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Heart to Heart Talk

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Cardiac Pacemaker

What is a cardiac pacemaker?

Cardiac pacemaker is a self-contained battery-operated unit that sends electrical stimulation to the inner wall of the right ventricle of the heart to make it beat no lower than a certain pre-set rate. A heart pacemaker is implanted among patients, usually elderly, whose heart rate goes below 60 beats per minute causing them to feel weak, lack pep and even feel dizzy or actually faint and lose consciousness.

What is the normal heart rate?

Essentially, it is between 60 and 100 beats per minute. Anything below 60 is considered bradycardia (slow heart rate) and rate above 100 is called tachycardia (rapid heart rate). But what is normal is also relative. Well-conditioned athletes, for instance, could have heart rate lower than 60, maybe as low as 40, as their normal rate and feel very well. Almost all of us, in general, especially the elderly, would feel dizzy, weak and even pass out if our heart rate dropped below 60.

Why does bradycardia cause this?

Slow heart rate obviously causes the heart to pump less blood to the brain and the rest of the body. The brain is very sensitive to diminished blood (oxygen and nutrition) supply. So, when the "pump" slows down, the blood circulation and pressure going to the brain is also lower than what is normal for the individual. This fall in blood pressure and blood volume to the brain causes the weakness and fainting spells.

What causes bradycardia?

The usual cause of slow heart rate is called Sick Sinus Syndrome (SSS), where the natural impulse generator (Sinus Node) of the heart is "ill" and not able to send enough electrical impulses to the heart to stimulate it to beat at the normal

rate. The culprit is usually arteriosclerosis (hardening of the artery that supplies that "pulse generator of the heart." For this reason, an artificial (electronic) pacemaker is used to function as the heart's stimulator.

If not treated, what happens?

Untreated persistent bradycardia leads to hypotension (lower blood pressure) and lesser blood supply to the brain, which could result in a stroke. Usually, the symptoms range from weakness, lack of pep or interest, sleepiness among the elderly, to chest pains, and/or fainting spells or to actual syncope (passing out). Persons who develop bradycardia while climbing stairs could faint and fall and hurt themselves, and those who are driving could pass out and lose control of the vehicle.

How is the diagnosis made?

Simplistically, the diagnosis is made by history and physical examination. Listening to the heart beat and checking the pulse to count the heart rate instantly reveal the diagnosis. An EKG tracing will confirm this on record. A more sophisticated method, like Electro-Physiologic Studies (EPS), is now available. This test defines more precisely the nature of the rhythm problem.

What other test may be needed?

If the patient also complains of chest pains or has a history of chest tightness, or EKG findings of myocardial ischemic (deficient blood supply to the heart muscles), heart catheterization may also be needed to find out any significant coronary artery blockages causing the bradycardia. In majority of cases, the history and physical examination finding of slow heart rate, confirmed by EKG tracings, suffices to make a diagnosis of bradycardia/Sick Sinus Syndrome.

Do all patients with bradycardia need a pacemaker?

No, not all. Only those bradycardeic patients with symptoms of weakness, dizziness or fainting spells, and/or chest tightness, need a cardiac pacemaker. If they feel well and are active, with none of any of those symptoms, they do not need an artificial cardiac pacemaker.

Do people with dizziness or fainting spells need a heart pacer?

If the heart rate is normal, the dizziness or fainting spells could be due to other medical causes, and therefore, a cardiac pacemaker will not help and is obviously not needed. Having the correct diagnosis is very important in order to

know the proper treatment regimen. Consultation with a physician is essential because some symptoms could be common among many diseases.

What is a cardiac pacemaker made of?

This tiny device is a little (about 20%) larger than a 5-peso coin and its thickness is about four of these coins piled on top of each other. The micro-computer inside the cardiac pacemaker senses (detects) if the patient's heart rate is below a pre-set (safe minimum) rate (example 65 or 70 beats per minutes). If the heart rate goes below this, the computer starts firing electrical impulses to make the heart beat faster, thus preventing the heart rate from slowing down lower and lower (as in those patients with SSS). The shell of the pacer is made of titanium, a very strong and light metal, a material introduced by the space age. In the 60s, cardiac pacemakers were the size of a hockey puck (about 3 inches in diameter and an inch thick). They have "grown" smaller to their present size with the advances in engineering and computer technology.

How much does cardiac pacemaker cost?

The standard single chamber heart pacer costs about P100,000 and the dual chamber about P200,000. The battery lasts for about 10-14 years, depending on how much the heart uses it, since it is usually set on "demand" mode, where it fires only when it senses the natural heart rate of the patient is going below the pre-set safe minimum rate. If the patient's own rate is above the preset rate, then the pacemaker computer is on a standby mode, and like any battery operated devices, the pacer battery will last longer if not used often.

With lo-bat, what happens?

When the battery power is drained, the cardiac pacemaker will be less efficient, and if allowed to deplete totally, it will cease working. However, when the battery power goes below 90% or so, the regular cardiac pacemaker check-up by the cardiologist every 3 months or so (more often the older the pacemaker gets) will easily reveal the condition of the battery. The battery does not just die down without a warning. There is a safety margin of about a few months, after the 90% battery drain is reached, giving an ample time for a battery replacement.

How is it implanted?

Pacemaker implantation is a safe and brief procedure, usually lasting less than an hour, and done under local anesthesia only. A 2-inch skin cut is made about an inch and a half below the left clavicle (collar bone). The vein is dissected and exposed. The soft and tiny spaghetti-like pacer lead (2 wires enveloped in silicone) is inserted into the vein and directed (under X-ray fluoroscopy) into the right ventricle

of the heart. The electrode (tip of the lead) is left lying against the inner wall of the right ventricle to make a good electrical contact. The other end of this lead is then attached to a pacemaker battery, which is implanted under the skin below the left collar bone. The wound is then closed, using an absorbable suture that does not need to be removed. The patient can usually go home a few hours or a day after the implantation.

Can a person with a cardiac pacer live a normal life?

Yes, individuals with a cardiac pacemaker usually live a normal life, a lot safer and more comfortable life. The only exception are those persons with an attendant illness that is debilitating. One of the famous world personalities who has had a cardiac pacemaker for several years now and still very active in global political affairs is former US Secretary of State Henry Kissinger. Contrary to the myth, persons with heart pacer can safely use a microwave oven, as long as the door of the oven is intact and not leaking. Patients with a cardiac pacemaker are advised to prevent anything from hitting the left upper chest where the unit is, to prevent the pacer lead from getting fractured. Cardiac pacemakers have saved millions of lives and have made life more comfortable and more productive for millions more.