

Updated ESC guidelines

Management of stable coronary artery disease

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Summary

Chest pain is the number one topic we deal with as cardiologists in daily practice. In this context in 2013 the updated ESC guidelines on the management of stable coronary artery disease have been published. In the new guidelines the pretest probability of disease plays an even more important role than in prior editions of the guidelines. When evaluating a chest pain patient, not only diagnostic but also prognostic assessment is important. Stress imaging is always preferred in intermediate pretest probability patients. The new guidelines also provide thresholds for accurate risk stratification and treatment of patients with stable CAD.

Key words: coronary artery disease; guidelines; diagnosis; risk stratification; treatment

Introduction

Chest pain is the number one topic we deal with as cardiologists in daily practice. In this context in 2013 the updated ESC guidelines on the management of Stable Coronary Artery Disease (SCAD) were published [1]. When comparing the new edition of the guidelines with the 2006 guidelines [2] there is a broader consideration of functional CAD as a cause of symptoms, there is a separate summary of the diagnostic and the prognostic approach. The importance of the pretest probability of CAD has been stressed even more than in the prior editions of the guidelines and new data has been added in this regard. Last but not least, there is a larger value for modern imaging techniques in the workup of CAD patients (cardiac magnetic resonance [CMR], and computed tomography coronary angiography [CCTA]). However, every method has also its limitations that have been taken into account (e.g., with stress ECG baseline ST-segment abnormalities; with nuclear cardiology and CCTA radiation exposure that has been taken into account; with stress Echo individual anatomic challenges for image acquisition; with CMR arrhythmia, contraindications because of ferromagnetic implants and claustrophobia).

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Diagnostic considerations

Initial diagnostic management of patients with suspected CAD consists of patient history, clinical examination, resting ECG, blood samples for biochemistry, and resting echocardiography (except in very young and otherwise healthy patients). Regarding blood test a full blood count including haemoglobin and white cell count, screening for potential type 2 diabetes (fasting glucose levels and HbA1c), creatinine, and a fasting lipid profile (including LDL) are recommended. This screening has the goal to establish or optimise medical therapy if necessary.

The easiest way to estimate the pretest likelihood of CAD still is based on patient gender, age, and symptoms (table 1). The prevalence of angina increases with age in male and female patients. The clinical classification of chest pain follows the traditional three categories: typical angina (meets all of the following characteristics: substernal chest discomfort of characteristic quality and duration; provoked by exertion or emotional stress; is relieved by rest and/or nitrates within minutes). If two of the before mentioned characteristics are present it is consistent with atypical angina, and if only one or none of the

Table 1: Estimated pretest probabilities of CAD based on gender, age and symptomatic status.

Age	Typical angina		Atypical angina		Nonanginal chest pain	
	Men	Women	Men	Women	Men	Women
30–39	59	28	29	10	18	5
40–49	69	37	38	14	25	8
50–59	77	47	49	20	34	12
60–69	84	58	59	28	44	17
70–79	89	68	69	37	54	24
>80	93	76	78	47	65	32

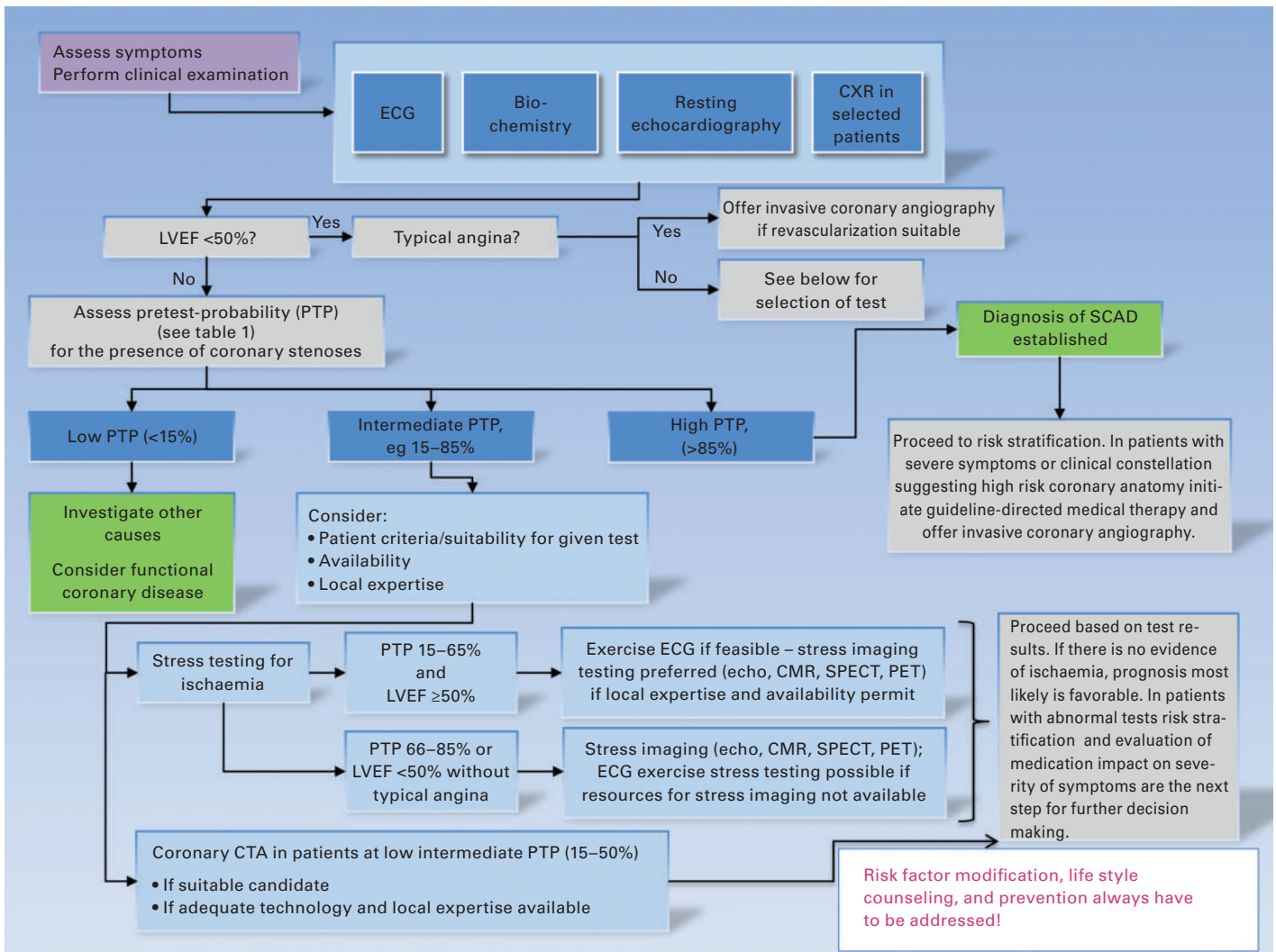


Figure 1: Diagnostic algorithm in patients with chest pain. Modified from [1].

CRX: chest X-ray; PTP: pretest probability; CMR: Cardiac Magnetic Resonance; SPECT: Single Photon Emission Tomography = myocardial scintigraphy; PET: Positron Emission Tomography; coronary CTA: coronary computed tomography angiography.

characteristics is present then it is consistent with nonanginal chest pain.

After having estimated the pretest probability based on these three variables (table 1), a distinction is drawn between low (<15%), intermediate (15% to 85%), and high (>85%) pretest probability of CAD. In terms of cardiac imaging the intermediate probability has been split into more categories than in earlier editions of the guidelines and will be discussed in further detail.

Regarding diagnostic testing, patients with a low pretest probability of CAD should not undergo further CAD evaluation, since false positive results could result in a cascade of potential harmful procedures and unnecessary costs. From the diagnostic point of view, patients with a high pretest probability of CAD can be directly referred for coronary angiography and po-

tential revascularisation. However, additional testing may provide important prognostic information and in particular also information regarding the culprit vessel, e.g., in patients with multivessel disease or patients after revascularisation, especially coronary artery bypass grafting. Patients with an intermediate pretest probability of CAD still are the best candidates for noninvasive cardiac imaging techniques or stress testing. New in the 2013 guidelines is the fact that stress imaging always is preferred to stress testing without imaging – if imaging is available. This holds especially true in patients with a pretest probability of 66% to 85% or with a left ventricular ejection fraction of less than 50%. This recommendation is based on the significantly lower diagnostic sensitivity of the exercise ECG than the imaging modalities, 45%–50% and 67% to 99%, respectively.

In patients with a pretest probability of CAD between 15% and 65%, exercise ECG may be the first diagnostic test. However, if feasible, stress imaging is preferred. The choice of the imaging modality then is dependent on patient criteria, their suitability for a given test, local expertise, availability and other cofactors.

CCTA, as the only noninvasive modality that reasonably visualises coronary anatomy, may be suitable in candidates at low intermediate pretest probability (15% to 50%). In patients with a high calcium score (Agatston score >400) the ability to identify coronary stenosis is hampered, and it is wise not to proceed with CCTA in these patients.

Prognostic considerations

In patients with ergometry stress testing, a modified Duke Treadmill Score (DTS) can be used to estimate prognosis based on exercise ECG data. Based on symptoms, ST-segment deviation and metabolic equivalents reached during the stress test, the average annual mortality rate can be estimated. From easily available data the diagnostic information can be extended to a prognostic assessment of the CAD patient, which is needed for further decision-making. The annual mortality rates of <1%, 1% to 3%, and >3% have been defined as low, intermediate, and high risk, respectively.

With cardiac imaging modalities, the extent of ischaemia is so far the best validated variable for prognostic purposes when it comes to the decision if a patient should be treated by optimal medical therapy or rather should undergo coronary angiography and potential revascularisation. Based on nuclear cardiology data, 10% myocardium ischaemic turned out to be the threshold above which patients probably benefit best from revascularisation. Below this threshold of 10% myocardium patients with ischaemia can be treated with optimal medical therapy if the symptoms can be controlled adequately. The classification of low, intermediate or high risk is based on 0%, 1% to 10% and more than 10% myocardium ischaemic, respectively. The risk estimate by the other cardiac imaging modalities is based on these findings of nuclear cardiology as long as perfusion imaging is considered. For stress – echo and dobutamine CMR, the number of dysfunctional segments during stress is used for risk assessment. CCTA evaluates anatomy and in analogy to invasive coronary angiography the number of significant lesions and their location has to be considered for risk assessment.

Risk stratification of asymptomatic patients still is an

issue of debate. However, in low or intermediate risk asymptomatic adults stress imaging is neither indicated nor recommended for further risk assessment. However, high-risk patients, and particularly diabetic patients may benefit from risk stratification [3]. In patients with known CAD, follow-up stress testing may only be considered after at least two years from the last test (unless there is a change in clinical presentation).

In summary, risk stratification is done by clinical evaluation, assessment of ventricular function, response to stress testing (ischaemia), and by coronary anatomy.

Therapeutic management

The therapeutic goal in patients with stable CAD is twofold: to eliminate or at least reduce symptoms and to improve prognosis. To achieve these goals lifestyle modification, CAD risk factor control, patient education, pharmacotherapy and revascularisation have to be considered.

First-line symptomatic drugs are beta-blockers and/or calcium channel blockers. As a second line, one may add or switch to ivabradine, long-acting nitrates, nicorandil, ranolazine, or trimetazidine. To improve prognosis lifestyle management, risk factor modification, platelet inhibition (aspirin), and statins are pivotal.

Since CAD is a dynamic process every decision is a very temporal one. Depending on various factors, but certainly patients without satisfactory pain control under medication should be considered for invasive evaluation and revascularisation even though they do not meet high-risk criteria by cardiac imaging.

In patients with an acute coronary syndrome, an invasive strategy with revascularisation provides a clearly established mortality benefit. In patients with SCAD-randomised trials show similar mortality rates for patients who were treated with optimal medical therapy or optimal medical therapy and revascularisation. However, subgroup analyses have demonstrated that residual ischaemia was unfavourable and that the extent of residual ischaemia was larger in the medically treated groups.

The decision whether revascularisation should be done by percutaneous coronary intervention or by coronary artery bypass grafting is based on coronary anatomy, syntax score, left ventricular function, patient risk and finally the decision in the “heart team”. This insight underscores the importance of risk stratification and a patient-tailored (therapeutic) strategy.

Conclusions

Patient history remains the first step for triage in patients with chest pain. Based on the pretest probability of CAD, further diagnostic evaluation can be planned. If the diagnosis of CAD is established, the risk stratification process should provide the necessary information if patients can be treated medically or if they may benefit from an invasive strategy and potential revascularisation.

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