Whole Heart Care

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Beacon Hospital
This is Modern Medicine

CASE 1

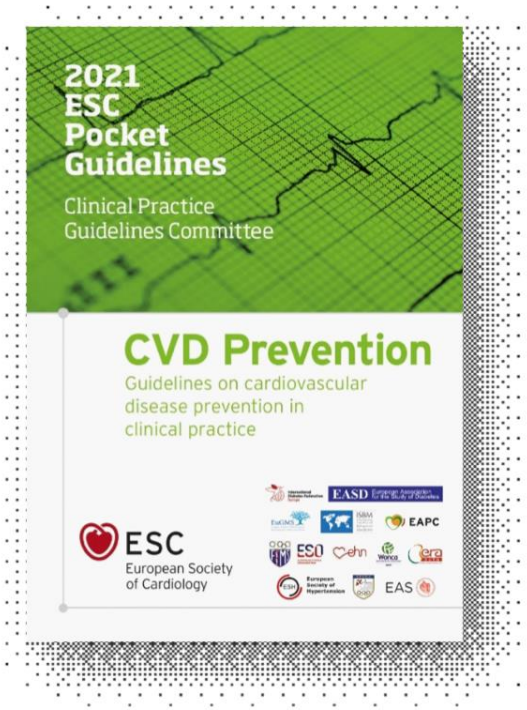
Risk assessment

50 yr old BMI 30, Chol 5.3, Stressed, poor sleep, inactive

Chest pains, fatigue.

BP 150/80, Normal ECG, Echo, 5 minutes on EST – stops
Legs sore

ESC Pocket Guidelines



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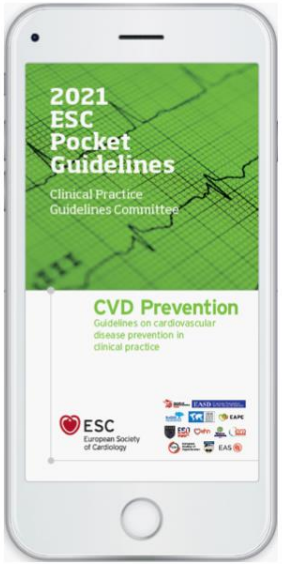

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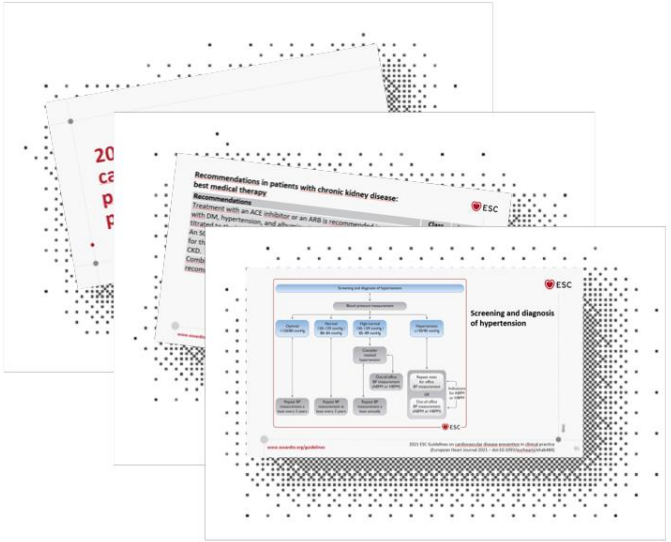

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice
(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab484)

Treatment goals for different patient categories (1)

Patient category	Prevention goals (STEP 1)	Intensified/additional prevention goals[a] (STEP 2)
Apparently healthy persons	For BP and lipids: initiation of drug treatment based on CVD risk assessment or SBP >160 mmHg	
<50 years	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction in high-risk patients LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction in very-high-risk patients
50–69 years	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction in high-risk patients LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction in very-high-risk patients
≥70 years	Stop smoking and lifestyle optimization SBP <140 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL)	For specific risk factor management in patients ≥70 years old, please see relevant sections in *section 4*.
Patients with CKD	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) and ≥50% LDL-C reduction Otherwise according to ASCVD and DM history	LDL-C <1.8 mmol/L (70 mg/dL) in high-risk patients and <1.4 mmol/L (55 mg/dL) in very-high-risk patients (see *Table 4*)
Patients with FH	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) and ≥50% LDL-C reduction Otherwise according to ASCVD and DM history	LDL-C <1.8 mmol/L (70 mg/dL) in high-risk patients and <1.4 mmol/L (55 mg/dL) in very-high-risk patients (see *Table 4*)

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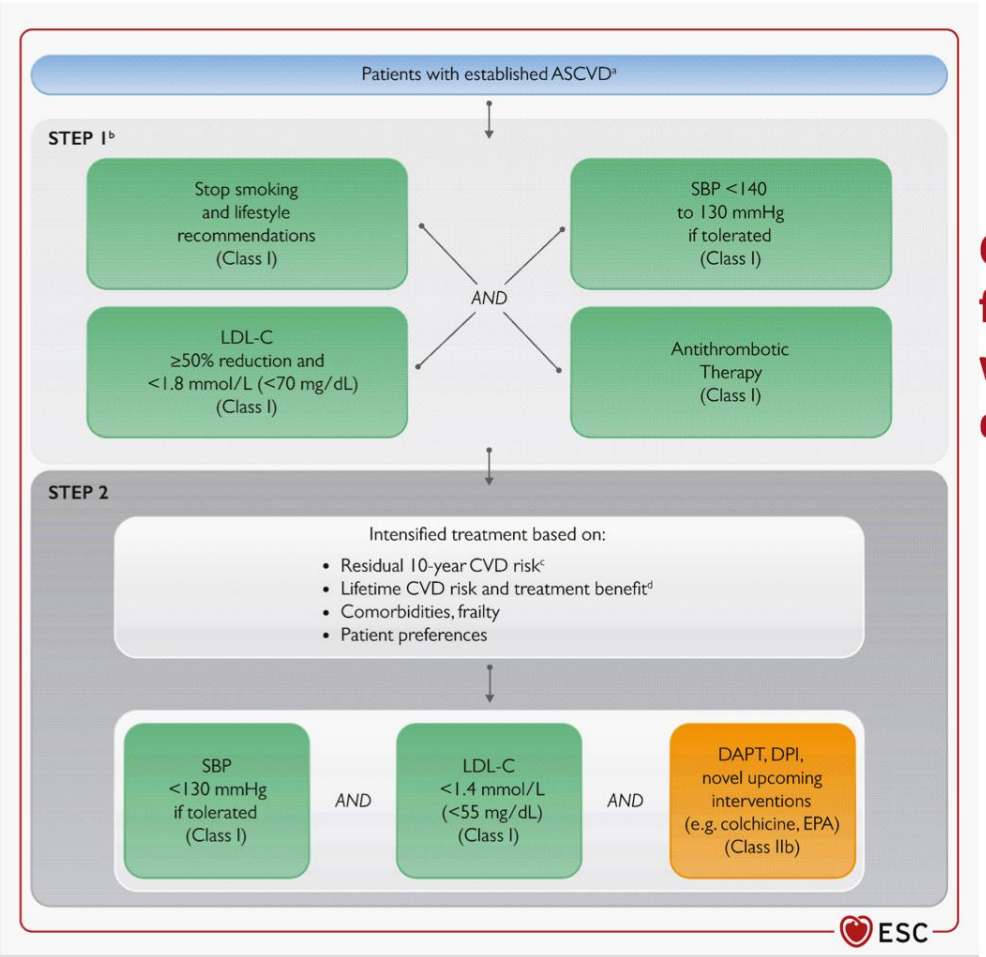

Cardiovascular risk and risk factor treatment in patients with established cardiovascular disease

2021 ESC Guidelines on cardiovascular disease prevention in clinical practice
(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab484)

Recommendations for physical activity (1)

Recommendations	Class	Level
It is recommended for adults of all ages to strive for at least 150–300 min a week of moderate-intensity or 75–150 min a week of vigorous-intensity aerobic PA, or an equivalent combination thereof, to reduce all-cause mortality, CV mortality, and morbidity.	I	A
It is recommended that adults who cannot perform 150 min of moderate-intensity PA a week should stay as active as their abilities and health condition allow.	I	B
It is recommended to reduce sedentary time to engage in at least light activity throughout the day to reduce all-cause and CV mortality and morbidity.	I	B

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Recommendations for physical activity (2)

Recommendations	Class	Level
Performing resistance exercise, in addition to aerobic activity, is recommended on 2 or more days per week to reduce all-cause mortality.	I	B
Lifestyle interventions, such as group or individual education, behaviour-change techniques, telephone counselling, and use of consumer-based wearable activity trackers, should be considered to increase PA participation.	IIa	B

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Recommendations for body weight

Recommendations	Class	Level
It is recommended that overweight and obese people aim for a reduction in weight to reduce BP, dyslipidaemia, and risk of type 2 DM, and thus improve their CVD risk profile.	I	A
While a range of diets are effective for weight loss, it is recommended that a healthy diet in regard to CVD risk is maintained over time.	I	A
Bariatric surgery for obese high-risk individuals should be considered when lifestyle change does not result in maintained weight loss.	IIa	B

Recommendations for mental healthcare and psychosocial interventions at the individual level

Recommendations	Class	Level
Patients with mental disorders need intensified attention and support to improve adherence to lifestyle changes and drug treatment.	I	C
In ASCVD patients with mental disorders, evidence-based mental healthcare and interdisciplinary cooperation are recommended.	I	B
ASCVD patients with stress should be considered for referral to psychotherapeutic stress management to improve CV outcomes and reduce stress symptoms.	IIa	B
Patients with CHD and moderate-to-severe major depression should be considered for antidepressive treatment with an SSRI.	IIa	B
In patients with HF and major depression, SSRIs, SNRIs, and tricyclic antidepressants are not recommended.[c]	III	B

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Investigations for patient with Chest pain

- Routine Bloods: FBC, U&E, fasting lipids/glucose, TFTs
- Resting ECG
- ECHO
- Non-invasive vs invasive

Resting echocardiography and cardiac magnetic resonance in the initial diagnostic management of patients with suspected coronary artery disease

Recommendations	Class[a]	Level[b]
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; and (4) Evaluation of diastolic function.[44,45,52,58]	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

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CAD = coronary artery disease; CCS = chronic coronary syndromes; CMR = cardiac magnetic resonance imaging; LVEF = left ventricular ejection fraction.
[a]Class of recommendation.
[b]Level of evidence.

Resting electrocardiogram in the initial diagnostic management of patients with suspected coronary artery disease

Recommendations	Class[a]	Level[b]
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

CAD = coronary artery disease; CCS = chronic coronary syndromes; ECG = electrocardiogram.
[a]Class of recommendation.
[b]Level of evidence.

Basic biochemistry testing in the initial diagnostic management of patients with suspected coronary artery disease

Recommendations	Class[a]	Level[b]
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.[28,29]	I	A
The following blood tests are recommended in all patients:		
• Full blood count (including haemoglobin);[30]	I	B
• Creatinine measurement and estimation of renal function;[31,32]	I	A
• A lipid profile (including LDL-C).[33,34]	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.[16,35]	I	B
Assessment of thyroid function is recommended in case of clinical suspicion of thyroid disorders.	I	C

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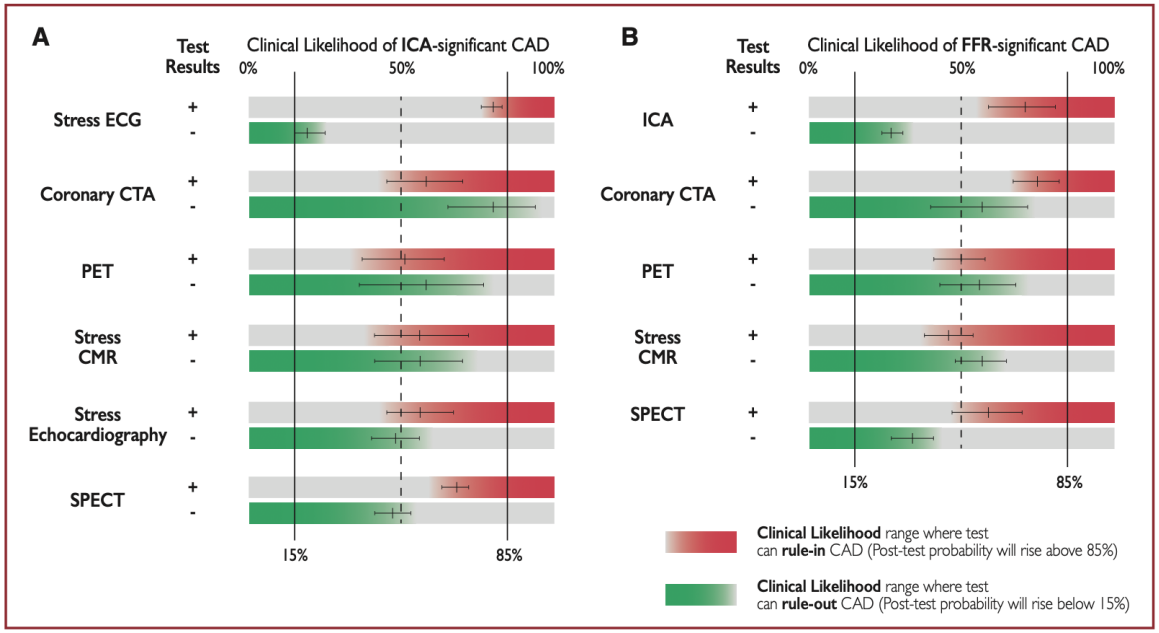
ACS = acute coronary syndromes; CAD = coronary artery disease; CCS = chronic coronary syndromes; HbA1c = glycated haemoglobin; LDL-C = low-density lipoprotein cholesterol.
[a]Class of recommendation.
[b]Level of evidence.

2019 ESC guidelines for the diagnosis and management of chronic coronary syndromes. European Heart Journal 2020;41,407-477

Non-Invasive Testing

Factors in choice of non-invasive test:

- Risk profile/pre-test probability
- Local expertise/Availability
- Patient factors such as body habitus/renal function/underlying rhythm



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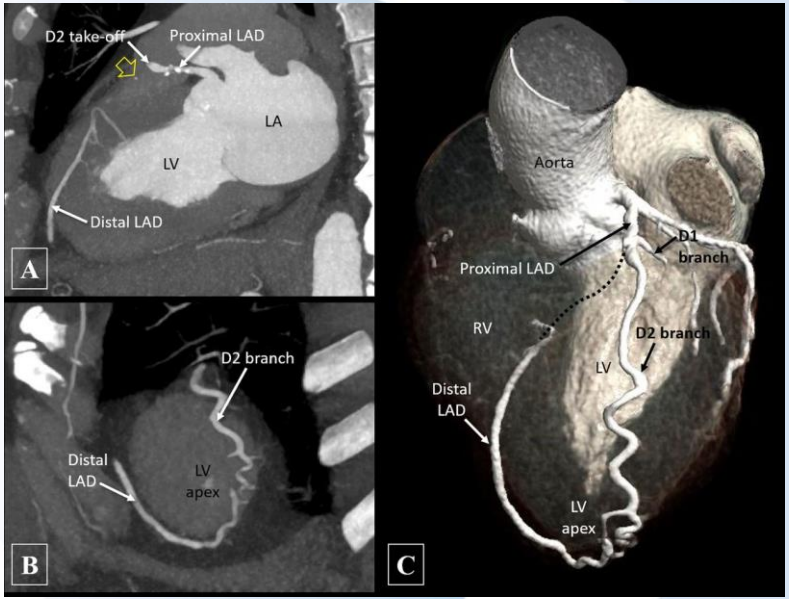
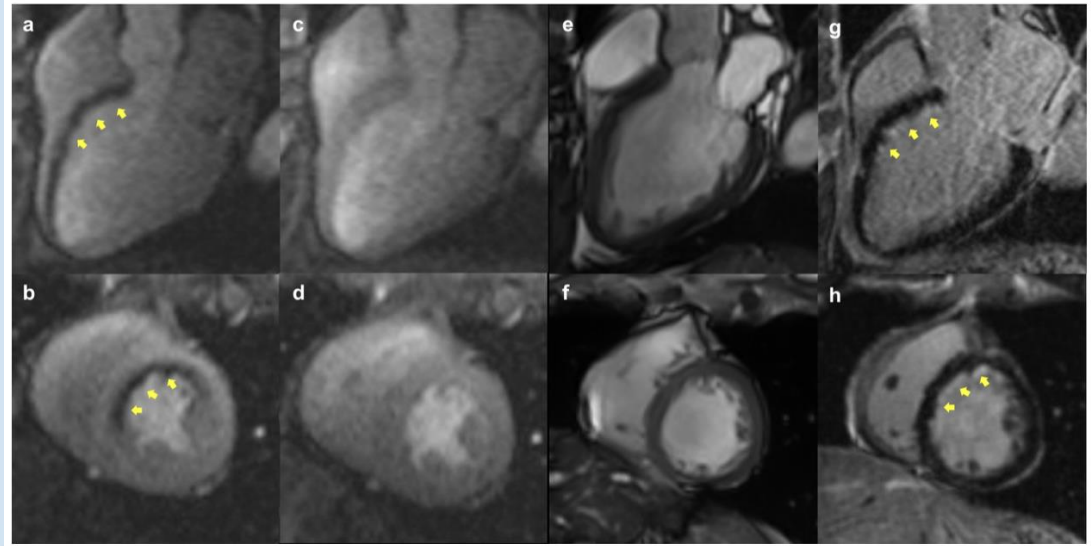
Non-Invasive Testing





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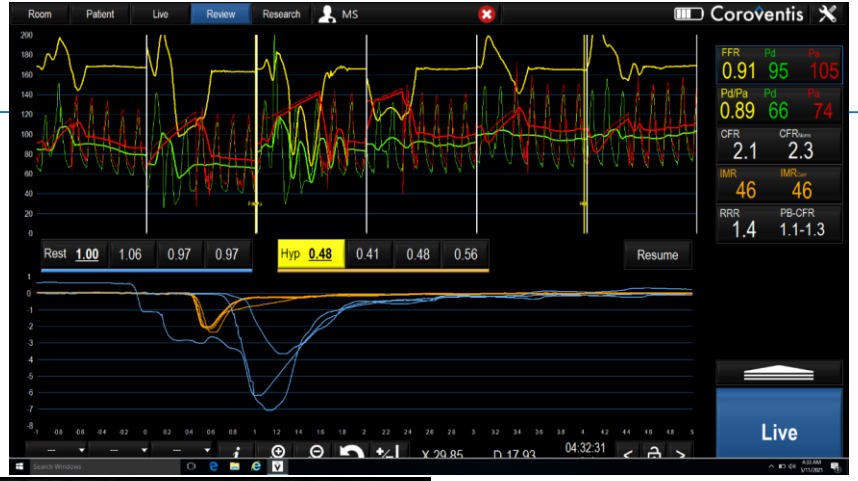
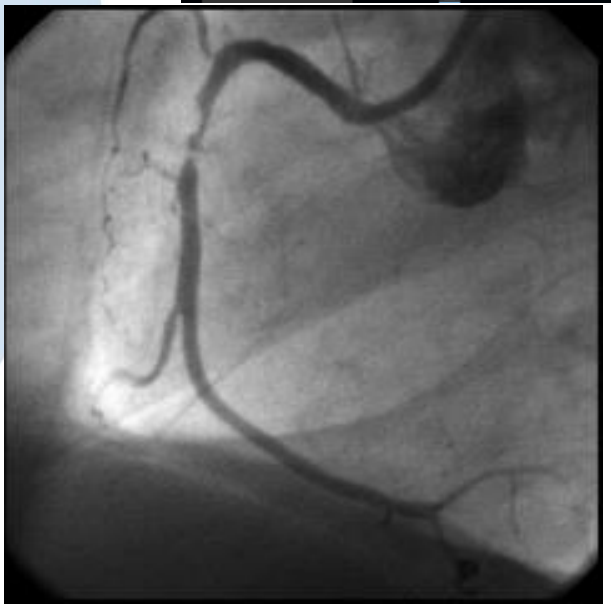
Invasive Testing

- Coronary angiogram 1st line test with High clinical likelihood/Severe symptoms and those with typical angina at low levels of exercise
- Otherwise reserved for those with abnormal non-invasive testing





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Treatment CAD

1. Medical Therapy:

- Anti-thrombotic medications: Aspirin/Plavix/Low dose rivaroxaban

- -Symptoms Control: - BB - CaCB - Nitrates - Ivabradine - Ranolazine

- Event Prevention: - Statins/lipid lowering agents - ACE in pts with HFREF/HTN/DM
- BB with previous MI/HFREF

Revascularization

- Always in conjunction with medical therapy never as alternative
- Individualised to each patient however shown to when compared to medical therapy alone:
- Reduce symptom burden
- Improve quality of life
- Improve exercise tolerance
- Need for urgent revascularization/Spontaneous MI
- Reduces Mortality when new generation DES/CABG

- In the absence of symptoms patients with the following should be considered for Revascularization:

- 90% stenosis

- FFR ≤0.80 or iwFR ≤0.89

- LVEF ≤ 35%

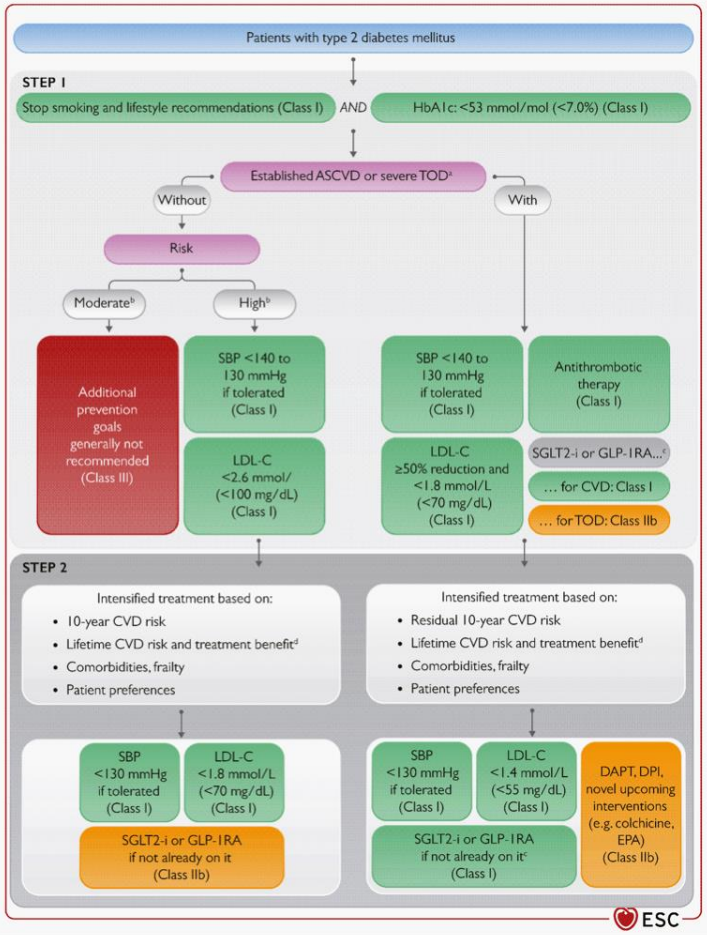
CASE 2

62 yo female with T2DM, a.fib, MR

acute unresolving chest pain/angina with acute ECG changes/abnormal troponin

Risks of anti-thrombotic therapy, Modality of revascularization

Cardiovascular risk and risk factor treatment in patients with type 2 diabetes mellitus



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Treatment goals for different patient categories (2)

Patient category	Prevention goals (STEP 1)	Intensified/additional prevention goals[a] (STEP 2)
People with type 2 DM		
Well-controlled short-standing DM e.g. <10 years), no evidence of TOD and no additional ASCVD risk factors	Stop smoking and lifestyle optimization	
Without established ASCVD or severe TOD (see *Table 4* for definitions)	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <2.6 mmol/L (100 mg/dL) HbA1c <53 mmol/mol (7.0%)	SBP <130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction SGLT2 inhibitor or GLP-1RA
With established ASCVD and/or severe TOD (see *Table 4* for definitions)	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] LDL-C <1.8 mmol/L (70 mg/dL) HbA1c <64 mmol/mol (8.0%) SGLT2 inhibitor or GLP-1RA CVD: antiplatelet therapy	SBP <130 mmHg if tolerated[b] LDL-C <1.4 mmol/L (55 mg/dL) and ≥50% reduction SGLT2 inhibitor or GLP-1RA if not already on *May additionally consider novel upcoming treatments: DAPT, dual pathway inhibition, colchicine, icosapent ethyl, etc.*
Patients with established ASCVD	Stop smoking and lifestyle optimization SBP <140 down to 130 mmHg if tolerated[b] Intensive oral lipid-lowering therapy aiming at LDL-C <1.8 mmol/L (70 mg/dL) and ≥50% reduction Antiplatelet therapy	SBP <130 mmHg if tolerated[b] LDL-C <1.4 mmol/L and ≥50% reduction (55 mg/dL) *May additionally consider novel upcoming treatments: DAPT, dual pathway inhibition, colchicine, icosapent ethyl, etc.*

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Recommendations for lifestyle interventions and management of risk factors and concomitant diseases in patients with atrial fibrillation (1)

Recommendations	Class	Level
Identification and management of risk factors and concomitant diseases are recommended to be an integral part of treatment.	I	B
Modification of unhealthy lifestyle and targeted therapy of intercurrent conditions is recommended to reduce AF burden and symptom Severity.	I	B
Attention to good BP control is recommended in AF patients with hypertension to reduce AF recurrences and risk of stroke and bleeding.	I	B
In obese patients with AF, weight loss together with management of other risk factors should be considered to reduce AF incidence, AF progression, AF recurrences, and symptoms.	IIa	B

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Initial medical therapy

Recommendations for antithrombotic treatment in non-ST-segment elevation acute coronary syndrome patients without atrial fibrillation undergoing percutaneous coronary intervention

Recommendations	Class[a]	Level[b]
Antiplatelet treatment		
Aspirin is recommended for all patients without contraindications at an initial oral LD of 150–300 mg (or 75–250 mg i.v.), and at a MD of 75–100 mg o.d. for long-term treatment.[179–181]	I	A
A $P2Y_{12}$ receptor inhibitor is recommended in addition to aspirin, and maintained over 12 months unless there are contraindications or an excessive risk of bleeding.[170,171,182] Options are:	I	A
• Prasugrel in $P2Y_{12}$ receptor inhibitor-naïve patients proceeding to PCI (60 mg LD, 10 mg/d as standard dose, 5 mg/d for patients aged ≥75 years or with a body weight <60 kg).[171]	I	B
• Ticagrelor irrespective of the planned treatment strategy (invasive or conservative) (180 mg LD, 90 mg b.i.d.).[170]	I	B
• Clopidogrel (300–600 mg LD, 75 mg daily dose), only when prasugrel or ticagrelor are not available, cannot be tolerated, or are contraindicated.[182,183]	I	C
Prasugrel should be considered in preference to ticagrelor for NSTE-ACS patients who proceed to PCI.[174]	IIa	B
GP IIb/IIIa antagonists should be considered for bail-out if there is evidence of no-reflow or a thrombotic complication.	IIa	C
Cangrelor may be considered in $P2Y_{12}$ receptor inhibitor-naïve patients undergoing PCI.[184–187]	IIb	A
Pre-treatment with a $P2Y_{12}$ receptor inhibitor may be considered in patients with NSTE-ACS who are not planned to undergo an early invasive strategy and do not have an HBR.	IIb	C
Treatment with GP IIb/IIIa antagonists in patients in whom coronary anatomy is not known is not recommended.[188,189]	III	A
It is not recommended to administer routine pre-treatment with a $P2Y_{12}$ receptor inhibitor in patients in whom coronary anatomy is not known and an early invasive management is planned.[174,177,178,190,191]	III	A
Peri-interventional anticoagulant treatment		
Parenteral anticoagulation is recommended for all patients, in addition to antiplatelet treatment, at the time of diagnosis and, especially, during revascularization procedures according to both ischaemic and bleeding risks.[192,193]	I	A
UFH (weight-adjusted i.v. bolus during PCI of 70–100 IU/kg, or 50–70 IU/kg in combination with a GP IIb/IIIa inhibitor; activated clotting time target range of 250–350 s, or 200–250 s if a GP IIb/IIIa inhibitor is given) is recommended in patients undergoing PCI.	I	A
In cases of medical treatment or logistical constraints for transferring the patient to PCI within the required time frame, fondaparinux is recommended and, in such cases, a single bolus of UFH is recommended at the time of PCI.[183]	I	B
It is recommended to select anticoagulation according to both ischaemic and bleeding risks, and according to the efficacy–safety profile of the chosen agent.	I	C
Enoxaparin (i.v.) should be considered in patients pre-treated with subcutaneous enoxaparin.[194–196]	IIa	B
Discontinuation of parenteral anticoagulation should be considered immediately after an invasive procedure.	IIa	C
Bivalirudin may be considered as an alternative to UFH.[189,197,198]	IIb	A
Crossover of UFH and LMWH is not recommended.[196]	III	B

Recommendations for anti-ischaemic drugs in the acute phase of non-ST-segment elevation acute coronary syndrome

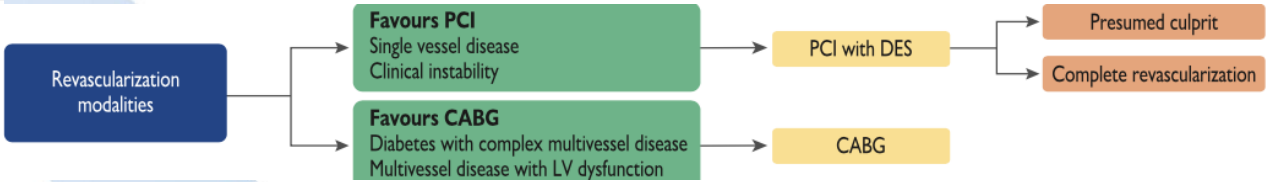
Recommendations	Class[a]	Level[b]
Sublingual or i.v. nitrates and early initiation of beta-blocker treatment are recommended in patients with ongoing ischaemic symptoms and without contraindications.	I	C
It is recommended to continue chronic beta-blocker therapy unless the patient is in overt heart failure.	I	C
i.v. nitrates are recommended in patients with uncontrolled hypertension or signs of heart failure.	I	C
In patients with suspected/confirmed vasospastic angina, calcium channel blockers and nitrates should be considered and beta-blockers avoided.[231]	IIa	B

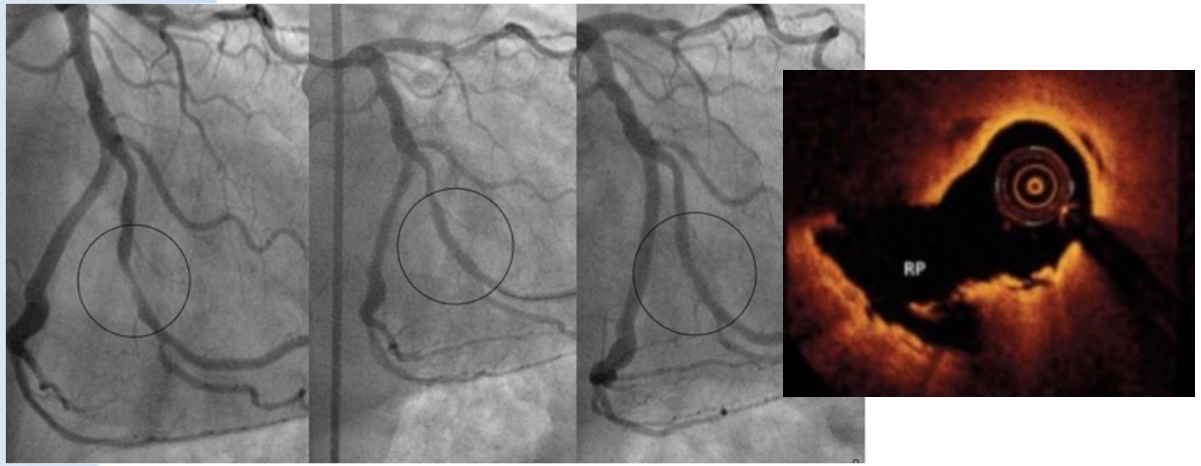
2020 ESC guidelines for the management of acute coronary syndromes presenting without ST-segment elevation. European Heart Journal 2020;00,1-79

Angiography/Revascularization

Recommendations for coronary revascularization

Recommendations	Class[a]	Level[b]
Timing of invasive strategy		
An immediate invasive strategy (<2 h) is recommended in patients with at least one of the following very high-risk criteria: • Haemodynamic instability or CS. • Recurrent or refractory chest pain despite medical treatment. • Life-threatening arrhythmias. • Mechanical complications of MI. • Heart failure clearly related to NSTE-ACS. • Presence of ST-segment depression >1 mm in ≥6 leads additional to ST-segment elevation in aVR and/or V1.	I	C
An early invasive strategy within 24 h is recommended in patients with any of the following high-risk criteria: • Diagnosis of NSTEMI suggested by the diagnostic algorithm recommended in *section 3*. • Dynamic or presumably new contiguous ST/T-segment changes suggesting ongoing ischaemia. • Transient ST-segment elevation.[273,362] • GRACE risk score >140.[271,272,277]	I	A
A selective invasive strategy after appropriate ischaemia testing or detection of obstructive CAD by CCTA is recommended in patients considered at low risk.[267,268,363]	I	A
Delayed as opposed to immediate angiography should be considered among haemodynamically stable patients without ST-segment elevation successfully resuscitated after out-of-hospital cardiac arrest.[358,364]	IIa	B





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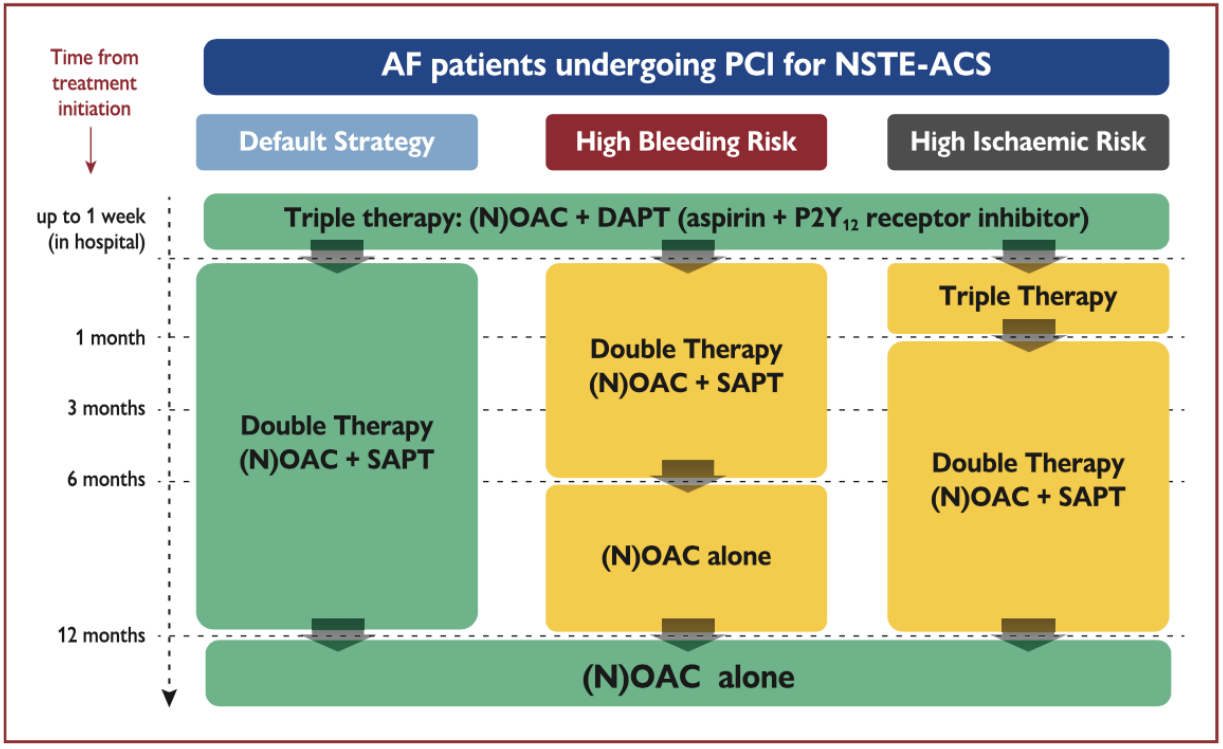
Maintenance Therapy - Post ACS



2020 ESC guidelines for the management of acute coronary syndromes presenting without ST-segment elevation. European Heart Journal 2020;00,1-79

Recommendations	Class[a]	Level[b]
Lipid-lowering drugs		
Statins are recommended in all NSTE-ACS patients. The aim is to reduce LDL-C by ≥50% from baseline and/or to achieve LDL-C <1.4 mmol/L (<55 mg/dL).[533,534]	I	A
If the LDL-C goal[c] is not achieved after 4–6 weeks with the maximally tolerated statin dose, combination with ezetimibe is recommended.[514,535]	I	B
If the LDL-C goal[c] is not achieved after 4–6 weeks despite maximally tolerated statin therapy and ezetimibe, the addition of a PCSK9 inhibitor is recommended.[520,535]	I	B
If the current NSTE-ACS episode is a recurrence within less than 2 years of a first ACS, while taking maximally tolerated statin-based therapy, an LDL-C goal of <1.0 mmol/L (<40 mg/dL) may be considered.[520,535]	IIb	B
ACE inhibitors or ARBs		
ACE inhibitors (or ARBs in cases of intolerance to ACE inhibitors) are recommended in patients with heart failure with reduced LVEF (<40%), diabetes, or CKD unless contraindicated (e.g. severe renal impairment, hyperkalaemia, etc.) in order to reduce all-cause and cardiovascular mortality and cardiovascular morbidity.[536–538]	I	A
Beta-blockers		
Beta-blockers are recommended in patients with systolic LV dysfunction or heart failure with reduced LVEF (<40%).[539–541]	I	A
In patients with prior MI, long-term oral treatment with a beta-blocker should be considered in order to reduce all-cause and cardiovascular mortality and cardiovascular morbidity.[542–547]	IIa	B
MRAs		
MRAs are recommended in patients with heart failure with reduced LVEF (<40%) in order to reduce all-cause and cardiovascular mortality and cardiovascular morbidity.[548,549]	I	A
Proton pump inhibitors		
Concomitant use of a proton pump inhibitor is recommended in patients receiving aspirin monotherapy, DAPT, DAT, TAT, or OAC monotherapy who are at high risk of gastrointestinal bleeding in order to reduce the risk of gastric bleeds.[169]	I	A

CASE 3

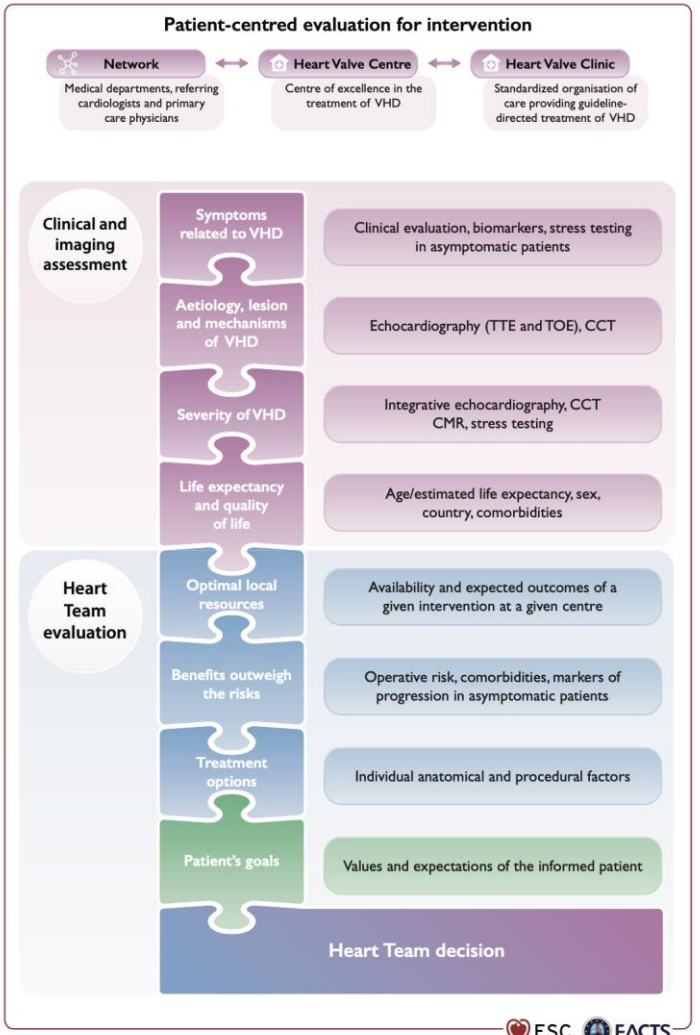
78 yo female new systolic murmur with associated chest pain and dyspnea on exertion

PMHx of CKD, DM, Atrial fibrillation and COPD

Evaluation/management VHD

- All patients with valvular heart disease require Heart team evaluation/Seen at Heart Valve Center
- Evaluation involves Basic testing, TTE/TOE, CT, CMR and coronary angiography
- Large population of under/non-treated patients with valvular heart disease

2021 ESC/EACTS guidelines for the management of valvular heart disease. European Heart Journal 2021;00,1-72



Surveillance

- All patients with **new** or previously **non-evaluated murmur** should have ECHO/cardiology RV
- All patients with a history of **acute/chronic coronary syndromes** should have annual cardiologist review
- In patients with valvular heart disease not warranting intervention - **routine surveillance/cardiology review** necessary depending on severity/location