

Sudden Cardiac Death

Mr. K is 55 yr old senior corporate manager who had bypass surgery done in 2000 after he was found to have blockages in all the 3 arteries and a weak heart. (Triple vessel disease with LV dysfunction). Following a successful surgery he took his medications regularly and maintained a healthy lifestyle. He had two recent episodes of dizziness one of which resulted in a transient loss of consciousness. He dismissed these symptoms as insignificant. His family was devastated when he was found dead in his bed one morning.

Ms R is a young lady who is very concerned after her 28 yr old brother died suddenly with no obvious disease. She wants to know if her family members are at a similar risk.

Situations involving sudden cardiac death have a devastating effect on the affected families who constantly ask themselves if there was something that could have been done to prevent this tragedy. Considerable research in this area has been done in the last decade addressing these issues, which has enhanced our knowledge to recognize and help such patients.

Sudden Cardiac Death or Sudden Cardiac Arrest (SCD or SCA) is defined as death due to cardiovascular causes in a patient with or without known preexisting heart disease in whom the mode and time of death are unexpected. Though a heart attack or Myocardial infarction may cause a Cardiac arrest, these terms are not synonymous. Heart attack may result in cardiac arrest and sudden death but all sudden cardiac deaths are not due to heart attacks. The magnitude of the problem is more enormous than generally realized. About 400000 people every year are known to die of sudden cardiac death in the United States.

What Causes Sudden Death?

The most common and important cause of sudden death is the presence of diagnosed or undiagnosed coronary artery disease. A patient experiencing cardiac arrest may not have any prior symptoms or be aware that he has a prior blockage of his coronary arteries, as this could be the first indication of presence of heart disease.

Sudden cardiac death may occur in those patients who have had a heart attack in the past and have a weakly pumping heart. These patients constitute a large majority of patients who at risk of having a cardiac arrest and who can be saved from sudden death by current technology. It is often asked by patients why angioplasty, stenting or a by pass surgery could not prevent this. No doubt these procedures increase blood supply to the heart and prevent heart attacks or provide relief from chest pain but they do very little to the already damaged heart muscle, which is responsible for the sudden death. The damaged weak heart has areas of scars resulting from earlier heart attacks which lead to generation of abnormal electrical circuits in the heart muscle. This can result in rapid heart rates known as ventricular tachycardia and ventricular fibrillation leading to cardiac arrest and death. A patient can have a cardiac arrest many years (10- 20 yrs) after having a heart attack. Patients who are revived from these episodes are called survivors of sudden cardiac death. It is very important to hospitalize and treat these patients urgently as, if a

cardiac arrest occurs a second time they may not survive. It is known that only about 30 – 40% of these patients eventually live after surviving one episode. Some patients however can have poorly functioning cardiac muscle without having suffered a heart attack; this condition is called dilated cardiomyopathy which is seen frequently by Cardiologists. This condition also has a similar risk of cardiac arrest and sudden death. Some patients may have a genetic abnormality predisposing to sudden death, which runs in families and should be suspected in families who have history of young members dying suddenly. Two well-recognized conditions are the Long QT syndrome and the Brugada syndrome, which is both, recognized as an ECG abnormality that may be seen in non-affected members of the family giving the doctor a clue to this disorder.

Who is at a risk of sudden death?

The highest risk of sudden death is in a patient who has survived a cardiac arrest. This may be witnessed by medical or trained personnel who perform a CPR or may be suspected when a patient experiences loss of consciousness particularly if he is known to have heart disease. To emphasize the gravity of this symptom, it is said that the difference between death and loss of consciousness is that in the latter the patient wakes up while in the former he does not. Patients with a heart attack in the past or those with weakly pumping ventricles with dizziness, transient loss of consciousness, fit or seizure or palpitations should seek medical help for evaluation to assess the risk of cardiac arrest. Sometimes these patients experience brief episodes of fast beating of heart (palpitations) or missed heart beats. These symptoms indicate prompt consultation with a cardiologist for further investigations. Some of the patients may have some ECG abnormalities which can be recognized by physicians as precursors of cardiac arrest underscoring the importance of periodic medical examinations. In the recent times spectacular advances in cardiology in the area dealing with electrical disorders of heart has led to evolution of Electrophysiology as a subspecialty in Cardiology. Centers offering Electrophysiology services have equipment, facilities and specially trained personnel to evaluate patients at a risk of sudden death. An Electrophysiological study involves placing special catheters with electrodes in the heart and simulating the fast heart rates in the catheterization lab under safe and controlled conditions to assess if the patient is at a risk of developing cardiac arrest. This testing can sometimes answer the question if a patient who has had a heart attack before or who has an abnormal ECG is at a risk of sudden death.

How to prevent sudden death

Diabetes, hypertension, Smoking, high cholesterol are the major factors which increase risk of developing blockages in the blood vessels supplying the heart and result in heart attack. Routine yearly medical examination of everyone even without any problem helps in early detection and treatment of these risk factors is the most cost effective way to prevent heart attacks and reduce occurrence of sudden death. Those with these risk factors should undergo yearly investigations to detect blockages in their coronary arteries and undergo treatment if needed. All patients with known heart disease particularly those with coronary artery disease and their echocardiogram showing weakly pumping ventricles, should be evaluated by their cardiologists to ascertain the risk of sudden death.

Similarly any one experiencing transient dizziness, loss of consciousness or fast beating of the heart need expert evaluation. When a cardiac arrest occurs the only way to save the patient's life is to give a shock delivered by a defibrillator. Many of those who experience a cardiac arrest may not reach a medical center where a defibrillator is available. Miniature devices which work just like the defibrillators are available which are automated and need to be implanted in the human body. These devices are Implantable Cardioverter Defibrillators (ICD's). The definite and scientific strategy to prevent sudden death is to identify patients who have survived a cardiac arrest or are at risk of sudden death and implant these devices which are endowed with life saving revolutionary technology.

ICD in the prevention of sudden death

The idea of ICD was first conceived by Dr Michael Mirowski in 1966 but it took nearly 20 years before they were approved for use in patients. These devices are implanted beneath the skin in the chest under local anesthesia. Wires from these are placed in the right ventricle of the heart through blood vessels. The procedure takes about an hour and involves hospitalization for about 2-3 days. The whole system acts like miniature computer, which detects fast and dangerous rhythms of heart like Ventricular Fibrillation and Ventricular Tachycardia which result in cardiac arrest and delivers a shock automatically terminating the fast rhythm and preventing sudden death. When used in patients who survived an event of cardiac arrest they help in treating the next episode when it occurs. ICDs are life saving devices with sophisticated electronic circuits incorporated in them. It looks like a pacemaker weighing about 60-70 grams and about 40 cc in volume. Like a computer, skillful and appropriate programming is necessary for optimal functioning of the device. In the last decade numerous trials have been conducted across the globe to assess the utility of the ICD's in preventing sudden cardiac death. These trials have involved thousands of cardiac patients and compared the efficacy of the Implantable defibrillators with standard medications. They have authoritatively and conclusively proven that implantations of these devices in the high risk groups save them from the risk of sudden death. The patients in whom this therapy has shown to be immensely beneficial are those who have survived a cardiac arrest, and those with significant weakness of cardiac muscle of left ventricle caused by a heart attack or otherwise. These large studies gave objective and clear evidence that this new technology should be the first line of treatment in the prevention of sudden cardiac deaths. Lakhs of these devices have been implanted in the United States and Europe and are being increasingly used in our country with rise in awareness among patients, physicians and among health care payers. With availability of specially trained cardiologists and centers offering Electrophysiology services has facilitated the safe implantation and scientific follow up of patients with these devices.

Relevance of this issue to India

Sudden cardiac death is a major but under recognised and under-treated problem in our country. The only data to date available from our country is from a study done by our center which shows that Sudden Cardiac death constitutes 8% of total deaths. Importantly it involves a younger age group of individuals (about 62 yrs) compared to the west.

With increasing incidence of coronary artery disease, this problem is on the increase hence this issue needs to be tackled aggressively. It should be realized that if a heart attack can cause damage to heart in minutes, Cardiac arrest even if the patient survives can cause irreversible damage to the brain in seconds. Many of these patients do not even reach a hospital and therefore it is important to identify the patients and take appropriate precautions on medical advice beforehand. When a cardiac arrest is witnessed, the only way to save these patients is to shock them with an external defibrillator, which is quite easy to operate. All ambulances should be equipped with external defibrillators and they should be made available in public places like cinema theatres, railway stations, Railway stations and Bus Depots. There should be a mandatory regulation that all Nursing home and hospitals treating emergencies must have a defibrillator. A conscious effort should be made to educate people in the recognition of cardiac arrest and in the usage of these defibrillators. Studies including ours show that most of the sudden deaths occur at home, the only way to prevent them is to recognize patients who are at a risk of sudden death and advise implantation of ICD. As these devices are expensive (cost around Rs 5 Lakh) and need skillful follow up, the decision to use them in a patient should be judiciously made. Probably for no other health situation the age-old adage “prevention is better than cure” is so applicable than for sudden cardiac death.

ABOUT THE WRITER

Dr B.Hygriv Rao MD, DM, FISE
Senior Consultant Cardiologist and Electro physiologist
CARE Hospitals, Nampally, Hyderabad

DM from GB Pant Hospital, New Delhi

Fellowship in Cardiac Electrophysiology from USA

25 Publications in Indexed Journals