

Sudden Death During Marathon Races

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Recently, during the Standard Chartered Hong Kong Marathon 2012, a 26 years old half-marathon runner collapsed because of sudden cardiac arrest just after he had passed the finish line. He was brought to the hospital and pronounced dead. This is the second case in the history of marathon races in Hong Kong. Each year, more than 20,000 people participate in full marathon or half-marathon races in Hong Kong, and this number is ever increasing. Reports of sudden cardiac arrests have generated concern about the safety of this activity. Intense discussion was aroused among laymen with regard to the need for routine screening prior to participation in marathon races.

In the US, systemic analysis had been performed to quantitatively assess the relative risks incurred in the course of intense competitive sports.¹ The prevalence of sudden death was assessed in two systematically tabulated groups of endurance runners competing in marathons held over a cumulative 30-year period. Among a total of 215,413 runners, four exercise-related sudden deaths had occurred. Three deaths occurred during the race and the other immediately after its completion. The ages were 19 to 58 years (average 37), and three were men. Three of the sudden deaths were due to atherosclerotic coronary artery disease and one to anomalous origin of the left main coronary artery from the right sinus of Valsalva. None of the four runners had prior

documentation of heart disease or experienced prodromal symptoms, and two had previously completed three marathon races each. The overall prevalence of sudden cardiac death during the marathon was 0.002%, strikingly lower than for several other variables of risk for premature death calculated for the general US population.

More recently, the Race Associated Cardiac Arrest Event Registry (RACER) Study Group also published on the incidence and causes of cardiac arrest during long-distance running races in the US.² They assessed the incidence and outcomes of cardiac arrest associated with marathon and half-marathon races in the US from January 1, 2000 to May 31, 2010. Clinical characteristics of the arrests were evaluated by interviewing survivors and the next of kin of non-survivors, reviewing medical records, and analyzing postmortem data. They found that among 10.9 million runners, 59 (42±13 years; 51 men) had cardiac arrest. The incidence is 0.54 per 100,000. The incidence rate was significantly higher during marathons than during half-marathons and among men than among women. Of the 59 cases of cardiac arrest, 42 (71%) were fatal, corresponding to an incidence of 0.39 per 100,000. Causes of cardiac arrest were hypertrophic cardiomyopathy in around half of them. Other causes include atherosclerotic coronary disease, arrhythmogenic right ventricular cardiomyopathy, bicuspid aortic valve and coronary anomaly, accessory atrioventricular nodal bypass tract, hyperthermia and hyponatremia. Among the 31 cases with complete clinical data, initiation of bystander-administered cardiopulmonary resuscitation was one of the strongest predictors of survival. This study group concluded that marathons and half-marathons are associated with a low overall risk of cardiac arrest and sudden death.

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Opinions expressed are views of the authors and not necessarily the view of the editorial board or the Hong Kong College of Cardiology.

Redelmeier and Greenwald also published a population based retrospective analysis to determine the risk of sudden cardiac death associated with running in an organized marathon compared with the risk of dying from a motor vehicle crash that might otherwise have taken place if the roads had not been closed.³ Marathons held from 1975 to 2004 with at least 1,000 participants that had two decades of history and were on public roads in the United States were analyzed. The study included 3,292,268 runners on 750 separate days encompassing about 14 million hours of exercise. There were 26 sudden cardiac deaths observed, equivalent to a rate of 0.8 per 100,000 participants (95% confidence interval 0.5 to 1.1). Because of road closure, an estimated 46 motor vehicle fatalities were prevented, equivalent to a relative risk reduction of 35% (95% confidence interval 17% to 49%). The net reduction in sudden death during marathons amounted to a ratio of about 1.8 crash deaths saved for each case of sudden cardiac death observed (95% confidence interval: 0.7 to 3.8). The net reduction in total deaths could not be explained by re-routing traffic to other regions or days and was consistent across different parts of the country, decades of the century,

seasons of the year, days of the week, degree of competition, and course difficulty. The authors concluded that organized marathons are not associated with an increase in sudden deaths from a societal perspective, contrary to anecdotal impressions fostered by news media.

Therefore, although highly trained athletes such as marathon runners may harbor underlying and potentially lethal cardiovascular disease, the risk for sudden cardiac death associated with such intense physical effort was exceedingly small (1 in 50,000 to 200,000). The low risk for sudden death identified in long-distance runners from the general population suggests that routine screening for cardiovascular disease in such athletic populations may not be justifiable. There is also no clinical trial to prove the usefulness of pre-participation screening.

References

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