Sudden cardiac death in modern-day athletes

This is a phenomenon that has been rearing its head much more in recent years. Athlete or not, it is important to understand its possible causes.

By Dr Eric Hong, Cardiologist

A heart attack in fit, young, active people makes no sense. After all, these individuals are admired for their athletic prowess and personify healthy lifestyle. When such a death occurs, it has a devastating effect not only on their families, but also on communities and doctors, and understandably attracts considerable public and media attention.

A small but deadly risk

Yet seen objectively, the absolute risk of sudden cardiac death (SCD) is very small, though not inconsequential. A study conducted in Singapore in 2003 showed that approximately 1000 Singaporeans died from SCD a year – about three cases a day. Half these deaths occurred in people under 60, and the majority of the cases (> 90%) were in males with a median age of 47. For females, the median age was 50. The study also demonstrated that 81% of SCD were due to coronary artery disease. Astoundingly, in half of the deceased, all three of their major coronary blood vessels were blocked. Medical reasons aside, the trend of these deaths could be due to having more 'weekend warriors' – people who engage in strenuous physical activity only one or two days a week. This habit is associated with a higher incidence of SCD. SCD affects more men than women in a ratio of 9:1, perhaps because of a lower participation rate or the fact that fewer women do certain extreme sports.

Undetected and unseen

In the final push to complete a race, the body undergoes extreme stress. It is shown that SCD is most likely to happen in the final 1.6km of a 42km marathon – and accounts for half of all SCD. The final sprint to the end with a sudden stop is also associated with greater risk of SCD, which is also twice more likely to occur in triathletes than marathon runners – with the occurrence most common in the swimming leg of the event. Yet, in the majority of these cases (85%) there was no clear risk or minimal risk. Thus, the main challenge is to identify those at high risk due to undetected heart conditions.

Studies in the US have shown that in athletes under 35, the most common cause of SCD is hypertrophic cardiomyopathy. This condition is inherited and caused by a thickening of the muscles of the heart. The second most common cause of SCD in those under 35 is an anomaly in the structure of the coronary arteries. This can cut off blood supply when the heart beats rapidly, as is the case during extreme physical exertion. Other causes include undetected infections, such as myocarditis (caused by a viral infection), coronary artery disease, rupture of the aorta and left ventricular hypertrophy (a thickening of the left lower chamber of the heart). In 3% of cases, the cause is unknown.

In athletes above 35 years old, coronary artery disease is the most common cause of SCD. Those with a previous history of reduced heart function account for a majority of SCD (75% to 80%) in this age group. Pre-existing structural heart disease accounts for another 10% to 15% of SCD while the third most common cause is an electrical disorder of the heart, a condition known as arrhythmia. Wolff-Parkinson-White Syndrome for instance, can potentially cause an 'electrical short circuit' resulting in a rapid heartbeat especially during physical exertion.

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