

2020 ESC Guidelines on: Sports Cardiology and Exercise in Patients with Cardiovascular Disease

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Introduction

The 2005 ESC guidelines were for competitive sports participation in *athletes* with cardiovascular disease (CVD). This year's updated guidelines broaden the scope to include all patients, with and without CVD. Key messages include:

General exercise recommendations

Individuals with high or very high CVD risk: Clinical evaluation, including maximal exercise testing, should be considered for prognostication in patients who wish to undertake intensive exercise (IIa-C).

Adults with obesity (BMI ≥ 30 kg/m²), diabetes mellitus or well-controlled hypertension: resistance training ≥ 3 times per week in addition to moderate or vigorous aerobic exercise (at least 30 minutes, 5-7 times per week) to reduce CVD risk, improve insulin sensitivity and blood pressure (1-A).

Older adults (age >65 years) at risk of falls: strength training exercises at least 2 days per week to improve balance and coordination (1-B).

Coronary artery disease

Asymptomatic adults at risk of CVD or with coronary disease at screening: Maximal exercise testing, functional imaging and/or CT coronary angiography should be considered in patients with high CVD risk wishing to undertake high intensity exercise (IIa-C).

Established (symptomatic) chronic coronary syndrome: high-risk features for exercise-induced cardiac events include:

- $>70\%$ stenosis in a major coronary artery or $>50\%$ stenosis in the left main stem and/or FFR <0.8
- Left ventricular ejection fraction (LV EF) $\leq 50\%$ and wall motion abnormalities
- Inducible ischaemia on maximal exercise testing
- Non-sustained VT or frequent ventricular ectopics at rest and during maximal stress
- Recent ACS with or without revascularisation in last year
- Leisure-time exercise below the angina and ischaemic thresholds may be considered in these individuals but competitive sports are not recommended.

Heart failure

Patients with chronic heart failure: 3-5 days per week of 20-60 minutes aerobic exercise at 40-80% of VO_{2peak} and 2-3 days per week of resistance exercise. Participation in sports only in low-risk, stable, optimally treated patients with NYHA Class I symptom status.

Valvular heart disease

Evaluation should include clinical history, ECG, echocardiography and exercise stress testing.

Participation in competitive sport is supported for the majority of patients with moderate valve disease. In aortic stenosis competitive sport of low to moderate intensity is supported for patients with normal LV function and a normal BP response during exercise. Patients with mitral regurgitation should not partake in competitive sport if there is resting pulmonary artery hypertension (PAP>50mmHg) (IIb-C).

Asymptomatic patients with severe valvular abnormalities are considered high risk and should not undertake intensive exercise or competitive sport (III-C).

Arrhythmias

Evaluation should include assessment of the risk for life-threatening arrhythmias with exercise, symptom control at rest and exercise, and the impact of exercise on progression of the arrhythmic condition.

Atrial fibrillation: ablation is recommended in exercising individuals with recurrent symptomatic AF and in those who do not want drug therapy due to its impact on athletic performance (I-B).

Long QT syndrome: high-intensity exercise or competitive sports are not recommended in individuals with a QT_c ≥500ms or a genetically confirmed long QT syndrome with a QT_c ≥470ms in men and QT_c ≥480ms in women. Competitive sport not recommended in any individual with prior cardiac arrest or arrhythmic syncope (III-B).

Cardiomyopathies

Hypertrophic cardiomyopathy: no high-intensity exercise if ≥1 of the following is present:

- History of cardiac arrest or unexplained syncope
- Moderate five-year risk (ESC score >4%)
- Resting LV outflow tract gradient >30mmHg
- Exercise induced arrhythmias
- Abnormal blood pressure response to exercise

Dilated cardiomyopathy: no high-intensity exercise if ≥1 of the following is present:

- History of cardiac arrest or unexplained syncope
- LV EF <45%
- Frequent or complex ventricular arrhythmias
- Extensive late gadolinium enhancement on cardiac magnetic resonance imaging
- High-risk genotype (e.g. lamin A/C)

Myocarditis: moderate-to-high-intensity exercise should not be undertaken until 3-6 months after recovery (III-B).

Arrhythmogenic cardiomyopathy: high-intensity exercise should not be undertaken (III-B).

Conclusions

The ESC have expanded their guidance on sports and exercise in patients with CVD considerably, whilst acknowledging that there remains a paucity of evidence in many instances. The complete 80-page document also includes recommendations in patients with aortopathy, pericarditis, channelopathies and adult congenital heart disease. The guidelines address an area of previous uncertainty in cardiovascular medicine, but in doing so unveil major challenges for clinicians:

Exercise is characterised according to its frequency, intensity, time and type. However, classifying sports in this way is challenging and highly subjective. Lack of a comprehensive and objective system of scoring exercise intensity may result in variation regarding risk assessment.

Many recommendations for exercise appear unrealistic, whereas others are restrictive. For example: individuals with obesity, diabetes and hypertension may struggle to perform a minimum of 8 exercise

sessions per week. By contrast, restricting sports only to stable NYHA class I heart failure patients appears cautious and may impair quality of life.

There is widespread adoption of maximal exercise testing in the guidelines to assist formal exercise prescription and to unmask any abnormal CV responses to exercise. This is not current clinical practice and may be impossible to deliver in a resource-constrained NHS.

Exercise recommendations for patients with cardiovascular disease continue to require individual risk assessment. These guidelines provide a useful framework upon which to base discussion with patients.