Komorové tachykardie
ESC Guidelines 2015

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Komplexní kardiovaskulární centrum

Lékařská fakulta Univerzity Palackého v Olomouci

I. INTERNÍ KLINIKA KARDIOLOGICKÁ
FAKULTNÍ NEMOCNICE OLOMOUC

VT and SCD ESC Guidelines 2015

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ESC GUIDELINES

2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

The Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC)

Endorsed by: Association for European Paediatric and Congenital Cardiology (AEPC)

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Definice terminologie NS

Term	Definition	Ref[a]
Sudden death	Non-traumatic, unexpected fatal event occurring within 1 hour of the onset of symptoms in an apparently healthy subject. If death is not witnessed, the definition applies when the victim was in good health 24 hours before the event.	1
SUDS and SUDI	Sudden death without an apparent cause and in which an autopsy has not been performed in an adult (SUDS) or in an infant <1 year of age (SUDI).	14
SCD	The term is used when: • A congenital, or acquired, potentially fatal cardiac condition was known to be present during life; OR • Autopsy has identified a cardiac or vascular anomaly as the probable cause of the event; OR • No obvious extra-cardiac causes have been identified by post-mortem examination and therefore an arrhythmic event is a likely cause of death.	1, 14, 15
SADS and SIDS	Both autopsy and toxicology investigations are inconclusive, the heart is structurally normal at gross and histological examination and non-cardiac aetiologies are excluded in adults (SADS) and in infants (SIDS).	16
Aborted cardiac arrest	Unexpected circulatory arrest, occurring within 1 hour of onset of acute symptoms, which is reversed by successful resuscitation manoeuvres (e.g. defibrillation).	-
Idiopathic ventricular fibrillation	Clinical investigations are negative in a patient surviving an episode of ventricular fibrillation.	17, 18
Primary prevention of SCD	Therapies to reduce the risk of SCD in individuals who are at risk of SCD but have not yet experienced an aborted cardiac arrest or life-threatening arrhythmias.	-
Secondary prevention of SCD	Therapies to reduce the risk of SCD in patients who have already experienced an aborted cardiac arrest or life-threatening arrhythmias.	1

SADS = sudden arrhythmic death syndrome; SCD = sudden cardiac death; SIDS = sudden infant death syndrome; SUDI = sudden unexplained death in infancy; SUDS = sudden unexplained death syndrome.

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Klasifikace komorových arytmií

Terminology - Type of VA	Definition - ECG classification
Bidirectional VT	VT with a beat-to-beat change in the QRS axis.
Bundle-branch re-entrant tachycardia	VT due to re-entry involving the His-Purkinje system, usually with LBBB morphology; most common in DCM with prolonged HV interval.
Idioventricular rhythm	Arrhythmia of three or more consecutive complexes originating from ventricles at a rate of <100 bpm.
Monomorphic VT	Stable single QRS morphology during VT.
Non-sustained VT	Three or more consecutive ventricular complexes in duration, terminating spontaneously in <30 seconds.
Pleomorphic VT	More than one stable QRS morphology during an episode of VT.
Polymorphic VT	A changing or multiform QRS morphology at cycle length between 100 and 300 bpm during VT.
Premature ventricular complexes	A ventricular depolarization that occurs earlier than expected and appears on the ECG as an early, wide QRS complex without a preceding related P wave.
Sustained VT	VT ≥30 seconds in duration and/or requiring termination due to haemodynamic compromise in <30 seconds.
Torsade de pointes	VT characterized by twisting of the QRS complexes around the isoelectric line on the ECG during the arrhythmia, which may be associated with a Long QT Syndrome.
Ventricular flutter	A regular (cycle length variability ≤30 ms) VT approximately 300 bpm with a monomorphic appearance; no isoelectric interval between successive QRS complexes.
Ventricular fibrillation	Rapid, usually >300 bpm (cycle length ≤200 ms), grossly irregular ventricular rhythm with marked variability in QRS cycle length, morphology, and amplitude.
Ventricular tachycardia	Arrhythmia of three or more consecutive complexes in duration originating from the ventricles at a rate of ≥100 bpm.

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Doporučení pro provedení pitvy a molekulární analýzy

Recommendations	Class[a]	Level[b]	Ref.[c]
An autopsy is recommended to investigate the causes of sudden death and to define whether SCD is secondary to arrhythmic or non-arrhythmic mechanisms (e.g. rupture of an aortic aneurysm).	I	C	17
Whenever an autopsy is performed, a standard histological examination of the heart is recommended and it should include mapped labelled blocks of myocardium from representative transverse slices of both ventricles.	I	C	17
The analysis of blood and other adequately collected body fluids for toxicology and molecular pathology is recommended in all victims of unexplained sudden death.	I	C	17
Targeted post-mortem genetic analysis of potentially disease-causing genes should be considered in all sudden death victims in whom a specific inheritable channelopathy or cardiomyopathy is suspected.	IIa	C	17,50, 51

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Vyšetření u příbuzných pacientů s SCD

Approach	Action[a]
History taking and physical examination	• Personal clinical history • Family history focused on cardiac diseases or sudden deaths
ECG	• Baseline 12-lead ECG with standard and high precordial leads • 24-hour ambulatory ECG • Exercise stress test • Signal-averaged ECG • Provocative test with ajmaline/flecainide (when Brugada syndrome is suspected)
Cardiac imaging	• Two-dimensional echocardiography and/or CMR (with or without contrast)
Genetic testing	• Targeted molecular testing and genetic counselling if there is the clinical suspicion of a specific disease • Referral to a tertiary centre specialized in evaluation of the genetics of arrhythmias

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Neinvazivní vyšetření při podezření na KT, resp. s dokumentovanou KT

Recommendations	Class[a]	Level[b]	Ref.[c]
Resting 12-lead ECG			
Resting 12-lead ECG is recommended in all patients who are evaluated for VA.	I	A	1
ECG monitoring			
Ambulatory ECG is recommended to detect and diagnose arrhythmias. Twelve-lead ambulatory ECG is recommended to evaluate QT-interval changes or ST changes.	I	A	93
Cardiac event recorders are recommended when symptoms are sporadic to establish whether they are caused by transient arrhythmias.	I	B	94
Implantable loop recorders are recommended when symptoms, e.g. syncope, are sporadic and suspected to be related to arrhythmias and when a symptom–rhythm correlation cannot be established by conventional diagnostic techniques.	I	B	95
SA-ECG is recommended to improve the diagnosis of ARVC in patients with VAs or in those who are at risk of developing life-threatening VAs.	I	B	96,97
Exercise stress testing			
Exercise stress testing is recommended in adult patients with VA who have an intermediate or greater probability of having CAD by age and symptoms to provoke ischaemic changes or VA.	I	B	98
Exercise stress testing is recommended in patients with known or suspected exercise-induced VA, including CPVT, to achieve a diagnosis and define prognosis.	I	B	99
Exercise stress testing should be considered in evaluating response to medical or ablation therapy in patients with known exercise-induced VA.	IIa	C	1
Imaging			
Echocardiography for assessment of LV function and detection of structural heart disease is recommended in all patients with suspected or known VA.	I	B	100, 101
Echocardiography for assessment of LV and RV function and detection of structural heart disease is recommended for patients at high risk of developing serious VAs or SCD, such as those with dilated, hypertrophic or RV cardiomyopathies, survivors of acute myocardial infarction or relatives of patients with inherited disorders associated with SCD.	I	B	100
Exercise testing plus imaging (exercise stress echocardiography test or nuclear perfusion, SPECT) is recommended to detect silent ischaemia in patients with VAs who have an intermediate probability of having CAD by age or symptoms and in whom an ECG is less reliable (digoxin use, LV hypertrophy, >1-mm ST-segment depression at rest, WPW syndrome, or LBBB).	I	B	102
Pharmacological stress testing plus imaging modality is recommended to detect silent ischaemia in patients with VAs who have an intermediate probability of having CAD by age or symptoms and are physically unable to perform a symptom-limited exercise test.	I	B	103
CMR or CT should be considered in patients with VAs when echocardiography does not provide accurate assessment of LV and RV function and/or evaluation of structural changes.	IIa	B	1

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Invazivní vyšetření při podezření na KT, resp. s dokumentovanou KT

Recommendations	Class[a]	Level[b]	Ref.[c]
Coronary angiography			
Coronary angiography should be considered to establish or exclude significant obstructive CAD in patients with life-threatening VAs or in survivors of SCD, who have an intermediate or greater probability of having CAD by age and symptoms.	IIa	C	104
Electrophysiological study			
Electrophysiological study in patients with CAD is recommended for diagnostic evaluation of patients with remote myocardial infarction with symptoms suggestive of ventricular tachyarrhythmias, including palpitations, presyncope and syncope.	I	B	105
Electrophysiological study in patients with syncope is recommended when bradyarrhythmias or tachyarrhythmias are suspected, based on symptoms (e.g. palpitations) or the results of non-invasive assessment, especially in patients with structural heart disease.	I	C	106
Electrophysiological study may be considered for the differential diagnosis of ARVC and benign RVOT tachycardia or sarcoidosis.	IIb	B	107

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Antiarytmika určená k terapii KT I

Anti-arrhythmic drugs (Vaughan Williams class)	Oral dose# (mg/day)[a]	Common or important adverse effects	Indications	Cardiac contra-indications and warnings
Amiodarone (III)	200–400	Pulmonary fibrosis, hypothyroidism and hyperthyroidism, neuropathies, corneal deposits, photosensitivity, skin discolouration, hepatotoxicity, sinus bradycardia, QT prolongation, and occasional TdP.	VT,VF	Conditions and concomitant treatments associated with QT interval prolongation; inherited LQTS; sinus bradycardia (except in cardiac arrest); sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); decompensated HF or cardiomyopathy.
Beta-blocker (II)	Various	Bronchospasm, hypotension, sinus bradycardia, AV block, fatigue, depression, sexual disturbances.	PVC,VT, LQTS, CPVT	Severe sinus bradycardia and sinus node disease (unless a pacemaker is present); AV conduction disturbances (unless a pacemaker is present); acute phase of myocardial infarction (avoid if bradycardia, hypotension, LV failure); decompensated HF; Prinzmetal's angina.
Disopyramide (IA)	250–750	Negative inotrope, QRS prolongation, AV block, pro-arrhythmia (atrial flutter, monomorphic VT, occasional TdP), anticholinergic effects.	VT, PVC	Severe sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; hypotension.
Flecainide (IC)	200–400	Negative inotrope, QRS widening, AV block, sinus bradycardia, pro-arrhythmia (atrial flutter, monomorphic VT, occasional TdP), increased incidence of death after myocardial infarction.	PVC,VT	Sinus node dysfunction (unless a pacemaker is present); AF/flutter (without the concomitant use of AV-blocking agents); severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; haemodynamically significant valvular heart disease; Brugada syndrome; inherited LQTS (other than LQTS3); concomitant treatments associated with QT-interval prolongation.
		anticholinergic effects.		
Flecainide (IC)	200–400	Negative inotrope, QRS widening, AV block, sinus bradycardia, pro-arrhythmia (atrial flutter, monomorphic VT, occasional TdP), increased incidence of death after myocardial infarction.	PVC,VT	Sinus node dysfunction (unless a pacemaker is present); AF/flutter (without the concomitant use of AV-blocking agents); severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; haemodynamically significant valvular heart disease; Brugada syndrome; inherited LQTS (other than LQTS3); concomitant treatments associated with QT-interval prolongation.
Mexiletine (IB)	450–900	Tremor, dysarthria, dizziness, gastrointestinal disturbance, hypotension, sinus bradycardia.	VT, LQT3	Sinus node dysfunction (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); severe HF; reduced LVEF; inherited LQTS (other than LQTS3); concomitant treatments associated with QT-interval prolongation.
Procainamide (IA)	1000–4000	Rash, myalgia, vasculitis, hypotension, lupus, agranulocytosis, bradycardia, QT prolongation, TdP.	VT	Severe sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; hypotension; reduced LVEF, Brugada syndrome.

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Antiarytmika určená k terapii KT II

Propafenone (IC)	450–900	Negative inotrope, gastrointestinal disturbance, QRS prolongation, AV block, sinus bradycardia, pro-arrhythmia (atrial flutter, monomorphic VT, occasional TdP).	PVC,VT	Severe sinus bradycardia and sinus node dysfunction (unless a pacemaker is present); AF/flutter (without the concomitant use of AV-blocking agents); severe AV-conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; haemodynamically significant valvular heart disease; Brugada syndrome; inherited LQTS (other than LQTS3); concomitant treatments associated with QT interval prolongation.
Quinidine	600–1600	Nausea, diarrhoea, auditory and visual disturbance, confusion, hypotension, thrombocytopenia, haemolytic anaemia, anaphylaxis. QRS and QT prolongation, TdP.	VT,VF, SQTS, Brugada syndrome	Severe sinus node disease (unless a pacemaker is present), severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; hypotension; inherited Long QT Syndrome; concomitant treatments associated with QT interval prolongation.
Ranolazine (IB)	750 –2000	Dizziness, nausea, constipation, hypotension, gastrointestinal disturbance, headache, rash, sinus bradycardia, QT prolongation.	LQTS3[b]	Severe sinus bradycardia and sinus node disease; severe HF; inherited Long QT Syndrome (other than LQTS3); concomitant treatments associated with QT interval prolongation.
Sotalol (III)	160–320	As for other beta-blockers and TdP.	VT, (ARVC)[c]	Severe sinus bradycardia and sinus node disease (unless a pacemaker is present); AV conduction disturbances (unless a pacemaker is present); severe HF; Prinzmetal's angina; inherited LQTS; concomitant treatments associated with QT interval prolongation.
Verapamil (IV)	120–480	Negative inotrope (especially in patients with reduced LVEF), rash, gastrointestinal disturbance, hypotension, sinus bradycardia, AV block,VT.	LV fascicular tachycardia	Severe sinus bradycardia and sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); acute phase of myocardial infarction (avoid if bradycardia, hypotension, left ventricular failure); HF; significantly reduced LVEF; atrial flutter or fibrillation associated with accessory conducting pathways (e.g. WPW syndrome).
Propafenone (IC)	450–900	Negative inotrope, gastrointestinal disturbance, QRS prolongation, AV block, sinus bradycardia, pro-arrhythmia (atrial flutter, monomorphic VT, occasional TdP).	PVC,VT	Severe sinus bradycardia and sinus node dysfunction (unless a pacemaker is present); AF/flutter (without the concomitant use of AV-blocking agents); severe AV-conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; haemodynamically significant valvular heart disease; Brugada syndrome; inherited LQTS (other than LQTS3); concomitant treatments associated with QT interval prolongation.
Quinidine	600–1600	Nausea, diarrhoea, auditory and visual disturbance, confusion, hypotension, thrombocytopenia, haemolytic anaemia, anaphylaxis, QRS and QT prolongation, TdP.	VT,VF, SQTS, Brugada syndrome	Severe sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); severe intraventricular conduction disturbances; previous myocardial infarction; CAD; HF; reduced LVEF; hypotension; inherited Long QT Syndrome; concomitant treatments associated with QT interval prolongation.
Ranolazine (IB)	750 –2000	Dizziness, nausea, constipation, hypotension, gastrointestinal disturbance, headache, rash, sinus bradycardia, QT prolongation.	LQTS3[b]	Severe sinus bradycardia and sinus node disease; severe HF; inherited Long QT Syndrome (other than LQTS3); concomitant treatments associated with QT interval prolongation.
Sotalol (III)	160–320	As for other beta-blockers and TdP.	VT, (ARVC)[c]	Severe sinus bradycardia and sinus node disease (unless a pacemaker is present); AV conduction disturbances (unless a pacemaker is present); severe HF; Prinzmetal's angina; inherited LQTS; concomitant treatments associated with QT interval prolongation.
Verapamil (IV)	120–480	Negative inotrope (especially in patients with reduced LVEF), rash, gastrointestinal disturbance, hypotension, sinus bradycardia, AV block,VT.	LV fascicular tachycardia	Severe sinus bradycardia and sinus node disease (unless a pacemaker is present); severe AV conduction disturbances (unless a pacemaker is present); acute phase of myocardial infarction (avoid if bradycardia, hypotension, left ventricular failure); HF; significantly reduced LVEF; atrial flutter or fibrillation associated with accessory conducting pathways (e.g. WPW syndrome).

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ICD: Sekundární prevence

Recommendations	Class[a]	Level[b]	Ref.[c]
ICD implantation is recommended in patients with documented VF or haemodynamically not tolerated VT in the absence of reversible causes or within 48 h after myocardial infarction who are receiving chronic optimal medical therapy and have a reasonable expectation of survival with a good functional status >1 year.	I	A	151–154
ICD implantation should be considered in patients with recurrent sustained VT (not within 48 h after myocardial infarction) who are receiving chronic optimal medical therapy, have a normal LVEF and have a reasonable expectation of survival with good functional status for >1 year.	IIa	C	This panel of experts
In patients with VF/VT and an indication for ICD, amiodarone may be considered when an ICD is not available, contraindicated for concurrent medical reasons or refused by the patient.	IIb	C	155, 156

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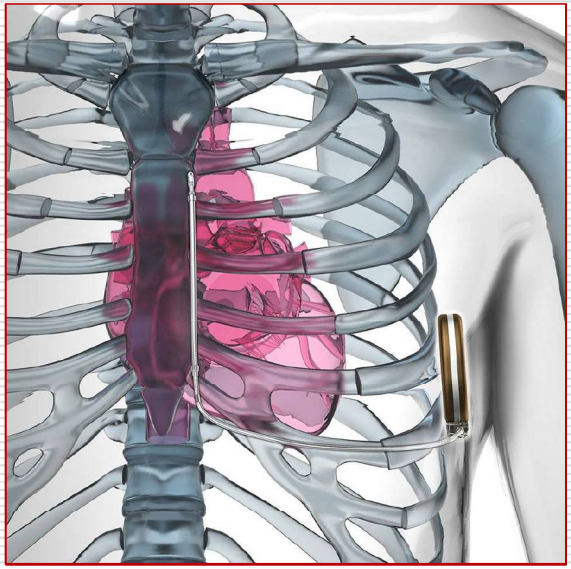
Novinka: Indikace SQ ICD

Recommendations	Class[a]	Level[b]	Ref.[c]
Subcutaneous defibrillators should be considered as an alternative to transvenous defibrillators in patients with an indication for an ICD when pacing therapy for bradycardia support, cardiac resynchronization or antitachycardia pacing is not needed.	IIa	C	157, 158
The subcutaneous ICD may be considered as a useful alternative to the transvenous ICD system when venous access is difficult, after the removal of a transvenous ICD for infections or in young patients with a long-term need for ICD therapy.	IIb	C	This panel of experts



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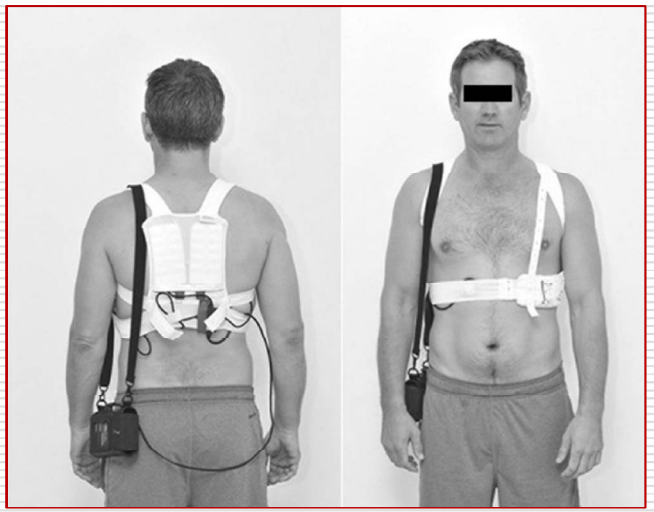
Novinka: Wearable defibrillator

Recommendation	Class[a]	Level[b]	Ref.[c]
The WCD may be considered for adult patients with poor LV systolic function who are at risk of sudden arrhythmic death for a limited period, but are not candidates for an implantable defibrillator (e.g. bridge to transplant, bridge to transvenous implant, peripartum cardiomyopathy, active myocarditis and arrhythmias in the early post-myocardial infarction phase).	IIb	C	167, 168



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Novinka: Public defibrillation AED

Recommendations	Class[a]	Level[b]	Ref.[c]
It is recommended that public access defibrillation be established at sites where cardiac arrest is relatively common and suitable storage is available (e.g. schools, sports stadiums, large stations, casinos, etc.) or at sites where no other access to defibrillation is available (e.g. trains, cruise ships, airplanes, etc.).	I	B	173, 174
It may be considered to teach basic life support to the families of patients at high risk of SCD	IIb	C	This panel of experts

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Akutní management KT

Recommendations	Class[a]	Level[b]	Ref.[c]
Direct current cardioversion is recommended for patients presenting with sustained VT and haemodynamic instability.	I	C	180
In patients presenting with sustained haemodynamically tolerated VT in the absence of structural heart disease (e.g. idiopathic RVOT), i.v. flecainide or a conventional beta-blocker, verapamil or amiodarone may be considered.	IIb	C	

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Intervenční terapie: Katetrizační ablace KT

Recommendations	Class[a]	Level[b]	Ref.[c]
Urgent catheter ablation is recommended in patients with scar-related heart disease presenting with incessant VT or electrical storm.	I	B	183
Catheter ablation is recommended in patients with ischaemic heart disease and recurrent ICD shocks due to sustained VT.	I	B	184–186
Catheter ablation should be considered after a first episode of sustained VT in patients with ischaemic heart disease and an ICD.	IIa	B	184–186

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Intervenční terapie: Chirurgická ablace KF

Recommendations	Class[a]	Level[b]	Ref.[c]
Surgical ablation guided by preoperative and intraoperative electrophysiological mapping performed at an experienced centre is recommended in patients with VT refractory to anti-arrhythmic drug therapy after failure of catheter ablation by experienced electrophysiologists.	I	B	212–215
Surgical ablation at the time of cardiac surgery (bypass or valve surgery) may be considered in patients with clinically documented VT or VF after failure of catheter ablation.	IIb	C	216, 217

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I: Akutní koronární syndrom

KT u akutního koronárního syndromu I

Prehospitalizační fáze

Recommendations	Class[a]	Level[b]	Ref.[c]
In patients with chest pain, it is recommended to reduce delays both from symptom onset to first medical contact and from first medical contact to reperfusion.	I	A	244
It is recommended that ambulance teams are trained and equipped to identify ACS (with the use of ECG recorders and telemetry as necessary) and treat cardiac arrest by performing basic life support and defibrillation.	I	B	178
It is recommended that basic and advanced life support are performed following the algorithm protocols defined by the European Resuscitation Council or by national or international resuscitation expert groups.	I	C	179
It is recommended that post-resuscitation care is performed in high-volume expert centres capable of offering multidisciplinary intensive care treatment, including primary coronary interventions, electrophysiology, cardiac assist devices, cardiac and vascular surgery and therapeutic hypothermia.	I	B	245, 246
The creation of regional networks for the treatment of cardiac arrest should be considered to improve outcomes.	IIa	B	245

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KT u akutního koronárního syndromu II

Hospitalizační fáze: Revaskularizace

Recommendations	Class[a]	Level[b]	Ref.[c]
Urgent reperfusion is recommended in patients with STEMI.	I	A	247–249
Coronary revascularization is recommended in patients with NSTEMI or unstable angina according to the ESC NSTEMI guidelines.	I	C	13,250
A coronary angiogram followed, if necessary, by coronary angioplasty within 2 h of hospital admission is recommended in patients with high-risk NSTEMI, which also includes life-threatening VA.	I	C	13,250
Prompt and complete coronary revascularization is recommended to treat myocardial ischaemia that may be present in patients with recurrent VT or VF.	I	C	251, 252
Prompt opening of the infarct vessels is recommended to reverse new-onset ischaemic AV conduction disturbances. This is especially true for AV block due to inferior infarction, even in the case of late (>12 h) presentation.	I	C	253
Direct admission to the catheterization laboratory is recommended in comatose survivors of out-of-hospital cardiac arrest with electrocardiographic criteria for STEMI on the post-resuscitation ECG.	I	B	251, 252
An intensive care unit stop should be considered in comatose survivors of out-of-hospital cardiac arrest without electrocardiographic criteria for ST-segment elevation on the post-resuscitation ECG to exclude non-coronary causes and, in the absence of an obvious non-coronary cause, a coronary angiogram should be considered as soon as possible (<2 h), particularly in haemodynamically unstable patients.	IIa (for both recommendations)	B	251, 252
Implantation of an LV assist device or extracorporeal life support should be considered in haemodynamically unstable patients with recurrent VT or VF despite optimal therapy.	IIa	B	254
Cardiac assist support and revascularization in specialized centres may be considered in patients with refractory cardiac arrest.	IIb	C	255, 256

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KT u akutního koronárního syndromu III

Prevence a terapie SCD během hospitalizace

Recommendations	Class[a]	Level[b]	Ref.[c]
Beta-blocker treatment is recommended for recurrent polymorphic VT.	I	B	257
Intravenous amiodarone is recommended for the treatment of polymorphic VT.	I	C	258
Immediate electrical cardioversion or defibrillation is recommended in patients with sustained VT or VF.	I	C	180
Urgent coronary angiography followed, when indicated, by revascularization is recommended in patients with recurrent VT or VF when myocardial ischaemia cannot be excluded.	I	C	251, 252
Correction of electrolyte imbalances is recommended in patients with recurrent VT or VF.	I	C	179
Oral treatment with beta-blockers should be considered during the hospital stay and continued thereafter in all ACS patients without contraindications.	IIa	B	130, 257, 259, 260
Radiofrequency catheter ablation at a specialized ablation centre followed by the implantation of an ICD should be considered in patients with recurrent VT, VF or electrical storms despite complete revascularization and optimal medical treatment.	IIa	C	261–267
Transvenous catheter overdrive stimulation should be considered if VT is frequently recurrent despite use of anti-arrhythmic drugs and catheter ablation is not possible.	IIa	C	
Intravenous lidocaine may be considered for the treatment of recurrent sustained VT or VF not responding to beta-blockers or amiodarone or in the presence of contraindications to amiodarone.	IIb	C	268
Prophylactic treatment with anti-arrhythmic drugs (other than beta-blockers) is not recommended.	III	B	269, 270

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KT u akutního koronárního syndromu IV

Indikace kardiostimulace a ICD

Recommendations	Class[a]	Level[b]	Ref.[c]
Temporary transvenous pacing is recommended in patients symptomatic for sinus bradycardia despite treatment with positive chronotropic medication.	I	C	271
Temporary transvenous pacing is recommended in patients with symptomatic high-degree AV block without stable escape rhythm.	I	C	271
Urgent angiography is recommended in patients symptomatic for high-degree AV block who have not received reperfusion.	I	C	271
Reprogramming a previously implanted ICD is recommended for patients with recurrent inappropriate ICD therapies.	I	C	272
Reprogramming a previously implanted ICD should be considered to avoid unnecessary ICD shocks.	IIa	C	272
ICD implantation or temporary use of a WCD may be considered <40 days after myocardial infarction in selected patients (incomplete revascularization,[d] pre-existing LVEF dysfunction, occurrence of arrhythmias >48 h after the onset of ACS, polymorphic VT or VF).	IIb	C	170, 273
ICD implantation for the primary prevention of SCD is generally not indicated <40 days after myocardial infarction.	III	A	274, 275

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Komplexní kardiovaskulární centrum

Lékařská fakulta Univerzity Palackého v Olomouci

I. INTERNÍ KLINIKA KARDIOLOGICKÁ
FAKULTNÍ NEMOCNICE OLOMOUC

Echokardiografie po IM

Recommendations	Class[a]	Level[b]	Ref.[c]
Early (before discharge) assessment of LVEF is recommended in all patients with acute myocardial infarction.	I	C	286–288
Re-evaluation of LVEF 6–12 weeks after myocardial infarction is recommended to assess the potential need for primary prevention ICD implantation.	I	C	286–288

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Farmakologická léčba u pacientů s dysfunkcí LK

Recommendations	Class[a]	Level[b]	Ref.[c]
Optimal pharmacological therapy with ACE inhibitors (or, when intolerant, ARBs), beta-blockers and MRAs is recommended in patients with HF with systolic dysfunction (LVEF ≤35–40%) to reduce total mortality and SCD.	I	A	301–304

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Indikace ICD u pacientů s dysfunkcí LK

Recommendations	Class[a]	Level[b]	Ref.[c]
ICD therapy is recommended to reduce SCD in patients with symptomatic HF (NYHA class II–III) and LVEF ≤35% after ≥3 months of optimal medical therapy who are expected to survive for at least 1 year with good functional status:			
– Ischaemic aetiology (at least 6 weeks after myocardial infarction).	I	A	63,64
– Non-ischaemic aetiology.	I	B	64,316, 317

NYHA IV

Recommendation	Class[a]	Level[b]	Ref.[c]
ICD implantation should be considered for primary and secondary prevention of SCD in patients who are listed for heart transplant.	IIa	C	320, 321

Recommendations	Class[a]	Level[b]	Ref.[c]
CRT is recommended to reduce all-cause mortality in patients with an LVEF ≤35% and LBBB despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status:			322–326
– With a QRS duration >150 ms	I	A	313, 314, 327–329
– With a QRS duration of 120–150 ms	I	B	313, 314
CRT should or may be considered to reduce all-cause mortality in patients with an LVEF ≤35% without LBBB despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status:			326 323–325
– With a QRS duration >150 ms	IIa	B	313, 314
– With a QRS duration of 120–150 ms	IIb	B	313, 314

CRT-SR

CRT-AF

Recommendations	Class[a]	Level[b]	Ref.[c]
CRT should be considered to reduce all-cause mortality in patients with chronic HF, QRS ≥120 ms and LVEF ≤35% who remain in NYHA functional class III/ambulatory class IV despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status, provided that biventricular pacing as close as possible to 100% can be achieved.	IIa	B	330, 331
AV junction ablation should be considered in case of incomplete biventricular pacing.	IIa	B	332, 333

NYHA II

Recommendations	Class[b]	Level[c]	Ref.[d]
CRT-D is recommended to reduce all-cause mortality in patients with a QRS duration ≥130 ms, with an LVEF ≤30% and with LBBB despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status.	I	A	148, 322, 323, 325, 327, 329
CRT-D may be considered to prevent hospitalization for HF in patients with a QRS duration ≥150 ms, irrespective of QRS morphology, and an LVEF ≤35% despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status.	IIb	A	148, 327–329, 334

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Bundle-branch reentry KT

Recommendation	Class[a]	Level[b]	Ref.[c]
Catheter ablation as first-line therapy is recommended in patients presenting with bundle branch re-entrant tachycardia.	I	C	345, 346

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II: Kardiomyopatie

KT u DKMP: Riziková stratifikace a terapie

Recommendations	Class[a]	Level[b]	Ref.[c]
Optimal medical therapy (ACE inhibitors, beta-blockers and MRA) is recommended in patients with DCM to reduce the risk of sudden death and progressive HF.	I	A	8
Prompt identification and treatment of arrhythmogenic factors (e.g. pro-arrhythmic drugs, hypokalaemia) and co-morbidities (e.g. thyroid disease) is recommended in patients with DCM and VA.	I	C	8
A coronary angiography is recommended in stable DCM patients with an intermediate risk of CAD and new onset VA.	I	B	8
An ICD is recommended in patients with DCM and haemodynamically not tolerated VT/VF, who are expected to survive for >1 year with good functional status.	I	A	151–154
An ICD is recommended in patients with DCM, symptomatic HF (NYHA class II–III) and an ejection fraction ≤35% despite ≥3 months of treatment with optimal pharmacological therapy who are expected to survive for >1 year with good functional status.	I	B	64, 313, 316, 317, 354
Catheter ablation is recommended in patients with DCM and bundle branch re-entry ventricular tachycardia refractory to medical therapy.	I	B	8,208, 345, 346
An ICD should be considered in patients with DCM and a confirmed disease-causing *LMNA* mutation and clinical risk factors.[d]	IIa	B	71
Amiodarone should be considered in patients with an ICD that experience recurrent appropriate shocks in spite of optimal device programming.	IIa	C	229
Catheter ablation may be considered in patients with DCM and VA not caused by bundle branch re-entry refractory to medical therapy.	IIb	C	355
Invasive EPS with PVS may be considered for risk stratification of SCD.	IIb	B	115
Amiodarone is not recommended for the treatment of asymptomatic NSVT in patients with DCM.	III	A	313, 354
Use of sodium channel blockers and dronedarone to treat VA is not recommended in patients with DCM.	III	A	129, 356, 357

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HKMP:
Riziková stratifikace a terapie

Recommendations	Class[a]	Level[b]	Ref.[c]
Avoidance of competitive sports[d] is recommended in patients with HCM.	I	C	366
ICD implantation is recommended in patients who have survived a cardiac arrest due to VT or VF or who have spontaneous sustained VT causing syncope or haemodynamic compromise and a life expectancy >1 year.	I	B	116, 367–372
Risk stratification with the HCM Risk-SCD calculator is recommended to estimate the risk of sudden death at 5 years in patients ≥16 years of age without a history of resuscitated VT or VF or spontaneous sustained VT causing syncope or haemodynamic compromise.	I	B	116, 365
It is recommended that the 5-year risk of SCD is assessed at first evaluation and at 1- to 2-year intervals, or when there is a change in clinical status.	I	B	116, 365
ICD implantation should be considered in patients with an estimated 5-year risk of sudden death ≥6% and a life expectancy >1 year following detailed clinical assessment that takes into account the lifelong risk of complications and the impact of an ICD on lifestyle, socioeconomic status and psychological health.	IIa	B	116, 368
ICD implantation may be considered in individual patients with an estimated 5-year risk of SCD of ≥4 to <6% and a life expectancy >1 year following detailed clinical assessment that takes into account the lifelong risk of complications and the impact of an ICD on lifestyle, socioeconomic status and psychological health.	IIb	B	116, 365, 368
ICD implantation may be considered in individual patients with an estimated 5-year risk of SCD <4% when they have clinical features that are of proven prognostic importance and when an assessment of the lifelong risk of complications and the impact of an ICD on lifestyle, socioeconomic status and psychological health suggests a net benefit from ICD therapy.	IIb	B	116, 365, 368
Invasive EPS with PVS is not recommended for stratification of SCD risk.	III	C	116

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5-year risk of SCD using the HCM Risk-SCD model

Probability $_{\text{SCD at 5 years}}$ **= 1-0.998** $^{\exp(\text{Progostic index})}$

where Prognostic index = [0.15939858 x maximal wall thickness (mm)] – [0.00294271 x maximal wall thickness^2 (mm^2)] + [0.0259082 x left atrial diameter (mm)] + [0.00446131 x maximal (rest/Valsalva) left ventricular outflow tract gradient (mm Hg)] + [0.4583082 x family history SCD] + [0.82639195 x NSVT] + [0.71650361 x unexplained syncope] – [0.01799934 x age at clinical evaluation (years)].

Hranice: 5 leté riziko SCD ≥ 5 % a předpoklad přežití > 1 rok

European Heart Journal (2014);35:2733–2779 - doi:10.1093/eurheartj/ehu284

Arytmogenní KMP PK

Recommendations	Class[a]	Level[b]	Ref.[c]
Avoidance of competitive sports[d] is recommended in patients with ARVC.	I	C	388
Beta-blockers titrated to the maximally tolerated dose are recommended as the first-line therapy to improve symptoms in patients with frequent PVC and NSVT.	I	C	This panel of experts
ICD implantation is recommended in patients with a history of aborted SCD and haemodynamically poorly tolerated VT.	I	C	389
Amiodarone should be considered to improve symptoms in patients with frequent PVC or NSVT who are intolerant of or have contraindications to beta-blockers.	IIa	C	390, 391
Catheter ablation, performed in experienced centres, should be considered in patients with frequent symptomatic PVC or VT unresponsive to medical therapy to improve symptoms and prevent ICD shocks, respectively.	IIa	B	183, 202, 207, 392, 393
ICD implantation should be considered in ARVC patients who have haemodynamically well-tolerated sustained VT, balancing the risk of ICD therapy, including long-term complications, and the benefit for the patient.	IIa	B	387, 394, 395
ICD implantation may be considered in patients with one or more recognized risk factors for VA in adult patients with a life expectancy >1 year following detailed clinical assessment that takes into account the lifelong risk of complications and the impact of an ICD on lifestyle, socioeconomic status and psychological health.	IIb	C	This panel of experts
Invasive EPS with PVS may be considered for stratification of SCD risk.	IIb	C	113, 114

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Amyloidóza

Recommendation	Class[a]	Level[b]	Ref.[c]
An ICD should be considered in patients with light-chain amyloidosis or hereditary transthyretin associated cardiac amyloidosis and VA causing haemodynamic instability who are expected to survive >1 year with good functional status.	IIa	C	408–412

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Restriktivní kardiomyopatie

Recommendations	Class[a]	Level[b]	Ref.[c]
An ICD is recommended in patients with restrictive cardiomyopathy and sustained VA causing haemodynamic instability who are expected to survive >1 year with good functional status to reduce the risk of SCD.	I	C	412, 417–420

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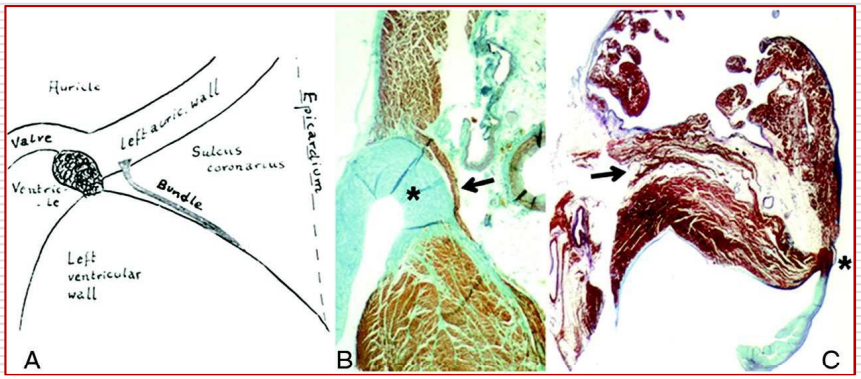
Riziko NS u pacientů s WPW sy

Recommendations	Class[a]	Level[b]	Ref.[c]
Ablation is recommended in patients with WPW syndrome resuscitated from sudden cardiac arrest due to AF and rapid conduction over the accessory pathway causing VF.	I	B	793
Ablation should be considered in patients with WPW syndrome who are symptomatic and/or who have accessory pathways with refractory periods ≤240 ms in duration.	IIa	B	793



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SCD a KT u pacientů s VSV

Recommendations	Class[a]	Level[b]	Ref.[c]
After evaluation to define the cause of the event and exclude any reversible causes, ICD implantation is recommended for patients with CHD who are survivors of an aborted cardiac arrest.	I	B	488–491
ICD implantation is recommended for patients with CHD with symptomatic sustained VT who have undergone haemodynamic and electrophysiological evaluation.	I	B	488–492
Catheter ablation is recommended as additional therapy or an alternative to ICD in patients with CHD who have recurrent monomorphic VT or appropriate ICD therapies that are not manageable by device reprogramming or drug therapy.	I	C	492
ICD therapy is recommended in adults with CHD and a systemic LVEF <35%, biventricular physiology, symptomatic HF despite optimal medical treatment and NYHA functional class II or III.	I	C	493, 494
ICD implantation should be considered in patients with CHD with syncope of unknown origin in the presence of either advanced ventricular dysfunction or inducible sustained VT or VF on PVS.	IIa	B	488, 490, 491
ICD implantation should be considered in selected patients with tetralogy of Fallot and multiple risk factors for SCD, including LV dysfunction, non-sustained VT, QRS duration >180 ms or inducible sustained VT on PVS.	IIa	B	488, 494–496
Catheter ablation should be considered as an alternative to drug therapy for symptomatic sustained monomorphic VT in patients with CHD and an ICD.	IIa	B	492
ICD therapy may be considered in patients with advanced single or systemic RV dysfunction in the presence of other risk factors such as non-sustained VT, NYHA functional class II or III or severe systemic AV valve regurgitation.	IIb	B	489, 497, 498
PVS may be considered for risk stratification of SCD in patients with tetralogy of Fallot who have one or more risk factors among LV dysfunction, non-sustained VT and QRS duration >180 ms.	IIb	B	496
PVS may be considered in patients with CHD and non-sustained VT to determine the risk of sustained VT.	IIb	C	This panel of experts
Surgical ablation guided by electrophysiological mapping may be considered in patients with CHD undergoing cardiac surgery, with clinical sustained VT and with inducible sustained monomorphic VT with an identified critical isthmus.	IIb	C	This panel of experts
Catheter ablation or prophylactic anti-arrhythmic therapy is not recommended for asymptomatic infrequent PVC in patients with CHD and stable ventricular function.	III	C	This panel of experts
PVS is not recommended to stratify the risk in patients with CHD in the absence of other risk factors or symptoms.	III	B	496

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Náhlá smrt u atletů/sportu

Recommendations	Class[a]	Level[b]	Ref.[c]
Careful history taking to uncover underlying cardiovascular disease, rhythm disorder, syncopal episodes or family history of SCD is recommended in athletes.	I	C	This panel of experts
Upon identification of ECG abnormalities suggestive of structural heart disease, echocardiography and/or CMR imaging is recommended.	I	C	This panel of experts
Physical examination and resting 12-lead ECG should be considered for pre-participation screening in younger athletes.	IIa	C	This panel of experts
Middle-aged individuals engaging in high-intensity exercise should be screened with history, physical examination, SCORE and resting ECG.	IIa	C	785
Staff at sporting facilities should be trained in cardiopulmonary resuscitation and on the appropriate use of automatic external defibrillators.	IIa	C	179, 786

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III: Vrozené a geneticky podmíněné poruchy rytmu

LQT: Diagnostika

Recommendations	Class[a]	Level[b]	Ref.[c]
LQTS is diagnosed with either – QTc ≥480 ms in repeated 12-lead ECGs or – LQTS risk score >3.[431]	I	C	This panel of experts
LQTS is diagnosed in the presence of a confirmed pathogenic LQTS mutation, irrespective of the QT duration.	I	C	This panel of experts
ECG diagnosis of LQTS should be considered in the presence of a QTc ≥460 ms in repeated 12-lead ECGs in patients with an unexplained syncopal episode in the absence of secondary causes for QT prolongation.	IIa	C	This panel of experts

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LQT: Riziková stratifikace

Recommendations	Class[a]	Level[b]	Ref.[c]
The following lifestyle changes are recommended in all patients with a diagnosis of LQTS: (a) Avoidance of QT-prolonging drugs (http://www.crediblemeds.org). (b) Correction of electrolyte abnormalities (hypokalaemia, hypomagnesaemia, hypocalcaemia) that may occur during diarrhoea, vomiting or metabolic conditions. (c) Avoidance of genotype-specific triggers for arrhythmias (strenuous swimming, especially in LQTS1, and exposure to loud noises in LQTS2 patients).	I	B	434
Beta-blockers are recommended in patients with a clinical diagnosis of LQTS.	I	B	435
ICD implantation with the use of beta-blockers is recommended in LQTS patients with previous cardiac arrest.	I	B	436–438
Beta-blockers should be considered in carriers of a causative LQTS mutation and normal QT interval.	IIa	B	67
ICD implantation in addition to beta-blockers should be considered in LQTS patients who experienced syncope and/or VT while receiving an adequate dose of beta-blockers.	IIa	B	439
Left cardiac sympathetic denervation should be considered in patients with symptomatic LQTS when (a) Beta-blockers are either not effective, not tolerated or contraindicated; (b) ICD therapy is contraindicated or refused; (c) Patients on beta-blockers with an ICD experience multiple shocks.	IIa	C	440
Sodium channel blockers (mexiletine, flecainide or ranolazine) may be considered as add-on therapy to shorten the QT interval in LQTS3 patients with a QTc >500 ms.	IIb	C	441–443
Implant of an ICD may be considered in addition to beta-blocker therapy in asymptomatic carriers of a pathogenic mutation in *KCNH2* or *SCN5A* when QTc is >500 ms.	IIb	C	67
Invasive EPS with PVS is not recommended for SCD risk stratification.	III	C	117

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Short QT syndrom

Recommendations	Class[a]	Level[b]	Ref.[c]
SQTS is diagnosed in the presence of a QTc ≤340 ms.	I	C	This panel of experts
SQTS should be considered in the presence of a QTc ≤360 ms and one or more of the following: (a) A confirmed pathogenic mutation (b) A family history of SQTS (c) A family history of sudden death at age <40 years (d) Survival from a VT/VF episode in the absence of heart disease.	IIa	C	This panel of experts

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Riziková stratifikace a management Short QT sy

Short QT Syndrome			
Recommendations	**Class[a]**	**Level[b]**	**Ref.[c]**
ICD implantation is recommended in patients with a diagnosis of SQTS who (a) Are survivors of an aborted cardiac arrest, and/or (b) Have documented spontaneous sustained VT.	I	C	119, 447
Quinidine or sotalol may be considered in patients with a diagnosis of SQTS who qualify for an ICD but present a contra-indication to the ICD or refuse it.	IIb	C	118, 448
Quinidine or sotalol may be considered in asymptomatic patients with a diagnosis of SQTS and a family history of SCD.	IIb	C	118, 448
Invasive EPS with PVS is not recommended for SCD risk stratification.	III	C	118, 119

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Brugada syndrom: Diagnostika

Recommendations	Class[a]	Level[b]	Ref.[c]
Brugada syndrome is diagnosed in patients with ST-segment elevation with type 1 morphology ≥2 mm in one or more leads among the right precordial leads V1 and/or V2 positioned in the second, third, or fourth intercostal space, occurring either spontaneously or after provocative drug test with intravenous administration of sodium channel blockers (such as ajmaline, flecainide, procainamide or pilsicainide).	I	C	This panel of experts

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Brugada syndrom: Riziková stratifikace a management

Recommendations	Class[a]	Level[b]	Ref.[c]
The following lifestyle changes are recommended in all patients with a diagnosis of Brugada syndrome: (a) Avoidance of drugs that may induce ST-segment elevation in right precordial leads (http://www.brugadadrugs.org) (b) Avoidance of excessive alcohol intake and large meals (c) Prompt treatment of any fever with antipyretic drugs.	I	C	This panel of experts
ICD implantation is recommended in patients with a diagnosis of Brugada syndrome who (a) Are survivors of an aborted cardiac arrest and/or (b) Have documented spontaneous sustained VT.	I	C	451
ICD implantation should be considered in patients with a spontaneous diagnostic type I ECG pattern and history of syncope.	IIa	C	451
Quinidine or isoproterenol should be considered in patients with Brugada syndrome to treat electrical storms.	IIa	C	453
Quinidine should be considered in patients who qualify for an ICD but present a contraindication or refuse it and in patients who require treatment for supraventricular arrhythmias.	IIa	C	454
ICD implantation may be considered in patients with a diagnosis of Brugada syndrome who develop VF during PVS with two or three extrastimuli at two sites.	IIb	C	120
Catheter ablation may be considered in patients with a history of electrical storms or repeated appropriate ICD shocks.	IIb	C	201, 455

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Katecholaminogergní polymorfní KT: Diagnostika

Recommendations	Class[a]	Level[b]	Ref.[c]
CPVT is diagnosed in the presence of a structurally normal heart, normal ECG and exercise- or emotion-induced bidirectional or polymorphic VT.	I	C	14,52, 457
CPVT is diagnosed in patients who are carriers of a pathogenic mutation(s) in the genes *RyR2* or *CASQ2*.	I	C	14,52

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Katecholaminogergní polymorfní KT: Management

Recommendations	Class[a]	Level[b]	Ref.[c]
The following lifestyle changes are recommended in all patients with a diagnosis of CPVT: avoidance of competitive sports, strenuous exercise and stressful environments.	I	C	This panel of experts
Beta-blockers are recommended in all patients with a clinical diagnosis of CPVT, based on the presence of documented spontaneous or stress-induced VAs.	I	C	458, 460
ICD implantation in addition to beta-blockers with or without flecainide is recommended in patients with a diagnosis of CPVT who experience cardiac arrest, recurrent syncope or polymorphic/bidirectional VT despite optimal therapy.	I	C	458, 461
Therapy with beta-blockers should be considered for genetically positive family members, even after a negative exercise test.	IIa	C	461, 462
Flecainide should be considered in addition to beta-blockers in patients with a diagnosis of CPVT who experience recurrent syncope or polymorphic/bidirectional VT while on beta-blockers, when there are risks/ contraindications for an ICD or an ICD is not available or rejected by the patient.	IIa	C	463
Flecainide should be considered in addition to beta-blockers in patients with a diagnosis of CPVT and carriers of an ICD to reduce appropriate ICD shocks.	IIa	C	463
Left cardiac sympathetic denervation may be considered in patients with a diagnosis of CPVT who experience recurrent syncope or polymorphic/ bidirectional VT/several appropriate ICD shocks while on beta-blockers or beta-blockers plus flecainide and in patients who are intolerant or have contraindication to beta-blockers.	IIb	C	464, 465
Invasive EPS with PVS is not recommended for stratification of SCD risk.	III	C	14

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Syndrom předčasné repolarizace

The presence of an early repolarization pattern in the inferior and/or lateral leads has been associated with idiopathic VF in case–control studies.[467,468] Owing to the high incidence of the early repolarization pattern in the general population, it seems reasonable to diagnose an 'early repolarization syndrome' only in patients with a pattern who are resuscitated from a documented episode of idiopathic VF and/or polymorphic VT.

The genetics of early repolarization are probable polygenic in many instances. No clear evidence of familial transmission of the early repolarization syndrome exists.

Given the uncertainties in the interpretation of the early repolarization pattern as a predictor of SCD, this panel of experts has decided that there is insufficient evidence to make recommendations for management of this condition at this time.

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IV: SCD u pacientů s VSV

V: KT a KT u pacientů bez strukturálního postižení myokardu

KT z výtokového traktu komory

Recommendations	Class[a]	Level[b]	Ref.[c]
Catheter ablation of RVOT VT/PVC is recommended in symptomatic patients and/or in patients with a failure of anti-arrhythmic drug therapy (e.g. beta-blocker) or in patients with a decline in LV function due to RVOT-PVC burden.	I	B	525–528
Treatment with sodium channel blockers (class IC agents) is recommended in LVOT/aortic cusp/epicardial VT/PVC symptomatic patients.	I	C	529–531
Catheter ablation of LVOT/aortic cusp/epicardial VT/PVC by experienced operators after failure of one or more sodium channel blockers (class IC agents) or in patients not wanting long-term anti-arrhythmic drug therapy should be considered in symptomatic patients.	IIa	B	195, 531–533

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Idiopatická komorová tachykardie

Recommendations	Class[a]	Level[b]	Ref.[c]
Catheter ablation by experienced operators is recommended as a first-line treatment in symptomatic patients with idiopathic left VTs.	I	B	346, 347, 563–575
When catheter ablation is not available or desired, treatment with beta-blockers, verapamil or sodium channel blockers (class IC agents) is recommended in symptomatic patients with idiopathic left VT.	I	C	This panel of expert
Treatment with beta-blockers, verapamil or sodium channel blockers (class IC agents) is recommended in symptomatic patients with papillary muscle tachycardia.	I	C	This panel of experts
Treatment with beta-blockers, verapamil or sodium channel blockers (class IC agents) is recommended in symptomatic patients with mitral and tricuspid annular tachycardia.	I	C	This panel of experts
Catheter ablation under echo guidance by experienced operators after failure of one or more sodium channel blockers (class IC agents) or in patients refusing long-term anti-arrhythmic drug therapy should be considered in symptomatic patients with papillary muscle tachycardia.	IIa	B	576–578
Catheter ablation by experienced operators after failure of one or more sodium channel blockers (class IC agents) or in patients not wanting long-term anti-arrhythmic drug should be considered in symptomatic patients with mitral and tricuspid annular tachycardia.	IIa	B	534, 579–581

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Idiopatická fibrilace komor

Recommendations	Class[a]	Level[b]	Ref.[c]
ICD implantation is recommended in survivors of idiopathic VF.	I	B	154, 583
Catheter ablation of PVCs triggering recurrent VF leading to ICD interventions is recommended when performed by experienced operators.	I	B	467, 584–587
Catheter ablation of PVCs leading to electrical storm is recommended when performed by experienced operators.	I	B	467, 584–587

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Torsade de pointes

Recommendations	Class[a]	Level[b]	Ref.[c]
ICD is recommended in patients with conclusive diagnosis of short-coupled TdP.	I	B	589
Intravenous verapamil to acutely suppress/prevent an electrical storm or recurrent ICD discharges should be considered.	IIa	B	590, 591
Catheter ablation for long-term suppression/prevention of an electrical storm or recurrent ICD discharges should be considered.	IIa	B	586

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VI: Zánětlivá a revmatická onemocnění

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Zánětlivá a revmatická onemocnění

Recommendations	Class[a]	Level[b]	Ref.[c]
It is recommended that patients with a life-threatening presentation of sustained ventricular tachyarrhythmias in the context of clinically suspected myocarditis are referred to specialized centres with the ability to perform haemodynamic monitoring, cardiac catheterization and endomyocardial biopsy and to use mechanical cardio-pulmonary assist devices and specialized arrhythmia therapies.	I	C	593–596
Temporary pacemaker insertion is recommended in patients with bradycardia and/or heart block triggering VA during the acute phase of myocarditis/pancarditis.	I	C	593, 594
Anti-arrhythmic therapy should be considered in patients with symptomatic non-sustained or sustained VT during the acute phase of myocarditis.	IIa	C	594
The implant of an ICD or pacemaker in patients with inflammatory heart diseases should be considered after resolution of the acute episode.	IIa	C	593, 597
In patients with haemodynamically compromising sustained VT occurring after the resolution of acute episodes, an ICD implantation should be considered if the patient is expected to survive >1 year with good functional status.	IIa	C	8
A wearable defibrillator should be considered for bridging until full recovery or ICD implantation in patients after inflammatory heart diseases with residual severe LV dysfunction and/or ventricular electrical instability.	IIa	C	598, 599
ICD implantation may be considered earlier in patients with giant cell myocarditis or sarcoidosis who had haemodynamically compromising sustained VA or aborted cardiac arrest, due to adverse prognosis of these conditions, if survival >1 year with good functional status can be expected.	IIb	C	600
Demonstration of persistent myocardial inflammatory infiltrates by immunohistological evidence and/or abnormal localized fibrosis by CMR after acute myocarditis may be considered as an additional indicator of increased risk of SCD in inflammatory heart disease.	IIb	C	601

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VII: Komorové arytmie u srdečních vad

KT a chlopenní vady

Recommendations	Class[a]	Level[b]	Ref.[c]
The implantation of an ICD is recommended in patients with valvular heart disease who, after surgical repair, satisfy the criteria for primary and secondary prevention of SCD.	I	C	602–604
Surgical treatment of acute aortic regurgitation due to endocarditis associated with sustained VT is recommended, unless otherwise contraindicated.	I	C	605, 606
An EPS with standby catheter ablation should be considered in patients who develop VT following valvular surgery in order to identify and cure bundle branch re-entry VT.	IIa	C	607, 608

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VIII: KT u dalších diagnóz

Psychiatričtí pacienti

Recommendations	Class[a]	Level[b]	Ref.[c]
Dosage adjustment or interruption of the offending agent is recommended when, after treatment with antipsychotic drugs, the QTc interval reaches a length >500 ms or increases by >60 ms compared with baseline.	I	C	637
Monitoring of plasma potassium levels to avoid hypokalaemia is recommended during treatment with antipsychotic drugs.	I	C	638
Avoidance of treatment with more than one drug prolonging the QT interval is recommended.	I	C	639, 640
Evaluation of the QT interval before initiation of treatment and during titration of dose with antipsychotic drugs should be considered.	IIa	C	638, 641, 642

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Neuromuskulární dystrofie

Recommendations	Class[a]	Level[b]	Ref.[c]
Annual follow-up is recommended in patients with muscular dystrophies, even in the concealed phase of the disease when patients are asymptomatic and the ECG is normal.	I	B	665–668
It is recommended that patients with neuromuscular disorders who have VAs are treated in the same way as patients without neuromuscular disorders.	I	C	This panel of experts
Permanent pacemaker implantation is recommended in patients with neuromuscular diseases and third-degree or advanced second-degree AV block at any anatomical level.	I	B	669
Permanent pacemaker implantation may be considered in patients with myotonic dystrophy type 1 (Steinert disease), Kearns–Sayre syndrome or limb-girdle muscular dystrophy with any degree of AV block (including first-degree) in consideration of the risk of rapid progression.	IIb	B	666, 669–672
The use of an ICD may be considered in myotonic dystrophy type 1 (Steinert disease), Emery–Dreifuss and limb-girdle type 1B muscular dystrophies when there is an indication for pacing and evidence of ventricular arrhythmias.	IIb	B	71,669, 672–674

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Gravidita a KT/KF

Recommendations	Class[a]	Level[b]	Ref.[c]
Implantation of an ICD is recommended if an indication emerges during pregnancy.	I	C	675
Beta-blocking agents are recommended during pregnancy and also post-partum in patients with LQTS or CPVT.	I	C	675, 676
Oral metoprolol, propranolol or verapamil is recommended for long-term management of idiopathic sustained VT.	I	C	675, 677
Immediate electrical cardioversion is recommended for sustained VT, especially if haemodynamically unstable.	I	C	675, 677
Sotalol or procainamide i.v. should be considered for acute conversion of haemodynamically stable monomorphic sustained VT.	IIa	C	675
Amiodarone i.v. should be considered for acute conversion of sustained, monomorphic VT when haemodynamically unstable, refractory to electrical cardioversion or not responding to other drugs.	IIa	C	675, 677, 678
Catheter ablation may be considered for management of drug-refractory and poorly tolerated tachycardias.	IIb	C	675

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Obstrukční spánková apnoe

Recommendations	Class[a]	Level[b]	Ref.[c]
Sleep apnoea syndrome should be considered in the differential diagnosis of bradyarrhythmias.	IIa	B	711
The presence of sleep apnoea and reduced oxygen saturation may be considered as a risk factor for SCD in subjects with sleep disordered breathing.	IIb	C	712

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Otázky spojené s vysokým věkem a úmrtím pacienta

Recommendations	Class[a]	Level[b]	Ref.[c]
Discussion of end-of-life issues with patients who qualify for the implant of an ICD should be considered before implantation and at significant points along the illness trajectory.	IIa	C	805, 806
ICD deactivation should be considered when clinical conditions deteriorate.	IIa	C	805, 806

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To do and not to do messages from the guidelines

General population	Class[a]	Level[b]
The analysis of blood and other adequately collected body fluids for toxicology and molecular pathology is recommended in all victims of unexplained sudden death.	I	C
It is recommended that public access defibrillation be established at sites where cardiac arrest is relatively common and suitable storage is available (e.g. schools, sports stadiums, large stations, casinos, etc.) or at sites where no other access to defibrillation is available (e.g. trains, cruise ships, airplanes, etc.).	I	B
Patients with ICD indications		
Discussion of quality-of-life issues is recommended before ICD implant and during disease progression in all patients.	I	C
Ischaemic heart disease		
Re-evaluation of LVEF 6–12 weeks after myocardial infarction is recommended to assess the potential need for primary prevention ICD implantation.	I	C
Patients with heart failure		
ICD therapy is recommended to reduce SCD in patients with symptomatic HF (NYHA class II or III) and LVEF ≤35% after ≥3 months of optimal medical therapy who are expected to survive at least 1 year with good functional status:		
– Ischaemic aetiology and at least 6 weeks after myocardial infarction	I	A
– Non-ischaemic aetiology	I	B
Cardiac resynchronization therapy defibrillator in the primary prevention of sudden death in patients in sinus rhythm with mild (New York Heart Association class II) heart failure: **CRT-D is recommended to reduce all-cause mortality** in patients with a QRS duration ≥130 ms, with an LVEF ≤30% and with an LBBB despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status.	I	A
Cardiac resynchronization therapy in the primary prevention of sudden death in patients in sinus rhythm and New York Heart Association functional class III/ambulatory class IV: CRT is recommended to reduce all-cause mortality in patients with an LVEF ≤35% and LBBB despite at least 3 months of optimal pharmacological therapy who are expected to survive at least 1 year with good functional status:		
– With a QRS duration >150 ms	I	A
– With a QRS duration of 120–150 ms	I	B
Inherited arrhythmogenic diseases		
Avoidance of competitive sports is recommended in patients with ARVC.	I	C
Emerging recommendations		
Flecainide should be considered in addition to beta-blockers in patients with a diagnosis of CPVT who experience recurrent syncope or polymorphic/bidirectional VT while on beta-blockers when there are risks/ contraindications for an ICD or an ICD is not available or is rejected by the patient.	IIa	C
An ICD should be considered in patients with DCM and a confirmed disease-causing *LMNA* mutation and clinical risk factors.	IIa	B

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