

The role of cardiac ultrasound in sports medicals

El papel de la ecografía cardiaca en el reconocimiento médico deportivo

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Cardiovascular examination has always played an important role in Sports Medicine but even more so since the turn of the century when sudden deaths in athletes called the attention not only of the media, and therefore politicians and those who manage sport, but also of those doctors whose daily work focuses on sport. Acknowledgement that the vast majority of these sudden deaths were related to the cardiovascular environment rather than randomness or musculoskeletal causes led to research into the subject.

Time has passed, and our knowledge has grown to a reasonable degree, although, as always, not as much as we would like. Within this context, the cardiovascular examination of athletes has, significantly, shifted from playing a routine or collateral role in sports medicals to having one now considered crucial.

Meanwhile, patient examination has evolved in clinical cardiology. Until the beginning of the 21st century, this specialty was fundamentally based on an intellectual and sensory approach to the patient through questions the answers to which were deftly interpreted in the light of physiology to infer relevant information and discard the incidental. Assessment of the patient through classic inspection, palpation, percussion and auscultation completed the clinical image which, inductively, provided the basis for a good diagnosis. From there, any complementary checks provided the finishing touches to the picture: electrocardiography, radiology, fluid and tissue analysis, and new techniques: ultrasound, computed tomography, scintigraphy and nuclear magnetic resonance. Thanks to technological progress, the status of a couple of these techniques has now changed. I am referring to electrocardiography and echocardiography.

It goes without saying that electrocardiograms are within the technological, economic and intellectual reach of all doctors working in all specialties. Their usefulness in sports medicals is indisputable and necessary. With all the limitations that they possess, their contribution

to the detection or suspicion of high-risk pathologies is unquestionable.

Although they have taken somewhat longer, echocardiograms have also grown to become a common complementary test, and there have been two reasons for this: accessibility and time.

Advances in engineering have led to ultrasound scanners (cardiac or for other regions of the body) which are much smaller and have become much more affordable than they used to be. The other factor, time, is a direct function of the relative lack of professionals and is inversely proportional to the increase in cases to attend, be they regular patients or athletes. The time available to attend patients has decreased.

Less time available per case means we need to try to enhance the factors of high diagnostic performance. This involves doing fewer things but with an equally effective result in terms of diagnostic power.

The echocardiogram has passed from being a complementary check to vying for a place in routine examination, a place which the electrocardiogram has secured, maybe displacing auscultation, although it is not certain that the time invested in echocardiography or the result obtained compared to traditional auscultation is efficient enough for one to fully replace the other. The future will tell. But the reality is that the echocardiogram is being advanced as a good complement to traditional examination in sports medicals.

Like many medical procedures, echocardiography is part technique, part art and part intuition. Echocardiography has evolved together with medical engineering and become more complex. In fact, modern-day echocardiography includes 1D, 2D and 3D imaging, transthoracic and transoesophageal access, with and without contrast, and measurements of blood dynamics using the Doppler effect, with calculation of valve and transparietal orifices, wall dynamics with calculation of movements and forces exerted or withstood, and calculation of the systolic function of the ventricles and induction of their diastolic function, etc. So complete echocardiography is a long, complex procedure which calls for suitable subspecialisation and dedication.

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All this contrasts with what has already been commented on the efficiency of the examination of the subject before us. This has led to conventional cardiology starting to create a distinction from echocardiography, developing a simpler, faster and more accessible procedure, and calling it echocardiography. This is a simple cardiac ultrasound test employing apparatus which is also simple, using it in conjunction with or instead of auscultation, and whose mission is to detail what the rest of the physical examination suggests. It can be summarised as assessing heart walls and valves, and observing their movement and that of the blood using surface Doppler ultrasound. From the point of view of clinical semiology, it is about finding abnormalities or distinguishing the image being examined from normality without the burden in terms of techniques and time that a complete echocardiographic examination involves.

Echocardiography, or rather echocardiography, may have a role to play in sports medicals when it comes to consolidating the suspicion of a condition involving a high risk of sudden death. Echocardiography in sports medicals aims to expand on the capabilities of auscultation and electrocardiography, such as details which raise suspicion in physical examination, like a significantly arrhythmic pulse or an obvious heart murmur, or a history of significant palpitations with exercise or syncope or near syncope during it or shortly after stopping, or even unexplained chest discomfort or the presence of fever. If this information is associated with an electrocardiogram with spikes which are not typical for the age and exercise, or an unusual repolarisation for the topographic location, bundle branch blocks not explained by age or high-risk arrhythmias or arrhythmias where risk is suspected, then echocardiography would be indicated.

A worn aortic or mitral valve, a ventricle that is too large or too small, walls which are too thick or grossly abnormal blood flow through the heart are things which enrich sports medical reports and point towards high-precision examinations to be carried out by specialists.

This means that the echocardiogram within sports medicals should not be a systematic procedure (I am not saying systematised, which it

is, but systematic in the sense of being carried out always and for all medicals, as is the electrocardiogram). Echocardiography should only be performed when conventional examination so indicates. It could be an intermediate step to distinguish those cases where a condition with a high risk of sudden death is genuinely suspected from those where one is not. Although publications on controlled studies exist, there is no evidence of the systematic use of echocardiography as part of sports medical examination involving any efficient increase in performance. I refer to efficiency in terms of time/precision. Sports medicals have a precise rhythm, and an ultrasound, if not targeted, without an objective predetermined by the previous semiology, can interfere in the multitude of examinations which make up the series. However, if ultrasounds are performed when they should be performed, they enhance the precision of the diagnosis and improve the image and prestige of the person using them.

So, echocardiograms in sports medicals, which have come to stay, should be performed to the right degree. They are a tool for selective use which improves the capabilities of the sports doctor and, when used properly, increases the quality of their work. Their mission of augmenting precision when an anatomical-functional condition involving a high risk of sudden death is suspected means they are appropriate when, endorsed by consensus and evidence, the circumstances of traditional examination dictate. The availability of the apparatus, right now and even more so in the future, will allow them to form part of the sports doctor's arsenal of tools. If used properly and when necessary, they will bring prestige to the professional and their use will be consolidated.

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