

SPECIALISTFOCUS



Sudden Cardiac Death

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Sudden Cardiac Death (SCD) in the young is rare. In the SAF from 1996 to 2005, there were 19 cases of SCD of which five occurred during training. No official figures are available for competitive sports in Singapore. The incidence in high school athletes in US is one in 100 000 to one in 200 000.

Based on an autopsy study in Sweden, the most common causes after biopsy include hypertrophic cardiomyopathy (13 to 25 per cent), arrhythmias (13 per cent), myocarditis (nine per cent), pulmonary embolism (seven per cent), Long QT syndrome (four per cent), dilated cardiomyopathy (four per cent) and coronary anomaly (two per cent). Of those with structurally normal hearts (16 per cent), the cause is uncertain. Premature IHD (25 per cent) is seen in those older than 25 years. HOCM has a low prevalence of 0.07 to 0.1 per cent in young white individuals but is the most common cause of sudden cardiac death.

The 12-lead ECG is a sensitive and powerful tool for identification and risk stratification of athletes. It is abnormal in up to 95 per cent of cardiomyopathies and the majority of ARVD (arrhythmogenic right ventricular dysplasia). It can detect lethal conditions like the Long QT syndrome, Lenegre disease, Brugada syndrome and Wolff-Parkinson-White Syndrome which together account for up to 60 per cent of sudden deaths in young competitive athletes.

The European Society of Cardiology (ESC), Japan and the International Olympic Committee (IOC), as well as several US and international professional sports leagues, endorse the use of ECG in the pre-participation screening of athletes. The ESC and IOC recommend pre-participation screening with history, physical and ECG from age of 12 repeated every two years. Italy is the only country in the world that routinely uses ECG for pre-participation screening in competitive sports and its programme begins at 12 years of age. In the US, the American Heart Association (AHA) in 2007 reaffirmed its recommendations against universal ECG screening, citing a low prevalence of disease, poor sensitivity, high false-positive rate, poor cost-effectiveness, and a lack of clinicians to interpret results. Instead, the AHA recommends a detailed personal and family history and physical examination alone, then screening young people who have higher risks.

In Singapore, every SAF serviceman, whether a National Serviceman or regular, goes through a pre-enlistment medical examination at the SAF Medical Classification Centre. The medical assessment includes a resting electro-cardiogram (or ECG), chest X-ray, blood tests and urine tests, and a physical examination. Individuals with a history of death in the immediate family before 40 years of age, or sudden death may be referred for specialist assessment and additional investigations. For regulars, medical screening is done once every two years from age 25 until age 40 and annually thereafter.

The European/IOC recommendation is based on the 25-year Italian study, launched in 1983, in which all individuals aged 12 to 35 years, engaged in organised sports, obtain an annual medical clearance. This includes history, physical examination and ECG.

This observational study of 42 386 young athletes by Dr Domenico Corrado (University of Padua Medical School, Italy) published in the 4 October 2006 issue of the Journal of the American Medical Association reports that the introduction of a nationwide pre-participation screening programme including ECGs for young athletes in Italy has led to an almost 90 per cent drop in sudden cardiac deaths in one region of the country from 3.6 per 100 000 person-years in 1979-1980 to 0.4 per 100 000 person-years in 2003-2004 (p for trend <0.001), whereas the incidence of sudden death among the unscreened nonathletic population did not change significantly during that time. Most of the reduced death rate was due to fewer cases of sudden death from cardiomyopathies.

In this study, the most common disqualifying conditions are rhythm and conduction abnormalities (39 per cent), hypertension (27 per cent), valvular (21 per cent) and HOCM (3.6 per cent). This study led to the proposal of using the 12 lead ECG by the IOC and the ESC in 2005.

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