SUMMARY of 2019 ESC GUIDELINES on chronic coronary syndromes, acute pulmonary embolism, supraventricular tachycardia and dislipidaemias.

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ESC guidelines for the diagnosis and management of chronic coronary syndromes (CCS)

The Guidelines have been revised to focus on CCS instead of stable CAD in order to emphasize the fact that the clinical presentations of CAD can be categorized as either acute coronary syndromes (ACS) or CCS (1). Six clinical scenarios most frequently encountered in patients have been identified: from naive and asymptomatic patients to symptomatic patients (angor/dyspnea) presenting after an ACS. The pretest probability (PTP) of CAD based on age, gender and nature of symptoms have undergone major revisions and the concept « Clinical likelihood of CAD » has been introduced that utilizes also various risk factors of CAD as PTP modifiers (Table & Figure). New recommendations can be divided in three categories:

1. Basic testing, diagnostics, and risk assessment

- Non-invasive functional imaging for myocardial ischaemia **or** coronary computed tomography (CTA) is recommended (Class I) as the initial test for diagnosing CAD in symptomatic patients in whom obstructive CAD cannot be excluded by clinical assessment alone.
- Exercise ECG is now only recommended for the assessment of exercise tolerance, symptoms, arrhythmias, blood presure (BP) response, and event risk in selected patients. I has been downgraded in II B category as an alternative test to rule-in or rule-out CAD when other non-invasive or invasive imaging methods are not available and in patients on treatment to evaluate control of symptoms and ischaemia.
- It is also recommended that selection of the initial non-invasive diagnostic test be based on the clinical likelihood of CAD and other patient characteristics that influence test performance, local expertise, and the availability of tests.
- Functional imaging for myocardial ischaemia is recommended if coronary CTA has shown CAD of uncertain functional significance or is not diagnostic.
- Invasive angiography is recommended as an alternative test to diagnose CAD in patients with a high clinical likelihood and 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).
- Invasive coronary angiography with the availability of invasive functional evaluation should be considered (Class IIA) for confirmation of the diagnosis of CAD in patients with an uncertain diagnosis on non-invasive testing.
- Coronary CTA should be considered as an alternative to invasive angiography if another non-invasive test is equivocal or non-diagnostic.
- Importantly, CTA is not recommended (Class III) when extensive coronary calcification, irregular heart rate, significant obesity, inability to cooperate with breath-hold commands, or any other conditions make good image quality unlikely.

2. Antithrombotic therapy in patients with CCS

- Addition of a second antithrombotic drug to aspirin for long-term secondary prevention should be considered (Class IIA) in patients with a high risk of ischaemic events and without high bleeding risk for patients with CCS and in sinus rhythm and may be considered (Class IIB) in patients with at least a moderately increased risk of ischaemic events and without high bleeding risk
- In patients with CCS and atrial fibrillation (AF) a direct oral anticoagulant (DOAC) is recommended (Class I) in preference to a vitamin K antagonists (VKA) in eligible patients
- In patients with CCS and post-PCI, who are eligible for a DOAC, it is recommended that a DOAC (apixaban 5 mg b.i.d., dabigatran 150 mg b.i.d., edoxaban 60 mg o.d., or rivaroxaban 20 mg o.d.) is used in preference to a VKA in combination with antiplatelet therapy.(Class I)
- In the same population, several Class IIA specific recommendations are provided for specific antithrombotic treatment : when rivaroxaban is used and concerns about high bleeding risk prevail over concerns about stent thrombosis or ischaemic stroke, rivaroxaban15 mg o.d. should be considered in preference to rivaroxaban 20 mg o.d. for the duration of concomitant single or dual antiplatelet therapy. When dabigatran is used and concerns about high bleeding risk prevail over concerns about stent thrombosis or ischaemic stroke, 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.
- After uncomplicated PCI, early cessation (<_1 week) of aspirin, and continuation of dual therapy with OAC and clopidogrel, should be considered if the risk of stent thrombosis is low or if concerns about bleeding risk prevail over concerns about risk of stent thrombosis, irrespective of the type of stent used.
- Triple therapy with aspirin, clopidogrel, and an OAC for >_1 month should be considered when the risk of stent thrombosis outweighs the bleeding risk, with the total duration (<_6 months) decided upon according to the assessment of these risks and clearly specified at hospital discharge.

3 Other pharmacological therapy

- Concomitant use of a proton pump inhibitor is recommended (Class I) in patients receiving aspirin monotherapy, DAPT, or OAC monotherapy who are at high risk of gastrointestinal bleeding.
- Lipid-lowering drugs: for patients at very high risk who do not achieve their goals on a maximum tolerated dose of statin and ezetimibe, combination with a PCSK9 inhibitor is Class I.
- The sodium-glucose co-transporter 2 inhibitors empagliflozin, canagliflozin, or dapagliflozin are recommended (Class I) in patients with diabetes mellitus and cardiovascular disease (CVD) as well as glucagon-like peptide-1 receptor agonist (liraglutide or semaglutide).
- ACE inhibitors should be considered (Class IIA) in CCS patients at very high risk of cardiovascular adverse events.
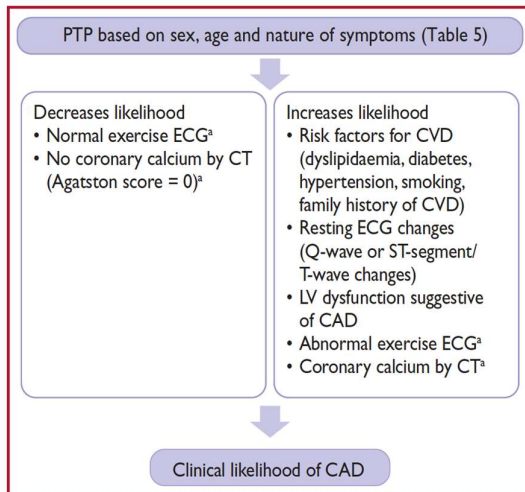
Table 1 : Pre-test probabilities of obstructive CAD in 15815 symptomatic patients according to age, sex , and the nature of symptoms in a pooled analysis of contemporary data.

	Typical		Atypical		Non-anginal			Dyspnoea[a]	
Age	Men	Women	Men	Women	Men	Women		Men	Women
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%

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CAD = coronary artery disease; PTP = pre-test probability.
[a]In addition to the classic Diamond and Forrester classes,[59] patients with dyspnoea only or dyspnoea as the primary symptom are included. The regions shaded dark green denote the groups in which non-invasive testing is most beneficial (PTP >15%). The regions shaded light green denote the groups with PTPs of CAD between 5–15%, in which testing for diagnosis may be considered after assessing the overall clinical likelihood based on the modifiers of PTPs presented in *Figure* 3.

Figure 1 Determinants of the clinical likelihood of obstructive CAD

Figure with boxes:

PTP based on sex, age and nature of symptoms (Table 5)

Decreases likelihood	Increases likelihood
• Normal exercise ECG[a] • No coronary calcium by CT (Agatston score = 0)[a]	• Risk factors for CVD (dyslipidaemia, diabetes, hypertension, smoking, family history of CVD) • Resting ECG changes (Q-wave or ST-segment/T-wave changes) • LV dysfunction suggestive of CAD • Abnormal exercise ECG[a] • Coronary calcium by CT[a]

Clinical likelihood of CAD

ESC guidelines for the management of acute pulmonary embolism (PE)

Pulmonary embolism (PE) remains a major a life-threatening condition. In the new ESC guidelines 2019 on the management of PE, the focus has been on the optimal diagnosis, evaluation and treatment with the goal to decrease variation in practice in treating PE and improve patient outcomes (2).

The ESC Task Force also selected a set of key rules to guide physicians, the most important and those that were new or revisited are listed below.

1. Diagnosis.

- In patients presenting with haemodynamic instability, perform bedside transthoracic echocardiography as a fast, immediate step to differentiate suspected high-risk PE from other acute life-threatening situations.
- Use recommended, validated diagnostic algorithms for PE, including standardized assessment of (pre-test) clinical probability and D-dimer testing (see figure 2)
- A D-dimer test, using an age-adjusted cut-off or adapted to clinical probability, should be considered as an alternative to the fixed cut-off level (IIa).
- The finding of a proximal DVT in patients suspected of having PE on compression venous ultrasonography (CUS) is considered sufficient to confirm PE further risk assessment risk assessment should be considered to guide management (IIa).

2. Risk assessment

- Stratify patients with suspected or confirmed PE, based on the presence of haemodynamic instability, to identify those at high risk of early mortality (I).
- Confirmation of PE in a patient, without haemodynamic instability, must be followed by further risk assessment involving clinical findings, evaluation of the size and/or function of the right ventricle, and laboratory biomarkers as appropriate. (see figure 2)
- Assessment of the RV by imaging or laboratory biomarkers should be considered, even in the presence of a low pulmonary embolism severity index. PESI or a sPESI of 0 (IIa).

3. Treatment in the acute phase

- If you suspect acute PE, institute anticoagulation therapy as soon as possible, while the diagnostic workup is ongoing, unless the patient is bleeding or has absolute contraindications to this therapy
- Administer systemic thrombolytic therapy to patients with high-risk PE (cardiac arrest, obstructive shock, persistent hypotension) (I).
- Rescue thrombolytic therapy is recommended for patients who deteriorate haemodynamically (I).

- Surgical embolectomy or catheter-directed treatment should be considered as alternatives to rescue thrombolytic therapy for patients who deteriorate haemodynamically (IIa).
- If anticoagulation is initiated parenterally in a patient without haemodynamic instability, prefer LMWH or fondaparinux over UFH (I).
- When oral anticoagulation is initiated in a patient with PE who is eligible for a DOAC (apixaban, dabigatran, edoxaban, or rivaroxaban), a DOAC is the recommended form of anticoagulant treatment (I).
- Set-up of multidisciplinary teams for management of high-risk and selected cases of intermediate-risk PE should be considered, depending on the resources and expertise available in each hospital (IIa).

4. Chronic treatment and prevention of recurrence

- Administer therapeutic anticoagulation for ≥ 3 months to all patients with PE (I).
- Routine clinical evaluation is recommended 3-6 months after acute PE (I).
- Discontinue therapeutic oral anticoagulation after 3 months in patients with first PE secondary to a major transient/reversible risk factor (I).
- Indefinite treatment with a VKA is recommended for patients with antiphospholipid antibody syndrome (I).
- Extended anticoagulation should be considered for patients with no identifiable risk factor for the index PE event (IIa).
- Extended anticoagulation should be considered for patients with a persistent risk factor other than antiphospholipid antibody syndrome (IIa).
- Extended anticoagulation should be considered for patients with a minor transient/reversible risk factor for the index PE event (IIa).
- A reduced dose of apixaban or rivaroxaban should be considered after the first 6 months (IIa).
- It is recommended that symptomatic patients with mismatched perfusion defects on a V/Q scan >3 months after acute PE are referred to a pulmonary hypertension/CTEPH expert centre, taking into account the results of echocardiography, natriuretic peptide, and/or cardiopulmonary exercise testing (I).

5) PE in cancer

- In patients with PE and cancer edoxaban or rivaroxaban should be considered as an alternative to LMWH, with the exception of patients with gastrointestinal cancer (IIa). In addition extended anticoagulation (beyond the first 6 months) should be considered for an indefinite period or until cancer is cured.

Figure 2: Diagnostic algorithm for patients with suspected pulmonary embolism
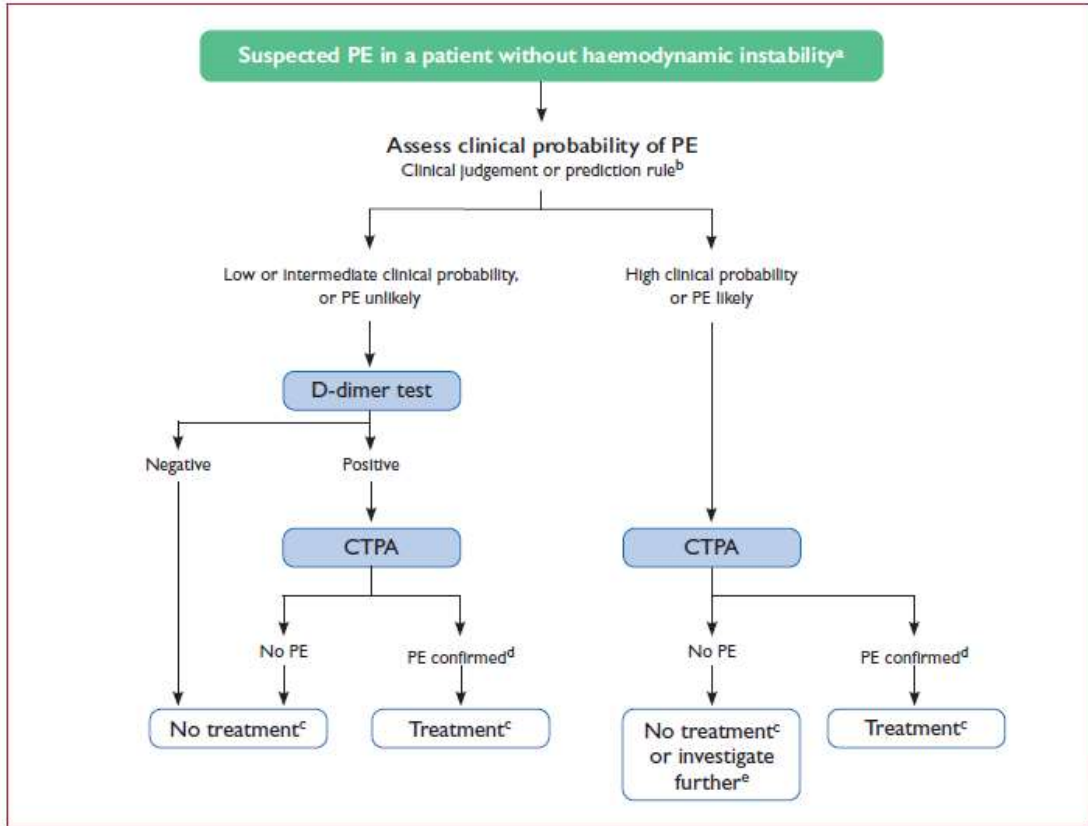
CTPA= computed tomography pulmonary angiography; PE= pulmonary embolism

Figure 3: Management algorithm for patients with acute pulmonary embolism

PATIENT WITH ACUTE PE

Anticoagulate

HAEMODYNAMIC INSTABILITY?

No

Distinguish low- from intermediate-risk PE[b]
CHECK ❶ and ❷:

❶ CLINICAL SIGNS OF PE SEVERITY, OR SERIOUS COMORBIDITY?

➢ PESI Class III-IV or sPESI ≥1[c]
➢ Alternatively: ≥1 Hestia criterion of PE severity or comorbidity fulfilled[d]

❷ RV DYSFUNCTION ON TTE OR CTPA?[e]

Yes: HIGH RISK[a,b]

❶ or ❷ present

Neither ❶ nor ❷ present: LOW RISK[b]

Perform troponin test[f]

No other reasons for hospitalization?[g] Family or social support?[g] Easy access to medical care?

Troponin positive + RV dysfunction: INTERMEDIATE-HIGH RISK[b]

Troponin negative: INTERMEDIATE-LOW RISK[b]

≥1 not true

Yes, all true

Reperfusion treatment haemodynamic support

Monitoring: consider rescue reperfusion, if deterioration

HOSPITALIZE

EARLY DISCHARGE HOME TREATMENT

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CTPA= computed tomography pulmonary angiography; PE= pulmonary embolism, PESI = Pulmonary Embolism Severity Index; RV: right ventricular; sPESI = Simplified Pulmonary Embolism Severity Index; TTE: trans thoracic echocardiography

ESC guidelines for the management of supraventricular tachycardia (SVT)

This is the first update of the guidelines on management of supraventricular tachycardia since 2003 (3). The most important messages are:

1. The treatments of choice for acute therapy of supraventricular tachycardia are vagal manoeuvers and adenosine IV (IB) and may also provide important diagnostic information; verapamil , diltiazem and beta-blockers receive recommendation IIa. The registration of a twelve lead ECG during tachycardia and also during acute treatment are recommended (IC).

2. Sinus tachycardia
   - Inappropriate sinus tachycardia:
     - first evaluation and treatment of reversible underlying causes (IC).
     - beta blockers and/or Ivabradine should be considered (IIa).
     - catheter ablation and calcium antagonists are not mentioned.
   - Sinus atrial re-entry tachycardia:
     When not responsive to drugs, catheter ablation should be considered (IIa).

3. In all re-entrant supraventricular tachycardia and most focal supraventricular tachycardia catheter ablation is offered as initial treatment to patients after having explained in detail potential risks and benefits.

4. Ablation of post AF ablation atrial tachycardia should be deferred ≥ 3 months after ablation when possible.

5. Catheter ablation in symptomatic and recurrent AVNRT (recommendation IB) can now be realized with almost no risk of AV block

6. In macro re-entrant atrial tachycardia (flutter) without atrial fibrillation anticoagulation should be considered (IIa). But the threshold for initiation has not been established.

7. Asymptomatic pre-excitation (WPW) see risk stratification diagram.
   - One in five patients develops arrhythmias during follow-up. Risk of cardiac arrest is 2.4 per 1000 person-years.
   - Noninvasive tests may be considered (IIb) risk stratification and its predictive ability remains modest.
   - Invasive testing (EPS) is recommended in patients with asymptomatic pre-excitation and high risk occupation or competitive athletes (IB) and should be considered in all others (IIa).
   - Catheter ablation is recommended in asymptomatic patients with shortest RR interval ≤ 250 ms during AF, refractory periods of accessory pathway < 250 ms, multiple accessory pathways and if inducible AVRT(IC). (see figure 4)
   - Catheter ablation should be considered in asymptomatic low risk patients (IIb).

8. Supraventricular tachycardia in pregnant woman:
   - During the first trimester it is recommended that all antiarrhythmic drugs are avoided (IC).
   - In SVT without WPW beta- I selective blocker (except atenolol) or Verapamil should be considered (IIa).
   - In WPW without structural heart disease or ischemic heart disease flecaïnide or propafenone should be considered (IIa).

- Fluoroless ablation should be considered in cases of drug-refractory or poorly tolerated supraventricular tachycardia , in experienced centers (IIa).

9. Tachycardia-induced cardiomyopathy (TCM)
    - TCM is one of the very few reversible causes of heart failure and should be considered in all new cases of LV dysfunction (IB).
    - Ablation is the treatment of choice in tachy cardiomyopathy due to supraventricular tachycardia (IB).
    - AV nodal ablation with subsequent biventricular or HIS bundle pacing (ablate + pace) should be considered if the supraventricular tachycardia cannot be cured (IC).

Figure 4: Risk stratification and therapy of patients with asymptomatic pre-excitation

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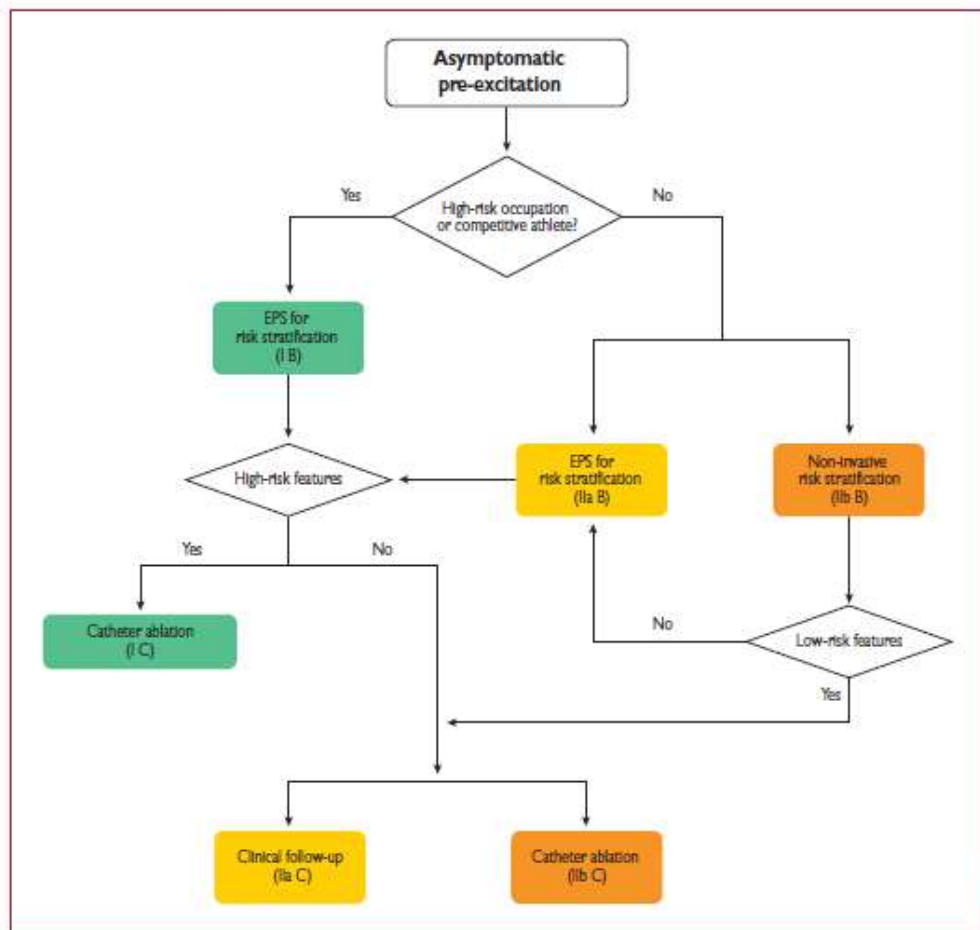
ESC guidelines for the management of dyslipidaemias

Several recent landmark studies made the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS) dyslipidemia revise their management guidelines (4). This is a short summary of the main modifications with this new document, in comparison to the previous Joint European Society of Cardiology (ESC)/European Atherosclerosis Society (EAS) Dyslipidaemia guidelines published 3 years ago.

- Cardiovascular risk levels

The different established risk levels (see also figure 5) are based on the best available evidence. It should be stressed that very high risk levels not only apply to patients with established atherosclerotic cardiovascular disease (ASCVD) but also to some high risk patients in the setting of primary prevention.

In subjects at low to moderate risk, arterial plaque burden by means of ultrasonography (carotid and/or femoral) or coronary artery calcium score are recommended risk modifiers.

- Lower low-density lipoprotein (LDL) goals to be achieved in high and very high-risk patients

It is now recommended that very high-risk patients, in secondary but also in primary prevention, achieve LDL-C levels of <55 mg/dL (<1.4 mmol/L) and at least 50% reduction from baseline LDL-C levels. In high-risk patients, the LDL-C goal is <70 mg/dL (<1.8 mmol/L) and at least 50% reduction from baseline LDL-C levels. A LDL-C goal of <1.0 mmol/L (<40 mg/dL) may be considered if a patient experience a second vascular event within 2 years (not necessarily in the same vascular territory) on maximally tolerated statin therapy. (see fibqure 5)

- Combination therapy

To achieve such low targets, the new ESC/EAS guidelines emphasize the importance of combination treatment, first with ezetimibe and then with a PCSK9 inhibitor. In patients with an acute coronary syndrome, adding a PCSK9 inhibitor early after the event (if possible, during hospitalization) should be considered. In these patients, if the LDL-C goal is not achieved after 4 - 6 weeks despite maximally tolerated statin therapy and ezetimibe, a PCSK9 inhibitor should also be added.

- n-3 polyunsaturated fatty acids (n-3 PUFAs – fish oils) in triglyceride management

Statin treatment remains the first choice for managing high triglycerides (TG, >200 mg/dL or 2.3 mmol/L). However when despite statin treatment high-risk patients continue to present persistently elevated TG (between 135 - 499 mg/dL or 1.5 and 5.6 mmol/L), n-3 PUFAs (icosapent ethyl 2 x 2 g daily) are recommended. Fenofibrate or bezafibrate may be considered in high-risk patients with an LDL-C at goal as result of statins, but in whom TG remain >200 mg/dL or >2.3 mmol/L.
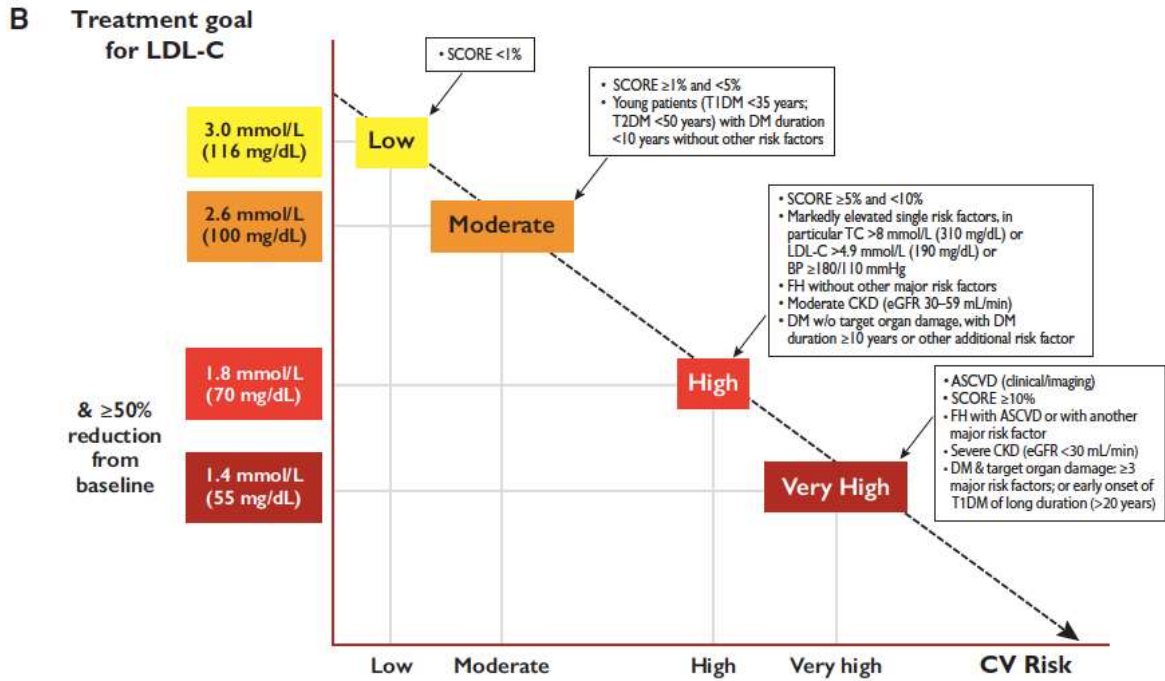
- Lipoprotein(a)

Lp(a) should be measured at least once in all adults. Mendelian randomization and epidemiologic studies suggest very high Lp(a) indicate a lifetime atherosclerotic cardiovascular risk comparable to heterozygous familial hypercholesterolemia. Nowadays, only PCSK9 inhibitors can reduce Lp(a) by 25-30%, but new therapies are awaited.

- Dyslipidaemia after 75 years

Before 75 years, statins are recommended for primary prevention depending on the level of risk. After 75 years, initiation of statin treatment for primary prevention may be considered (class IIb) when at high risk or above. In case of renal function impairment or risk for drug interaction, the low initiation dose is progressively up titrated to achieve LDL-C goals.

Figure 5:Cardiovascular risk categories and treatment goals

B Treatment goal for LDL-C

- SCORE <1%
- SCORE ≥1% and <5%
- Young patients (T1DM <35 years; T2DM <50 years) with DM duration <10 years without other risk factors
- SCORE ≥5% and <10%
- Markedly elevated single risk factors, in particular TC >8 mmol/L (310 mg/dL) or LDL-C >4.9 mmol/L (190 mg/dL) or BP ≥180/110 mmHg
- FH without other major risk factors
- Moderate CKD (eGFR 30–59 mL/min)
- DM w/o target organ damage, with DM duration ≥10 years or other additional risk factor
- ASCVD (clinical/imaging)
- SCORE ≥10%
- FH with ASCVD or with another major risk factor
- Severe CKD (eGFR <30 mL/min)
- DM & target organ damage: ≥3 major risk factors; or early onset of T1DM of long duration (>20 years)

3.0 mmol/L (116 mg/dL) — Low
2.6 mmol/L (100 mg/dL) — Moderate
1.8 mmol/L (70 mg/dL) — High
1.4 mmol/L (55 mg/dL) — Very High

& ≥50% reduction from baseline

CV Risk: Low Moderate High Very high

CT: computed tomography, CKD: chronic kidney disease, DM: diabetes mellitus , eGFR: estimated glomerular filtration rate, FH: familial hypercholesterolaemia, SCORE: systematic coronary risk estimation, TIA: transient ischaemic accident

Target organ damage is defined as microalbuminuria, retinopathy or neuropathy

Reference

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