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Arrhythmia Alliance

AFA AFAssociation

www.heartrhythmalliance.org

DefibsSaveLives.org
AED
UK Campaign

What can I do about sudden cardiac arrest?

Working together to improve the diagnosis, treatment and quality of life for all those affected by arrhythmias

Glossary

Automated external defibrillator (AED) An emergency lifesaving device that can be used by anyone to help restart the heart when sudden cardiac arrest strikes

Basic Life Support (BLS) A level of medical care used to treat sudden cardiac arrest until the patient reaches hospital

Cardiopulmonary Resuscitation (CPR) The term embraces all the procedures, from basic first aid to the most advanced medical interventions that can be used to restore the breathing and circulation in someone whose heart and breathing have stopped

Defibrillation The process in which a controlled electronic shock is given to the heart, helping to re-establish a normal rhythm

Implantable Cardioverter Defibrillator (ICD) A small device implanted in a patient to allow automatic defibrillation of the heart when needed

Sudden cardiac arrest (SCA) When the heart stops beating suddenly and unexpectedly without warning

Supraventricular Tachycardia (SVT) A fast rhythm that starts in the upper chambers of the heart; less commonly associated with SCA

Ventricular Fibrillation (VF) A dangerously fast heart rhythm which causes the heart to stop pumping blood effectively. Defibrillation is needed to return the heart back to a normal rhythm. Sudden cardiac arrest can soon follow if the rhythm is not treated quickly with a shock

Ventricular Tachycardia (VT) A fast heart rhythm which can cause collapse or degenerate into VF

Wolff-Parkinson-White Syndrome (WPW) A relatively common heart condition that causes the heart to beat abnormally fast for periods of time due to an abnormal accessory electrical conduction pathway

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What is Sudden Cardiac Arrest (SCA)?

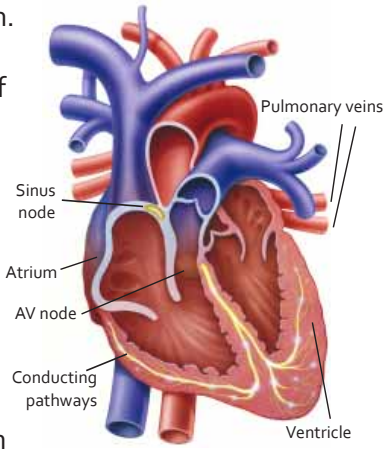
Sudden cardiac arrest (SCA) is a condition in which the heart stops beating suddenly and unexpectedly due to a malfunction in the heart's electrical system. The cause of SCA is a life-threatening abnormal rhythm; an arrhythmia. The most common cause of SCA is ventricular fibrillation (VF).

When in VF, the heart's rhythm is so chaotic (called 'fibrillating'), that the heart trembles and is unable to pump blood to the body and brain. Once the heart has entered VF, a sudden cardiac arrest may occur.

During SCA a patient will first lose their pulse, stop breathing and fall unconscious. All of this can happen quickly - in fact, in a matter of seconds.

Sudden cardiac arrest strikes without warning. It does not discriminate by age, race or sex, claiming thousands of lives worldwide each year.

The heart and normal conduction



Important information

This booklet is intended for use by people who wish to learn more about sudden cardiac arrest. The information within this booklet comes from research and patients' experiences. The booklet offers an explanation of sudden cardiac arrest and how it is treated. Additional information can be sourced at the websites provided. Arrhythmia Alliance is leading a national campaign to place AEDs in local communities. For more information about Defibs Save Lives please e-mail: info@defibssavelives.org or visit www.defibssavelives.org

Who can be affected by SCA?

Unfortunately, anyone can suffer a sudden cardiac arrest. SCA is unpredictable and anyone regardless of their age or fitness level, can suffer SCA anywhere, at any time. Risk factors of SCA include a previous heart attack, previous SCA event, fast rhythm in the lower part of the heart, family history of SCA, structural heart abnormalities and heart failure. Although pre-existing heart disease is a common cause of cardiac arrest, many victims have never had a heart problem. Among the causes of SCA in younger people (without a previous heart attack or heart failure) are inherited or congenital arrhythmias; these include Wolff-Parkinson-White syndrome (WPW), Long QT syndrome (LQTS) and Brugada syndrome.

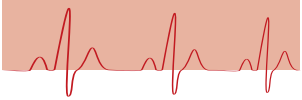
Wolff-Parkinson-White syndrome (WPW)

WPW results from an additional (accessory) connection pathway between the upper (atria) and lower (ventricles) chambers of the heart. This additional pathway occasionally allows very fast and unstable rhythms to develop and this can lead to SCA. These rhythm disturbances most often become apparent in teenage years or early twenties, but occasionally start earlier or later.

In a patient with WPW, electrical implulses arrive at the ventricles too early disturbing the normal heart rhythm. Occasionally this can degenerate into VF. The diagnosis is usually obvious from an electrocardiogram (ECG), although sometimes the characteristic appearances are not evident and may require additional testing to diagnose. However, many patients with WPW have few or no problems throughout their lives.

Sudden cardiac arrest facts

- It strikes without warning; killing 170 people a day in the UK
- In the UK, less than 5% of victims survive out of hospital SCA
- It kills more people than lung cancer, breast cancer and AIDS combined
- It can happen to anyone, even young athletes
- Together with CPR, defibrillation is the only way to re-establish the heart's natural rhythm



Long QT syndrome (LQTS)

Long QT is a syndrome which can cause a disturbance in the electrical system of the heart. This can predispose a person to ventricular tachycardia (VT) which can quickly degenerate into VF. The cause lies in the heart muscle cells which take slightly longer to recover from a heart beat (only by about a tenth of a second). In the presence of LQTS, SCA may be precipitated by such things as certain types of exercise, loud noises, or other sudden stimuli. Events usually occur in children or young people, but can be variable. The diagnosis is apparent from an ECG, which should also be offered to relatives of a patient shown to have Long QT syndrome (LQTS).

Brugada syndrome

Brugada syndrome is an inherited heart rhythm disorder which relates to the functioning of the heart muscle cells. It most commonly presents in people in their thirties and has a tendency to affect South East Asian populations. It can usually be diagnosed from an ECG but additional tests may be required.

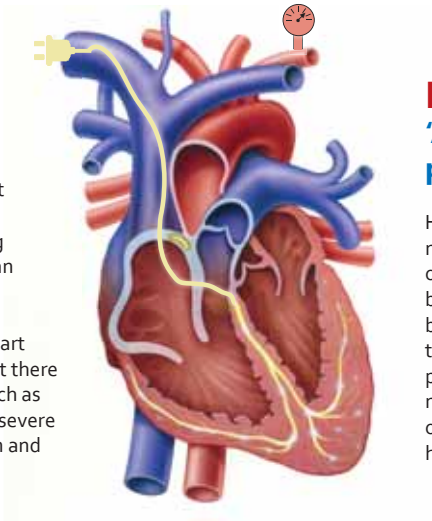
Affected people suffer sudden collapse (syncope) due to VF or a very rapid form of VT called 'Torsade de Pointes'. This can lead rapidly to SCA unless treated with defibrillation.

What is the difference between SCA and heart attack?

Arrhythmias can reduce the heart's ability to work effectively, and if left untreated, a life threatening situation can arise. If the arrhythmia results in VT or VF, an extremely fast and chaotic rhythm can occur. The lower chambers of the heart quiver and the heart pumps blood ineffectively, causing SCA.

SCA:
'An electrical problem'

SCA is different from heart attack. While heart attack is described as a 'plumbing problem', SCA is more of an 'electrical problem' that prevents the heart from functioning effectively. Heart attack can lead to SCA, but there are many other causes, such as congenital abnormalities, severe heart failure, electrocution and drug overdose.



Heart Attack:
'A plumbing problem'

Heart Attack (the medical term is myocardial infarction or MI) occurs when part of the heart's blood supply is reduced or blocked, causing the heart muscle to become injured or die. The person is awake (conscious) and may complain of one or more of the signs and symptoms of heart attack.

Signs and Symptoms of SCA When SCA occurs, the heart stops beating altogether. As a result, blood is no longer pumped throughout the body, including the brain. The person suddenly passes out, loses consciousness, and appears lifeless - except for abnormal 'gasping' which may last for several minutes.

Occasionally, SCA victims will experience 10-20 seconds of seizure-like activity (shaking of the arms and legs) at the onset of the event as the brain stops receiving blood and oxygen from the heart. The SCA victim is never awake and needs immediate help. If nothing is done, the victim will die within minutes. In fact, about 7-10% of sufferers die every minute without defibrillation.

Commotio cordis is a condition that can occur if you experience a severe blow or trauma to the chest, which can result in a SCA. Although a rare condition, it can commonly occur in young athletes participating in sporting activities, such as baseball, hockey pucks or lacrosse balls. If a person is struck in the chest at a specific time in the heart rhythm cycle, the heart's electrical signal can be interrupted, resulting in the heart stopping. This can occur even when someone does not have a pre-existing heart condition. Without immediate treatment and resuscitation, it can be fatal. Resuscitation within 3 minutes resulted in a survival rate of 25% (17 of 68 cases). Survival drops to 3% when resuscitation is delayed beyond 3 minutes. Survival of commotio cordis has risen from 10% to 15% since 2001. Reduced ventricular ejection fraction has been identified in some commotio cordis survivors.

Signs and Symptoms of Heart Attack Most heart attacks involve discomfort in the centre of the chest that lasts more than a few minutes or that goes away and comes back. Some heart attack victims experience mild intermittent chest discomfort that comes and goes over a period of days. These are early 'warning signs' that may precede a heart attack. (Some victims, however, do not experience any warning signs.) Chest discomfort can feel like uncomfortable pressure, squeezing or fullness. It can evolve into crushing pain. The pain may present or radiate (move) to the back or down one arm (usually the left arm).

Who is at higher risk of SCA? Patients with previous heart attack, heart failure or other known heart problems are at an increased risk of experiencing SCA.

SCA is usually caused by VT and/or VF starting in scars or damaged areas of the heart muscle, or very occasionally due to the effects of medication that the patient may be taking. Anyone, at any age, at any time can suffer SCA.

How is SCA treated?

Cardiopulmonary resuscitation (CPR)

When someone suffers an SCA, defibrillation together with CPR is the **only** way to re-establish the heart's natural rhythm.

The letters CPR stand for cardiopulmonary resuscitation. The term embraces all the procedures, from basic first aid to the most advanced medical interventions that can be used to restore the breathing and circulation in someone whose heart and breathing have stopped. The 'Resuscitation Guidelines' are published by the Resuscitation Council (UK) and are available at www.resus.org.uk.

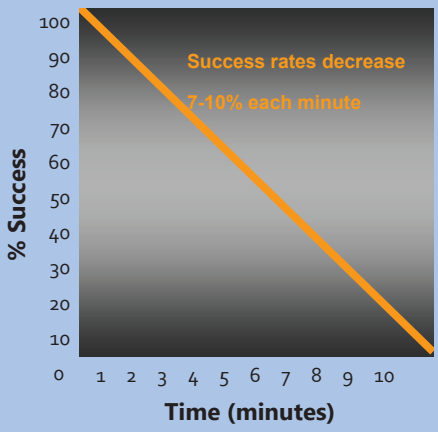
Cardiopulmonary resuscitation (CPR) alone will not restart a heart following SCA.

CPR alone = 9% survival

CPR + AED (automated external defibrillator) = >70% survival

What is an automated external defibrillator (AED)?

Early defibrillation is the key to surviving SCA



1. Cummins, R.O. 1989. From concept to standard-of-care? Review of the clinical experience with automated external defibrillators. Annals of Emergency Medicine 18: 1269-75

- Survival rates drop 7 - 10 percent every minute without defibrillation[1].
- CPR is a temporary measure that maintains blood flow and oxygen to the brain. It will not return the heart to a normal rhythm. Only defibrillation can return the heart to a normal rhythm.
- Quick action by the first person on the scene can truly make a difference in saving a life.
- Automated external defibrillators (AEDs) make early defibrillation readily available and are easy to use, even for lay people with no training.

An AED is an emergency life-saving device that can be used by anyone to help restart the heart when SCA strikes. The device is fully portable and gives the heart an electrical charge to establish a regular heartbeat. The AED will only shock when necessary.

Why is it needed?

A person who suffers sudden cardiac arrest may only be in a 'shockable rhythm' for the first few minutes; so immediate defibrillation is vital.

- CPR alone only saves 9% of people who suffer a sudden cardiac arrest.
- CPR and an AED used together increases chances of survival to greater than 70%.

How it works

1. When turned on, the AED will instruct the user to connect the pads to the person's bare chest. All clothing should be removed, including undergarments (especially underwired bras) because these can interfere with the electrical signal. The pads allow the AED to analyse their heart and determine if they require a shock.

2. If the device determines a shock is required, it will charge up in preparation to deliver a shock. The AED is completely safe as it will only deliver a charge when it determines a shockable rhythm is present.

3. When charged, the device instructs the user to ensure no one is touching the victim and then to press a button to deliver the shock. In the case of a fully automatic AED the unit will advise the user that it will deliver the shock without further intervention.

4. When the shock is delivered, the device will instruct the user to begin CPR for a period, after which it will analyse the heart rhythm once again, advising whether a further shock to continue CPR is needed. Anyone can use an AED, no training is needed.

The Chain of Survival

Worldwide guidelines for response to sudden cardiac arrest include 'The Chain of Survival'. Quick action by the first person on-scene can truly make a difference in saving a life.

The Chain of Survival represents the sequence of five events that must occur quickly to optimise a person's chance of surviving a cardiac arrest.

The five links of the chain are:

- Early access - Dial 999 immediately.
- Early CPR - Provide CPR to help maintain blood flow to the brain and organs until the arrival of the defibrillator and advanced medical care.
- Early defibrillation - Defibrillation is the only way to re-establish the natural rhythm following a sudden cardiac arrest.
- Effective advanced life support - An emergency team provides airway support, defi brillation, and intravenous medication.
- Early advanced cardiac life support - After initial survival of a SCA, a comprehensive management plan is made to decrease chances of further cardiac events.

Defibs Save Lives

We have worked with many community groups, clubs and individuals to help place lifesaving equipment for use in the event of an emergency.

The Defib Saves Lives campaign aims to ensure that AEDs are available in all public places. They must be accessible to everyone whatever the time of day. AEDs should ideally be housed in secure, weatherproof, heated cabinets on the exterior walls of buildings such as post offices, village halls, sports centres and other visible places in the community.

If you are a school or a sports team, you may decide to purchase two AEDs; one to be housed in an external cabinet at your club and a portable AED to take on trips away. A public-access AED in an external, heated and secure cabinet is the most versatile installation to ensure that an AED is always available when needed. These are ideal for high streets, shopping centres, sports stadiums, exhibition centres and concert venues.

If an AED is designed for portable use, it might still benefit from being stored in a visible, accessible location, such as a dedicated indoor cabinet. This prevents AEDs from being hidden away or forgotten in desk draws or locked offices.

Placing an AED in your community

Along with advice and guidance on purchasing your defibrillator, we offer a great range of fundraising materials and information. These include training resources and raising awareness in your community about SCA and the importance of knowing where and how to use your nearest AED. We tailor each package to suit your needs and community. We also provide guidance and advice on whether to choose a locked external cabinet, hanging hooks for the AED if internal, and rucksacks for carrying your AED and first aid kit (Grab and Go – ideal for sports and outdoor activities). All of which can be ordered through us.

Upon receipt of the defibrillator and educational package you will also receive instructions for registering your AED on the national database 'The Circuit'

We offer different packages to suit different communities.

Call us on 01789 867501 or email daisy@heartrhythmalliance.org for more information and the cost for the package including your AED to suit your needs.

Treatments for patients who survive a sudden cardiac arrest (SCA)

Patients who survive a SCA or who are diagnosed as being at risk of SCA can be treated in a number of ways. Many will be implanted with an implantable cardioverter defibrillator (ICD), a device like a pacemaker which is placed beneath the skin (usually on the upper chest wall) and has wires connecting it to the heart. This device constantly monitors the heart and will deliver a shock to defibrillate the heart if needed. Being fully implanted and completely automatic, the patient is able to lead a normal life with few limitations, safe in the knowledge that the ICD will respond immediately if required.

Some patients may only need to take medication alone, or in addition to an ICD. Occasionally some causes of SCA (such as WPW) can be treated by a curative procedure whereby the additional electrical pathway within the heart is destroyed by a small burn inside the heart, using a technique known as catheter ablation (see the Arrhythmia Alliance Catheter ablation for cardiac arrhythmias booklet).

All patients who have survived a SCA should be reviewed by a cardiac electrophysiologist (a doctor specialising in heart rhythm disturbances) in order to determine how best to prevent further events and to consider whether family members need to be screened.

Following recent studies, it is now known that cardiac arrest survivors who are more mindful report fewer symptoms of depression, anxiety or post-traumatic stress disorder following the event. Mindfulness-based interventions such as meditation or cognitive behavioural therapy can help in decreasing these symptoms and have a positive impact on cardiovascular disease and risk.

Notes

This booklet has been written to support patients and carers who struggle to find information on sudden cardiac arrest. Without donations and fundraising, we would not be able to provide support through our award-winning resources and helpline.

Please donate to support our vital work at
www.heartrhythmalliance.org/aa/uk/get-involved/donate

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FINGER ON YOUR PULSE

Finger on your Pulse: is our new library of educational video resources. Medical Experts share their knowledge and address specific concerns and patients share their experience living with the various conditions and treatments.

www.fingeronyourpulse.org

"The information in the booklet gave me some reassurance following my husband's SCA. I am so thankful that the defibrillator was on hand at the leisure centre"

Alison, Manchester

Please remember that this publication provides general information. You should always discuss and seek advice from your healthcare professional what is most appropriate for you.

Acknowledgments: we would like to thank all those who helped in the development and review of this publication. Particular thanks are given to Dr Charlotte D'Souza

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If you would like further information or would like to provide feedback please contact info@defibssavelives.org