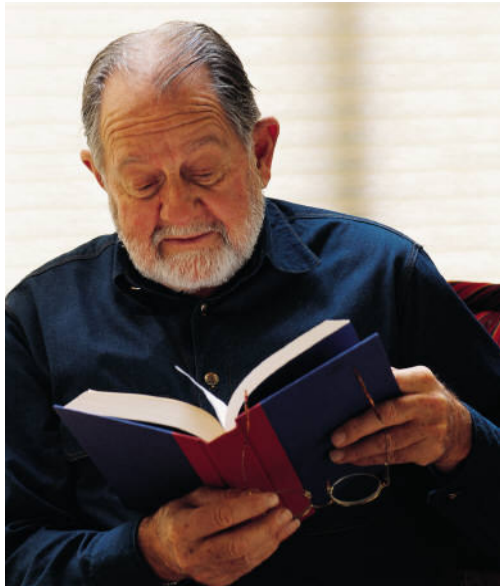


Implantable Cardioverter Defibrillator (ICD)

What every patient needs to know



CARDIAC HEALTH SYSTEM
APRIL 2009



This booklet is prepared as a reference guide for you and your family. It contains information about how an ICD functions, the surgical procedure and follow-up care.

Please bring this booklet with you when you come to the Cardiac Device Clinic.

DISCLAIMER

The information provided in this guide is for information purposes only. It is not intended nor implied to be considered, or used as a substitute, for professional health care advice, medical diagnoses or treatment. It is meant to be a general guide to your cardiac procedure at Trillium Health Centre.

If you have any additional questions or concerns, you should direct them to a health care professional. Never disregard, avoid or delay obtaining medical advice from your doctor or other health care professional because of something you have read in this guide. Trillium Health Centre does not make any express or implied warranties or representations of any kind whatsoever (including without limitation warranties of title or non-infringement or any warranties of merchantability or fitness for particular purpose) with respect to this guide or any information contained in this guide. We do not guarantee or warrant the quality, accuracy, completeness, timeliness, appropriateness, usefulness or suitability of the information provided.

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EMERGENCY DEPARTMENT

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CREDIT VALLEY HOSPITAL

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Mississauga, ON L5M 2N1
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EMERGENCY DEPARTMENT

(905) 813 - 2792



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THE HEART & ITS RHYTHMS

Normal heart rhythms start in the upper chambers of your heart (atrium) and are carried through cells to the lower chambers, known as ventricles. This allows the heart to contract and pump blood that carries oxygen and vital nutrients to the rest of the body.

An abnormal heart rhythm, also known as an arrhythmia, is the condition where the heart either beats too quickly, too slowly or irregularly. These abnormal rhythms may start in the upper part or the lower part of your heart.

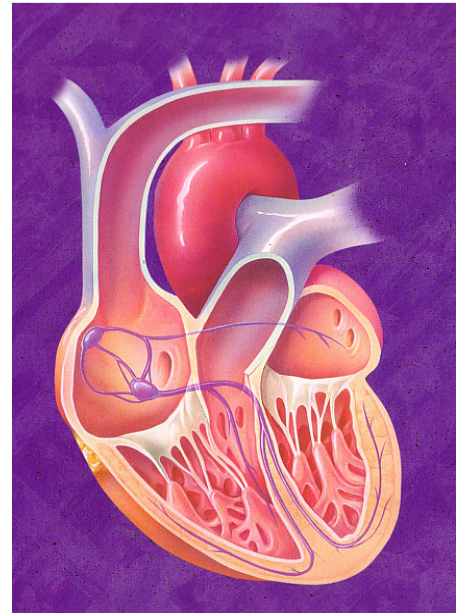


Fig. 1: Anatomy of the Heart

Ventricular Tachycardia (VT)

VT is an abnormal heart beat that starts in the bottom of the heart (ventricle). VT causes your heart to beat faster than normal and blood may not be pumped efficiently through the body. As a result, your brain, heart and body may not receive enough blood and oxygen to function properly and you may experience:

- pounding in the chest (palpitations),
- dizziness,
- weakness,
- fainting spells,
- temporary blind spots,
- blackouts and
- eventually unconsciousness.

Ventricular Fibrillation (VF)

In VF, the heart beat also starts at the bottom of the heart (ventricle) but is much faster, irregular, and chaotic when compared to VT. The heart is not actually beating but it is quivering, resulting in no blood being pumped out to vital organs. On its own, the heart rarely recovers from VF. VF is very dangerous and requires immediate

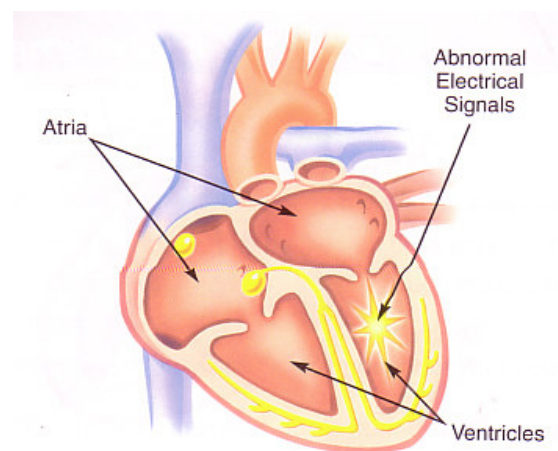


Fig. 2: Electrical activity of the heart

emergency treatment with an electric shock to restore normal rhythm. Without this treatment, an individual loses consciousness within seconds and dies within minutes.

Bradycardia

Bradycardia is a slow heart rate that usually results in the heart beating at less than 60 beats per minutes.

Sudden Cardiac Death

Sudden Cardiac Death, also called cardiac arrest, is a condition in which the heart abruptly and without warning stops working and no blood can be pumped to the rest of the body. This occurs when the heart's electrical system is faulty.

IMPLANTABLE CARDIOVERTER DEFIBRILLATOR

Your heart doctor, who is a heart rhythm specialist, has decided that you need to have an Implantable Cardioverter Defibrillator (ICD).

Why Do I Need an ICD?

An ICD is implanted for 2 main reasons:

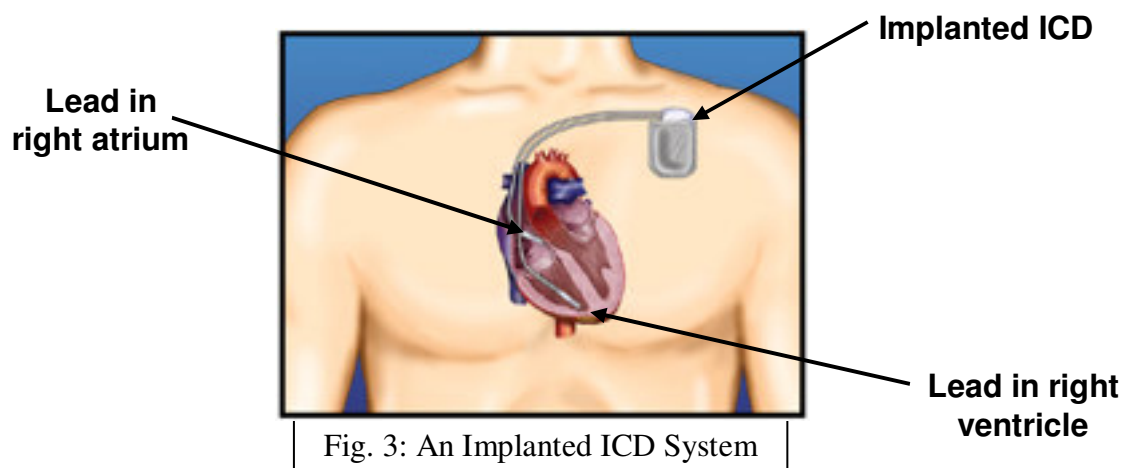
- You have suffered a cardiac arrest or have been treated for a dangerous heart rhythm

OR

- Your heart doctor feels you are at risk for a dangerous heart rhythm

ICD System

An ICD system consists of an Implantable Cardioverter Defibrillator and leads, which resemble long wires. Every ICD can also act as a pacemaker if needed.



The ICD is a small metal case that contains several main components which are illustrated below.

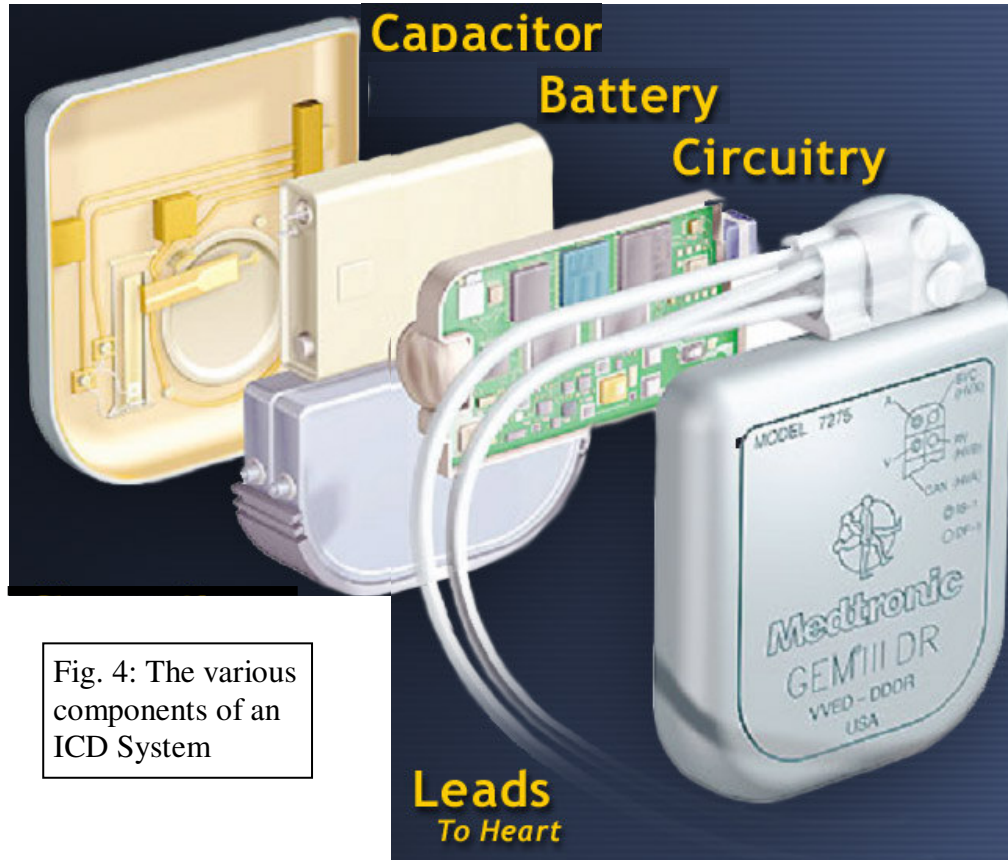


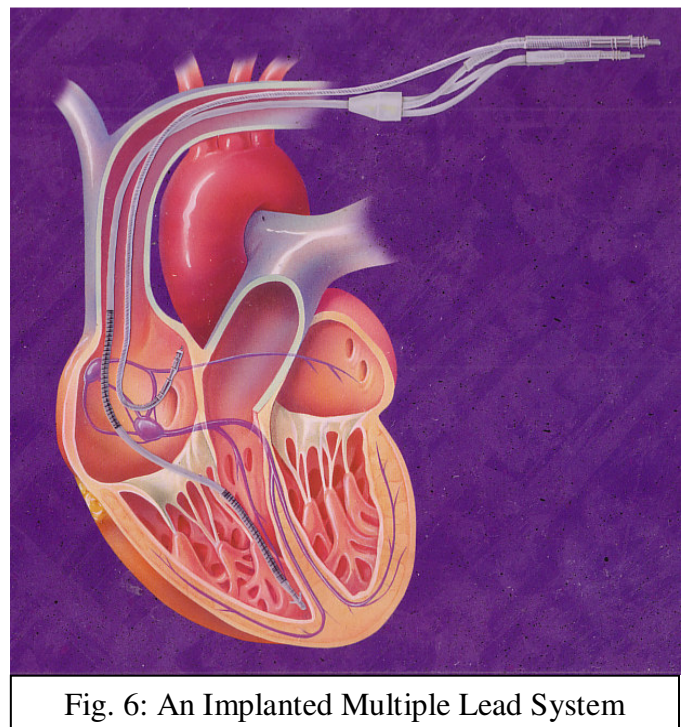
Fig. 4: The various components of an ICD System

An ICD is essentially a small computer with all of the components safely sealed inside the metal case. The device continuously monitors your heart and responds when needed by delivering electrical impulses to your heart. These impulses can vary in power based on the needs of your heart. When the ICD delivers a small electrical impulse, it is said that the ICD is “pacing” the heart and low-energy is used. When the ICD delivers a larger electrical impulse, it is said that the ICD “shocks” or “defibrillates” the heart, and high-energy is used. The ICD will record and save information about any treatments that have been delivered to your heart.

The Leads

The leads are flexible, insulated wires connected to the ICD. Depending on your needs, your doctor will decide whether you need one lead or a system of multiple leads. The leads are used to deliver the electrical impulses from the ICD to your heart.

The leads are inserted through a large vein in your upper chest that goes into the right side of your heart.



THERAPIES/TREATMENTS DELIVERED BY AN ICD

The therapies or treatments that an ICD can deliver to your heart include therapies for fast and slow rhythms.

THERAPIES TO TREAT FAST RHYTHMS

Anti-tachycardia Pacing (ATP)

This therapy is often used as the first means to try to correct your heart's fast rhythm. For just a few beats, the ICD paces your heart faster than the abnormal rhythm it is experiencing. This pacing can take control of the heart's rhythm and "break" the cycle of fast beats, allowing your heart to return to normal. ATP uses small impulses that are not usually felt by you.

Cardioversion

This therapy provides a single, low-energy shock to suddenly interrupt your fast ventricular rhythm and return you to your previous normal rhythm. This "shock" is a set amount of energy and therefore you may or may not be aware of it at the time it is delivered.

Defibrillation

This therapy provides a single, high-energy shock to disrupt a life-threatening rhythm such as ventricular fibrillation. Because it is a high-energy shock, this therapy may be painful or uncomfortable. However, the discomfort lasts a fraction of a second and does not cause lingering pain or damage. You may feel a kick or thump in the chest, a light flutter or palpitation, or nothing at all.

If you happen to pass out from a life-threatening rhythm, you will not feel the shock. If someone is touching you while you receive ICD therapy, they may feel a small thump similar to a muscle twitch but will not be harmed.

THERAPIES TO TREAT SLOW RHYTHMS

Pacing

This function of the ICD monitors the heart's electrical activity and responds when your own heart rate is too low. The electrical impulse that is sent from the ICD is strong enough to stimulate the heart to beat but not strong enough for you to feel. The ICD only paces when the heart needs it.

YOUR THERAPY

Every patient's therapy needs will be different and they may change over time. The heart doctor will make the decision on what kind of therapy is right for you.

Remember that your medications are also an important part of your overall treatment and must be taken as directed.




PREPARING FOR YOUR ICD PROCEDURE

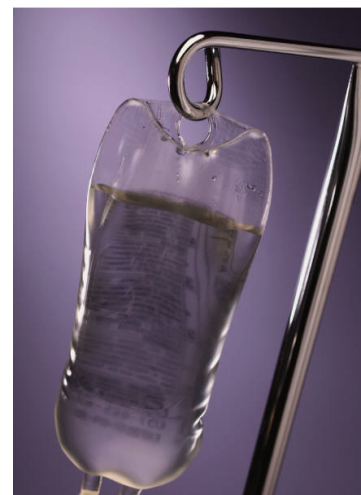
These are general guidelines for you to follow before you have your ICD implanted or replaced. Be sure to follow any specific instructions from your doctor and the Cardiac Device Clinic.

- Be sure you notify the Cardiac Device Clinic if you have any allergies to any medications (e.g. penicillin) or if you are on blood thinning medications (Warfarin, ASA, Plavix, Aggrenox, Ticlid).
- Arrangements will be made for you to visit the Pre-op Clinic. This is usually done one to four weeks before your expected procedure.

At the pre-op clinic you will have:

- bloodwork,
 - urine test,
 - ECG,
 - chest x-ray and
 - you will also see an Anesthetist.
- 
- Shower or bathe the evening before or the morning of the surgery.
 - DO NOT eat or drink anything after midnight the day before your surgery (this includes gum, candy and water).

- You will be given specific instruction if you are to have any medications prior to your ICD implant/replacement. If instructed to take medications: take with a very small sip of water.
- ICD surgery is often done on an outpatient basis. This means that you will come to the hospital the morning of your surgery and go home later that same day. Please make arrangement for someone to bring you to the hospital and pick you up.
- If you have other health problems that may complicate your surgery, the doctor might decide to admit you to the hospital.
- You will receive a phone call one day prior to your surgery to confirm the final details. You will be informed of the time and location for check in.
- When you arrive to Day Surgery the nurses will prepare you for your ICD implant by putting an IV in your arm and assisting you with your gown.



DURING YOUR ICD PROCEDURE

You will be brought to the Operating Room or Procedure Room. You will transfer to a very narrow table and the health care team will put equipment on you such as:

- heart rate monitor,
 - oxygen prongs/mask,
 - finger probe to measure your oxygen levels and
 - external defibrillation/pacing pads on you.
- Just before the procedure, you will be given IV medication to make you feel relaxed as well as antibiotics to prevent infection.
- Both your arms will be secured at your side.
- You will be required to lie very still and not move during the procedure.
- Sterile drapes will be applied. The only area that will be exposed is the area that your ICD will be implanted which is usually just below the shoulder bone.



- The implanting doctor will let you know before the area below your shoulder bone is “frozen”. You will feel a pinprick and a slight stinging sensation.
- Generally, a small incision 2 – 4 inches long is made below your shoulder bone.
- The leads are advanced through a vein until they are inside the heart. During the surgery, x-rays are used to help find the correct location for your leads.
- Once the leads are in place, electrical testing will be done to ensure that they are doing their job appropriately. Sometimes, the leads may need to be moved to ensure a good location.
- A further test, called DFT, may be performed once the leads have been connected to the ICD to ensure its correct functionality. The doctor will give you medications through the IV to put you to sleep for a short time while this testing is conducted.



RECOVERING AFTER YOUR ICD PROCEDURE

You will be transferred to the Recovery Room where you will be monitored for 1 to 2 hours. If you are an inpatient at Trillium Health Centre, you will be transferred back to your bed.

If you are an outpatient, or if you came from another hospital where you were an inpatient (e.g. Credit Valley Hospital), you will be taken to the Cardiac Short Stay Unit.

The health care team will arrange for your chest x-ray and ECG. A member of the Device team will come and check both the chest x-ray and ECG, prior to you being discharged.

Because you will have received medication that may make you drowsy, you must have someone drive you home and be with you for 24 hours. ***You will not be allowed to drive yourself home.*** Please make the necessary arrangements in advance.

Possible Signs Of An Emergency

Go to the nearest Emergency Department or call 911 if you experience the following:

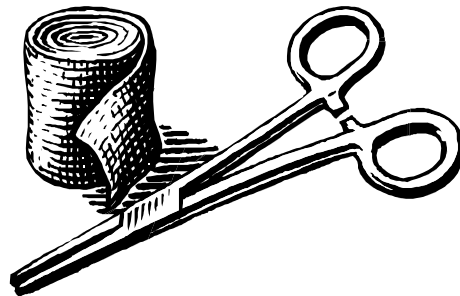


- **shortness of breath** or increased shortness of breath after the implant
- experience **hiccups** that last more than 1 to 2 hours
- **extreme swelling** of the arm or wrist on the same side of the ICD implant
- **oozing blood** from the bandage (do not remove and go to the nearest Emergency Department)

Taking Care of Your Incision

- You will have a bandage over your incision after your procedure.
- The incision will be closed by suture material that will dissolve on its own and does not need to be removed.
- Steristrips will be applied over the incision that helps keep the incision closed.
- Some discomfort, tenderness and bruising are common around your incision. This generally resolves over a few days to a week. You may take non-aspirin pain relievers containing acetaminophen (e.g. Tylenol) as needed for discomfort.
- The health care team will check & possible change your dressing the next morning.

- The outer dressing should be removed after day 3 of your procedure unless otherwise instructed by the health care team.
- The steristrips will loosen with time and are to be removed after 10 days.
- You may shower or bathe 4 days after your ICD implant. However, you should **not** direct the full force of the water on your incision area. Try not to get the steri-strips too wet. Water will not harm your ICD.



Daily Checking of your Incision and ICD

You **MUST** observe the incision and site of your ICD on a daily basis. If you notice signs of any of the following, **YOU MUST IMMEDIATELY** report it to Cardiac Device Clinic. If you are unsure, call us anyway.


- increased redness,
- swelling,
- localized pain,
- oozing from the incision or opening of the incision.

Do not touch, rub, or scratch at your incision or ICD area. You may cause the leads and/or ICD to move from where they are supposed to be!!

The Newly Implanted Lead(s)

The lead(s) that has been placed inside your heart will not be stable for approximately six weeks. Until it is known that the leads are secure within your heart, you will need to follow the specific instructions listed below:

Arm Limitations & Exercises

- All patients will be given a sling that should be worn until they return the following day to the Cardiac Device Clinic for their first visit. The sling is very important in order to restrict arm movement for 24 hours.
- 
- Do not raise your arm above the level of your shoulder on the side of the incision until after your 6 week appointment in the Cardiac Device Clinic.
 - For 6 weeks after your surgery, do not lift, push, pull anything over 5 pounds or use the affected arm in repetitive movements that could dislodge the lead(s) such as:
 - vacuuming, swimming, golfing, bowling, raking, shoveling
 - If you have had an ICD replacement only, without new leads being implanted, there are generally no arm restrictions. Confirm this with the Cardiac Device Clinic.

- 1- 2 days after your surgery, you ***must start using the arm*** on the side where the ICD was placed. If not, you could end up with limited movement of your shoulder joint.
- Hold your arm outstretched at your sides (no higher than your shoulder level) and make 8-10 small circles in the air 3 times a day for the first 6 weeks after your surgery.

Resuming Activities

- You and your doctor will decide when you may resume your regular activities, return to work and sexual activities. If you have been hospitalized for a period of time, try to increase your activity slowly.
- There are specific criteria that your doctor and the Ministry of Transportation must follow regarding your license to drive or not to drive. Talk with your doctor and the Cardiac Device team for your individual specific needs.

ICD Identification Card

Following surgery, you will be given the model number, the serial number and the name of the company who manufactured your ICD. Your ICD is registered with the manufacturer and a laminated identification card will be mailed to you by the company. You should carry your ICD Identification card in your wallet at all times. If your demographic information changes, please notify the company immediately, so that records can be updated. The company telephone number will be on the card.



Medic Alert Identification

A Medic Alert bracelet/necklace identification should be worn at all times. If you fall unconscious, the Medic Alert identification will let people know that you have an ICD and also give information about other health problems you may have. After your ICD implant and before you leave the hospital, you should receive a Medic Alert application form. If you already have a Medic Alert, you must contact them in order to update your information.



FOLLOW-UP OF YOUR ICD

If you require an interpreter, please bring an English speaking family member or friend with you to all your appointments.

What to Bring to Each & Every Clinic Visit

- Ontario Health Card
- ICD identification card (temporary or permanent)
- Medications: bring current medications in the original bottles (Please do NOT bring a list of your drugs)



After your ICD implant, you will have follow-up appointments with the Cardiac Device Clinic at the time intervals specified below:

- 1 day
- 6 weeks
- 3 months
- every 6 months unless there is a reason that the clinical staff wish to follow sooner.

Your follow-up appointment will include:

- ICD I.D. card review,
- medication review,
- blood pressure,
- device follow-up/testing and
- a visit with the heart doctor.

The Cardiac Device Clinics are busy and there may be some waiting. It is suggested that you not plan other appointments around the same time as your follow-up appointment. We will appreciate your patience. Your next follow-up appointment will be scheduled for you before you leave the clinic.

Please note that this clinic is not meant to replace the general medical care of your family doctor and/or heart doctor in your community. A letter will be sent to your doctor after each clinic visit.

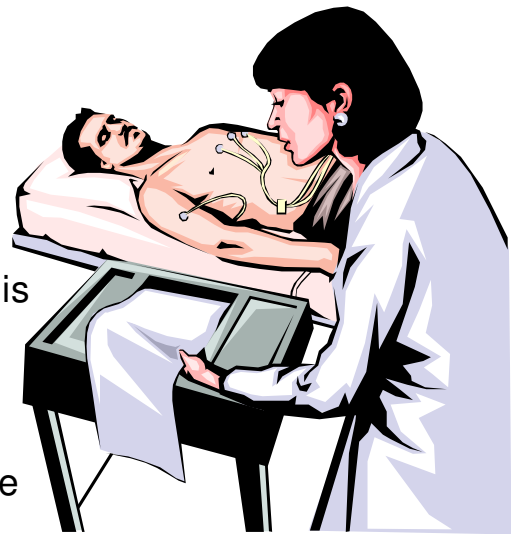


CARDIAC TESTS

A variety of tests may be performed on your heart to help determine how it is functioning and which treatment would best suit you. The following is only a brief description of a few common tests that may be performed. Other tests not listed in this book may also be performed and can be discussed with your doctor and the Cardiac Device Clinic.

ECG/EKG (electrocardiogram)

An ECG is a diagnostic test that measures and records your heart rhythm from the exterior or surface of your body. This test is designed to show how electrical signals travel throughout your heart. Your particular heart rhythm can be determined from the information gathered from an ECG.

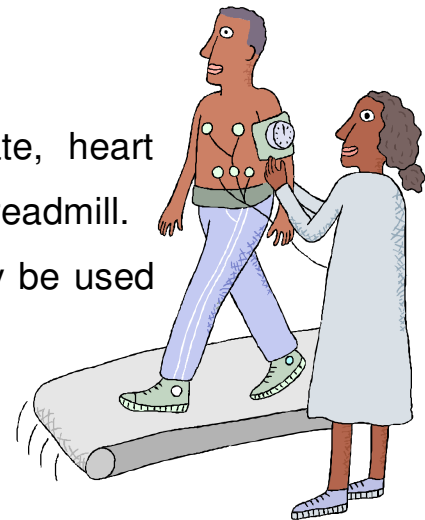


ECHOCARDIOGRAM (echo)

An echo uses high-frequency sound waves (ultrasound) to produce a picture of your heart. It allows your doctor to see structures of your heart such as the walls of the heart, the heart valves and the large blood vessels. The flow of blood through the heart can be visualized.

GXT (graded exercise test)

This test continuously monitors your heart rate, heart rhythm and blood pressure while walking on a treadmill. If this test is done, the information gathered may be used to help program your ICD.



EPS (electrophysiology study)

An EPS consists of ECG readings recorded from the inside of the heart using catheters. Sometimes, rapid rhythms are started to check the abnormal rhythm and your heart rate. Also, the heart doctor wants to know how your medications and ICD reacts to the abnormal rhythm.

MUGA (multi-gated angiography) or RNA (radio nuclide angiogram)

This test involves the intravenous injection of a substance that would allow an image of your heart to be produced. This test is often used to determine the strength of your heart's pumping ability.



WHAT TO DO IF YOU RECEIVE ICD THERAPY

Stop what you are doing and ask yourself how you feel:

Shocks	What to do
If you received ONE shock and feel well	Call the Cardiac Device Clinic for further discussion
If you received TWO or more shocks and feel well	Call the Cardiac Device Clinic for further discussion (if after hours or weekend go to the closest Emergency department).
If you received one or more shocks and feel UNWELL	Go to the closest Emergency Department

****Remember:** if going to the hospital bring your ICD I.D. card and your medications with you.

****Remember:** write down the date, time, symptoms and activities surrounding your shock

FREQUENTLY ASKED QUESTIONS

Other Medical Procedures

If you require any type of surgery or treatment, you need to inform all your Health Care Providers that you have an ICD. Also inform the Cardiac Device Clinic, as your ICD may need to be reprogrammed as certain medical equipment may interfere with the ICD. If you are unsure about a treatment you need to undergo, don't hesitate to call us to discuss your concerns.



Travel

Most often, your ICD will not prevent you from traveling to most countries in the world. Please discuss traveling with your Cardiac Device team before making any arrangements. Airport security systems contain metal detectors. Remember to show your ICD I.D. card to airport security. Usually, they prefer to check you manually or use the handheld wand. Plan to add an extra 5-10 minutes to your pre-boarding time to get through security.

Dental work

You should inform your dentist that you have an ICD.

Cellular Phones

Cell phones should be used on the opposite ear to the side where your ICD was implanted. Cell phone antennae should be kept at least 6 inches away from your ICD, therefore, do not place a cell phone in the breast pocket of your shirt or jacket on the same side as your ICD. If your ICD is in your abdomen, don't clip the phone to your belt near the device.

Electrical Appliances

General household appliances are safe to use, provided they are properly grounded and are in good condition. Examples of appliances and other household objects that **will not** interfere with your device include: microwaves, cordless phones, TV/VCRs, AM/FM radios, computers, toasters, and hairdryers.

Sexual Relations

The ICD should not delivery therapy for the natural increase in heart rate that happens during sex. However, if this happens, your partner may feel a tingling. The shock will NOT hurt your partner.

Electromagnetic Interference (EMI)

Electromagnetic Interference refers to electrical signals (outside of the ICD) that may affect your ICD. Your ICD is sensitive to strong electrical and magnetic fields. The following will interfere with the proper functioning of your device

Medical Sources of Interference:

Prior to undergoing any the following procedures or coming in contact with any of the items listed below, you must tell your physician(s) that you have an ICD and/or call the Cardiac Device Clinic staff for information:

- Electrocautery
- Cardioversion
- Defibrillation
- Magnetic Resonance Imaging (MRI)
- Lithotripsy
- Tens
- Diathermy
- Radiation
- Dental procedures
- Ultrasound
- Electrolysis

Non-Medical Sources:

- Cellular phones
- Improperly maintained household appliances
- Jewelry containing (feel good) magnets
- Large stereo speakers and strong magnets
- Car engines
- Arc welding
- Chain saws
- Ham radios
- Anti-theft devices

Death and the ICD

The Health care team understands how difficult it is for a family to deal with the passing of a loved one. However, we kindly request that the implanted ICD be returned to us for examination. Please ask a member of your family to call us to arrange this. Also, please tell your doctor and family about this request so that the funeral home can be informed.

However, if you have chosen to be cremated, the ICD must be removed; if you have chosen to be buried, the ICD can be buried with you.

MORE ABOUT YOUR ICD

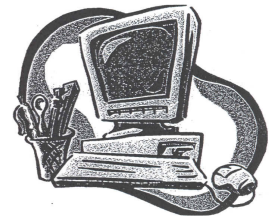
- Your ICD and leads have been thoroughly tested during each step of the manufacturing process however, as with all devices, not all is 100% foolproof.
- If a problem should be noted on any of your specific hardware, you will be notified by the clinic of the issue and discuss management.
- ICDs do not prevent your rhythm problems instead they treat these problems if they arise.
- The ICD is designed so that you can carry on as much of a normal lifestyle as possible. The goal of ICD therapy is to allow you to lead a life that is as good as or better than you could before the ICD.
- The Heart and Stroke Foundation of Ontario recommends that family and friends of people with heart disease receive training in CPR. It is a good idea to swim with a buddy.



RESOURCES

ICD Company Telephone Numbers

Biotronik Canada Inc.	(416) 620-0069
Boston Scientific (Guidant)	1-800-268-4487
Medtronic of Canada	1-800-268-5346
Sorin Group (ELA)	(416) 751-8787
St. Jude Medical	(905) 812-8600



Internet Addresses

The following is a list of websites you may be interested in viewing to obtain further health information. This is only a short list of the many resources that are available and you may wish to collect more. To assist you with this, we have included a space for you to note down additional web links.

www.hrspatients.org

<http://www.heartpoint.com/arrhythmias%20-%20introduction.html>

Questions/Notes



DONATION FORM

Trillium Health Centre appreciates all donations. Donations of \$25.00 and up are eligible for a tax deduction.

Name: _____

Phone: _____

Email: _____

Address: _____

City: _____ Postal Code: _____

Donation:

- I would like make a credit card donation (please call me)
- I have enclosed a donation cheque

Please direct my donation to:

- Cardiac Device Clinic
- Cardiac Catheterization & Electrophysiology Laboratory
- Trillium Health Centre Foundation area of greatest need

Please email, fax or mail this form along with your donation to:

Trillium Health Centre Foundation
Clinical & Administrative Building
Trillium Health Centre
100 Queensway W.
Mississauga L5B 1B8
T: 905.848.7575
F: 905.804.7927
foundation@thc.on.ca