

## RACE AGAINST SUDDEN CARDIAC ARREST



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What is sudden cardiac arrest? The clue is in the name – sudden cardiac arrest. The heart suddenly and unexpectedly stops beating. Blood flow to the brain and vital organs ceases and without treatment, the person is dead within minutes.

Tragically, two relatively young participants died in as many recent athletic events this year – the Spartan Race in Bintan and the Standard Chartered Marathon in Singapore. Deaths in people participating in endurance events are rare with an incidence of between 1-in-50 000 to 1-in-80 000 participants per year. But even one death is too many, if these can be prevented or mitigated.

In recent years, there has been an apparent increase in the incidence due to the increasing popularity of these events, drawing in participants from an ever widening demographic. In 2016 alone, there were over 150 running and endurance events in Singapore.

### **Causes of Sudden Cardiac Arrest at Endurance Events**

There are more than 20 possible conditions linked to sudden cardiac arrest during a sporting or endurance event. In participants older than 35 years of age, sudden cardiac arrests are frequently due to coronary artery disease and heart attacks. In the younger participants, inherited cardiac abnormalities are usually responsible and the most common condition is hypertrophic cardiomyopathy (HCM).

HCM occurs when a part of the heart muscle becomes abnormally thick and causes an obstruction to blood flow as the heart beats. In addition, the heart muscle cells responsible for coordinated contraction and relaxation are also highly disorganised, thereby increasing the person's risk of developing a deadly heart rhythm.

During a race when a person with HCM is exhausted, there is less blood volume from dehydration and the heart struggles to fill with blood and to pump blood out. A deadly heart rhythm develops possibly because of less oxygen delivery to the heart muscle that ultimately leads to sudden cardiac death.

Other causes of sudden cardiac arrest can be divided into problems with the physical structure of the heart (structural heart disease) and problems with the electrical system of the heart (arrhythmic heart disease).

Another important point is that sudden cardiac arrest often occurs near the end of the race or close to the finish line. This is often the time when participants, already exhausted from the race, choose to push themselves further and sprint at an even higher intensity. This causes an adrenaline rush that

can trigger the deadly heart rhythm which, in turn, causes sudden cardiac arrest especially in people with pre-existing heart conditions.

### Signs and Symptoms

Many of the conditions described above that cause sudden cardiac arrest presents themselves with ominous symptoms such as breathlessness, chest pain, palpitation, fainting spells or sudden loss of consciousness. This is fortunate, as it allows the person to get an early medical opinion and to take the necessary preventive action.

Some are not so lucky. A person may only have a history of unexplained sudden death of a young person in the family. Very often, many cardiac arrest victims do not experience any symptoms and their first presentation is that of sudden cardiac arrest.

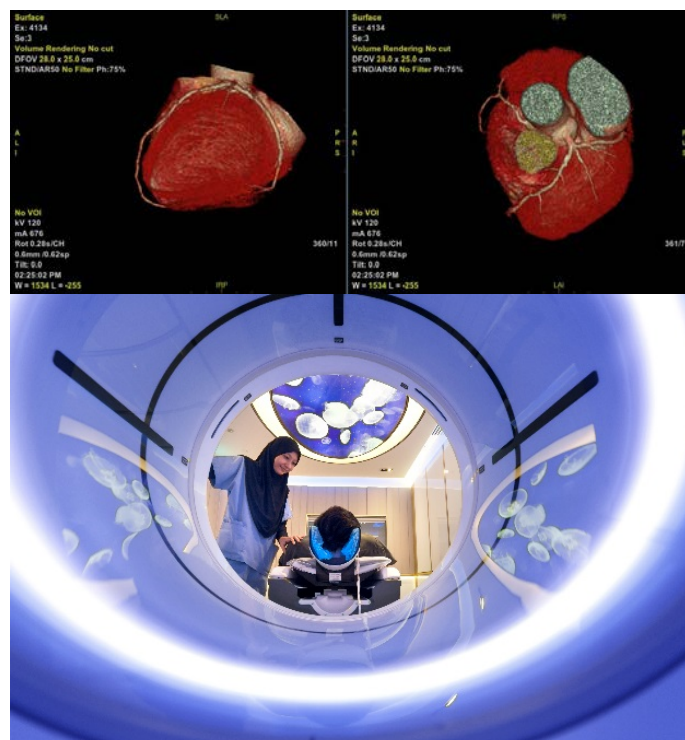
### Pre-Participation Screening

With the increasing popularity of endurance races in Singapore and worldwide, it is important that participants are screened. If you have any medical issues that you feel may put you at risk, you should speak to your doctor before the race. People with existing conditions like heart disease, diabetes, hypertension, hyperlipidaemia, or a family history of sudden death should also seek medical advice.

Pre-participation screening is key to identifying persons at risk of sudden cardiac arrest. This usually involves a comprehensive history and examination by a cardiologist. Screening tests usually include an electrocardiogram (ECG) which reads the electrical activity of the heart. A heart ultrasound scan (echocardiogram) looks for structural abnormalities, and a treadmill exercise test which screens for coronary artery disease. These tests will screen for patients with underlying cardiac disease which may put them at increased risk of sudden cardiac arrest.

When coronary artery disease is suspected, a CT coronary angiogram may be performed to look for narrowing or blockages in the heart arteries. With the advancement of technology, these tests are now affordable and accessible to most people.

Sudden cardiac arrest in the sports arena is fortunately a rare event but when it occurs, it is devastating. Although not fool-proof, pre-participation screening remains one of the practical ways to identify those with pre-existing heart conditions that may increase their risk of sudden cardiac arrest. Pre-participation screening does not just apply to professional athletes and those running marathons but also to those looking to start in any strenuous exercise program.



*CT Coronary Angiogram on a Revolution CT  
Images courtesy of RadLink Diagnostics Imaging*

### **Key Health Tips When Participating in an Endurance Event**

1. **Adequate Preparation and Training:** Begin a training programme appropriate for the activity you are participating in and allow time for a gradual build-up of intensity. Marathon runners often begin training 6 to 9 months ahead of the race and even earlier if you are a beginner.
2. **Avoid Dehydration:** Hydrate and refuel regularly in the race.
3. **Listen to Your Body:** Your body is the best indicator of your limits. Do not overexert yourself if you are already feeling exhausted.
4. **Consult your Doctor:** Do not race if:
  - a. You experience chest pain, breathlessness, palpitation, or feel faint while exercising.
  - b. You have any history of diabetes mellitus, hypertension, hyperlipidaemia, family history of sudden cardiac death.