.	III	C
Invasive coronary angiography is not recommended solely for risk stratification.	III	C

Patients with a long-standing diagnosis of chronic coronary syndromes - Symptomatic patients

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Recommendations	Class	Level
Reassessment of CAD status is recommended in patients with deteriorating LV systolic function that cannot be attributed to a reversible cause (e.g. long-standing tachycardia or myocarditis).	I	C
Risk stratification is recommended in patients with new or worsening symptom levels, preferably using stress imaging or, alternatively, exercise stress ECG.	I	B
It is recommended to expeditiously refer patients with significant worsening of symptoms for evaluation.	I	C
Invasive coronary angiography (with FFR/iwFR when necessary) is recommended for risk stratification in patients with severe CAD, particularly if the symptoms are refractory to medical treatment or if they have a high-risk clinical profile.	I	C

Angina without obstructive disease in the epicardial coronary arteries - Microvascular angina

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Angina without obstructive disease in the epicardial coronary arteries - Microvascular angina

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Angor typique **Ischémie documentée** (tests non-invasifs) **Pas de sténose coronaire hémodynamiquement significative**	
Obstruction Altération de la conductance microvasculaire/ augmentation des résistances	**Vasospasme** Dysrégulation arétériolaire
Mesure non invasive (IRM, echo) ou invasive de la réserve coronaire	Test intra coronaire à l'acetylcholine (vasospasme)
bétabloquants, IEC et statines modification du style de vie	Angor spastique

Angina without obstructive disease in the epicardial coronary arteries - Microvascular angina

Recommendations	Class	Level
Guidewire-based CFR and/or microcirculatory resistance measurements should be considered in patients with persistent symptoms, but coronary arteries that are either angiographically normal or have moderate stenoses with preserved iwFR/FFR.	IIa	B
Intracoronary acetylcholine with ECG monitoring may be considered during angiography, if coronary arteries are either angiographically normal or have moderate stenoses with preserved iwFR/FFR, to assess microvascular vasospasm.	IIb	B
Transthoracic Doppler of the LAD, CMR, and PET may be considered for non-invasive assessment of CFR.	IIb	B

Angina without obstructive disease in the epicardial coronary arteries - Suspected vasospastic angina

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- Evoquer devant:

-Angor de repos

-la nuit et au “petit matin”

-Patients “jeunes” et fumeurs

- Confirmation:

-ECG pendant la crise: variation ST

-**Holter ECG**

-Test de provocation intra coronaire

(angor, modification ECG, vasocostriction épicardique sévère)

Angina without obstructive disease in the epicardial coronary arteries - Suspected vasospastic angina

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Recommendations	Class	Level
An ECG is recommended during angina if possible.	I	C
Invasive angiography or coronary CTA is recommended in patients with characteristic episodic resting angina and ST-segment changes, which resolve with nitrates and/or calcium antagonists, to determine the extent of underlying coronary disease.	I	C
Ambulatory ST-segment monitoring should be considered to identify ST-segment deviation in the absence of increased heart rate.	IIa	C
An intracoronary provocation test should be considered to identify coronary spasm in patients with normal findings or non-obstructive lesions on coronary arteriography and a clinical picture of coronary spasm, to diagnose the site and mode of spasm.	IIa	B

Screening for CAD in asymptomatic subjects (1)

Recommendations	Class	Level
Total risk estimation using a risk-estimation system such as SCORE is recommended for asymptomatic adults >40 years of age without evidence of CVD, diabetes, CKD, or familial hypercholesterolaemia.	I	C
Assessment of family history of premature CVD (defined as a fatal or non-fatal CVD event, or/and established diagnosis of CVD in first-degree male relatives before 55 years of age or female relatives before 65 years of age) is recommended as part of cardiovascular risk assessment.	I	C
It is recommended that all individuals aged <50 years with a family history of premature CVD in a first-degree relative (<55 years of age in men or <65 years of age in women) or familial hypercholesterolaemia are screened using a validated clinical score.	I	B
Assessment of coronary artery calcium score with computed tomography may be considered as a risk modifier in the cardiovascular risk assessment of asymptomatic subjects.	IIb	B
Atherosclerotic plaque detection by carotid artery ultrasound may be considered as a risk modifier in the cardiovascular risk assessment of asymptomatic subjects.	IIb	B

Screening for CAD in asymptomatic subjects (2)

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Recommendations	Class	Level
ABI may be considered as a risk modifier in cardiovascular risk assessment.	IIb	B
In high-risk asymptomatic adults (with diabetes, a strong family history of CAD, or when previous risk-assessment tests suggest a high risk of CAD), functional imaging or coronary CTA may be considered for cardiovascular risk assessment.	IIb	C
In asymptomatic adults (including sedentary adults considering starting a vigorous exercise programme), an exercise ECG may be considered for cardiovascular risk assessment, particularly when attention is paid to non-ECG markers such as exercise capacity.	IIb	C
Carotid ultrasound IMT for cardiovascular risk assessment is not recommended.	III	A
In low-risk non-diabetic asymptomatic adults, coronary CTA or functional imaging for ischaemia are not indicated for further diagnostic assessment.	III	C
Routine assessment of circulating biomarkers is not recommended for cardiovascular risk stratification.	III	B

Prise en charge des fdr CV+++

Bénéfice de la revascularisation non démontré

Chronic coronary syndromes in specific circumstances

Hypertension

Recommendations	Class	Level
It is recommended that office BP is controlled to target values: systolic BP 120-130 mmHg in general and systolic BP 130-140 mmHg in older patients (aged >65 years).	I	A
In hypertensive patients with a recent MI, beta-blockers and RAS blockers are recommended.	I	A
In patients with symptomatic angina, beta-blockers and/or CCBs are recommended.	I	A
The combination of ACE inhibitors and ARBs is not recommended.	III	A

Chronic coronary syndromes in specific circumstances

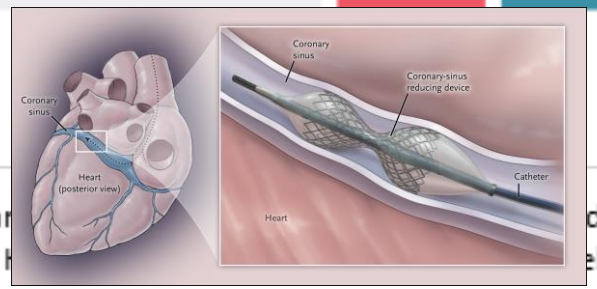
Diabetes mellitus

Recommendations	Class	Level
Risk factor (BP, LDL-C, and HbA1c) control to targets is recommended in patients with CAD and diabetes mellitus.	I	A
In asymptomatic patients with diabetes mellitus, a periodic resting ECG is recommended for cardiovascular detection of conduction abnormalities, AF, and silent MI.	I	C
ACE inhibitor treatment is recommended in CCS patients with diabetes for event prevention.	I	B
The sodium-glucose co-transporter 2 inhibitors empagliflozin, canagliflozin, or dapagliflozin are recommended in patients with diabetes and CVD.	I	A
A glucagon-like peptide-1 receptor agonist (liraglutide or semaglutide) is recommended in patients with diabetes and CVD.	I	A
In asymptomatic adults (age >40 years) with diabetes, functional imaging or coronary CTA may be considered for advanced cardiovascular risk assessment.	IIb	B

Chronic coronary syndromes in specific circumstances

Refractory angina

Recommendations	Class	Level
Enhanced external counterpulsation may be considered for symptom relief in patients with debilitating angina refractory to optimal medical and revascularization strategies.	IIb	B
A reducer device for coronary sinus constriction may be considered to ameliorate symptoms of debilitating angina refractory to optimal medical and revascularization strategies.	IIb	B
Spinal cord stimulation may be considered to ameliorate symptoms and quality of life in patients with debilitating angina refractory to optimal medical and revascularization strategies.	IIb	B
Transmyocardial revascularization is not indicated in patients with debilitating angina refractory to optimal medical and revascularization strategies.	III	A



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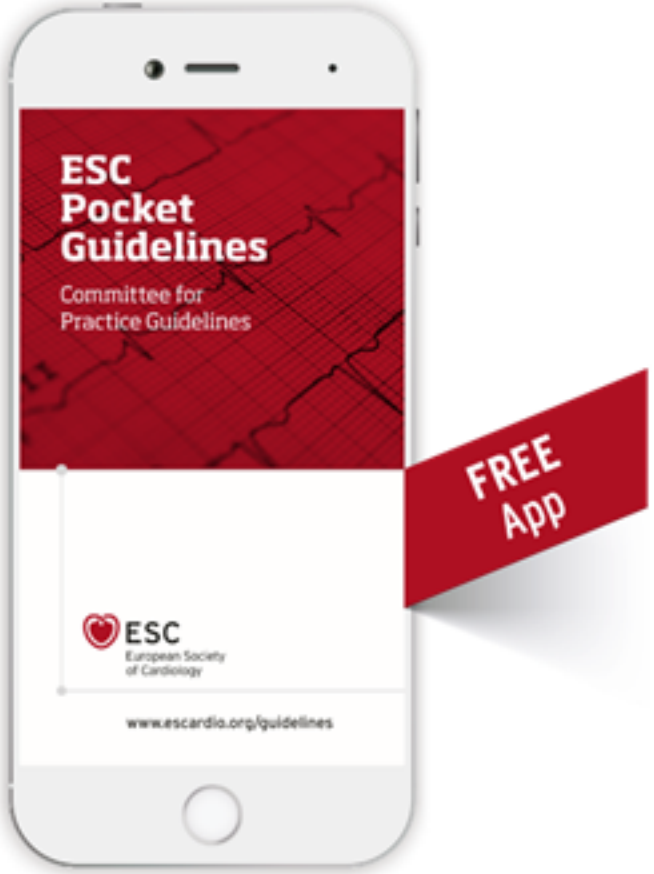

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