

European clinical guidelines for cardiology 2015

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Summary

The review presents the main provisions of 5 clinical practice guidelines of the European Society of Cardiology, published in 2015: guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation, guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death, guidelines for the diagnosis and management of pericardial diseases, guidelines for the diagnosis and treatment of pulmonary hypertension, guidelines for the management of infective endocarditis. This review focuses on changes introduced in the new version of the guidelines.

Keywords

Clinical practice guidelines, acute coronary syndrome, sudden cardiac death, pericarditis, pulmonary hypertension, infectious endocarditis.

In 2015 the European Society of Cardiology published 5 new clinical guidelines developed by working groups of experts and reviewers. These guidelines cover the following topics: acute coronary syndrome without persistent ST segment elevation (ACS| ST), ventricular arrhythmias (VA) and sudden cardiac death (SCD), pericardial diseases, pulmonary hypertension (PH), infective endocarditis (IE). These guidelines summarize all modern scientific data related to the topics of interest, thus being a valuable educational source for clinical practitioners.

Guidelines for ACS/ST treatment

Guidelines for ACS/ST treatment have been prepared by the group of experts of the European Society of Cardiology lead by Roffi M., et al [1]. Previous guidelines were published in 2011. Main changes of the new version are related to ACS/ST diagnostics, cardiac rhythm monitoring, risk stratification and treatment strategy.

In patients with suspected ACS/ST it is necessary to check the levels of cardiac troponin using sensitive or high-sensitivity test and obtaining the results

during 60 minutes after it. It is recommended to use high-sensitivity troponin test during 0h/1h timing if it is available in addition to the 0h/3h fast diagnostic algorithm that had been proposed in the previous edition of guidelines, thus deciding if a patient should be admitted to hospital. Additional testing in 3-6 hours is indicated if the results of first two troponin levels tests are not definitive and if clinical manifestations still allow to suspect ACS.

Continuous heart rhythm monitoring is recommended until the ACS/ST diagnosis would be established or excluded. Patients with ACS/ST should be admitted to the intensive care units. Heart rhythm monitoring for 24h or before percutaneous coronary intervention (PCI) should be considered for ACS/ST and low risk of dangerous arrhythmias. Heart rhythm monitoring for ≥ 24 h is indicated for patients with ACS/ST and moderate or high risk of arrhythmias. If manifestations of continuous ischemia are not present heart rhythm monitoring can be necessary only in some patients with unstable angina, so in case of negative high-sensitivity troponin test results.

Guidelines include new criteria of risk stratification in patients with ACS/ST that allow to choose treatment strategy and timing of invasive intervention. Presence of very high risk criteria: hemodynamic instability/cardiogenic shock, ongoing chest pain refractory to medical treatment, life-threatening arrhythmias/cardiac arrest, mechanic complications of myocardial infarction, acute heart failure, dynamic changes of ST-T wave in electrocardiogram (ECG), consider performing of coronary angiography and myocardial revascularization during 2 hours after admission. High-risk criteria (rise in cardiac troponin levels, dynamic ST- or T-wave changes, GRACE (Global Registry of Acute Coronary Events) score >140 , require invasive approach during up to 24 hours. Intermediate risk criteria: diabetes mellitus, glomerular filtration rate <60 ml/min/1.73 m², early post-infarction angina, LVEF $<40\%$ or congestive heart failure, prior PCI or coronary artery bypass grafting, GRACE risk score >109 and <140), consider maximum 72 h window from admission to coronary angiography. Conservative treatment is recommended in case of absence of all above-mentioned risk criteria

This document proposes transition from femoral access during coronary angiography to radial access in the hospitals where the treatment of patients with ACS is performed. It is recommended to use new-generation drug-eluting stents for PCI. Drug-eluting stents may be preferred comparing with bare-metal

stents even in patients at high bleeding risk for whom short duration of dual antiplatelet therapy (30 days) is considered.

Guidelines for treatment of patients with VA and SCD prevention

Guidelines for VA and sudden cardiac death (SCD) were prepared by expert group of European Society of Cardiology and were endorsed by Association for European Paediatric and Congenital Cardiology (AEPC) [2]. Comparing with previous guidelines issued in 2006 new document includes updated information aimed to improve efficacy of SCD prevention in patients with VA. Cardiac diseases that lead to SCD the most frequently include channelopathies and cardiomyopathies, myocarditis and substance abuse in young patients and chronic degenerative diseases in older populations. For the first time DNA extraction and analysis has been recommended as a part of standard autopsy in order to determine the presence of channelopathies in sudden death cases.

Authors consider the leading role of detection of life-threatening VA in SCD prevention and propose several approaches for patients' examination. Standard 12-lead ECG registration is recommended in all patients with suspected VA (Class of recommendation I, level of evidence A). Ambulatory ECG screening is reasonable for arrhythmias diagnostics and detection, QT interval length estimation, ST segment deviation (I, A). Cardiac event recorders can be used in patients with sporadic symptoms that allow to suspect VA (I, B). It is reasonable to use implantable loop recorders in case of sporadic symptoms that are suspected to be related to arrhythmia and also if the connection of arrhythmia and symptoms cannot be established by conventional diagnostic techniques (I, B). Signal-averaged ECG can help to diagnose arrhythmogenic right ventricular cardiomyopathy (I B).

Exercise stress testing is indicated for adult patients with VA and intermediate/high probability of having coronary artery disease (CAD) (I, B), for patients with known or suspected exercise-induced VA (I, B) and can be considered in estimating response to medical or ablation therapy in patients with exercise-induced VA (IIa C).

Echocardiography allows estimation of left ventricle function and detection of structural heart disease for patients with suspected/known VA or for patients with the risk of developing serious VA/SCD (I, B). Exercise testing plus imaging is recommended

to detect silent ischaemia in patients with VA and intermediate probability of having CAD at whom ECG testing is less reliable (I B). Pharmacological stress test is reasonable to perform in patients with VA and intermediate probability of having CAD who are unable to perform physical exercise test (I B). Computer tomography or magnetic resonance imaging may be considered for patients with VA when echocardiography doesn't provide precise estimation of left and right ventricle function or cardiac structural changes (IIa, B).

Coronary angiography should be considered to prove or exclude significant obstructive CAD in patients with life-threatening VA or SCD survivors with intermediate or high probability of having CAD (IIa, C). Electrophysiological study is advised to patients who had myocardial infarction with symptoms reminding ventricular tachyarrhythmia (I, B), to patients with syncope and suspected brady- or tachyarrhythmias (I, C). It can be recommended for the differential diagnosis of arrhythmogenic right ventricular cardiomyopathy and comparably benign conditions like right ventricular outflow tract tachycardia or sarcoidosis (IIb, B).

Recommended device therapy for patients with VA includes implantable cardioverter defibrillators (ICD), subcutaneous implantable cardioverter defibrillators (SICD) and wearable cardioverter defibrillators. ICD are advised for secondary prevention of SCD and ventricular tachyarrhythmia treatment, primary SCD prevention in patients with severe left ventricular dysfunction. New version of guidelines allows to consider SICD as alternative treatment of VA in young patients, people with difficult transvenous access or with infections. But this device is not suitable for patients who need bradycardia pacing or cardiac resynchronization therapy and also for patients with tachyarrhythmias that can be easily terminated by antitachycardia pacing. Wearable cardioverter defibrillators now can be used in patients with short-term risk of SCD for whom ICD are not suitable.

Catheter ablation should be considered in patients with continuous ventricular tachycardia or "electrical storms" because of myocardial scarring in case of CAD and repeated appropriate ICD shocks due to recurrent sustained ventricular tachycardia. Statement about making ablation after the first episode of sustained ventricular tachycardia in patients with CAD and ICD has been added to the new guideline.

Resynchronization therapy nowadays is recommended for primary SCD prevention in selected pa-

tients with sinus rhythm and NYHA functional class II/III and ambulatory class IV chronic heart failure.

This guideline contains separate table dedicated to treatment of patients with cardiomyopathy for SCD prevention.

Diagnostic criteria and guidelines for treatment of inherited primary arrhythmia syndromes were updated. It is recommended to use ICD implantation in patients with long QT syndrome who survived cardiac arrest, in the group of high risk prophylactic implantation of ICD can be considered. ICD implantation for secondary prevention is recommended in patients with short QT syndrome. ICD should be used in patients with Brugada syndrome or catecholaminergic polymorphic ventricular tachycardia who survived cardiac arrest. Differentiated pharmacological therapy (beta-blockers and I class antiarrhythmic drugs) also can be recommended for patients with these syndromes.

Guidelines for the diagnosis and management of pericardial diseases

Guidelines for the diagnosis and management of pericardial diseases have been prepared by the expert group of the European Society of Cardiology and have been endorsed by the European Association for Cardio-Thoracic Surgery [3]. Previous guidelines for this problem were published in 2004. These guidelines are particularly concentrated on diagnostics and treatment strategies in pericardial diseases.

Simple aetiological classification of pericardial diseases splitting them into infectious and non-infectious has been proposed. In developed countries, viruses and bacteria (mostly mycobacterium tuberculosis) are the most frequent causes of pericarditis, tumoral pericarditis and pericarditis related to systemic (usually autoimmune) disease occur more rarely. Classic pericardial symptoms include pericarditis, pericardial effusion, cardiac tamponade and constrictive pericarditis. Cardiac tamponade and pericardial effusion may occur in absence of pericarditis.

The diagnosis of acute pericarditis can be made with at least two following criteria: chest pain typical for pericarditis, pericardial friction rub, ECG changes – new expanded ST elevation or PR depression, pericardial effusion. Incessant pericarditis is defined as pericarditis lasting for more than 4 (up to 6) weeks but less than 3 months. Recurrent pericarditis characterized by the recurrence of pericarditis after a documented first episode of acute pericarditis and a symptom-free interval of 4–6 week. Pericarditis

without remission and lasting more than 3 months is defined as chronic one.

Authors of recommendations listed predictors of poor prognosis of pericarditis. Major risk factors include fever $>38^{\circ}\text{C}$, sub-acute onset, large pericardial effusion, cardiac tamponade, lack of reaction to aspirin or non-steroid anti-inflammatory drugs (NSAID) after 1 week of administration. Minor risk factors include myopericarditis, immunodepression, trauma, oral anticoagulant therapy. When pericarditis is suspected, first stage of diagnostics requires assessment of inflammation markers – leucocytosis, C-reactive protein and others and markers of myocardial injury – cardiac troponins, creatine kinase, estimation of kidney, liver and thyroid function, chest X-ray, ECG registration, echocardiography. Second level of diagnostic is required in case of insufficient information value of the first stage and it can include computer tomography or MRI (magnetic resonance imaging) of the heart, pericardial fluid analysis in order to detect bacteria and tumor cells in case of large effusion not responsive to standard anti-inflammatory therapy. Additional diagnostic procedures aiming to define pericarditis etiology should be performed being based on clinical symptoms and presence of the high risk of poor outcome predictors.

Pericardial effusion is classified according with the mechanisms of its onset – acute, subacute or chronic, its size – mild ($<10\text{mm}$), moderate ($10\text{--}20\text{ mm}$) or large ($>20\text{mm}$), its distribution – circumferential or loculated, and composition – transudate or exudates. Etiologically it is classified to idiopathic, cancer, infectious, iatrogenic, and related to connective tissue diseases. Complex evaluation of possible pericardial effusion should include chest x-ray, inflammation markers assessment, transthoracic echocardiography, computer tomography or heart MRI in patients with loculated effusion, pericardial thickening and masses, as well as associated chest abnormalities.

The most frequent causes of cardiac tamponade are pericarditis, tuberculosis, iatrogenic causes, traumas and tumors. Echocardiography is the first choice visualization technique for evaluation of size, localization and grade of hemodynamic changes of pericardial effusion. If it was found, cardiac tamponade requires immediate pericardiocentesis or surgical drainage.

Constrictive pericarditis can occur after almost every pericardial disease, but it rarely follows recurrent pericarditis. Idiopathic constrictive pericarditis is the most common one, other frequent causes are viral infection, cardiac surgery, radiotherapy, connective

tissue diseases, post-infectious causes not related to viral infections. Transthoracic echocardiography and chest X-ray are recommended for all the patients with suspected constrictive pericarditis. Computer tomography and heart MRI are indicated as second stage visualization techniques for evaluation of pericardial calcification, thickness and degree of extension. Heart catheterization is reasonable when non-invasive diagnostic techniques don't provide a definitive diagnosis of constriction.

Hospital admission is recommended for treatment of acute and recurrent pericarditis in patients with high risk (I B). Colchicine use (0.5 mg twice or once daily for patients $< 70\text{ kg}$ or intolerant to higher doses) is recommended as first-line therapy for acute pericarditis as an addition to aspirin/NSAID therapy (3 months) and is also recommended for recurrent pericarditis (6 months therapy) (I A). Corticosteroids are not recommended as first-line therapy of acute and recurrent pericarditis (III C). Serum C-reactive protein levels can be used to determine treatment duration and to estimate response to therapy (IIa C). Aspirin, NSAID or colchicines are recommended for treatment of exudative pericarditis if pericardial effusion is associated with systemic inflammation (I C). Pericardiocentesis or surgical drainage are reasonable to use in case of cardiac tamponade, or symptomatic moderate/large cardiac effusion, non responsive to pharmacological therapy, or suspected unknown bacterial or tumoral etiology (I C). If etiology of pericardial effusion is defined, it is recommended to target the therapy (I C). Pericardiectomy is the main treatment of chronic constrictive pericarditis (I C). Pharmacological treatment of defined causes of pericarditis is recommended to prevent the progression of constriction (I C). Empiric anti-inflammatory therapy can be considered in case of transient or new diagnosis constriction when there are the evidences of concomitant pericardial inflammation (IIb C).

Guidelines for the diagnosis and treatment of pulmonary hypertension

Guidelines for the diagnosis and treatment of pulmonary hypertension (PH) have been prepared by the European Society of Cardiology and the European Respiratory Society [4]. Previous guidelines were published in 2009.

It is mentioned that PH can include multiple clinical conditions and be a complication of several cardiovascular and respiratory diseases. PH is defined as an increase in mean pulmonary arterial pressure

(PAPm) \geq 25 mmHg at rest as assessed by right heart catheterization. Definition of PH and pre-capillary PH didn't change, but the definition of post-capillary PH has been modified.

Proposed PH clinical classification includes new conditions, recently identified gene mutations and some other changes. New main positions of this classification:

- pulmonary arterial hypertension (PAH);
- PH due to left heart disease;
- PH due to lung diseases or hypoxia;
- Chronic thromboembolic PH and other pulmonary artery obstructions;
- Pulmonary hypertension with unclear and/or multifactorial mechanisms.

PH diagnosis is based on evaluation of symptoms, physical examination, analysis of examinations defining hemodynamic criteria, etiology and severity of functional and hemodynamic condition. The main cause of PH should be identified according with the clinical classification.

Right heart catheterization is recommended to confirm the diagnosis of PAH and to explain the decision of treatment choice. It is also recommended for patients with PH due to left heart disease, lung disease or thromboembolic PH. Vasoreactivity testing during right heart catheterization is recommended for patients with idiopathic, hereditary, drug or toxin induced PAH in order to choose the patients who can be treated with high dose slow calcium channels blockers. PAH severity should be estimated using clinical data, physical exercise test results, biochemical markers, echocardiography and hemodynamic assays with subsequent dynamic control in stable patients each 3–6 months. Patients with PAH should avoid pregnancy.

In the beginning of PAH treatment monotherapy or drug combination are recommended for patients who didn't receive therapy before and for patients with low or intermediate risk. Initial combined therapy including intravenous administration of prostacyclin analogue is recommended for patients with high risk. Established approaches of PAH treatment are not recommended for patients with PH due to left heart or pulmonary diseases. Surgical pulmonary endarterectomy in condition of deep hypoxia and circulation arrest is recommended for patients with chronic thromboembolic PH.

Guidelines for the management of infective endocarditis

IE recommendations have been prepared by the group of experts of the European Society of Cardiology and

have been endorsed by European Association for Cardio-Thoracic Surgery, the European Association of Nuclear Medicine [5]. Previous guidelines dedicated to this problem were published in 2009. Authors of this new edition concentrated on the increase of a role of prevention, principles of teamwork of multidisciplinary "endocarditis team", multimodal visualization techniques, new diagnostic criteria and IE surgical treatment.

New guidelines highlight the key role of general IE prophylaxis and not only of antimicrobial prophylaxis. Prophylaxis is still recommended in patients with predisposing cardiological conditions, and also in patients who are undergoing procedures with high risk of developing IE.

High risk of IE group includes patients with valve replacement, with previous episode of IE, and with congenital heart disease. Antimicrobial prophylaxis should be considered only in dental procedures requiring manipulation of the gingival or periapical region of the teeth or perforation of the oral mucosa. Good oral hygiene and regular dentist visits are more important for reducing IE risk. Vulnerable patients undergoing high-risk dental procedures should receive amoxicillin, ampicillin or clindamycin in case of allergy to penicillin. Antimicrobial prophylaxis is not recommended for procedures involving airways, gastrointestinal tract, urogenital system, skin and soft tissues.

Work of multidisciplinary surgical team using standard protocol of IE treatment provides significant reduction of mortality risk. It is recommended to examine patients with complicated IE during early stage of disease in hospital with possibility of surgical intervention and presence of qualified team that includes infectious disease specialist, microbiologist, cardiologist, imaging specialist, cardiac surgeon, and, if necessary, specialist in CAD. Transthoracic echocardiography is recommended as the first-line imaging procedure for diagnostics of suspected IE. In addition, transesophageal echocardiography can be used. The last one should be initial imaging approach in patients with valve replacement or implanted intracardiac material. Diagnostic algorithm and modified diagnostic criteria of IE are present in the text of the guidelines.

Updated recommendations approve early surgical intervention for IE treatment. Heart failure is the most frequent IE complication and common indication for cardiac valvular operations. Second and third indications for the operation are uncontrollable infection and necessity of emboly, respectively.

Restricted volume of this article doesn't allow to expound all statements issued in new clinical guidelines of the European Society of Cardiology in 2015. Full texts are available on the cite: <http://www.escardio.org/Guidelines-&-Education/Clinical-Practice-Guidelines/ESC-Clinical-Practice-Guidelines-list/listings>.

Conflict of interest: None declared

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