



REVIEW ARTICLE

Use of implantable cardioverter-defibrillators in athletes: A systematic review[☆]



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Abstract International guidelines exclude athletes with implantable cardioverter-defibrillators (ICDs) from participating in sports, except those of low intensity (category IA, such as golf, billiards or bowling). However, these guidelines are based on expert consensus, and thus the safety and risks of participating in sports in this population are still largely unknown in the medical community.

We performed a systematic review of the literature in PubMed using the following search string: “((sudden cardiac death) AND (sport OR physical exercise)) AND defibrillator”. After the application of pre-defined inclusion and exclusion criteria, 36 results were selected, which are explored in this paper.

Preliminary results on ICD use in this population appear to demonstrate the safety and efficacy of the device in this context. Further studies, with longer follow-up and with larger samples, may provide stronger evidence to support these findings. In the meantime, disqualifying almost all ICD patients from participating in sports, without taking into consideration their individual needs and characteristics, may be prejudicial to a considerable number of patients by preventing them from exercising their profession or engaging in recreational sport, for which their risk of sudden cardiac death may be low.

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PALAVRAS-CHAVE

Cardioversor
desfibrilhador
implantável;
Morte súbita
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Atletas;
Desporto;
Desqualificação

Utilização de cardioversores desfibrilhadores implantáveis em desportistas: revisão sistemática

Resumo As recomendações internacionais excluem todos os atletas possuidores de um cardioversor desfibrilhador implantável (CDI) da prática de todos os desportos exceto os de baixa intensidade, inseridos na categoria IA (golfe, bilhar, *bowling*). No entanto, estas recomendações são baseadas em consensos de peritos e a segurança ou riscos resultantes da prática desportiva nesta população ainda são largamente desconhecidos da comunidade médica.

Foi realizada uma revisão sistemática da literatura existente na PubMed utilizando a seguinte expressão: «*sudden cardiac death* AND (*sport OR physical exercise*) AND *defibrillator*». Após a avaliação de critérios de inclusão e exclusão pré-definidos, foram selecionados 36 resultados que são explorados neste manuscrito.

Resultados preliminares da utilização de CDI nesta população parecem atestar a sua segurança e eficácia. Estudos futuros, permitindo o seguimento de um maior número de desportistas por um período mais duradouro, poderão fornecer mais robustez e evidência mais forte a suportar estes achados. Entretanto, a abordagem ao desportista portador de CDI deve ser personalizada e adequada ao paciente, de acordo com a cardiopatia e tipo de desporto em questão. Uma abordagem generalista com desqualificação de quase todos os desportistas sem atender às suas especificidades pode prejudicar uma quantidade considerável de doentes aos quais será vedada a possibilidade de manter a sua profissão ou prática, para a qual poderiam eventualmente apresentar um risco baixo de morte súbita cardíaca.

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List of abbreviations

ARVD	arrhythmogenic right ventricular dysplasia
BC#36	36th Bethesda Conference
DCM	dilated cardiomyopathy
ESC	European Society of Cardiology
ICD	implantable cardioverter-defibrillator
HCM	hypertrophic cardiomyopathy
SCD	sudden cardiac death
ACC/AHA	American College of Cardiology/American Heart Association

Introduction

Sudden cardiac death (SCD) in athletes, its prevention by means of implantable cardioverter-defibrillators (ICDs), and whether athletes with ICDs should be disqualified from participating in competitive sport, are currently the subject of intense controversy.¹

The recommendations of the 36th Bethesda Conference (BC#36)² and the European Society of Cardiology (ESC)²⁵ exclude athletes with ICDs from all but low-intensity sports (category IA of the BC#36 classification²) (Table 1). These recommendations are based on the perceived risks, including failure of the device to deliver appropriate therapies, injury resulting from loss of consciousness or control caused by an ICD shock or the arrhythmia itself, and damage to the device or leads.³ The guidelines were developed on the basis of expert consensus rather than on the results of studies, and there is as yet no solid evidence concerning the actual

risks to ICD patients arising from participation in competitive sports.

Implantation of ICDs has grown exponentially in recent decades, often in individuals with normal myocardial function but with genetic mutations that could lead to fatal arrhythmias.⁴ The result is an increasing number of young individuals with ICDs, many of whom are athletes and, according to the guidelines, should be disqualified from participating in competitive sports.^{2,25} The problem is even more serious for professional athletes who are thereby prevented from exercising their profession and suffer the inevitable consequences.

Despite the existence of the guidelines, according to a 2006 survey, many clinicians do not follow them and opt to make their decisions based on the individual athlete, medical condition and sport concerned.⁵ In recent years, the subject has been explored by some centers; their findings may support evidence-based decision-making and lead to changes in the management of these patients.

The aim of the present study is to systematically review the state of the art in this area.

Methods

The review was based on information in articles indexed in MEDLINE (via PubMed) using the following search string: “((sudden cardiac death) AND (sport OR physical exercise)) AND defibrillator”. Filters were defined to restrict searches to articles in English, Portuguese or Spanish, with available abstracts, published between 1985 and 2014.

Articles were selected on the basis of their abstract, which was used to assess their relevance and whether they

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