

Introduction

Out-of-hospital cardiac arrest claims some 550,000 lives each year in Europe and the United States, accounting for about half of all deaths due to cardiovascular disease. Even when resuscitation efforts are successful, recovery is too often limited. The risk of this complication increases with the delay in resuscitation, and the prognosis for comatose survivors of cardiac arrest is poor. In an international study, less than one third of comatose survivors of out-of-hospital cardiac arrest awakened within seven days; the others either died or remained unconscious.

What Is a Cardiac Arrest?

During cardiac arrest the heart can start beating very fast or stops beating altogether. When this happens, blood is not effectively pumped through the body and the person starts to die.

It is very important that the normal heart rhythm is restarted within minutes. After five (5) minutes, the brain starts to die. After 30 minutes, there is a little chance of survival. You can prolong the time by starting CPR before help arrives.

What Causes a Cardiac Arrest?

50% of men and 63% of women that fall victim to cardiac arrest do not exhibit any symptoms of heart disease. The American Heart Association lists several conditions or situations that may lead to cardiac arrest.

Heart Disease

Underlying heart disease - either known or unknown - is nearly always found in victims

of cardiac arrest. Typically in adults this takes the form of arteriosclerosis. In 90% of adult victims, two or more major coronary arteries are narrowed by arteriosclerosis; scarring from a prior heart attack is found in two-thirds of the victims. Therefore, the risk factors for cardiac arrest include similar risk factors for arteriosclerosis, such as smoking and high blood pressure.

A heart that's scarred or enlarged from any cause may develop life-threatening ventricular arrhythmias. The first six months after a heart attack is a particularly high-risk period for cardiac arrest with atherosclerotic heart disease. A thickened heart muscle from any cause (typically high blood pressure or valvular heart disease) - especially when there's congestive heart failure too - is an important factor for cardiac arrest.

Heart Medications

Under certain conditions, various heart medications can set the stage for arrhythmias that cause cardiac arrest. In particular, so-called "antiarrhythmic" drugs, even at normally prescribed doses, sometimes may produce lethal ventricular arrhythmias ("proarrhythmic" effect). Additionally, even in the absence of existing heart disease, significant changes in blood levels of potassium and magnesium (from using diuretics, for example) also can cause life-threatening arrhythmias and cardiac arrest.

Recreational Drug Abuse

Recreational drug abuse is also an important cause of cardiac arrest.

Other Causes

Less often, blood vessel abnormalities, particularly in the coronary arteries and aorta, may be present in young sudden death victims. Adrenaline released during intense physical or athletic activity often acts as a trigger for cardiac arrest when these predisposing conditions are present.

Other factors such as respiratory arrest, electrocution, auto accident, drowning, choking, or trauma can cause cardiac arrest.

How to Get the Heart Restarted?

Emergency medical teams are trained to revive people from cardiac arrest by using the paddles of an automatic external defibrillator.

What Is An Automatic External Defibrillator(AED)?

An Automatic External Defibrillator or AED is an easy-to-use, automated device, which delivers a life-saving electric shock to the heart. The AED is used to restore a normal heart rhythm by delivering an electrical shock to the heart when the heartbeat is dangerously fast due to ventricular tachycardia or ventricular fibrillation.

If treated quickly enough, cardiac arrest can be reversed and the heart restarted with electric shock.

The Heart and Brain Link

Cardiac arrest creates a condition whereby blood flow has stopped, ceasing the oxygen supply to the brain. This condition, called ischemia or reduced oxygen, causes a dangerous series of events that causes the

brain tissue to die. Additionally, once the heart is restarted the oxygen-deprived brain cells become vulnerable and can suffer additional injury from the renewed blood flow to the tissue. This is called reperfusion injury.

To date, all cardiac arrest therapies have been directed at getting the heart restarted but few have been targeted at preventing brain damage that occurs minutes after blood flow stops.

What is Hypothermia Therapy?

Hypothermia therapy involves cooling the patient to temperatures between 32 - 34°C for an extended period of time after the cardiac arrest.

Interest in this therapy evolved out of miraculous stories of survival that occur each winter when a child who falls into an icy lake, is pulled out after 45 minutes and then is warmed up and found to be perfectly normal. The icy water suspends biological processes that ordinarily would kill brain cells almost immediately.

Recent clinical studies using hypothermia therapy after cardiac arrest have been published in the New England Journal of Medicine (Feb. 2001). Two studies showed that cooling a victim of a cardiac arrest after resuscitation, improves the victim's chances of survival and ability to lead a normal life. The cooling works by reducing the brain's need for oxygen while suppressing the chemical processes that kill brain cells. Further it protects against reperfusion injury during the time when the heart is restarted and blood flow is reestablished.

During the Procedure

First, a temperature probe catheter is inserted into the bladder of the patient to monitor body temperature. This catheter is connected via a thin cable to the CoolGard 3000[®] temperature control system. The patient temperature is displayed at all times.

Next a heat exchange catheter will be inserted through a vein at the top of the leg. The catheter is a long, thin, soft tube with 3 balloons. It is gently guided over a wire to its resting place below the heart. This catheter is then connected to a tubing kit that will supply cooled saline from the CoolGard 3000 system into the catheter, down through the balloons and then recirculated back to the system in a closed-loop.

Blood is cooled as it passes by the balloons. No fluid is infused into the patient, nor is blood circulated outside of the body.



CoolGard 3000[®] system measures patient temperature and sends cooled saline to catheter.

The CoolGard 3000 system will automatically cool the patient until it achieves the target temperature at which the best brain protection is possible (32-34° C).

The cooling procedure may last 12-24 hours and will be followed by slow, controlled rewarm back to normal temperatures. The patient will remain sedated and comatose and will feel no discomfort from the procedure.

What is the CoolHeart[™] Registry?

The CoolHeart Registry is a collection of patient data from multiple participating hospitals approved by the European Resuscitation Council. The goal of the CoolHeart Registry is to optimize the use of intravascular hypothermia therapy in cardiac arrest patients.

Patient Rights & Privacy

The CoolHeart Registry is not a clinical trial and does not involve experimental technology. Your doctor uses hypothermia because he feels it is the right treatment for you.

Your doctor shares data with the Registry. This data is controlled in accordance with the European Directive on Privacy. None of your personal identification or financial data is shared with the Registry.

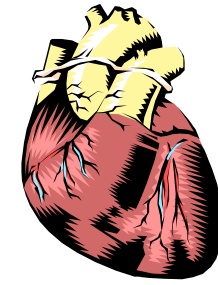
If you have concerns about this Registry, please contact your doctor. To learn more, please visit our web site at

CoolHeart[™] Registry:

www.coolheart.com

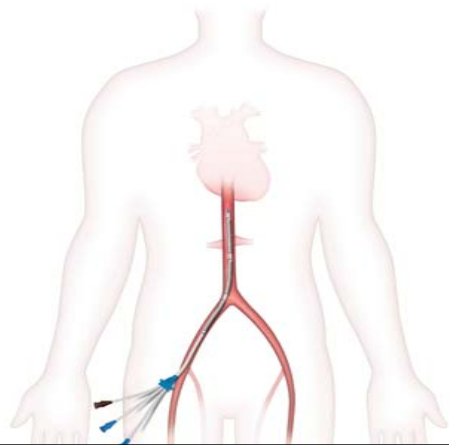


A Family's Guide to



Cardiac Arrest

- Symptoms, Causes, and Treatment
- The CoolHeart[™] Registry



Thin heat exchange catheter is inserted into the patient's femoral vein.

