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Heart to Heart Talk

With Phillip S. Chua, M.D.

Automatic Heart Shocker !

Is there an implantable device that shocks the heart?

Yes, it is called Automatic Implantable Cardioverter Defibrillator, or AICD for short. It is a computerized unit a little larger than the size of a round hopia (chinese pastry) that is implanted under the skin by the left upper chest or abdominal area, programmed to detect any dangerous rhythm of the heart. These so called fatal arrhythmias (ventricular tachycardia, ventricular fibrillation, or cardiac arrest) results in death, among persons with serious heart rhythm problem, who would otherwise look “quite healthy” and active, but who are prone to sudden cardiac death.

Are these heart rhythm problems the same atrial fibrillation?

No, atrial fibrillation is a very common type of heart irregularity (with skipped heart beats) where the atria (upper chambers of the heart) are the ones which are beating irregularly. This is generally well-tolerated, and many of patients are treated with digitalis, among other medications. Most of them are otherwise healthy and grow old with their atrial fibrillation, but those with heart valve disease and atrial fibrillation are more prone to form blood clots inside the heart.

Why is Ventricular Fibrillation Fatal?

If not electrically defibrillated (shocked) within a 2-3 minutes, a patient who develops ventricular fibrillation will rapidly deteriorate to cardiac arrest and die. This type of heart rhythm problem involves the left ventricle, which is the main pumping chamber of the heart. When the left ventricle fibrillates (quivers, instead of beating normally), blood in the heart chambers, and all over the body, does not circulate and stagnates because the “pump” is quivering and not pumping effectively. As a result, the brain and all other vital organs are deprived of fresh blood that carries oxygen and nutrition, etc. Brain cells and all body cells suffer from “suffocation” and die.

From the time the heart quivers or stops, how much time is there to save the person?

As a rule, we say no more than 3 minutes by the clock. The brain is most sensitive to hypoxia (lack of oxygen). If ventricular fibrillation or cardiac arrest is left untreated

beyond 3 minutes, the brain deteriorates, is irreversibly damaged and the person strokes out and dies. That was the very reason why AICD was invented.

How does AICD work?

After AICD has been implanted in a person, it constantly “analyzes” the heart rhythm of the patient and is “on guard” at all times. This tiny computer is programmed to detect serious or fatal arrhythmias. Once it senses ventricular tachycardia or ventricular fibrillation or cardiac arrest, it instantly sends out a pre-measured (18-20 joules) electric shock from the AICD unit through the lead (insulated wire) to the electrodes (contact points) which have been inserted and positioned to lay in contact with the inner walls of the heart. This shock will jolt (convert) the heart back to normal rhythm, much like the external hand-held defibrillators emergency room physicians use to shock the patients in cardiac arrest. The only difference is that AICD is small and implanted in the patient, with no exposed wires, etc. Besides “shocking” the heart, the AICD unit is also a pacemaker and paces the heart in the event the heart beat is too slow, which happens in more than 50% of these patients.

Is this the same as a pacemaker?

No. A heart pacemaker only paces the heart to correct bradycardia (heart rate slower than 60 beats per minute) to make it beat at a higher chosen rate, but it does not have the capability or feature to defibrillate (shock) the heart and convert a fatal rhythm to a sinus (normal) rhythm. An AICD has these capabilities and at the same time functions (on demand) as a pacemaker as well.

How is AICD implanted?

About few years ago, the technique required opening the chest and attaching with sutures two “contact” pads on the surface of the heart. The pads were connected to insulated wires that were connected to a hockey pock sized AICD unit. Today, we do not have to open the chest. The new technique is what we call percutaneous, much like the way we implant a standard pacemaker. The lead (wire) is inserted through a simple skin puncture and the electrodes (distal end and tip of the lead) positioned to lay against the inner wall of the right atrium and ventricle for proper contact. This is connected to an AICD unit, which is now about 1/3 the size of the older units, which are all implanted in a pocket under the skin in the left upper chest or upper abdominal area. The patient goes home within 24-48 hours.

Who are candidates for AICD?

Patients who pass out and diagnosed to have ventricular tachycardia, ventricular fibrillation or cardiac arrest. They are potential victims of what is called Sudden Cardiac Death Syndrome. An Electro-physiologic Study is done on these patients for definitive diagnosis. Once the diagnosis is established, prompt implantation of AICD is recommended. AICD implantation, without any doubt, is life-saving, and the best alternative today for patients with any of these fatal arrhythmias.

Will AICD trigger airport metal detectors?

Yes. And so with a cardiac pacemaker, a metal heart valve, artificial metal joints, etc. These patients usually carry a medical device I.D. card with them.

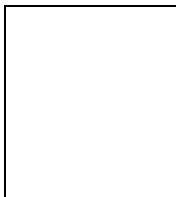
When a person with AICD is dancing and a jolt occurs, does the partner feel the shock also?

No, the partner will not feel the jolt, but he or she will feel the patient having a sudden jerky movement when the split-second defibrillatory shock is transmitted. The patient will feel a bit weak and wobbly for a moment, and very tired, after the AICD fires. Had the patient not have an AICD in this hypothetical instance, he/she would have most likely died.

Are AICD patients allowed to drive?

Certainly not, for a very obvious reason. They are also advised against climbing tall ladders or working on the roof and similar “dangerous” situations. But most of these patients are otherwise active, feeling well, healthy-looking and working normally. Unless they tell you they have AICD on them, even physicians would not be able to tell. They simply have to be more careful and change their lifestyle a bit. However, the reward is certainly worth it.

Our readers are invited to send in their medical questions for possible inclusion in future issues of this column. Mail your questions to the author at Heart to Heart Talk, c/o Cebu Cardiovascular Center, Cebu Doctors’ Hospital, Osmena Boulevard, Cebu City, Philippines, or e-mail them to heart@chua.net



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