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REVIEW ARTICLE

Summary of 2020 ESC guidelines on non-STE ACS, adult congenital heart disease, sports cardiology and atrial fibrillation

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ABSTRACT

During the ESC congress in September 2020, the new ESC guidelines were presented and are available on the ESC website. The new guidelines describe management recommendations on following cardiovascular diseases: non-STE ACS, adult congenital heart disease, sports cardiology and atrial fibrillation. The present document gives a summary of these guidelines and highlights the most important recommendations and changes in the management of these diseases. It will help to increase awareness about the new guidelines and may stimulate to consult the full document for specific items. Ultimately, the authors hope that this document will enhance implementation of new ESC guidelines in daily clinical practice.

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Atrial fibrillation; sports; myocardial infarction; congenital heart disease

ESC guidelines for the diagnosis and management of acute coronary syndromes without persistent ST elevation myocardial infarction [1]

Several recent landmark studies made the European Society of Cardiology (ESC) revise their management guidelines. This is a short summary of the main messages and modifications, in comparison to the previous guideline from 2015.

1. Diagnosis and risk assessment

Biomarkers complement clinical assessment and 12-lead ECG in the diagnosis, risk stratification, and treatment of patients with suspected NSTE-ACS. The ESC 0 h/1 h algorithm (or 0 h/2h) with blood sampling at 0 h and 1 h (2 h) is recommended if an hs-cTn test with a validated 0 h/1 h(2h) algorithm is available (class 1B). Additional testing after 3 h is recommended if the first two cardiac troponin measurements of the 0 h/1 h(2h) algorithm are not conclusive and the clinical condition is still suggestive of ACS.

Coronary computed tomography angiography (CCTA) is recommended as an alternative to invasive coronary angiography to exclude ACS when there is a low-to-intermediate likelihood of CAD and when cardiac troponin and/or ECG are normal or inconclusive.

Grace risk score models and measuring BNP or NT-proBNP plasma concentrations should be considered to gain prognostic information (class IIa).

2. Antithrombotic drugs

Given the trade-off between ischaemic versus bleeding risks for any antithrombotic regimen, the use of scores might prove useful to tailor antithrombotic duration, as well as intensity, to maximise ischaemic protection and minimise bleeding risk in the individual patient.

Parenteral anticoagulation is recommended for all patients, in addition to antiplatelet treatment, at the time of diagnosis and, especially, during revascularization procedures. UFH (weight-adjusted i.v. bolus during PCI of 70−100 IU/kg, or 50–70 IU/kg in combination with a GP IIb/IIIa inhibitor) is the preferred anticoagulans (I-A) with bivalirudin as alternative (IIb).

A P2Y12 receptor inhibitor is recommended in addition to aspirin, and maintained over 12 months unless there are contraindications or an excessive risk of bleeding (I-A). Following options are:

1. Prasugrel in P2Y12 receptor inhibitor-naïve patients proceeding to PCI (60 mg LD, 10 mg/d as standard dose, 5 mg/d for patients aged >_75 years or with a body weight <60 kg). (I-B)

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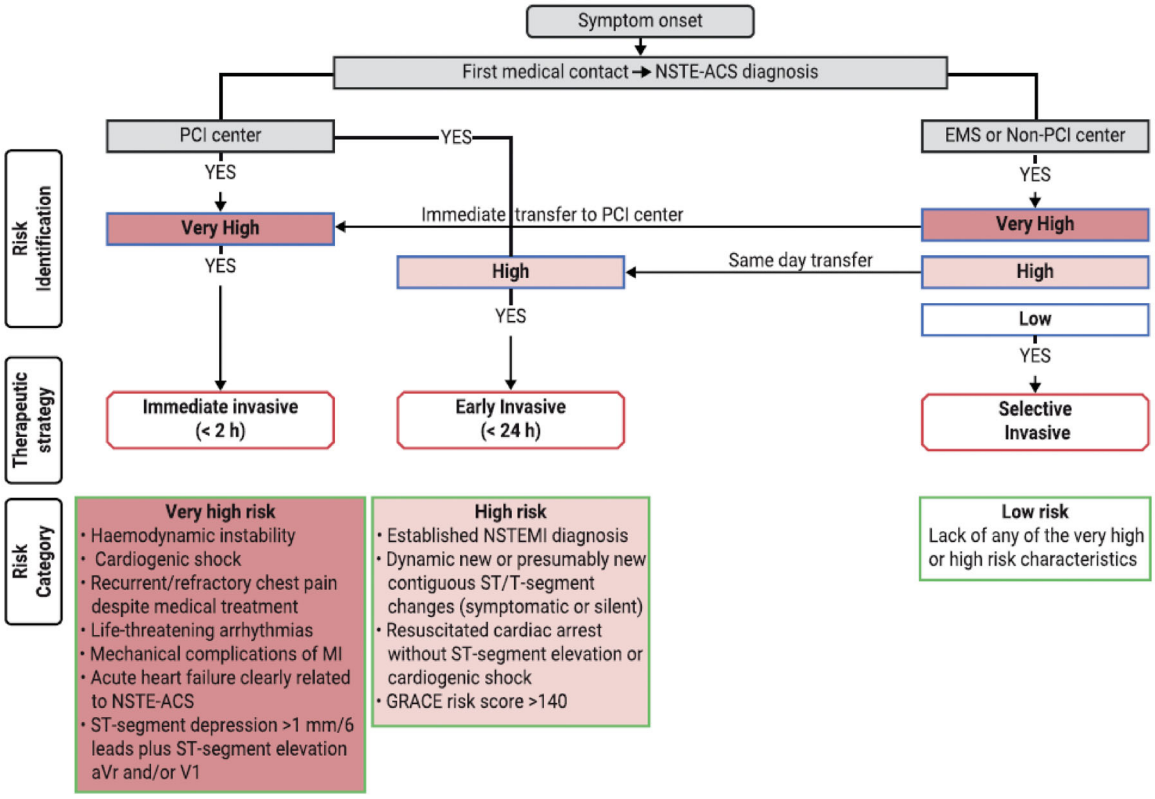

Figure 1. Timing of invasive strategy. The document ends with some new sections about spontaneous coronary artery dissection (SCAD), MINOCA (myocardial infarction without obstructive coronary arteries) and quality indicators.

2. Ticagrelor irrespective of the planned treatment strategy (invasive or conservative) (180 mg LD, 90 mg b.i.d.). (I-B)
3. Clopidogrel (300-600 mg LD, 75 mg daily dose), only when prasugrel or ticagrelor are not available, cannot be tolerated, or are contraindicated.

Based upon ISAR-REACT 5 study, Prasugrel should be considered in preference to Ticagrelor for NSTE-ACS patients who proceed to PCI (IIa). Routine pre-treatment with a P2Y12 receptor inhibitor is not recommend but pre-treatment with a P2Y12 receptor inhibitor (Ticagrelor) may be considered in patients with NSTE-ACS who are not planned to undergo an early invasive strategy and do not have an high bleeding risk. (IIb)

De-escalation of P2Y12 inhibitor treatment (e.g. with a switch from prasugrel or ticagrelor to clopidogrel) may be considered, especially for ACS patients deemed unsuitable for potent platelet inhibition. De-escalation may be done unguided based on clinical judgement, or guided by platelet function testing, or CYP2C19 genotyping depending on the patient's risk profile and availability of respective assays (IIb).

Adding a second antithrombotic agent to aspirin (either clopidogrel 75 mg or ticagrelor 2×60mg or rivoraxaban 2×2.5 mg) for extended (after one year post ACS) long-term secondary prevention should be considered in patients at high risk of ischaemic events and without increased risk of major or life-threatening bleeding (IIa).

In patients with AF (CHA2DS2-VASc score ≥ 1 in men and ≥ 2 in women), after a short period of triple antithrombotic therapy (TAT) (up to 1 week from the acute event), Dual Antithrombotic Therapy (DAT) is recommended as the default strategy using a NOAC at the recommended dose for stroke prevention and single oral antiplatelet agent (preferably clopidogrel).

3. Timing of invasive strategy

Figure 1 depicts a clinical flow chart for the timing of an invasive strategy underscoring that the benefit with an early invasive strategy is strongly associated with the patient's risk profile (I-A/B). A selective invasive strategy after appropriate ischaemia testing or detection of obstructive CAD by CCTA is recommended in patients considered at low risk (I-A).

The document ends with some new sections about spontaneous coronary artery dissection (SCAD), MINOCA (myocardial infarction without obstructive coronary arteries) and quality indicators.

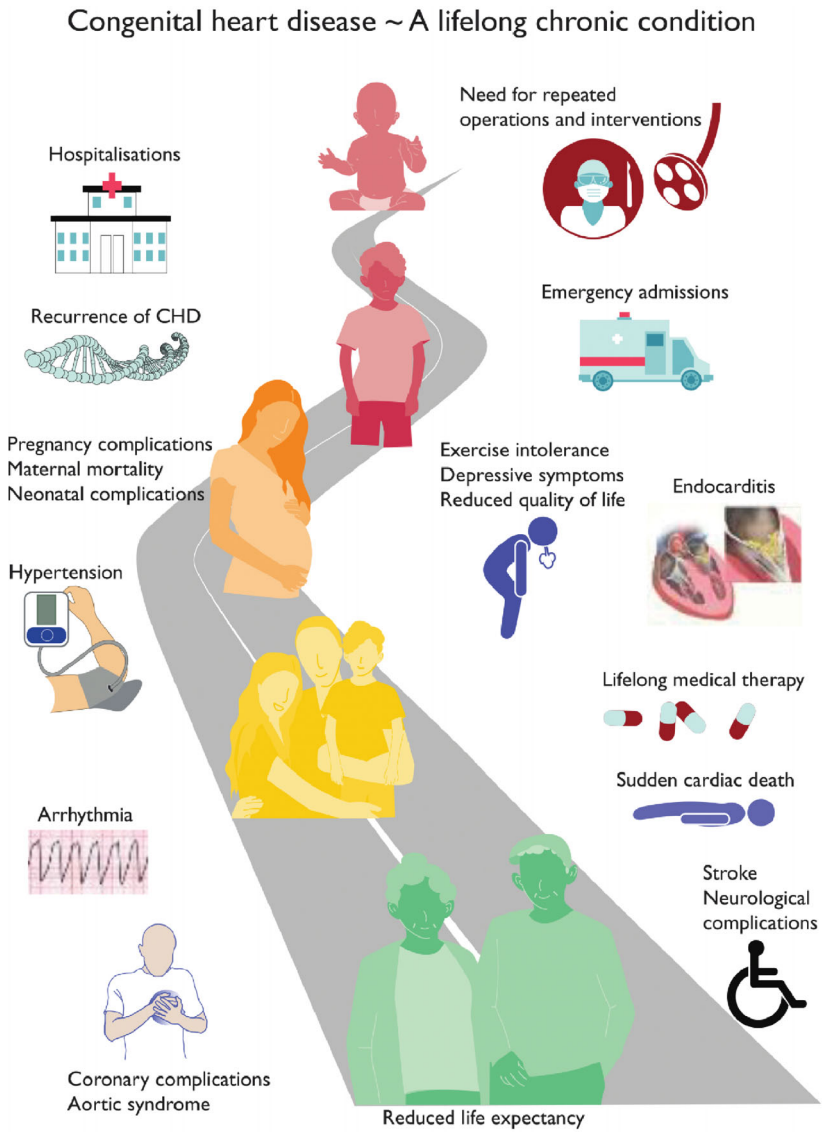

Figure 2. Congenital Heart Disease as a lifelong chronic condition. Keys steps not to be missed!.

2020 Esc guidelines for the management of adult congenital heart disease [2]

1. Adult congenital heart disease: a lifelong process

Since the previous version of the guidelines on the management of Adult with Congenital Heart disease, 10 years of tremendous medical, technical and scientific improvements accumulated, generating a huge expectation for this new version of the guidelines.

In these new guidelines, emphasis is put on the need for lifelong appropriate care in this specific population which requires specific attention, appropriate knowledge and dedicated practice (Figure 2). Highlighting this, the old term of 'Grown-up Congenital Heart Disease' has been replaced by 'Adult with Congenital Heart Disease' (ACHD). The minimal requirements for a centre taking care of ACHD patient are now defined, proposing a model for ACHD care organisation.

2. Patient assessment and heart failure

In this new version of the guidelines, a better description of simple, moderate and complex lesions is provided allowing a more structured view of patient evaluation and care organisation. While multimodality imaging remains a key step for assessing cardiac anatomy, function, flow and valves, cardiac catheterisation remains the key procedure to evaluate haemodynamics, in particular of the pulmonary circulation and vascular resistances. Functional evaluation also plays a central role in patient assessment. Specific attention has to be paid to heart failure, for which management is complex in this ACHD population. Optimising haemodynamics and rhythm control are key

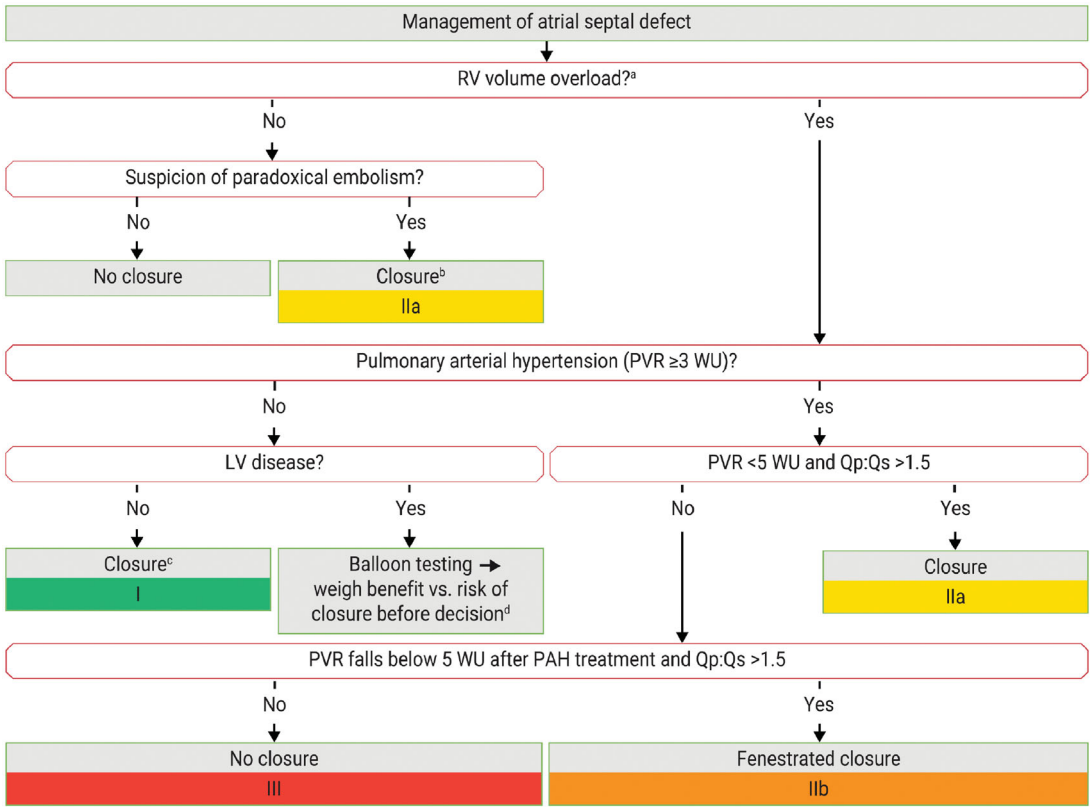

Figure 3. Therapeutic algorithm for ASD management.

elements to prevent heart failure. Timely referral to cardiac transplantation centres is critical, especially in case of advanced heart failure in moderate or complex lesions.

3. Arrhythmia and sudden cardiac death

The entire spectrum of arrhythmia is encountered in ACHD, with lesion specific risks. Maintenance of sinus rhythm is preferred in most ACHD patients, and therapeutic management should be performed in centres with expertise in ACHD-related arrhythmia. In case of documented arrhythmia, or in ACHD patients at high risk for postprocedural arrhythmias (ex: late ASD closure), percutaneous or surgical intervention is indicated in expert centres (I-C). Catheter ablation is recommended over long-term medical therapy for symptomatic, sustained recurrent SVT, or if SVT is related to sudden cardiac death (SCD) (I-C). Management of SCD is also better defined, with a door now opened for ablation in monomorphic VT, incessant VT, or electrical storm, as adjunctive therapy to ICD (I-C).

4. Pulmonary hypertension

Lifelong careful attention is needed for the pulmonary circulation in ACHD, and justifies regular assessment event after shunt closure. Risk assessment is recommended in all pulmonary arterial hypertension (PAH)-CHD patients in expert centres (I-C). Specific treatment should be offered in all PAH-patients including Eisenmenger syndrome. In low and intermediate risk patients with repaired simple lesions and pre-capillary-PH, initial oral combination, or sequential combination therapy is recommended (I-A). In high-risk patients, initial combination therapy including parenteral prostanoïds should be offered (I-A).

5. Pregnancy, contraception and genetic counselling

ACHD women with pre-capillary-PH should be counselled against pregnancy (I-C). The majority of other ACHD patients tolerate pregnancy well, except for women with complex lesions who are at higher risk. In line with the ESC pregnancy guidelines published in 2018, counselling should be provided to every ACHD patient contemplating pregnancy.

6. Atrial septal defect

ASD closure is recommended regardless of symptoms in patients with evidence of right-ventricular overload and no PAH (no echocardiographic sign of PAP elevation, or invasive confirmation of PVR $<$ 3 WU in case

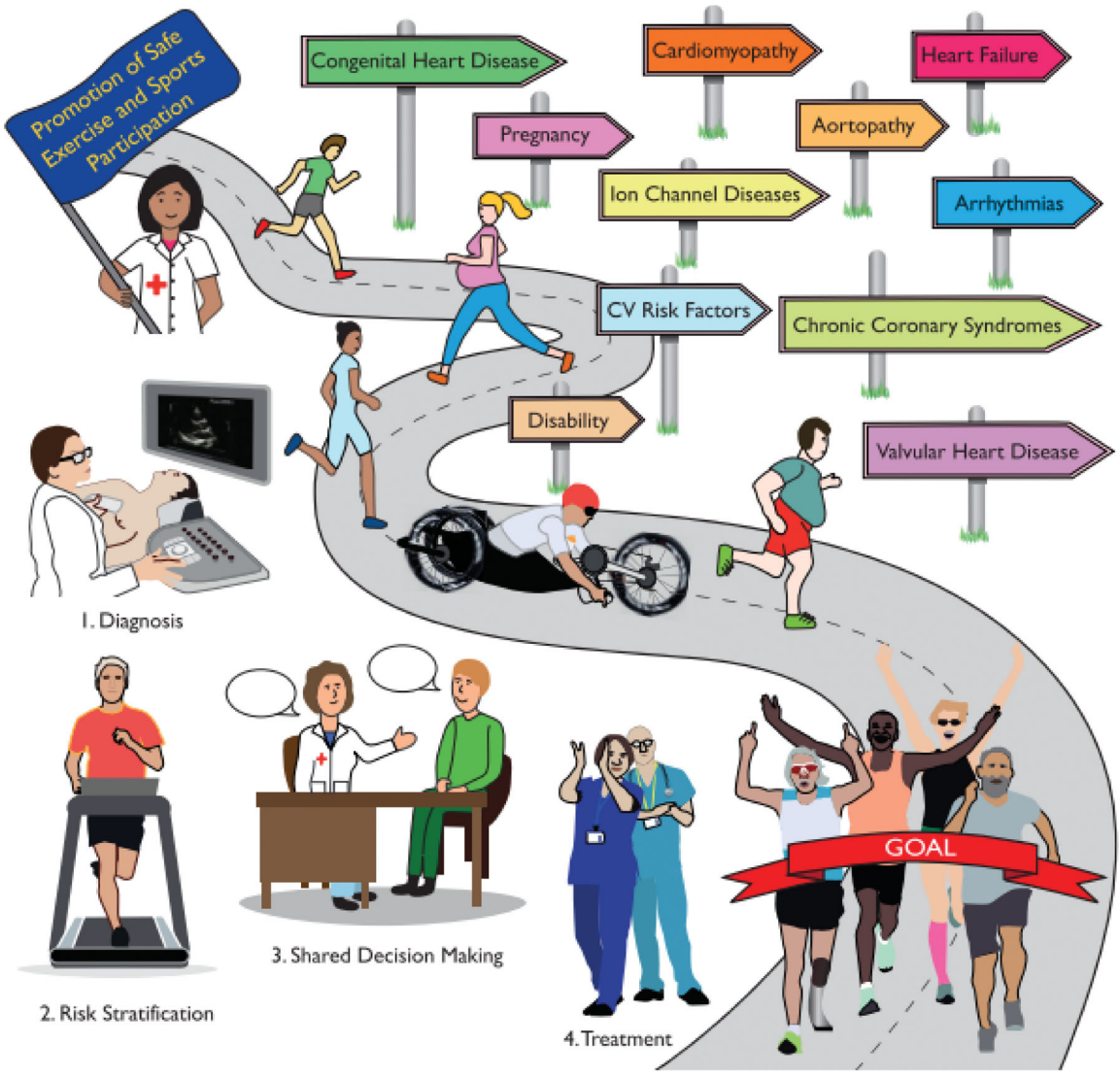

Figure 4. Appropriate risk stratification and optimal therapy are essential for providing exercise prescription for more vigorous activity.

of such sign) or LV disease (Figure; I-B). Device closure is recommended as the method of choice for ASD closure when technically suitable (I-C). Other situations are described in the flow chart (Figure 3).

7. Ventricular septal defect

VSD closure is recommended regardless of symptoms in patients with LV overload and no PAH (no echocardiographic sign of PAP elevation, or invasive confirmation of PVR $<$ 3 WU in case of such sign) (I-C). In patients with VSD-associated prolapse of the aortic valve and progressive AR, surgery could be considered (IIa-C). Also, closure should be considered in patients with PAH and PVR 3-5 WU when there is still a significant L-R shunt (Qp/Qs $>$ 1.5) (IIa-C). A difficult situation is the case of PVR $>$ 5 but when there is still a significant shunt (Qp/Qs $>$1.5): a careful individual decision in expert centres is mandatory (IIb-C). VSD closure is not recommended in Eisenmenger physiology and patients with PVR $>$ 5 with desaturation on exercise (III-C).

8. Aortic coarctation and aortapathies

Repair of coarctation or re-coarctation is indicated in hypertensive patients with either an increased non-invasive gradient between upper and lower limbs, confirmed with an invasive measurement (peak-to peak $>$ 20 mmHg) (I-C); or with a $>=$50% narrowing of the diameter of the aorta (even when peak-to peak $<$ 20 mmHg), when feasible (IIa-C). Normotensive

patients with > 20 mmHg peak-to-peak gradient can also be considered for repair (IIa-C). Stenting is the method of choice when feasible. Careful follow-up with regular blood pressure monitoring of these patients is required.

The guidelines provide also tables describing the recommendations for aortic surgery in aortopathies or management of aortic stenosis in line with the ESC guidelines related to aortic diseases and valvular heart disease. Coronary anomalies are discussed with a central place given to 'non-pharmalogical functional imaging' (preferring then nuclear imaging, echocardiography or CMR with physical stress) to demonstrate myocardial ischaemia.

Finally, the complex management of Fallot, Ebstein patients and more complex situations such as transposition of the great arteries, univentricular heart and Fontan circulation are broadly addressed.

2020 Esc guidelines on sports cardiology and exercise in patients with cardiovascular disease [3]

Exercise has undeniable benefits for all patients with cardiovascular disease (CVD). The impact of sports on the progression of the underlying CVD condition has been highlighted in several studies. Exercise prevents sudden deterioration during sports, such as life-threatening arrhythmias, and allows to control symptoms during sports.

The new ESC 2020 guidelines on sports cardiology provide new insights into the evaluation of the sports fitness and the prescription and monitoring of physical exercise and sports activity, both competitive and recreational, in patients with CVD (see also Figure 4). They include novel recommendations for specific patient subgroups (e.g. pregnant women, older people, patients with chronic kidney disease, spinal cord injury, or cancer, and those with ventricular assist devices) and the approach to sports activities in extreme environments (e.g. heat, pollution, altitude, underwater). They also substitute the Mitchell classification of sports by a more useful classification for clinicians, based on the type of sporting discipline according to the predominant component (skill, power, mixed, and endurance) and exercise intensity (low, medium, and high).

Noteworthy, these guidelines do not provide diagnostic recommendations for the management of symptomatic athletes (e.g. those with chest pain or syncope), but specific recommendations on sports activities after determination of the underlying cause.

For instance, the pocket guidelines accompanying the main document provide in the form of an interactive algorithm, *via* a smartphone application, specific recommendations for sports activity in patients with coronary heart disease. The document endorses the competitive sports participation of individuals with chronic coronary syndrome with a low risk of events during exertion, except for activities with very high cardiovascular demand and older people. The guidelines highlight the recommendation for safe and necessary physical activity in people with CVD (moderate-intensity aerobic exercise for at least 150 min/week or at least 75 min/week vigorous aerobic activity over at least 4 or 5 days).

In patients with cardiomyopathies, a genetic study is now recommended to assess the individual risk of athletes with certain cardiomyopathies. In this context, the existence of pathogenic genetic variants associated with a high risk of cardiovascular events, such as those found in lamin A/C and filamin C in patients with dilated, arrhythmogenic, or non-compaction cardiomyopathy, indicates that athletes with the same condition require a different management approach and different recommendations, which may be particularly restrictive for competitive and high-intensity sports.

Interestingly, patients with hypertrophic cardiomyopathy may now participate in competitive sports or high-intensity exercise if they have no risk markers (no symptom, no arrhythmia, no abnormal blood pressure response to exercise, or a sudden cardiac death risk score <4%) and no risk of harm or death in the case of syncope. The guidelines also recommend 150 min per week of low-intensity exercise in all people with arrhythmogenic cardiomyopathy and allow individuals with low arrhythmic risk (asymptomatic, with minimal structural abnormalities, and fewer than 500 premature ventricular contractions/24h) to participate in low-to-moderate intensity recreational sports.

All people with congenital heart diseases are recommended to perform regular and moderate-intensity exercise. Exercise prescription should be individualised according to the following parameters: ventricular function, pulmonary artery pressure, aortic dimensions (contact sports should be avoided by those with an aortic diameter> 5 cm), presence of arrhythmias, and O_2 saturation/lung function.

The current evidence from athletes with bicuspid aortic valves indicates that there is no relationship between sports activities and elevated risk of aortic dilatation/events. Therefore, sports participation is not contraindicated unless patients exceed the diameter

cut-off of 40 mm or have other risk criteria. The most important recommendations in patients with mitral valve prolapse are aimed at identifying athletes at high risk of sudden cardiac death.

In athletes with atrial fibrillation, pulmonary vein isolation is indicated and represents an alternative first-line treatment in patients with recurrent symptomatic atrial fibrillation or in people who prefer an alternative to drugs. In addition, the guidelines stress the contraindication to class I antiarrhythmic drugs as monotherapy due to the risk of atrial fibrillation or flutter with a fast-ventricular response during exercise.

In individuals with an implantable cardioverter-defibrillator (ICD), fitness for competitive sports activities should be evaluated based on the underlying disease, the psychological impact of possible discharges, the risk of harm associated with syncope, and the risk of trauma in the device site.

In patients with a recent history of myocarditis, the resumption of any sports activity, including competitive sports, can be considered after 3 to 6 months in asymptomatic athletes with normal biological markers and complementary tests.

2020 Esc guidelines for the management of atrial fibrillation [4]

The 2016 ESC AF Guidelines introduced the concept of the five domains to facilitate an integrated structured approach to AF care and promote consistent, guideline-adherent management for all patients. The Atrial Fibrillation Better Care (ABC) approach in the 2020 ESC AF Guidelines is a continuum of this approach, with the goal to further improve the structured management of AF patients, promote patient values, and finally improve patient outcomes.

Diagnosis and assessment

When AF is detected by a screening tool, including mobile or wearable devices, a single-lead ECG tracing of >_30 s or 12-lead ECG showing AF analysed by a physician with expertise in ECG rhythm interpretation is necessary to establish a definitive diagnosis of AF (I-B). Structured characterisation of AF, which includes clinical assessment of stroke risk (CHA_2DS_2-VASc score), symptom status, burden of AF (paroxysmal, persistent, permanent), and evaluation of substrate (atrial remodelling), should be considered in all AF patients to streamline the assessment and management of AF patients.

Stroke risk management

For stroke prevention in AF patients who are eligible for oral anticoagulation (OAC), NOACs (non-vit K OAC) are recommended in preference to VKAs (excluding patients with mechanical heart valves or moderate-to-severe mitral stenosis) (I-A). OAC is recommended for stroke prevention in AF patients with CHA2DS2-VASc score >_2 in men or >_3 in women. (class I-A) and should be considered in AF patients with a CHA2DS2-VASc score of 1 in men or 2 in women (IIa). For a formal risk-score-based assessment of bleeding risk, the HAS-BLED score should be considered to help address modifiable bleeding risk factors, and to identify patients at high risk of bleeding (HAS-BLED score >_3) for early and more frequent clinical review and follow-up. Estimated bleeding risk, in the absence of absolute contraindications to OAC, should not in itself guide treatment decisions to use OAC for stroke prevention (III).

Left atrial appendix occlusion may be considered for stroke prevention in patients with AF and contraindications for long-term anticoagulant treatment (e.g. intracranial bleeding without a reversible cause) (IIb).

In patients with AF duration of >24 h undergoing cardioversion, therapeutic anticoagulation should be continued for at least 4 weeks, even after successful cardioversion to sinus rhythm (beyond 4 weeks, the decision about long-term OAC treatment is determined by the presence of stroke risk factor (IIa).

Rate control

Beta-blockers, diltiazem, or verapamil are recommended as first-choice drugs to control heart rate in AF patients with LVEF>_40% and digoxin and beta-blockers in AF patients with LVEF < 40% (I-B)).

Atrioventricular node ablation should be considered to control heart rate in patients unresponsive or intolerant to intensive rate and rhythm control therapy, and not eligible for rhythm control by LA ablation, accepting that these patients will become pacemaker dependent (class IIa).

Rhythm control

Rhythm control therapy is recommended for symptom and QoL improvement in symptomatic AF patients.

Effective anticoagulation (NOACs are recommended with at least similar efficacy and safety to warfarin) should be initiated as soon as possible before every cardioversion of AF or AFlutter. Early cardioversion can be performed without TOE in patients with an AF

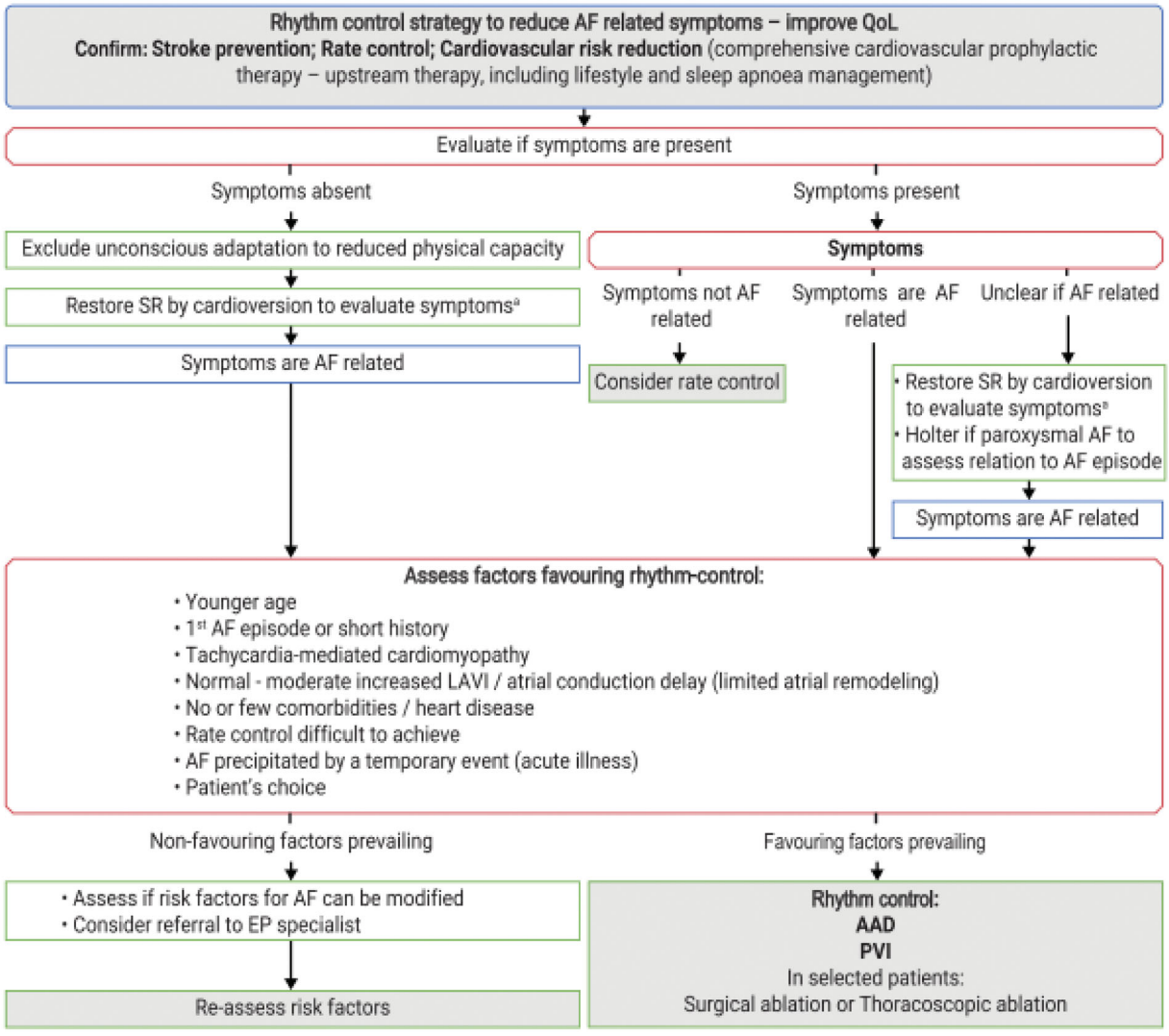

Figure 5. Rhythm control strategy.
AAD: antiarrhythmic drug; AF: atrial fibrillation; CMP: cardiomyopathy; CV: cardioversion; LAVI: left atrial volume index; PAF: paroxysmal atrial fibrillation: PVI: pulmonary vein isolation; QoL: quality of life: ST: sinus rhythm. [a]Consider cardioversion to confirm that the absence of symptoms is not due to unconscious adaptation to reduced physical and/or mental capacity.

duration of <48 h. (IIa)Pharmacological cardioversion of recent onset AF(<48h) is indicated only in a haemodynamically stable patient, after consideration of the thromboembolic risk. For pharmacological cardioversion, i.v. vernakalant (excluding patients with recent ACS or severe HF) or flecainide or propafenone (excluding patients with severe structural heart disease) is recommended. (I-A). A intravenous amiodarone is recommended for cardioversion of AF in patients with HF or structural heart disease (I-A).

In patients with AF duration of >24 h undergoing cardioversion, therapeutic anticoagulation should be continued for at least 4 weeks, even after successful cardioversion to sinus rhythm (beyond 4 weeks, the decision about long-term OAC treatment is determined by the presence of stroke risk factor) (IIa).

The 'rhythm control strategy' refers to attempts to restore and maintain sinus rhythm and may engage a combination of treatment approaches, including cardioversion, antiarrhythmic medication (AAD) and catheter ablation, along with an adequate rate control, anticoagulation therapy and comprehensive cardiovascular prophylactic therapy (upstream therapy, including lifestyle and sleep apnoea management) (Figure 5).

Flecainide or propafenone is recommended for long-term rhythm control in AF patients with normal LV function and without structural heart disease, including significant LVH and myocardial ischaemia (I-A).

Sotalol may be considered for long-term rhythm control in patients with normal LV function or with

ischaemic heart disease if close monitoring of QT interval, serum potassium levels, CrCl, and other proarrhythmia risk factors is provided (IIb).

Amiodarone is recommended for long-term rhythm control in all AF patients, including those with HFrEF. However, owing to its extracardiac toxicity, other AADs should be considered first whenever possible (I-B).

AF catheter ablation for PVI is recommended for rhythm control after one failed or intolerant class I or III AAD, to improve symptoms of AF recurrences in patients with paroxysmal and persistent AF (I-A).

AF catheter ablation for PVI should/may be considered as first-line rhythm control therapy to improve symptoms in selected patients with symptomatic paroxysmal (IIa) or persistent (IIb) AF episodes.

AF catheter ablation Should be considered in selected AF patients with HF with reduced LVEF to improve survival and reduce HF hospitalisation (IIa).

Complete electrical isolation of the pulmonary veins is recommended during all AF catheter-ablation procedures. (I-A)

For patients undergoing AF catheter ablation who have been therapeutically anticoagulated, performance of the ablation procedure without OAC interruption is recommended. (I-A) After AF catheter ablation, it is recommended that systemic anticoagulation with warfarin or a NOAC is continued for at least 2 months post ablation and long-term continuation of systemic anticoagulation beyond 2 months post ablation is based on the patient's stroke risk profile and not on the apparent success or failure of the ablation procedure (I-C).

The documents end with recommendations about management of atrial fibrillation in specific clinical settings/conditions/patient such post ACS/PCI, post CVA, bleeding. Those recommendations are in line with guidelines of the target diseases.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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