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

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ESC Classes of recommendations

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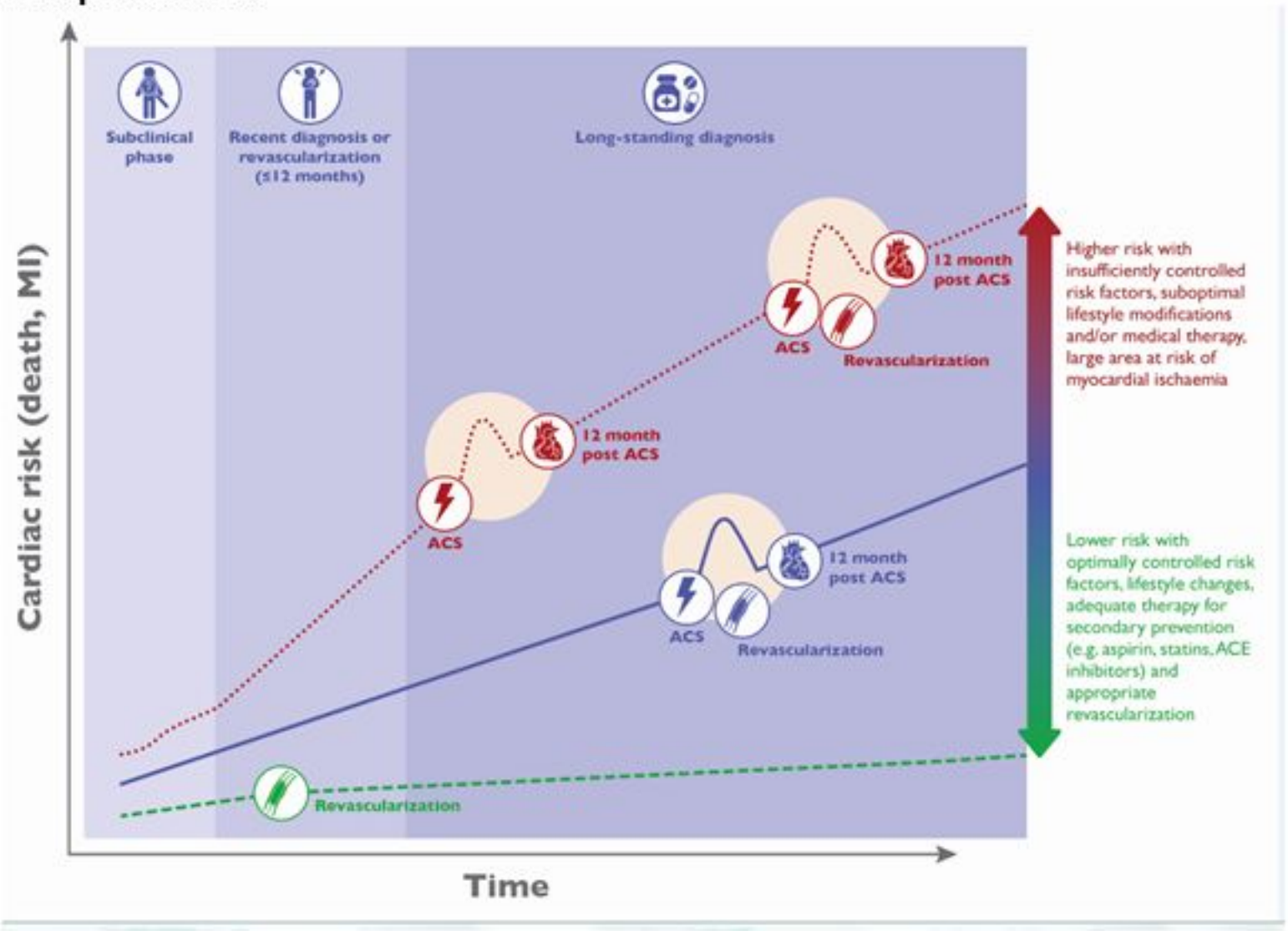
	Definition	Wording to use
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended or is indicated
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	Weight of evidence/opinion is in favour of usefulness/efficacy.	Should be considered
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.	May be considered
Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.	Is not recommended

ESC Levels of evidence

Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

Natural history of chronic coronary syndromes

A dynamic process



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

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.

What is new in the 2019 Guidelines?

New/revised concepts (2)

The pre-test probabilities (PTP) of CAD based on age, gender and nature of symptoms have undergone major revisions.

In addition, we introduced the new phrase "Clinical likelihood of CAD" that utilizes also various risk factors of CAD as PTP modifiers.

The application of various diagnostic tests in different patient groups to rule-in or rule-out CAD have been updated.

The Guidelines emphasize the crucial role of healthy lifestyle behaviours and other preventive actions in decreasing the risk of subsequent cardiovascular events and mortality.

What is new in the 2019 Guidelines?

New recommendations (1)

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Basic testing, diagnostics, and risk assessment

Non-invasive functional imaging or coronary CTA as the initial test for diagnosing CAD.	Invasive angiography to diagnose CAD in patients with - a high clinical likelihood and severe symptoms refractory to medical therapy - typical angina at 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).	Invasive coronary angiography with availability of invasive functional evaluation for confirmation of CAD diagnosis in patients with uncertain diagnosis on non-invasive testing.
Initial non-invasive diagnostic test based on the clinical likelihood of CAD, patient characteristics, local expertise and availability.		Coronary CTA as an alternative to invasive angiography if another non-invasive test is equivocal or non-diagnostic.
Functional imaging for myocardial ischaemia if coronary CTA has shown CAD of uncertain functional significance or is not diagnostic.		Coronary CTA when any conditions make good image quality unlikely.

Class I Class IIa Class IIb Class III

What is new in the 2019 Guidelines?

New recommendations (2)

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Antithrombotic therapy in patients with CCS and sinus rhythm	Antithrombotic therapy in patients with CCS and atrial fibrillation	Antithrombotic therapy in post-PCI patients with indication for OAC
Adding a second antithrombotic drug to aspirin for long-term secondary prevention in patients with high-risk of ischaemic events and without high bleeding risk.	NOAC is recommended in preference to a VKA.	Full dose NOAC is recommended in preference to a VKA.
	Long-term OAC therapy in patients with AF and a CHA_2DS_2-VASc score ≥2 in males and ≥3 in females.	Rivaroxaban 15 mg over 20 mg.
		Dabigatran 110 mg over 150 mg.
		Early cessation (≤1 week) of aspirin.
Adding a second antithrombotic drug to aspirin for long-term secondary prevention in patients with at least a moderately increased risk of ischaemic events and without high bleeding risk.	Long-term OAC therapy in patients with AF and a CHA_2DS_2-VASc score 1 in males and 2 in females.	Triple therapy for 1 to 6 months.
		INR 2.0-2.5 and TTR >70% if VKA.
		Dual therapy with prasugrel or ticagrelor over clopidogrel.

Class I Class IIa Class IIb Class III

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

What is new in the 2019 Guidelines?

New recommendations (3)

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Other pharmacological therapy		Screening for CAD in asymptomatic subjects
A PPI in patients receiving aspirin monotherapy, DAPT, or OAC monotherapy who are at high risk of gastrointestinal bleeding.	A sodium-glucose co-transporter-2 inhibitors in patients with diabetes mellitus and CVD	Carotid ultrasound IMT for cardiovascular risk assessment is not recommended.
Ezetimibe if lipid goals not achieved with statins	A glucagon-like peptide-1 receptor agonist in patients with diabetes mellitus and CVD	Treatment options for refractory angina
A PCSK9 inhibitor in patients at very high risk who do not achieve lipid goals with statins and ezetimibe	ACE inhibitors in patients at very high risk of cardiovascular adverse events	Coronary sinus constriction for debilitating angina refractory to optimal medical and revascularization strategies.

Class I Class IIa Class IIb Class III

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

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)

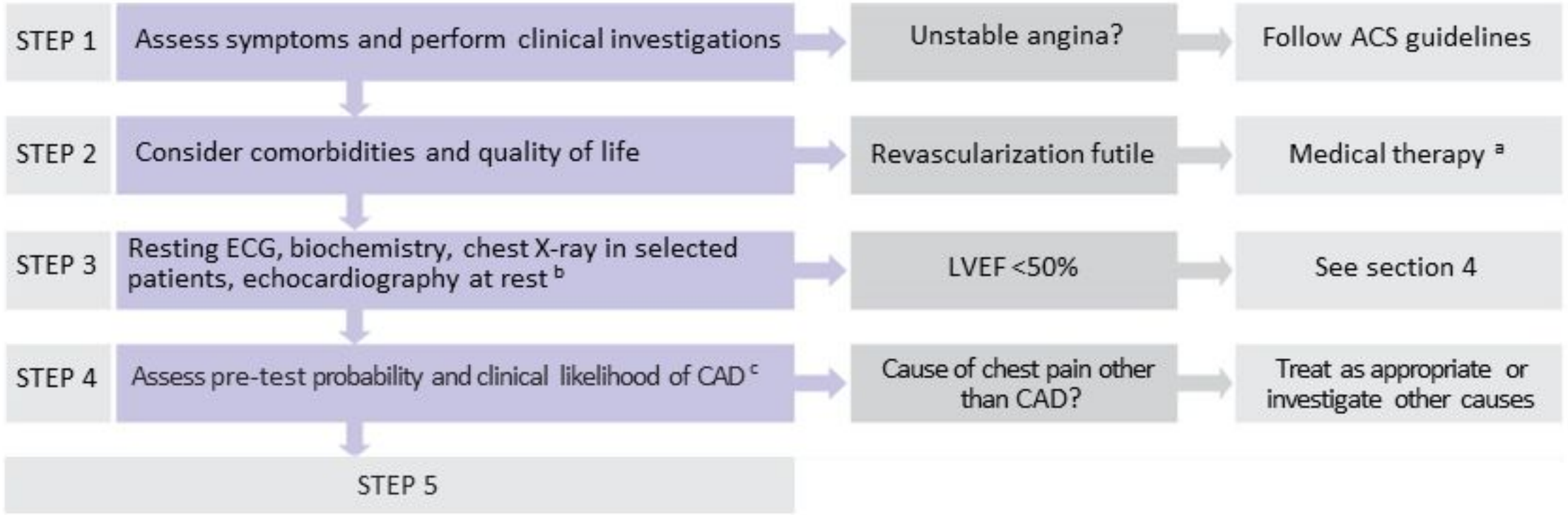
What is new in the 2019 Guidelines?

Changes in major recommendations (2)

2013		2019	
Intracoronary acetylcholine and adenosine with Doppler measurements for patients with suspected microvascular angina.	IIb	Guidewire-based CFR and/or microcirculatory resistance measurements in patients with persistent symptoms but coronary arteries that are either angiographically normal or have moderate stenoses with preserved iwFR/FFR.	IIa
		Intracoronary acetylcholine with ECG monitoring to assess microvascular vasospasm.	IIb
Transthoracic Doppler echocardiography of the LAD for non-invasive measurement of CFR in patients with suspected microvascular angina.	IIb	Transthoracic Doppler of the LAD, CMR, and PET for non-invasive assessment of CFR.	IIb

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

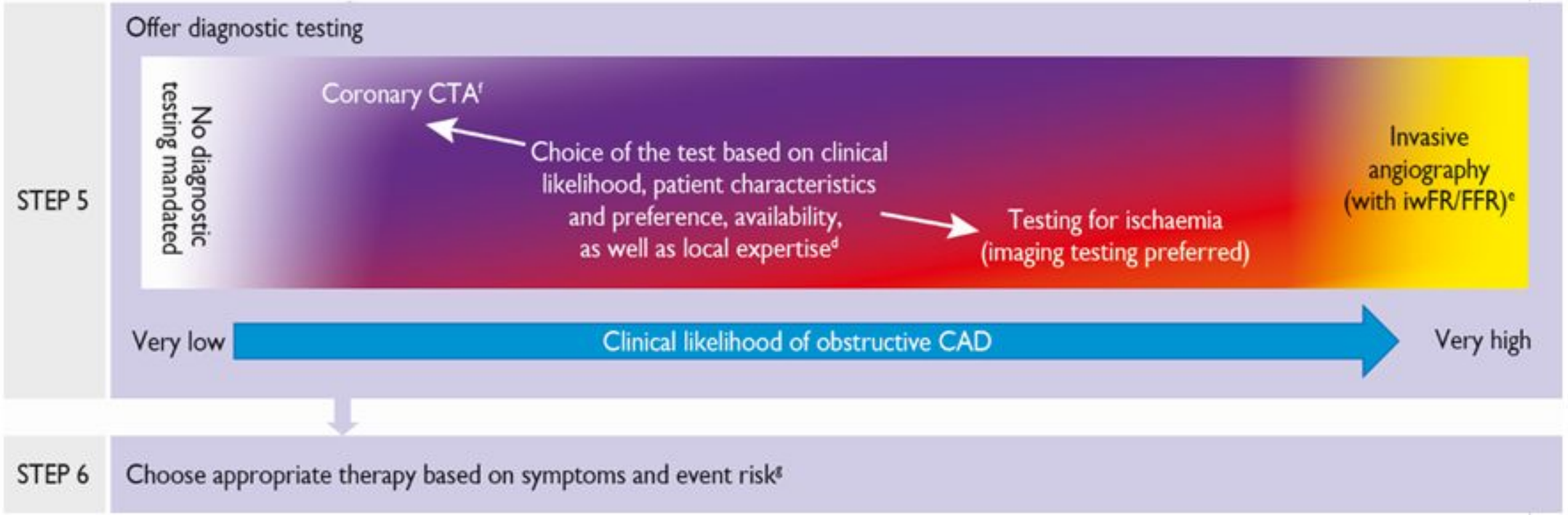
Diagnostic approach (1)



[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

Diagnostic approach (2)



[d] Ability to exercise, individual test-related risks, and likelihood of obtaining diagnostic test result. [e] High clinical likelihood and symptoms inadequately responding 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).

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

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

Canadian Cardiovascular Society grading of effort angina severity

Class	Description of angina severity	
I	Angina only with strenuous exertion	Presence of angina during strenuous, rapid, or prolonged ordinary activity (walking or climbing the stairs).
II	Angina with moderate exertion	Slight limitation of ordinary activities when they are performed rapidly, after meals, in cold, in wind, under emotional stress, or during the first few hours after waking up, but also walking uphill, climbing more than one flight of ordinary stairs at a normal pace, and in normal conditions.
III	Angina with mild exertion	Having difficulties walking one or two blocks, or climbing one flight of stairs, at normal pace and conditions.
IV	Angina at rest	No exertion needed to trigger angina.

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

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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

Ambulatory electrocardiogram monitoring

Recommendations	Class	Level
Ambulatory ECG monitoring is recommended in patients with chest pain and suspected arrhythmias.	I	C
Ambulatory ECG recording, preferably monitoring with 12 leads, should be considered in patients with suspected vasospastic angina.	IIa	C
Ambulatory ECG monitoring should not be used as a routine examination in patients with suspected CCS.	III	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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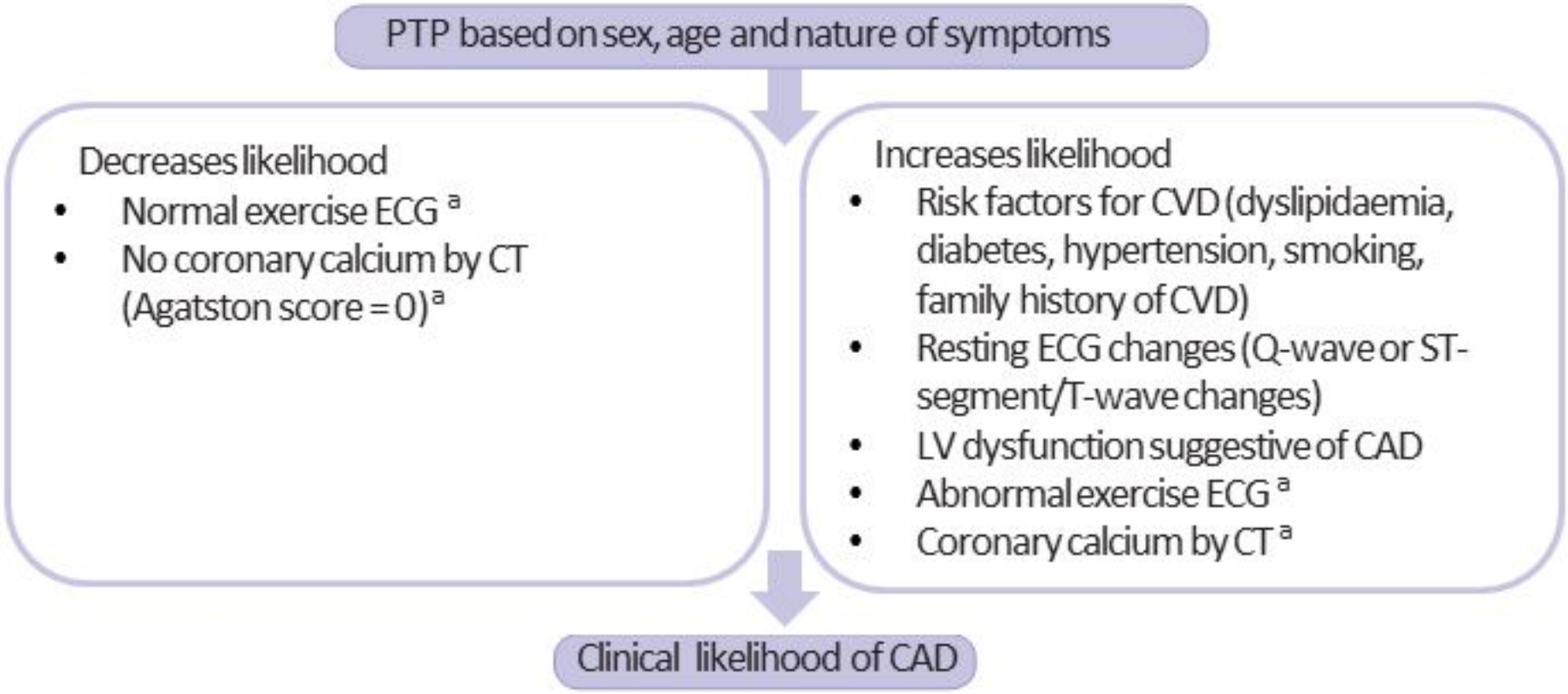
Pre-test probability of coronary artery disease

	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

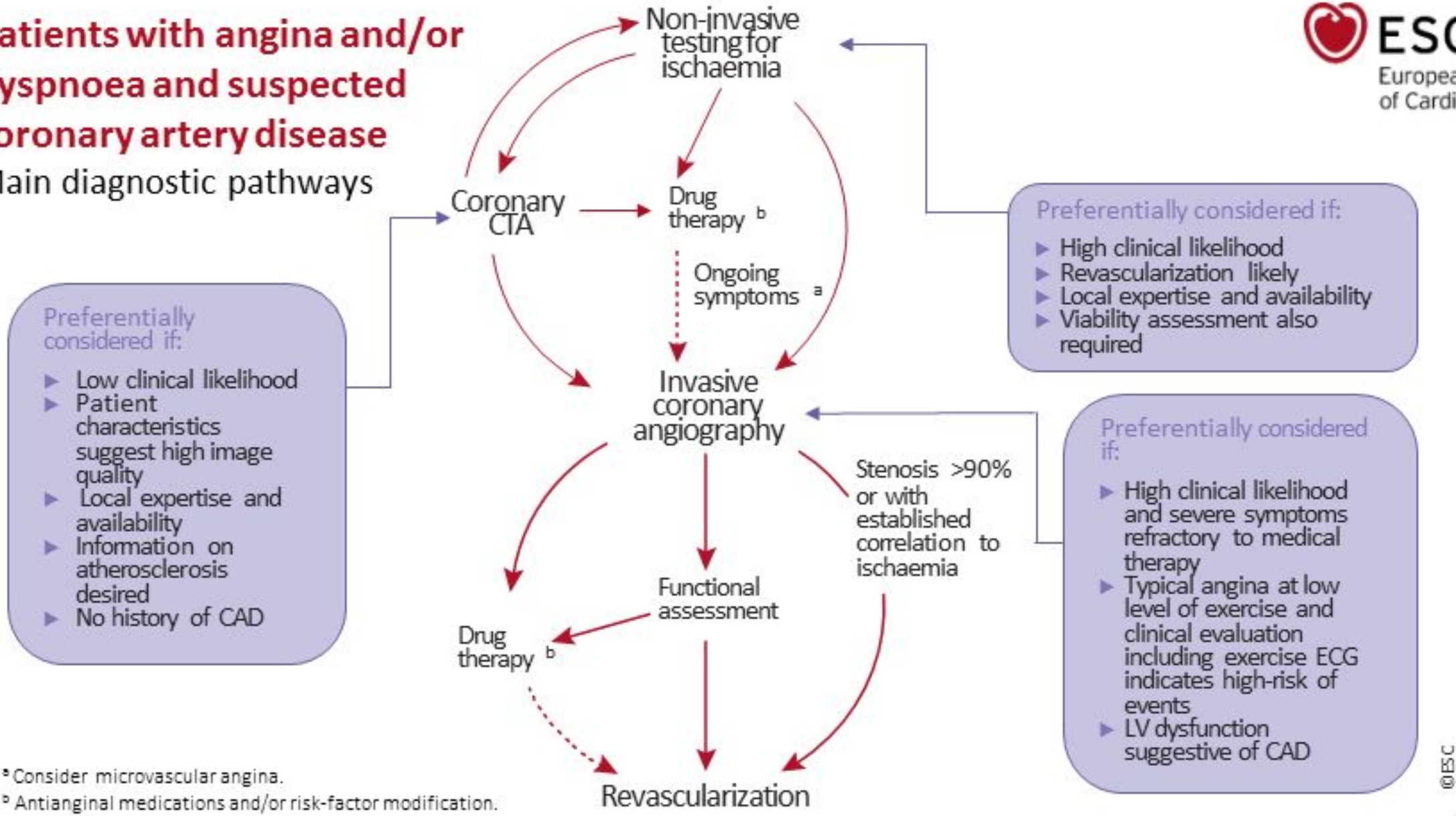
Determinants of clinical likelihood of CAD



[a] if available.

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

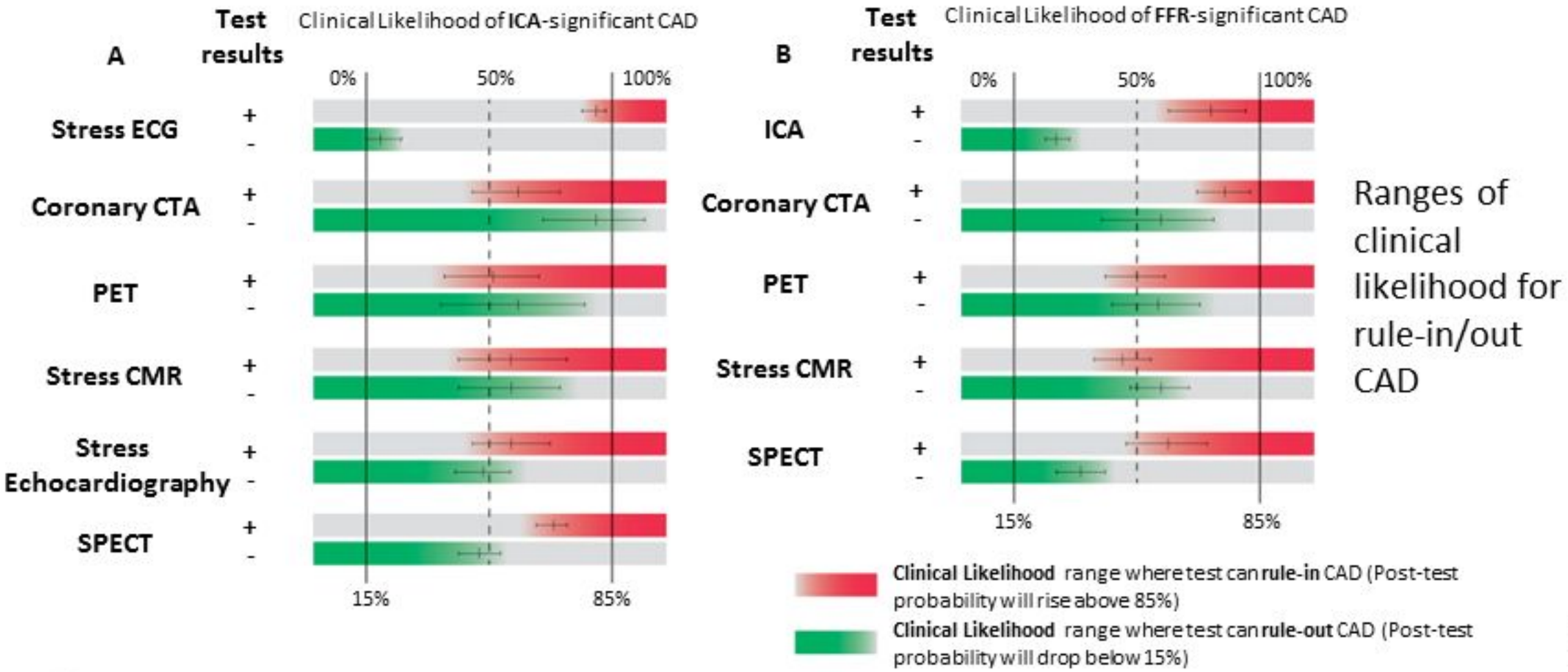
Main diagnostic pathways



[a] Consider microvascular angina.

[b] Antianginal medications and/or risk-factor modification.

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



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.

Patients with angina and/or dyspnoea and suspected coronary artery disease - Use of diagnostic imaging tests (2)

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Recommendations	Class	Level
Invasive coronary angiography with the availability of invasive functional evaluation should be considered for confirmation of the diagnosis of CAD in patients with an uncertain diagnosis on non-invasive testing.	IIa	B
Coronary CTA should be considered as an alternative to invasive angiography if another non-invasive test is equivocal or non-diagnostic.	IIa	C
Coronary CTA is not recommended when extensive coronary calcification, irregular heart rate, significant obesity, inability to cooperate with breath-hold commands, or any other conditions make obtaining good image quality unlikely.	III	C
Coronary calcium detection by CT is not recommended to identify individuals with obstructive CAD.	III	C

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.

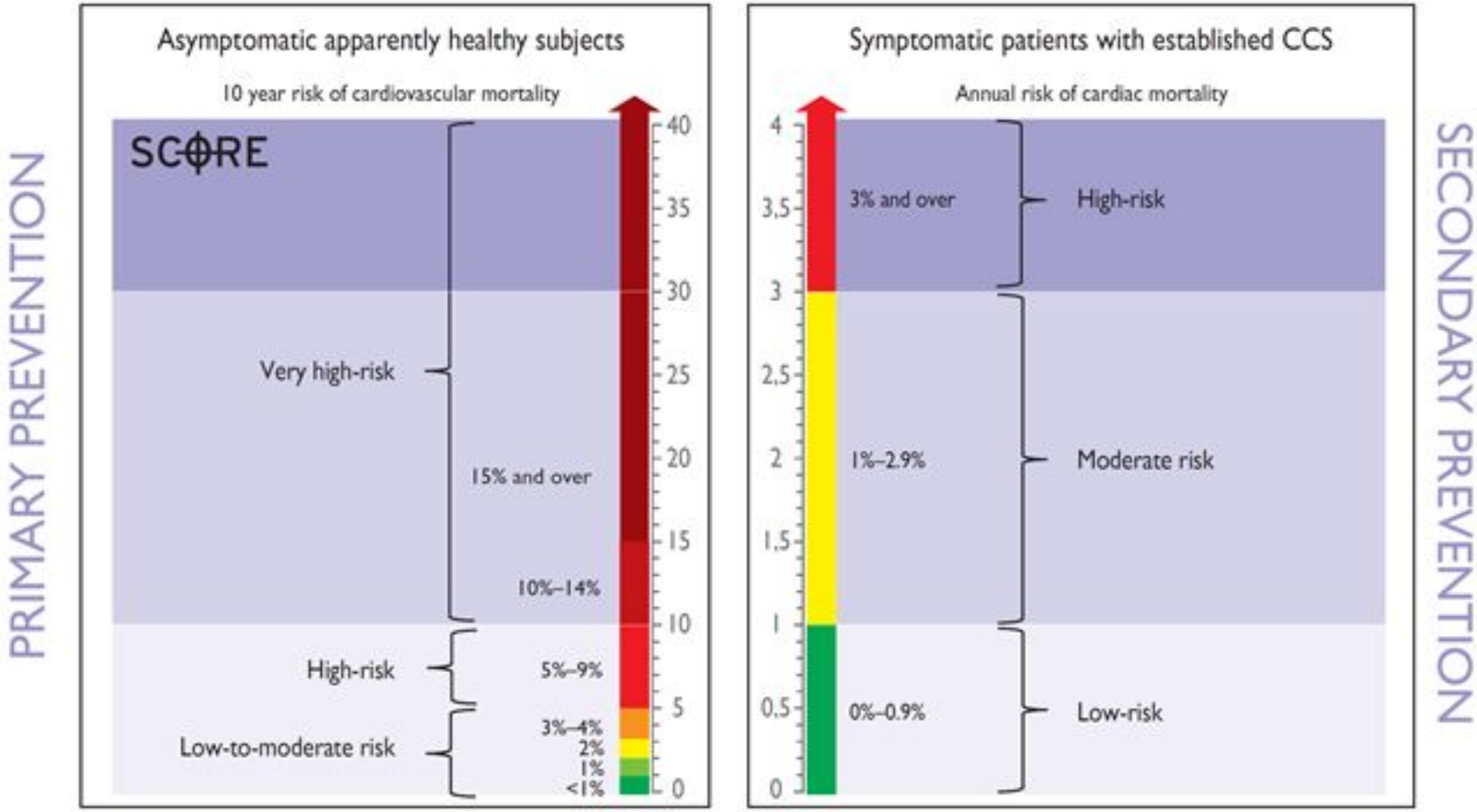
Patients with angina and/or dyspnoea and suspected coronary artery disease

Definitions of high event risk for different tests

Exercise ECG	Cardiovascular mortality >3% per year according to Duke Treadmill Score.
SPECT or PET perfusion imaging	Area of ischaemia ≥10% of the left ventricle myocardium.
Stress echocardiography	≥3 of 16 segments with stress-induced hypokinesia or akinesia.
CMR	≥2 of 16 segments with stress perfusion defects or ≥3 dobutamine-induced dysfunctional segments.
Coronary CTA or ICA	Three-vessel disease with proximal stenoses, LM disease, or proximal anterior descending disease.
Invasive functional testing	FFR ≤0.8, iwFR ≤0.89.

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

Risk assessment in primary vs. secondary prevention



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 - Risk assessment (1)

Recommendations	Class	Level
Risk stratification is recommended based on clinical assessment and the result of the diagnostic test initially employed to diagnose CAD.	I	B
Resting echocardiography is recommended to quantify LV function in all patients with suspected CAD.	I	C
Risk stratification, preferably using stress imaging or coronary CTA (if permitted by local expertise and availability), or alternatively exercise stress ECG (if significant exercise can be performed and the ECG is amenable to the identification of ischaemic changes), is recommended in patients with suspected or newly diagnosed CAD.	I	B
In symptomatic patients with a high-risk clinical profile, ICA complemented by invasive physiological guidance (FFR) is recommended for cardiovascular risk stratification, particularly if the symptoms are responding inadequately to medical treatment and revascularization is considered for improvement of prognosis.	I	A

Patients with angina and/or dyspnoea and suspected coronary artery disease - Risk assessment (2)

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Recommendations	Class	Level
In patients with mild or no symptoms, ICA complemented by invasive physiological guidance (FFR/iwFR) is recommended for patients on medical treatment, in whom non-invasive risk stratification indicates a high event risk and revascularization is considered for improvement of prognosis.	I	A
ICA complemented by invasive physiological guidance (FFR) should be considered for risk-stratification purposes in patients with inconclusive or conflicting results from non-invasive testing.	IIa	B
If coronary CTA is available for event risk stratification, additional stress imaging should be performed before the referral of a patient with few/no symptoms for ICA.	IIa	B
Echocardiographic assessment of global longitudinal strain provides incremental information to LVEF and may be considered when LVEF is >35%.	IIb	B
Intravascular ultrasound may be considered for the risk stratification of patients with intermediate LM stenosis.	IIb	B
ICA is not recommended solely for risk stratification.	III	C

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 - Healthy diet characteristics

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Increase consumption of fruits and vegetables (≥200 g each per day).
35-45 g of fibre per day, preferably from wholegrains.
Moderate consumption of nuts (30 g per day, unsalted).
1-2 servings of fish per week (one to be oily fish).
Limited lean meat, low-fat dairy products, and liquid vegetable oils.
Saturated fats to account for <10% of total energy intake; replace with polyunsaturated fats.
As little intake of trans unsaturated fats as possible, preferably no intake from processed food, and <1% of total energy intake.
≤5-6 g of salt per day.
If alcohol is consumed, limiting intake to ≤100 g/week or <15 g/day is recommended.
Avoid energy-dense foods such as sugar-sweetened soft drinks.

Patients with angina and/or dyspnoea and coronary artery disease - Lifestyle management

Recommendations	Class	Level
Improvement of lifestyle factors in addition to appropriate pharmacological management is recommended.	I	A
Cognitive behavioural interventions are recommended to help individuals achieve a healthy lifestyle.	I	A
Exercise-based cardiac rehabilitation is recommended as an effective means for patients with CCS to achieve a healthy lifestyle and manage risk factors.	I	A
Involvement of multidisciplinary healthcare professionals (e.g. cardiologists, GPs, nurses, dieticians, physiotherapists, psychologists, and pharmacists) is recommended.	I	A
Psychological interventions are recommended to improve symptoms of depression in patients with CCS.	I	B
Annual influenza vaccination is recommended for patients with CCS, especially in the elderly.	I	B

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

Long term anti-ischaemic drug therapy in patients with chronic coronary syndromes and specific baseline characteristics. The proposed stepwise approach must be adapted to each patient's characteristics and preferences.

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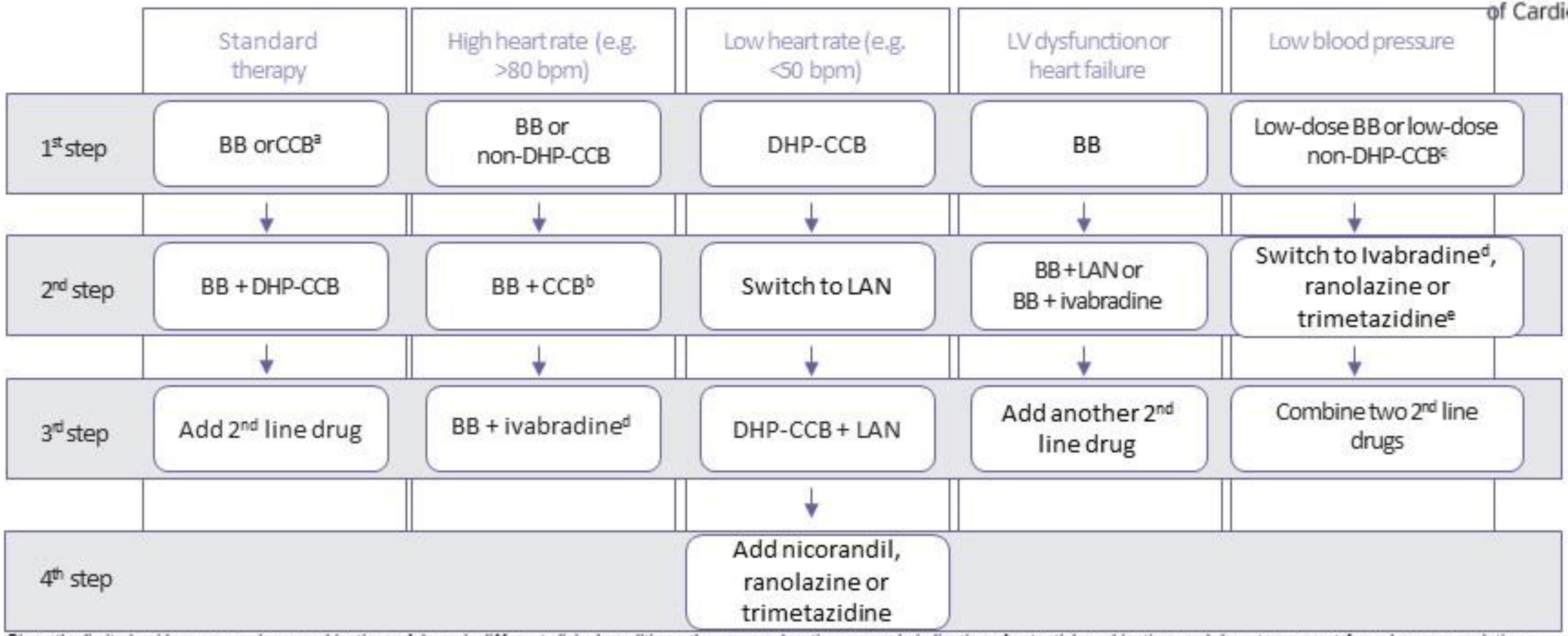

Given the limited evidence on various combinations of drugs in different clinical conditions, the proposed options are only indicative of potential combinations and do not represent formal recommendations. BB = beta-blocker; bpm = beats per minute; CCB = [any class of] calcium channel blocker; DHP-CCB = dihydropyridine calcium channel blocker; HF = heart failure; LAN = long-acting nitrate; LV = left ventricular; non-DHP-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 a 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 BB or low-dose non-DHP-CCB should be used under close monitoring of tolerance, particularly heart rate and blood pressure. [d]Ivabradine should not be combined with non-DHP-CCB. [e]Consider adding the drug chosen at step 2 to the drug tested at step 1 if blood pressure remains unchanged.

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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 - Anti-ischaemic drugs (1)

Recommendations	Class	Level
General considerations		
Medical treatment of symptomatic patients requires one or more drug(s) for angina/ischaemia relief in association with drug(s) for event prevention.	I	C
It is recommended that patients are educated about the disease, risk factors, and treatment strategy.	I	C
Timely review of the patient's response to medical therapies (e.g. 2-4 weeks after drug initiation) is recommended.	I	C

Patients with angina and/or dyspnoea and coronary artery disease - Anti-ischaemic drugs (2)

Recommendations	Class	Level
Angina relief		
Short-acting nitrates are recommended for immediate relief of effort angina.	I	B
First-line treatment is indicated with beta-blockers and/or CCBs to control heart rate and symptoms.	I	A
If angina symptoms are not successfully controlled on a beta-blocker or a CCB, the combination of a beta-blocker with a DHP-CCB should be considered.	IIa	C
Initial first-line treatment with the combination of a beta-blocker and a DHP-CCB should be considered.	IIa	B
Long-acting nitrates should be considered as a second-line treatment option when initial therapy with a beta-blocker and/or a non-DHP-CCB is contraindicated, poorly tolerated, or inadequate to control angina symptoms.	IIa	B
When long-acting nitrates are prescribed, a nitrate-free or low-nitrate interval should be considered to reduce tolerance.	IIa	B

Patients with angina and/or dyspnoea and coronary artery disease - Anti-ischaemic drugs (3)

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Recommendations	Class	Level
Angina relief		
Nicorandil, ranolazine, ivabradine, or trimetazidine should be considered as a second-line treatment to reduce angina frequency and improve exercise tolerance in subjects who cannot tolerate, have contraindications to, or whose symptoms are not adequately controlled by beta-blockers, CCBs, and long-acting nitrates.	IIa	B
In subjects with baseline low heart rate and low BP, ranolazine or trimetazidine may be considered as a first-line drug to reduce angina frequency and improve exercise tolerance.	IIb	C
In selected patients, the combination of a beta-blocker or a CCB with second-line drugs (ranolazine, nicorandil, ivabradine, and trimetazidine) may be considered for first-line treatment according to heart rate, BP, and tolerance.	IIb	B
Nitrates are not recommended in patients with hypertrophic obstructive cardiomyopathy and co-administration of phosphodiesterase inhibitors.	III	B

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

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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 (2)

Recommendations	Class	Level
Antithrombotic therapy in patients with CCS and in sinus rhythm		
Adding a second antithrombotic drug to aspirin for long-term secondary prevention should be considered in patients with high risk of ischaemic events[a] and without high bleeding risk.[b]	IIa	A
Adding a second antithrombotic drug to aspirin for long-term secondary prevention may be considered in patients with at least a moderately increased risk of ischaemic events[c] and without high bleeding risk.[b]	IIb	A

[a] Diffuse multivessel CAD with at least one of the following: diabetes mellitus requiring medication, recurrent MI, PAD, or CKD with eGFR 15-59 mL/min/1.73 m^2.
[b] Prior history of intracerebral haemorrhage or ischaemic stroke, history of other intracranial pathology, recent gastrointestinal bleeding or anaemia due to possible gastrointestinal blood loss, other gastrointestinal pathology associated with increased bleeding risk, liver failure, bleeding diathesis or coagulopathy, extreme old age or frailty, or renal failure requiring dialysis or with eGFR <15 mL/min/1.73 m^2.
[c] At least one of the following: multivessel/diffuse CAD, diabetes mellitus requiring medication, recurrent MI, PAD, HF, or CKD with eGFR 15-59 mL/min/1.73 m2

Patients with angina and/or dyspnoea and coronary artery disease

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Treatment options for dual antithrombotic therapy

Drug option	Dose	Indication	Additional cautions
Clopidogrel	75 mg o.d.	Post-MI in patients who have tolerated DAPT for 1 year	
Prasugrel	10 mg o.d. or 5 mg o.d. if body weight <60 kg or age >75 years	Post-PCI for MI in patients who have tolerated DAPT for 1 year	Age >75 years
Rivaroxaban	2.5 mg b.i.d.	Post-MI >1 year or multivessel CAD	eGFR 15-29 mL/min/1.73 m^2
Ticagrelor	60 mg b.i.d.	Post-MI in patients who have tolerated DAPT for 1 year	

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

ESC European Society of Cardiology

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 (4)

Recommendations	Class	Level
Antithrombotic therapy post-PCI in patients with CCS and in sinus rhythm		
Clopidogrel 75 mg daily following appropriate loading (e.g. 600 mg or >5 days of maintenance therapy) may be considered for 1 month in patients with very high risk of life-threatening bleeding.	IIb	C
Prasugrel or ticagrelor may be considered, at least as initial therapy, in specific high-risk situations of elective stenting (e.g. suboptimal stent deployment or other procedural characteristics associated with high risk of stent thrombosis, complex left main stem, or multivessel stenting) or if DAPT cannot be used because of aspirin intolerance.	IIb	C

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 (6)

Recommendations	Class	Level
Antithrombotic therapy in patients with CCS and AF		
Long-term OAC therapy (NOAC or VKA with time in therapeutic range >70%) should be considered in patients with AF and a CHA_2DS_2-VASc score[a] of 1 in males and 2 in females.	IIa	B
Aspirin 75-100 mg daily (or clopidogrel 75 mg daily) may be considered in addition to long-term OAC therapy in patients with AF, history of MI, and at high risk of recurrent ischaemic events[b] who do not have a high bleeding risk.[c]	IIb	B

[a] 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.
[b] Diffuse multivessel CAD with at least one of the following: diabetes mellitus requiring medication, recurrent MI, PAD, or CKD with eGFR 15-59 mL/min/1.73 m^2.
[c] Prior history of intracerebral haemorrhage or ischaemic stroke, history of other intracranial pathology, recent gastrointestinal bleeding or anaemia due to possible gastrointestinal blood loss, other gastrointestinal pathology associated with increased bleeding risk, liver failure, bleeding diathesis or coagulopathy, extreme old age or frailty, or renal failure requiring dialysis or with eGFR <15 mL/min/1.73 m^2.

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (7)

Recommendations	Class	Level
Antithrombotic therapy in post-PCI patients with AF or another indication for an OAC		
It is recommended that peri-procedural aspirin and clopidogrel are administered to patients undergoing coronary stent implantation.	I	C
In patients who are eligible for a NOAC, it is recommended that a NOAC (apixaban 5 mg b.i.d., dabigatran 150 mg b.i.d., edoxaban 60 mg o.d., or rivaroxaban 20 mg o.d.)[a] is used in preference to a VKA in combination with antiplatelet therapy.	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.

Patients with angina and/or dyspnoea and coronary artery disease - Event prevention (8)

Recommendations	Class	Level
Antithrombotic therapy in post-PCI patients with AF or another indication for an OAC		
When rivaroxaban is used and concerns about high bleeding risk[a] prevail over concerns about stent thrombosis[b] or ischaemic stroke,[c] rivaroxaban 15 mg o.d. should be considered in preference to rivaroxaban 20 mg o.d. for the duration of concomitant single or dual antiplatelet therapy.	IIa	B
When dabigatran is used and concerns about high bleeding risk[a] prevail over concerns about stent thrombosis[b] or ischaemic stroke,[c] dabigatran 110 mg b.i.d. should be considered in preference to dabigatran 150 mg b.i.d. for the duration of concomitant single or dual antiplatelet therapy.	IIa	B

[a] Prior history of intracerebral haemorrhage or ischaemic stroke, history of other intracranial pathology, recent gastrointestinal bleeding or anaemia due to possible gastrointestinal blood loss, other gastrointestinal pathology associated with increased bleeding risk, liver failure, bleeding diathesis or coagulopathy, extreme old age or frailty, or renal failure requiring dialysis or with eGFR <15 mL/min/1.73 m².

[b] 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. [c] 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)

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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 (10)

Recommendations	Class	Level
Antithrombotic therapy in post-PCI patients with AF or another indication for an OAC		
Dual therapy with an OAC and either ticagrelor or prasugrel may be considered as an alternative to triple therapy with an OAC, aspirin, and clopidogrel in patients with a moderate or high risk of stent thrombosis,[a] irrespective of the type of stent used.	IIb	C
The use of ticagrelor or prasugrel is not recommended as part of triple antithrombotic therapy with aspirin and an OAC.	III	C

[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 (11)

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Recommendations	Class	Level
Use of proton-pump inhibitors		
Concomitant use of a proton-pump inhibitor is recommended in patients receiving aspirin monotherapy, DAPT, or OAC monotherapy who are at high risk of gastrointestinal bleeding.	I	A

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

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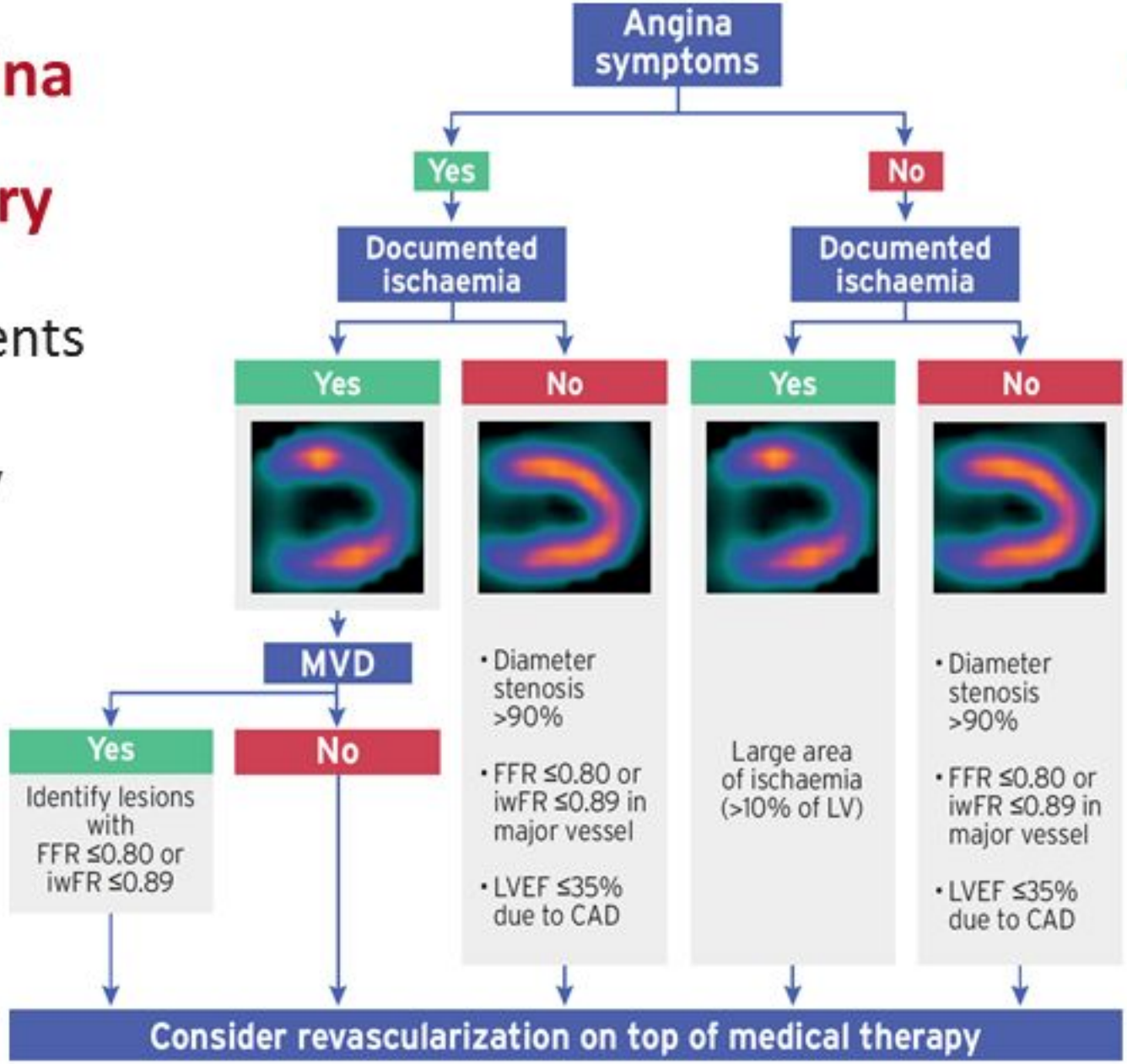
Recommendations	Class	Level
Lipid-lowering drugs		
Statins are recommended in all patients with CCS.	I	A
If a patient's goal is not achieved with the maximum tolerated dose of statin, combination with ezetimibe is recommended.	I	B
For patients at very high risk who do not achieve their goal on a maximum 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 - Event prevention (13)

Recommendations	Class	Level
Other drugs		
Beta-blockers are recommended in patients with LV dysfunction or systolic HF.	I	A
In patients with a previous STEMI, long-term oral treatment with a beta-blocker should be considered.	IIa	B

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 new onset of heart failure or reduced left ventricular function

Recommendations for drug therapy (1)

Recommendations	Class	Level
Diuretic therapy is recommended in symptomatic patients with signs of pulmonary or systemic congestion to relieve HF symptoms.	I	B
Beta-blockers are recommended as essential components of treatment due to their efficacy in both relieving angina, and reducing morbidity and mortality in HF.	I	A
ACE inhibitor therapy is recommended in patients with symptomatic HF or asymptomatic LV dysfunction following MI, to improve symptoms and reduce morbidity and mortality.	I	A
An ARB is recommended as an alternative in patients who do not tolerate ACE inhibition, or an angiotensin receptor-neprilysin inhibitor in patients with persistent symptoms despite optimal medical therapy.	I	B

Patients with new onset of heart failure or reduced left ventricular function

Recommendations for drug therapy (2)

Recommendations	Class	Level
An MRA is recommended in patients who remain symptomatic despite adequate treatment with an ACE inhibitor and beta-blocker, to reduce morbidity and mortality.	I	A
A short-acting oral or transcutaneous nitrate should be considered (effective antianginal treatment, safe in HF).	IIa	A
Ivabradine should be considered in patients with sinus rhythm, an LVEF ≤35% and a resting heart rate >70 b.p.m. who remain symptomatic despite adequate treatment with a beta-blocker, ACE inhibitor, and MRA, to reduce morbidity and mortality.	IIa	B
Amlodipine may be considered for relief of angina in patients with HF who do not tolerate beta-blockers, and is considered safe in HF.	IIb	B

Patients with new onset of heart failure or reduced left ventricular function

Devices, comorbidities and revascularization (1)

Recommendations	Class	Level
In patients with HF and bradycardia with high-degree atrioventricular block who require pacing, a CRT with a pacemaker rather than right ventricular pacing is recommended.	I	A
An implantable cardioverter-defibrillator is recommended in patients with documented ventricular dysrhythmia causing haemodynamic instability (secondary prevention), as well as in patients with symptomatic HF and an LVEF ≤35%, to reduce the risk of sudden death and all-cause mortality.	I	A
CRT is recommended for symptomatic patients with HF in sinus rhythm with a QRS duration ≥150 ms and LBBB QRS morphology, and with LVEF ≤35%, despite optimal medical therapy to improve symptoms, and reduce morbidity and mortality.	I	A

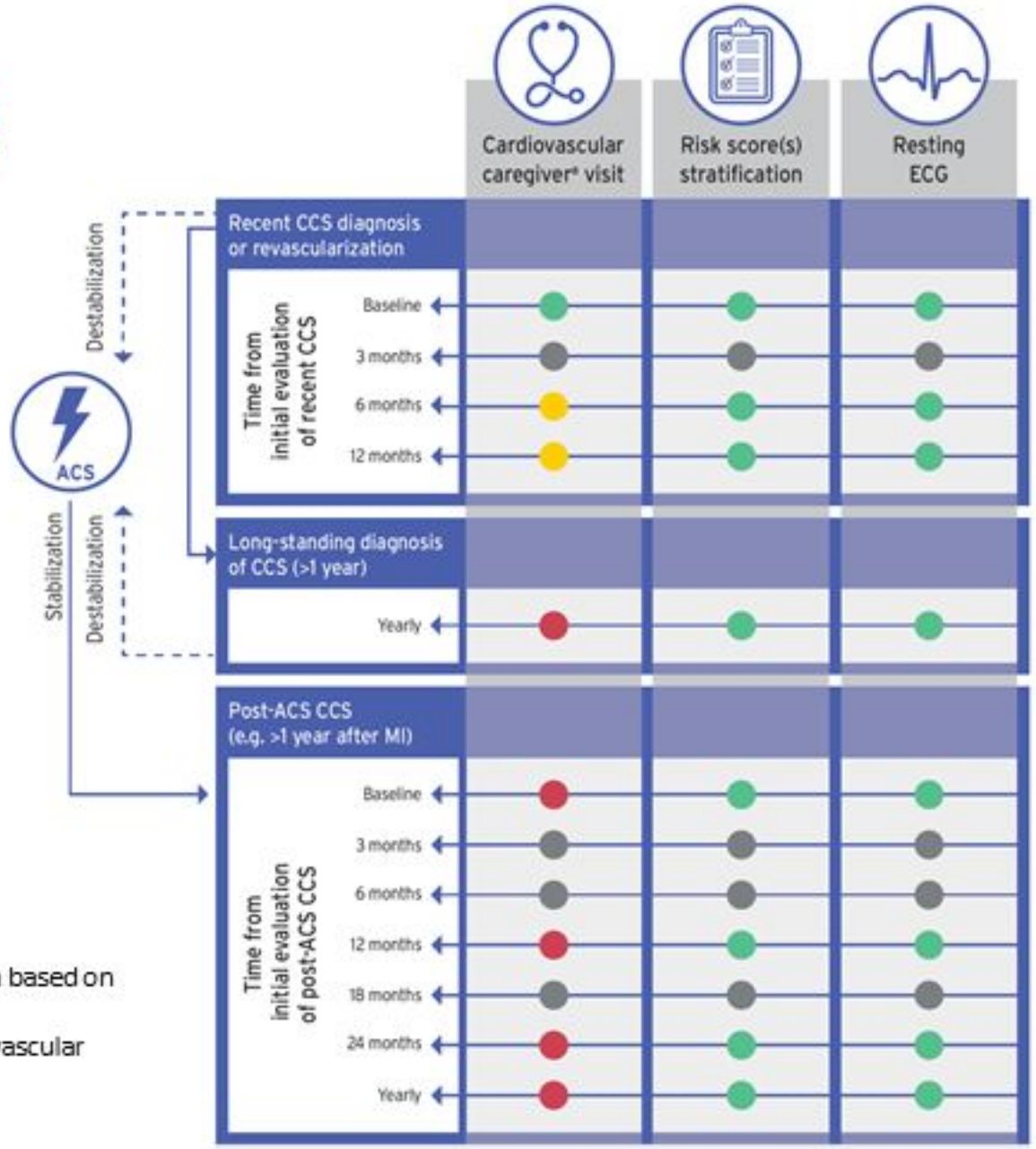
Patients with new onset of heart failure or reduced left ventricular function

Devices, comorbidities and revascularization (2)

Recommendations	Class	Level
CRT is recommended for symptomatic patients with HF in sinus rhythm with a QRS duration 130-149 ms and LBBB QRS morphology, and with LVEF ≤35%, despite optimal medical therapy to improve symptoms, and reduce morbidity and mortality.	I	B
Comprehensive risk profiling and multidisciplinary management, including treatment of major comorbidities such as hypertension, hyperlipidaemia, diabetes, anaemia, and obesity, as well as smoking cessation and lifestyle modification, are recommended.	I	A
Myocardial revascularization is recommended when angina persists despite treatment with antianginal drugs.	I	A

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.

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

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

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

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

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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

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)

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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)

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

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

Blood pressure thresholds

Category	Systolic BP (mmHg)		Diastolic BP (mmHg)
Office BP	≥140	and/or	≥90
≥80 years of age	≥160	and/or	≥90
Ambulatory BP			
Daytime (or awake)	≥135	and/or	≥85
Night-time (or asleep)	≥120	and/or	≥70
24 h	≥130	and/or	≥80
Home BP	≥135	and/or	≥85

Chronic coronary syndromes in specific circumstances

Valvular disease

Recommendations	Class	Level
ICA is recommended before valve surgery and for any of the following: history of CVD, suspected myocardial ischaemia, LV systolic dysfunction, in men >40 years of age and postmenopausal women, or one or more cardiovascular risk factors.	I	C
ICA is recommended in the evaluation of moderate-to-severe functional mitral regurgitation.	I	C
Coronary CTA should be considered as an alternative to coronary angiography before valve intervention in patients with severe valvular heart disease and low probability of CAD.	IIa	C
PCI should be considered in patients undergoing transcatheter aortic valve implantation and coronary artery diameter stenosis >70% in proximal segments.	IIa	C
In severe valvular heart disease, stress testing should not be routinely used to detect CAD because of the low diagnostic yield and potential risks.	III	C

Chronic coronary syndromes in specific circumstances

Active cancer

Recommendations	Class	Level
Treatment decisions should be based on life expectancy, additional comorbidities such as thrombocytopenia, increased thrombosis propensity, and potential interactions between drugs used in CCS management and antineoplastic agents.	I	C
If revascularization is indicated in highly symptomatic patients with active cancer and increased frailty, the least invasive procedure is recommended.	I	C

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

Chronic kidney disease

Recommendations	Class	Level
It is recommended that risk factors are controlled to target values.	I	A
It is recommended that special attention is paid to potential dose adjustments of renally excreted drugs used in CCS.	I	C
It is recommended that the use of iodinated contrast agents is minimized in patients with severe CKD and preserved urine production to prevent further deterioration.	I	B

Chronic coronary syndromes in specific circumstances

Elderly

Recommendations	Class	Level
It is recommended that particular attention is paid to side effects of drugs, intolerance, and overdosing in elderly patients.	I	C
The use of DES is recommended in elderly patients.	I	A
Radial access is recommended in elderly patients to reduce access-site bleeding complications.	I	B
It is recommended that diagnostic and revascularization decisions are based on symptoms, the extent of ischaemia, frailty, life expectancy, and comorbidities.	I	C

Chronic coronary syndromes in specific circumstances

Sex issues

Recommendations	Class	Level
Hormone replacement therapy is not recommended for risk reduction in post-menopausal women.	III	C

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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(European Heart Journal 2019; 10.1093/eurheartj/ehz425)

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