

SUDDEN CARDIAC DEATH

Sudden cardiac death results from the sudden, abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease. Most victims of sudden cardiac death die in the early morning hours and within an hour of the onset of symptoms, if any symptoms at all are present. An estimated 250,000 people die each year (700 individuals each day) in the United States from sudden cardiac death. The average age of sudden cardiac health victims is 60 years. The most common underlying reason for death from cardiac arrest is coronary artery disease (CAD). Sudden cardiac arrest may also occur in competitive athletes or young adults due to other heart abnormalities such as coronary artery anomalies, hypertrophic cardiomyopathy or Marfan's syndrome. The adrenaline released during intense physical or athletic activity often acts as a trigger for sudden cardiac death when these abnormalities are present. The number of cardiac deaths occurring during athletic participation is unknown. At the high school level the occurrence is one in 100,000 to one in 300,000 and increases in more mature athletes as the prevalence of CAD rises. A careful family and medical history and cardiovascular examination can identify some individuals at risk. Those with predisposing conditions mandate further workup.

In most cases of sudden cardiac death, the causative cardiac rhythm is ventricular fibrillation. Ventricular fibrillation is a condition in which the heart's electrical impulses suddenly become chaotic causing the heart to stop effectively pumping blood. Defibrillation is the only known therapy for ventricular fibrillation. The application of electrical shock can restore the heart's normal rhythm if it is given within minutes of the cardiac arrest. Individuals who suffer cardiac arrest outside of a hospital have a 33 percent better chance of survival if defibrillation is accomplished within eight (8) minutes. For every minute that passes the chance of survival decreases seven (7) to ten (10) percent. Very few resuscitation attempts are successful after ten (10) minutes. Currently, it is estimated that more than 95 percent of cardiac arrest victims die before reaching a hospital. Automatic External Defibrillators (AEDs) appropriately deployed and used are contributing greatly to early defibrillation for sudden cardiac death victims.

A history of CAD or heart attack is predictive of sudden cardiac death. There are a number of risk factors associated with the development of CAD. They include tobacco use, high cholesterol, high blood pressure, physical inactivity, overweight or obesity and diabetes. Heredity, male gender (although heart disease in women is increasing) and possessing a "type A" personality are also risk factors in the development of CAD.

In summary, the best available treatment for victims of sudden cardiac arrest is early defibrillation. Treatment within the first eight (8) minutes can significantly improve the outcome. Prevention or significant risk factor reduction for CAD can be accomplished with lifestyle changes such a healthy diet, managing stress effectively, exercising on a regular basis, maintaining an ideal weight, and not smoking. Caution should be used when beginning an exercise program. If you are starting an exercise program after leading a sedentary life style, you have cardiac risk factors, or you have any symptoms that may be cardiac in nature, you should seek the advice of a physician concerning

screening for coronary heart disease and for an exercise prescription. It is also important to monitor your pulse rate to stay within a defined target zone.

Regarding the treatment of cardiac emergencies, the NASA Occupational Health Program (OHP) Principal Center Office is responsible for:

- Setting standards for professional staff certifications at NASA clinics.
- Establishing AED Program guidelines for the Centers.
- Auditing cardiac emergency preparedness at Centers.
- Providing Advanced Cardiac Life Support (ACLS) training and support.

NASA Centers OHP clinics are responsible for:

- Ensuring professional staffs are ACLS and non-professional staffs are Basic Life Support (BLS) trained.
- Establishing emergency medical care procedures.
- Maintaining up to date emergency cardiac crash cart.
- Ensuring on-going training and periodic emergency drills for staff.
- Ensuring oversight of Center AED Programs.