

SPORTS CARDIOLOGY
PART II

How to avoid a Lightning Strike ...

What heart problems can cause young people to die suddenly and what can you do to prevent it.



HAVE A QUESTION ON ANY HEART RELATED TOPIC?

If you have a question for Dr Andre La Gerche on any heart related topic he can be reached via our Runners Soapbox (email soapbox@runforyourlife.com.au). Dr Andre will endeavour to answer as many questions as possible in an upcoming edition of R4YL.

In the last edition of R4YL, I described the multitude of reasons why we should all be exercising regularly. The rare event of a young athlete dying attracts a great deal of media attention which distorts our appreciation of just how rare this is. A recent article illustrated this nicely. The authors calculated that lives are actually saved whenever a marathon is staged because of the reduction in road trauma due to road closures¹. The predicted road toll on these roads far exceeded the rare deaths of competitors.

Despite these reassurances, the death of any young person is an absolute tragedy and every attempt needs to be made to avoid this. In this article I will describe the most common causes of what is termed "sudden cardiac death" or "SCD". There are two main reasons for doing this. Firstly, it may be of interest to readers to learn about those conditions we consider when faced with unexpected collapse or death. Secondly, I will discuss what you can do to best guarantee that you are not affected. It is absolutely critical, however, that you realise that SCD is extremely rare and that even the most common causes represent rare entities.

Causes of sudden death in young people and athletes.

Beyond the age of 35 years, the most common cause of SCD is coronary heart disease. That is, a heart attack caused by the sudden formation of a clot in an artery to the heart hence starving the heart muscle of blood flow and oxygen. Clots in heart arteries form in arteries at the site of chole-

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sterol plaques. As people get older, the risk of heart attack increases. Other factors which increase the risk are smoking, high blood pressure, high cholesterol, diabetes, familial history and a sedentary lifestyle. Symptoms of a heart attack include chest, arm and/or jaw pain often associated with sweating and shortness of breath.

How do you know if you are at risk of a heart attack?

Roughly two-thirds of those who have a heart attack have some warning symptoms. Chest pain, particularly with exertion, is a concerning symptom and requires medical attention. Unfortunately, the other third has no warning of an impending heart attack. In about 15% of people this first heart attack results in sudden death. There have been many attempts at trying to predict this group. Some groups advocate stress tests, CT coronary angiograms or calcium scoring in an attempt to identify these people and prevent a heart attack. Unfortunately, there is no evidence that this strategy works. There are costs and side effects of these tests that, at present, outweigh the small chance of picking up someone who is at imminent risk of a heart attack. We simply do not have good enough tools to pick who is going to have a heart attack. Therefore, if you have symptoms that may suggest heart disease then a further investigation is strongly recommended. If you do not have symptoms then Australian and International guidelines do not recommend "screening" tests. This does not mean that there is nothing that you can do. We know, as I continue to state, that exercise, a healthy diet, cholesterol and blood pressure

control and giving up the fags (if any readers of R4YL smoke) all reduce the risk of a heart attack. This is the most important message of this entire article. Heart attacks remain the most common cause of death in Australia and these lifestyle measures remain our best means of protection.

Causes of sudden death in those aged <35 years

In younger adults coronary heart disease is rare and other heart conditions are a more common cause of SCD. Table 1 presents a list of most of the disorders which can cause SCD. This is presented for interest and I will not explain each of these disorders – this is a semester's work in med school! These conditions are so rare that most heart specialists will see only a few of these conditions in a career.

Most of these conditions cause sudden death as a result of 'arrhythmias'. This refers to abnormal and rapid electrical signals in the heart which

TABLE 1:

- Causes of Sudden Death in Athletes**
- Ischaemic Heart Disease (most common cause in those aged >35 years)
 - Hypertrophic cardiomyopathy
 - Arrhythmogenic right ventricular cardiomyopathy
 - Inherited channelopathies
 - Long QT syndrome
 - Catecholaminergic polymorphic ventricular tachycardia
 - Brugada syndrome
 - Short QT syndrome
 - Wolf Parkinson White syndrome
 - Anomalous coronary artery circulation
 - Marfan's syndrome

FIGURE 1: A heart ultrasound (echocardiogram) of a patient with hypertrophic cardiomyopathy (left) and a normal heart (right). The red arrows signify the thickness of the muscular walls which comprise the left ventricle. The left ventricle is the dominant pumping chamber of the heart.



lead to uncoordinated heart contraction. The most severe arrhythmia is ventricular fibrillation where the electrical signals are random and, as a result, there is no meaningful heart contraction and, therefore no blood flow (death).

Hypertrophic cardiomyopathy

This is a genetic abnormality of the heart muscle proteins which results in the heart muscle growing to be excessively thick. This 'Schwarzenegger of the heart world' creates problems because the muscle is stiff, functions poorly and can cause arrhythmias. The condition is inherited in a "dominant" fashion which means that children of an affected person have a 50% chance of inheritance. Affected people may feel chest pains, black outs, palpitations, breathlessness or, quite commonly, they may not have any symptoms at all. It can be diagnosed using cardiac ultrasound (refer to figure 1).

Arrhythmogenic right ventricular cardiomyopathy (ARVC)

Also a "dominant" genetic condition meaning that if a person is affected, it is likely that at least one family member also has the condition. ARVC involves thinning, weakening and scarring of the right side of the heart which results in a tendency to arrhythmias. Affected individuals may experience palpitations or black-outs.

Inherited channelopathies

Don't worry about all the names for this

bunch of rare conditions. Basically, the electricity in the heart is generated by the flow of 'salt' channels. Genetic abnormalities of these channels disrupt the normal electrical flow which can again lead to arrhythmias.

» If you have had unexplained black-outs, palpitations or if you have a family history of unexplained collapse or sudden death then you should certainly ask your doctor for a thorough physical examination and an ECG. »

How do I know if I have one of these conditions?

Most of these conditions can be diagnosed, or at least suspected, on a simple test called an electrocardiogram (ECG) – see figure 2. This test records the unique electrical signals from the heart via conduction through the skin in much the same way as a heart rate monitor does. Most of the rare conditions listed above have a characteristic abnormality on an ECG.

So why doesn't everyone get an ECG?

There is much debate at present as to whether this should be routine policy for all school children prior to participating in organised sport. The

European guidelines recommend it, the US recommends against and we (the Aussies) don't have a policy. The problem is that abnormalities on an ECG are fairly common and many people will require further unnecessary testing as a result. These

"unnecessary" tests are expensive, create emotional stress and may have side effects. Consensus is yet to be reached on this important issue.

What should I do now?

If you have had unexplained black-outs, palpitations or if you have a family history of unexplained collapse or sudden death then you should certainly ask your doctor for a thorough physical examination and an ECG. If there is no such history then this is probably not necessary. Rather, you should concentrate on that which you can control – continue to exercise, eat well and get your blood pressure and cholesterol checked. Most of all keep running!

REFERENCES:

1. Redelmeier DA, Greenwald JA. *Competing risks of mortality with marathons: retrospective analysis.* Bmj. Dec 22 2007;335(7633):1275-1277.

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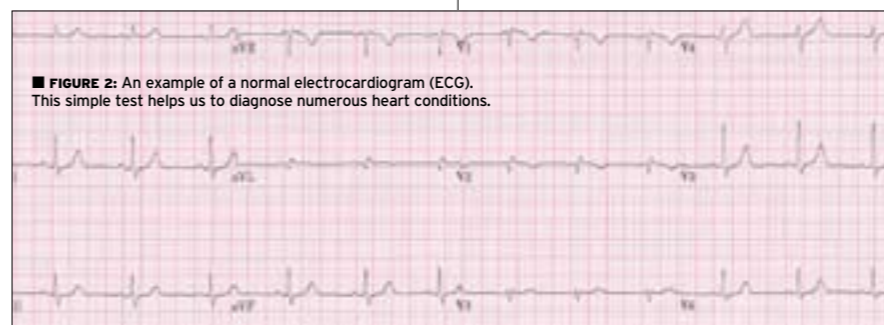


FIGURE 2: An example of a normal electrocardiogram (ECG). This simple test helps us to diagnose numerous heart conditions.