



CARDIOVASCULAR  
SOLUTIONS

# Guide for Patients with Coronary Artery Disease

This guide has been specifically designed and put together for patients who have recently suffered from an acute heart attack or chest angina. It is also meant to be an excellent source of information for family members and friends of those patients. The goal of this guide is to help you and your loved ones understand your coronary artery disease, its causes and risk factors, and how to best respond to them in order to protect yourself.

In this guide you will find the following:

- Recommendations for a healthy lifestyle.
- Information about diagnostic tests that have been or may be performed on you.
- Education about your treatment and how to manage your medications.
- Directions for what to do in the event that you have another heart attack.

In conclusion, we hope that this information will benefit you positively by helping you be more proactive about your health, by helping you shorten your recuperation time and by helping address any concerns or questions you and your family have about your health now and in the future.

With this information we are confident that you will be able to control your coronary artery disease as you take the right precautions without experiencing unnecessary anxiety or fear.

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# The Heart

## FUNCTION

The heart is a vital organ whose primary goal is to pump blood to all parts of the body, and with it oxygen in addition to other necessary elements. In order to do this it has a unique system of stretchy tubes, called arteries and veins, that are distributed throughout the body.

The heart is a muscle that has four main chambers: the two upper chambers are the right and left atria and the two bottom chambers are the right and left ventricles. Blood circulates through each chamber by passing through valves that open and close rhythmically. (Fig. 1).

The heart also needs to be supplied with blood in order to work, therefore it has its own arteries, called coronary arteries, of which there are two main ones: the right and the left. The left coronary artery further down divides into two major branches which are known as the left anterior descending artery (LAD) and the circumflex (CX). (Fig. 2).

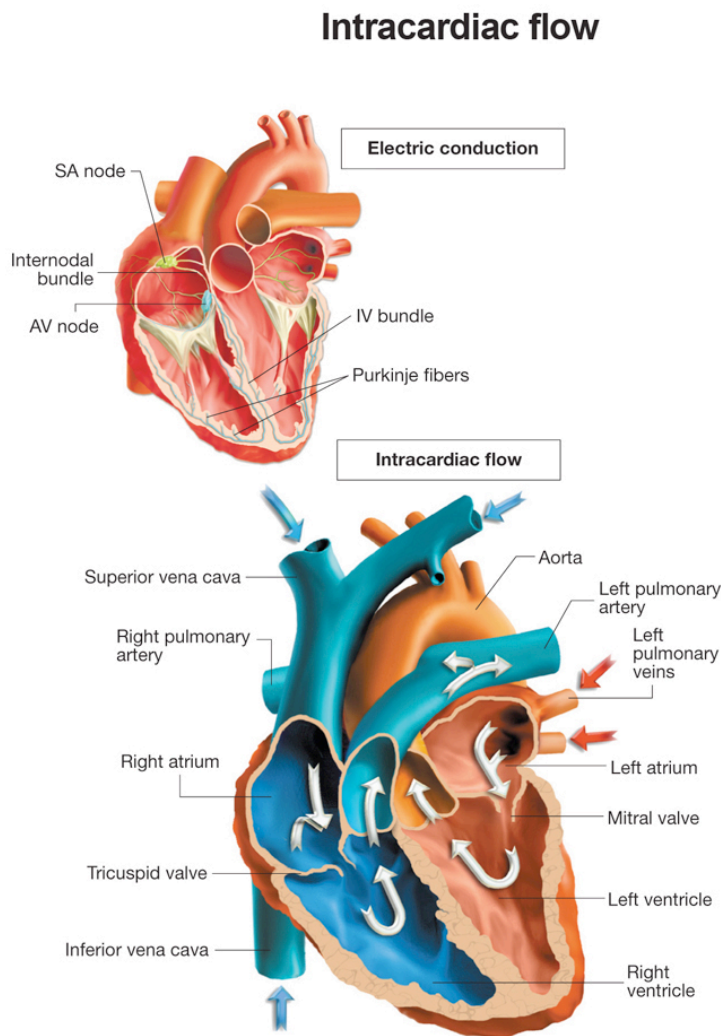


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## CORONARY DISEASE

An obstruction of one or more of the coronary arteries causes an imbalance in the amount of oxygen reaching the heart giving rise to coronary heart disease which can often manifest in several different ways:

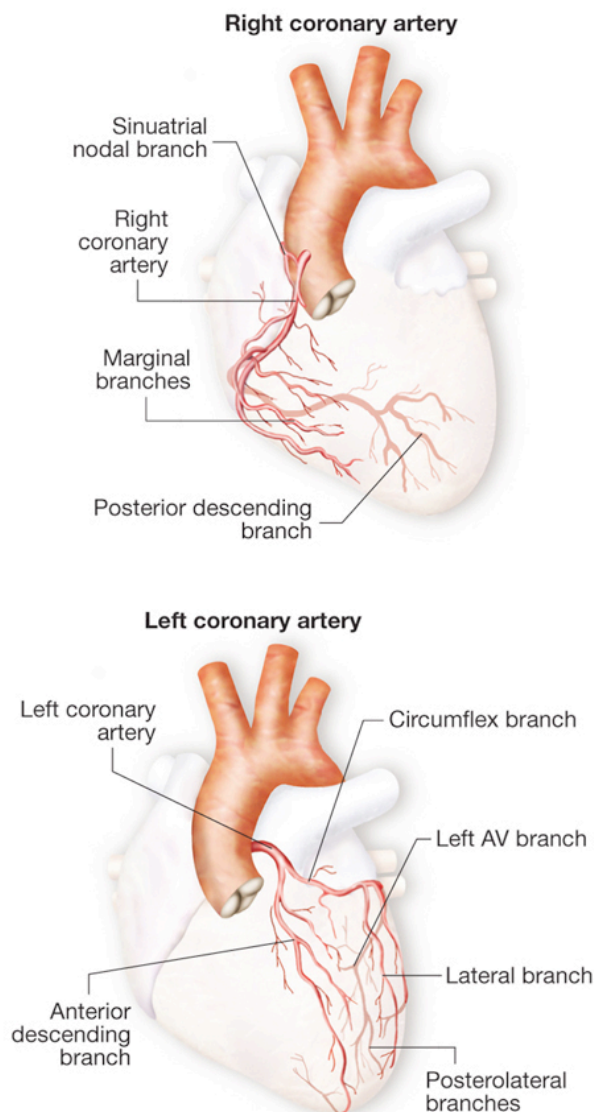
- **Chest Angina / Chest Pain:** This is characterized by a moderate pain or pressure, that starts in the center of the chest and could extend outward towards the arms, neck and jaw, back, and/or stomach and usually only lasts briefly. (Fig. 3). The lack of blood flow is short-lasting and normally does not leave any permanent damage. Typically the painful sensations are preceded by some physical effort or intense emotions and go away several minutes after the cessation of those precipitating events. This type of angina is called stable angina. In some cases the pain may start while the person is at rest and therefore it is called unstable angina. This type of angina may be caused by a spasm or stretching of the coronary artery wall (Fig. 4).

- **Myocardial infarction (heart attack):** This is characterized by a pain similar to the chest angina but it may be more intense and generally lasts longer, usually over 30 minutes, leaving behind permanent muscular damage. It's caused by the formation of a clot around an atheromatous plaque (cholesterol or calcium deposits in the arteries) that to-

tally obstructs the blood flow to the cardiac muscle. After suffering a heart attack the cardiac muscle that was left unharmed will start to take over the function of pumping blood. If the damaged area is small, the functioning will be just the same as before the attack, but if the damaged zone is extensive the heart has to undergo a series of transformations in order to adapt to the new situation. A coronary lesion may be experienced differently by every person. Most heart attacks are accompanied with pain except for in rare circumstances when there is no pain at all. The pain may appear while the person is at rest, however it occurs most often when the person is experiencing emotional stress, is doing some type of exercise, is in extreme temperatures, or happens during the early hours of the morning. (Fig. 5).

## Diagnostic Methods

### The coronary arteries



In the majority of cases, diagnosing a heart attack or chest angina is fairly simple and is attained by gathering the patients reported symptoms, performing a physical exam, doing an electrocardiogram, and analyzing lab results. In addition, at times it is best to use other methods of exploration in order to confirm the diagnosis, get a better understanding of how advanced the disease is, and evaluate possible consequences (Fig. 6).

Not all of the tests that are described here apply to all patients. Depending on your specific symptoms your doctor or cardiologist will decide which tests are the most appropriate for you.

### LAB TESTS

These are very useful at diagnosing a heart attack in its early stages. They are also used in routine checkups to monitor levels of substances related to coronary artery disease: cholesterol, glucose, enzymes, etc...

### CHEST X-RAY

While this method does not help to diagnose a heart attack or chest angina, it offers an image of the heart so that one can see the size of the aorta and predict whether the disease will affect the lungs.

### ELECTROCARDIOGRAM

This is a graphic representation of your heart's electrical activity that is obtained using a machine called an electrocardiograph. Small metal electrodes are stuck on to the skin of your arms, legs and chest. Wires coming out of those electrodes connect them to the

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## Angina pectoris (Pain localization and propagation)

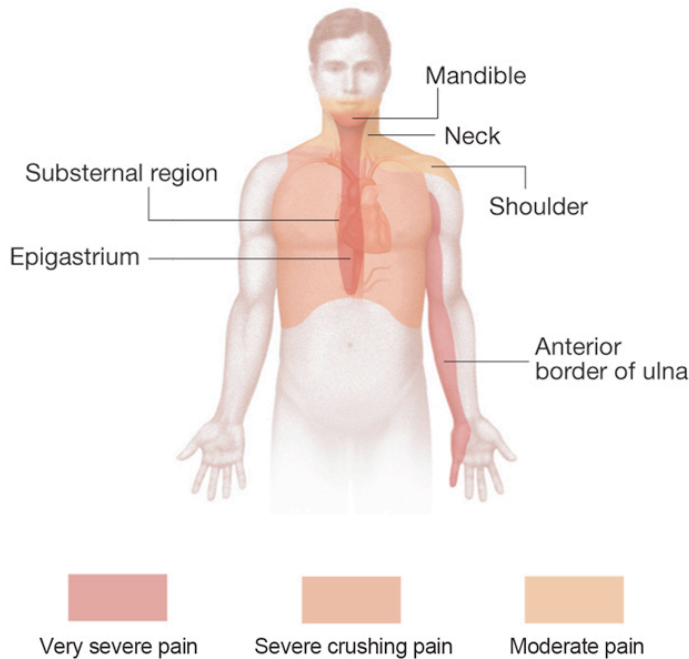


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take care to not let it get wet or get disconnected.

### STRESS TEST

In this test we increase the amount of work the heart is doing by deliberately stimulating it, often by exercising on a tread mill. During the exercise you will be hooked up to an ECG so that the heart's electrical activity can be monitored as well as your blood pressure. During this test you may experience chest pains and other symptoms similar to the ones that caused you to seek treatment in the first place. If this should happen don't panic, just tell your doctor immediately so that he can stop the test and the pain will stop shortly after. Other than this, it is important to try to reach your exhaustion point as it will yield more information. This test is useful for diagnosing coronary artery disease, supplying information about irregular heart beats, evaluating the overall heart functioning after a heart attack or cardiac intervention, and determining the recommended level of physical activity. It does not require any special preparation on your part other than to wear comfortable clothing to work out in. If you take medications your doctor may recommend that you suspend some of those medications several days prior to undergoing this procedure.

electrocardiograph. This test does not produce any pain or discomfort and requires no special preparation on your part.

The electrocardiogram (ECG) allows us to see the size and location of the heart attack. If you experience chest angina, the test may appear normal, especially when you are not having any pain at that moment. This is why if you are admitted into a hospital or are waiting to have the test done you should let the doctor know any pain or discomfort you are having so that they can capture the alteration on the ECG.

### HOLTER

This method allows for an ECG to be recorded over a span of 24-28 hours. A portable device is fastened to your waist. Connected to it are electrodes that register your heart's electrical activity and then store this information on a recorder. After it's finished this information is analyzed. This is an extremely useful tool for irregular heart beat disorders and in diagnosing certain types of chest angina. While wearing the device you will be able to continue with your daily activities as long as you

### Unstable angina pectoris

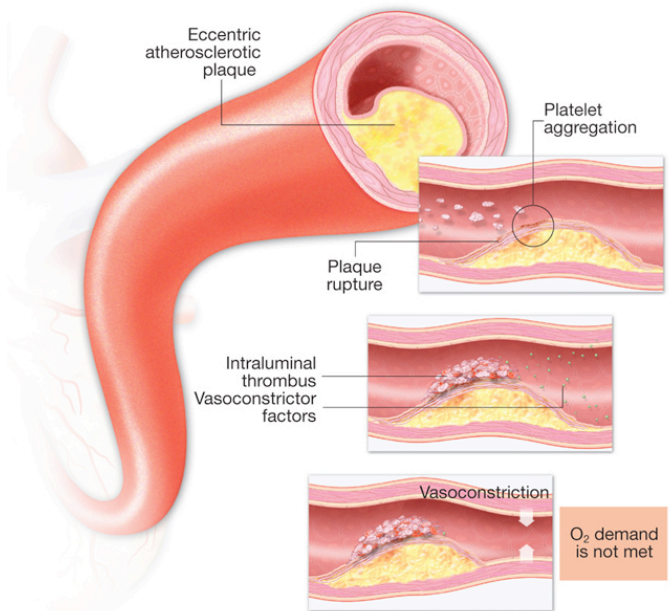


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## Myocardial infarction

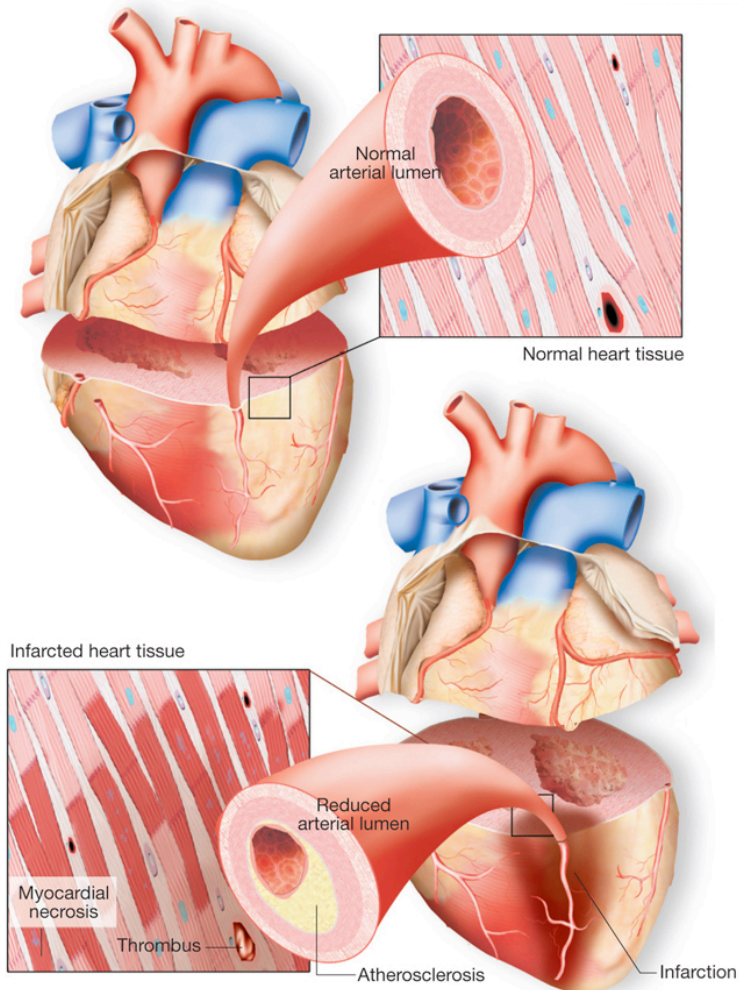


Fig. 5 © 2013 Licitelco España S.L.

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## ECHOCARDIOGRAM

This is an ultrasound of the heart taken at the level of the chest. It gives two and three dimensional images that provide information on the size of the heart, its movements, and how well the heart valves function. It's very useful in diagnosing and evaluating complications of a heart attack. It does not produce any type of pain or discomfort.

## TRANSESOPHAGEAL ECHOCARDIOGRAM

This is a variation of the echocardiogram that is taken by inserting a probe through your mouth into your throat. In order to avoid discomfort you may be given a local anesthetic or sedated.

## STRESS ECHOCARDIOGRAM

This test is performed by taking an ultrasound of the heart while it is being made to exercise an effort due to the use of an intravenous medication. The majority of medicines used in this procedure can cause uncomfortable sensations such as heart palpitations, sweating, tiredness, dry mouth, and headaches. It's also possible that you may feel chest pain similar to that caused in the stress test, and if you do you should let the doctor know immediately. This test is very useful in detecting heart disease in those people that are not able to do the stress test due to physical incapacity or for other reasons.

## NUCLEAR TEST / MYOCARDIAL PERFUSION TEST

These are tests that use substances that emit small amounts of radiation. They are injected into a vein and after 1-2 hours they are deposited into the cardiac muscle where they can be seen using special instruments. These tests are useful to study how the heart contracts, how the blood circulation is in the coronary arteries, and to see if there are any possible blockages in those arteries. Sometimes these tests are combined with the stress test. Although these substances are radioactive, they do not present a danger to you as the amount of radiation is so small and quickly eliminated by the body.

## CARDIAC CATHETERIZATION / CORONARY ANGIOGRAM

These tests provide very accurate and reliable information about the location and severity of obstructions in the coronary arteries. If you receive an intervention, you will be able to see the results of it and its successfulness. These tests do have some associated risks, therefore they are only performed if enough information is unable to be gathered or if it is insufficient by other diagnostic tests. This test is performed by inserting a catheter in an artery, usually the femoral (in the groin) or the radial (in the wrist), and using a guide-wire to move it towards the heart, which allows access to the coronary arteries (Fig. 7). A local anesthetic is used at the puncture site of the artery. Once the catheter is situated in the heart, a dye that is viewable through an X ray machine is injected,

allowing the coronary arteries to be seen. While the dye is being injected you may notice hot and suffocating sensation that barely lasts several seconds. At the puncture site you may feel some slight discomfort and may have some light bruising that will go away in several days. In order to avoid major complications after the intervention you should follow the established guidelines: rest in bed in a horizontal position, do not move your extremity for at least 8 hours. Drink lots of liquids, primarily water, in order to eliminate the contrast, unless otherwise indicated by your doctor.

## Diagnostic triad of AMI

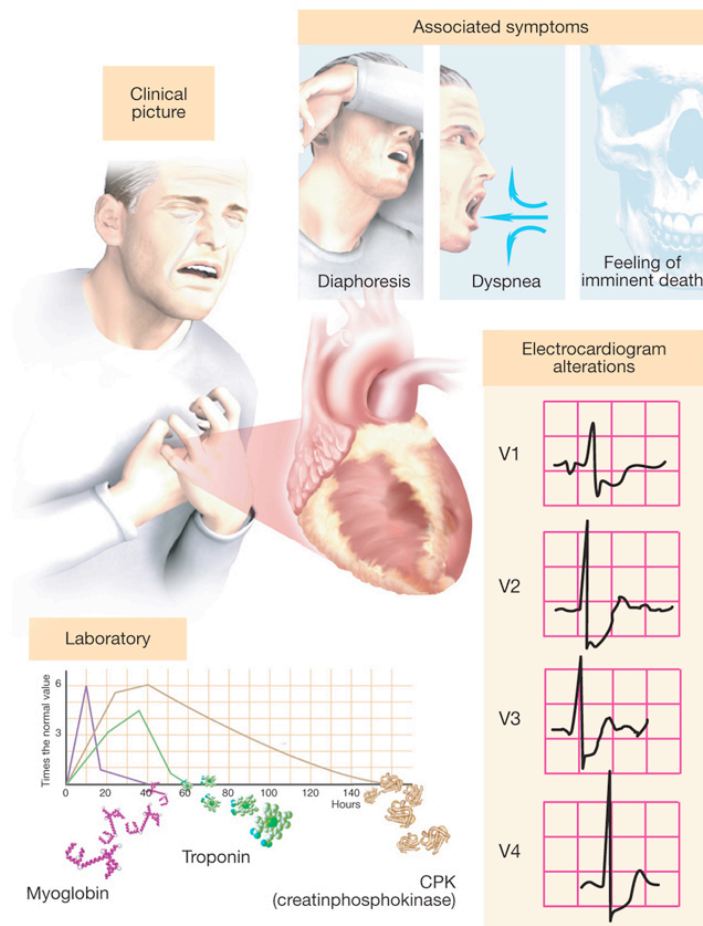


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## Treatment

There are various forms of treatment, the selection of which one to use will be made by the medical team based on the results of the diagnostic tests and each patient's individual characteristics.

### MEDICATION

#### A) Vasodilators:

- **Nitrates and isosorbide:** these increase the diameter of the blood vessels, allowing for more oxygen and blood to reach the heart. They come in different dosages and they are administered differently depending on whether they are being taken to treat an acute situation or are being taken as routine treatment.
- **Sublingual spray / pill:** these are fast acting nitrates that are used in acute situations. These should be taken at the first signs of chest pain that do not go away when you are at rest. For this reason they should always be carried with you, by placing them in a plastic case so that they are protected from the light. They should be replaced every six months as they become no longer active. Write down how many pills or sublingual sprays you used to relieve the chest pain, this information will be very useful for your doctor.
- **Intravenous:** this is used exclusively in the hospital setting.
- **Patch:** this is used as a routine form of treatment and is applied to any part of the skin that is hairless. It is placed on in the morning and is taken off 12 hours later..
- **Capsules and pills:** these can also be prescribed as part of a routine treatment, independent of its use in acute chest pain/angina.
- The main secondary effects of nitrates are: headaches, dizziness, heart palpitations.
- Avoid drinking alcoholic beverages while taking nitrates as they can cause unpleasant secondary effects.

- B) **Angiotensin converting enzyme inhibitors (ACE Inhibitors):** These are pills filled with substances that better the heart's performance and help control both the blood pressure and the abnormal dilatation of the heart muscle after a heart attack. As a side effect they may cause the blood pressure to drop and a persistent dry cough. If either occurs consult your doctor but don't take yourself off the medicine without the doctor's consent.

C) **Beta-blockers:** These reduce the heart rate / pulse and the blood pressure, thereby reducing the heart's need for oxygen. Remember to take your pulse before administering the corresponding dosage. If the pulse is less than 40 beats per minute, don't take them and call your doctor instead. Possible side effects are muscle fatigue, lowered heart rate, insomnia, nausea, vomiting, diarrhea, ankle swelling, impotence, and loss of libido. If you experience any of these side effects talk to your doctor but don't take yourself off the medicine.

D) **Calcium Channel Blockers:** These lower the heart's need for oxygen and dilate the coronary arteries. The most common side effects are headache, dizziness, and ankle swelling.

E) **Antiplatelets:** They prevent clot formation in the blood vessels. The most commonly used is aspirin (salicylic acid), but there are others like Clopidogrel (Iscover or Plavix), Prasugrel (Effient), or Ticagrelor (Brilinta). You should take them for the allowed period of time.

F) **Anticoagulants:** These prolong the time it takes for the blood to coagulate. The most common of these in pill format are acenocumarin, warfarin (Coumadin), Apixaban, Rivaroxaban, and Dabigatran.

If you are being prescribed anticoagulants, you should not forget to be periodically monitored in order to adjust the dosage as needed. You should always carry with you a card that states the name, type and dosage of coagulant you are on.

Lastly, you should remind whichever doctor you see that you are taking anticoagulants, as there are drug interactions that can occur especially with anti-inflammatories or antibiotics that may alter their effectiveness. You should also inform your doctor that you are taking anticoagulants if you are going to undergo any small interventions such as dental extractions. Keep in mind that alcohol can also alter the effectiveness of the anticoagulants.

There are also treatments to control cholesterol, hypertension and diabetes. If it's indicated you should follow the treatment to control cholesterol levels, blood pressure and glucose and periodically have check ups with your doctor to control your risk factors.

Before or directly after being discharged from the hospital, you should know the answers to the following questions:

- ~What is the specific name of the medication you are taking?
- ~What do you take the medication for?
- ~What is the dosage, how do you administer it and when do you take it?
- ~What are the possible side effects?
- ~What should you not mix with the medication?

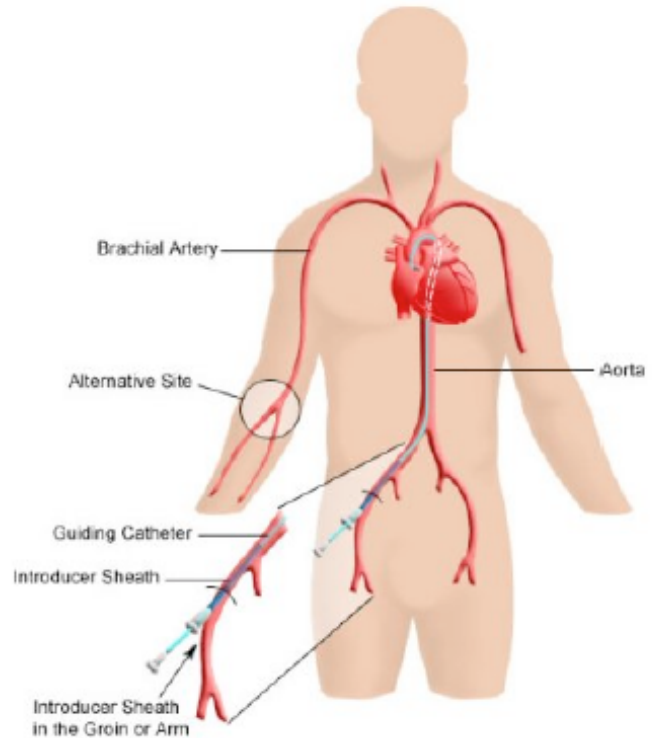


Fig. 7



Ask about anything else you need to complete your information about the treatment. It is very important to take the medicine that is on the prescription form exactly the way its indicated and to not stop it without your doctor's consent.

## INVASIVE TREATMENT

A) **Fibrinolysis:** if a heart attack is being caused by the formation of a clot in a coronary artery (Fig. 8) and it is a recent event (within a few hours), it's possible to dissolve it by use of IV medicatons administered under strict medical supervision and special medical equipment. These medicines generally work better the sooner they are used after the symptoms first appear. For this reason it is important to get immediate medical assistance and go to the hospital as soon as possible.

B) **Coronary Angioplasty:** This technique involves dilating the coronary artery that is obstructed. The procedure begins the same as a catheterization. However in an angioplasty, after the catheter is situated in the correct position, a balloon is guided to that area and inflated, causing the plaque to be pushed against the walls of the artery which thereby opens and allows for the blood to flow freely again (Fig. 9). Sometimes a metallic mesh called a "Stent" is placed to add support and reduce the risk that the artery becomes blocked again. After you have had the procedure you should follow the same aftercare protocols explained in the catheterization section, with the only adjustment being that you have to stay immobile for a longer duration.

C) **Open Heart Surgery (Coronary Artery Bypass Graft):** This consists of connecting the aorta to an area past the diseased part of the coronary artery by way of a vein segment extracted from the leg (saphena) or chest (mammary). This allows blood to circulate as it is rerouted around the obstructed area.

## Atherosclerosis, thrombosis and thromboembolism

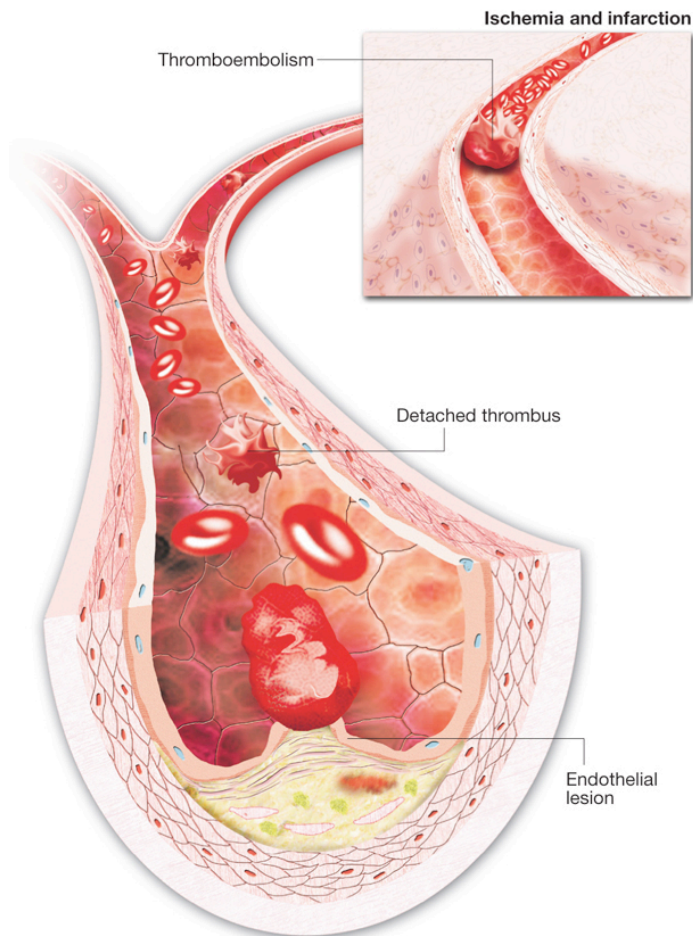


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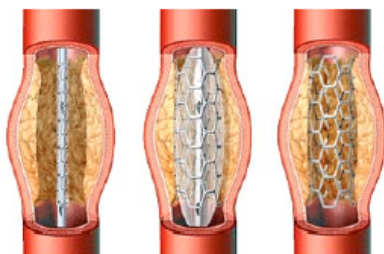


Fig. 9

## Risk Factors

The most frequent cause of heart disease is atherosclerosis, a degenerative process in the arteries that starts when you are born and slowly progresses (the reason for which some of its most devastating effects don't start to manifest themselves until usually middle age and later). There are a series of factors that aid in its development called cardiovascular risk factors, these are those conditions or circumstances that predispose the arteries to being obstructed, and therefore lead to the

apparition of heart disease. Keep in mind that the obstruction of coronary arteries is a slow process that starts many years before any symptoms appear.

There are three risk factors that have a clear influence on the appearance of this disease:

- Tobacco: Consumption of any type and quantity of tobacco.
- Hypertension: high levels of blood pressure.
- Hypercholesterolemia: high levels of cholesterol.

Other risk factors are:

- Diabetes: elevated levels of glucose in the blood.
- Sedentary Lifestyle: lack of physical exercise.
- Stress: emotional tension.
- Obesity.

All of the above mentioned risk factors are things that you can modify, that is to say, you can do something about them. However, there are other risk factors such as genetics, age, and gender which you can not change.

## SMOKING

This is one of the primary cardiovascular risk factors (Fig. 10). Nicotine and carbon monoxide, breathed in during the act of smoking, favor the appearance of heart disease. Tobacco raises the blood pressure and speeds up the heart beat, making the heart work harder. It also makes it difficult for oxygen to get to our body's cells, increasing the risk of blood clots (thrombosis).

In addition, tar and other chemicals in cigarettes are responsible for the majority of lung cancers, mouth, larynx, esophagus, pancreas, bladder, neck and cervix. It aids in the formation of gastric ulcers, bronchitis, esophageal hernias, acceleration of osteoporosis, higher levels of glucose in the blood and makes it difficult for the absorption of certain vitamins. It is also linked to problems with sexual impotency.

People who smoke live 10-15 years less than non-smokers. They are at an increased likelihood to suffer from ischemic heart disease as opposed to non-smokers. In people 40 years or younger, the most frequent risk factor for a heart attack is tobacco consumption.

***If you are a smoker and you continue smoking after your first episode of ischemic cardiopathy, your chances of suffering another episode are almost assured.***

It makes no difference if you smoke less. Light cigarettes, a pipe, or cigars are not a

## Tobacco use

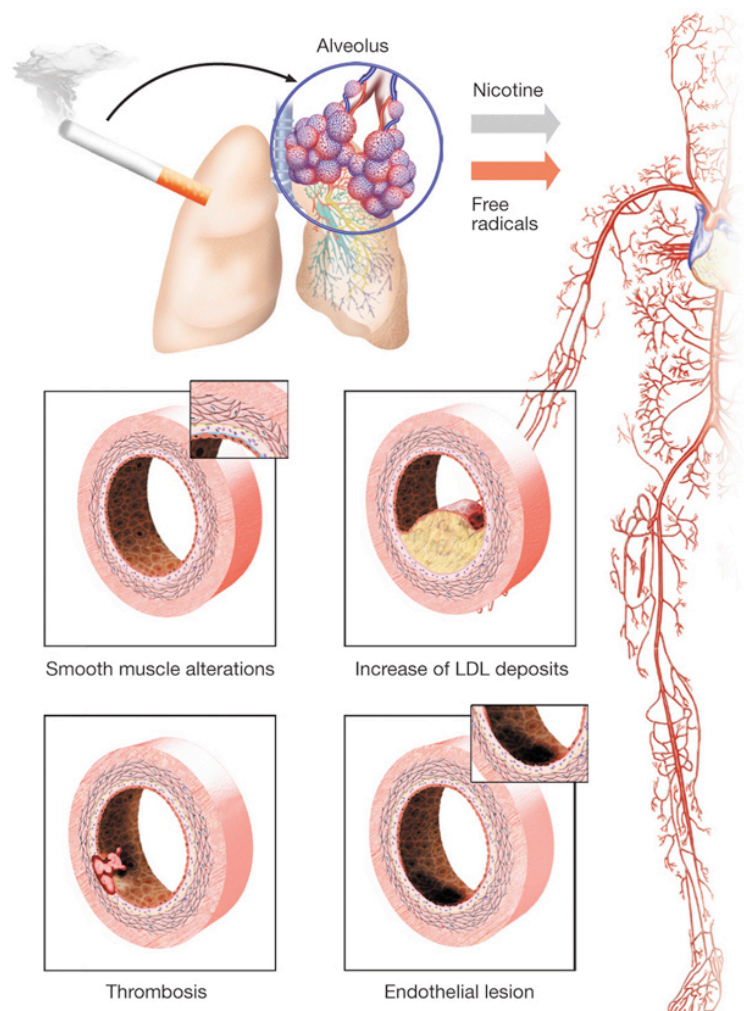


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solution, as they are equally as dangerous. Your admission into the hospital is a perfect opportunity to stop smoking, as you will have overcome your physical dependence on nicotine even if you will have a certain amount of residual psychological dependence. If when you are being discharged and you still feel symptoms of nicotine dependence let your doctor know.

If you stop smoking the chances that you will suffer another episode due to heart disease is much less even within the first year of stopping and the chances will continue to decline as time goes by. Stopping smoking will better your breathing ability, reduce coughing, increase your ability and endurance to do exercise, and in general better your quality of life.

Be careful, smoking even just one cigarette can restart your dependence on tobacco. There are clinics that specialize in programs and courses for tobacco cessation. If you would like more information let us know.

**General recommendations for how to stop smoking:**

- 1.- Write on a piece of paper the reasons why you smoke and the benefits you will receive if you quit.
- 2.- Tell your family and friends. Ask them not to smoke in your presence.
- 3.- Stay as active and busy as possible. Do the recommended amount of physical exercise.
- 4.- Drink a lot of liquid, primarily natural juices and water.
- 5.- Eat a diet rich in fruits and vegetables.
- 6.- Decide not to smoke even if it is just for today.
- 7.- Reread your list of reasons for smoking and benefits for quitting.
- 8.- If you feel cravings to smoke, relax, breathe deeply, drink a glass of water or juice, and go for a walk.
- 9.- Don't give in, not even for just one cigarette. The desire to smoke will decrease in the second or third week.
- 10.- Congratulate yourself for each day that passes without you smoking.

**HYPERTENSION (HIGH BLOOD PRESSURE)**

There are two numbers gathered when obtaining the measurement of blood pressure:

- The systolic pressure or high pressure produced when the heart pumps blood through the arteries.
- The diastolic pressure or low pressure produced when the heart is at rest between beats.

Blood pressure does not have a constant measurement, as it varies throughout the day. However, it is considered hypertension when the levels of systolic and diastolic pressure reach or go above 140/90 mmHg.

There are risk factors associated just as much for an increase in systolic pressure as for an increase in diastolic pressure. The higher the numbers the more risk, not just for coronary disease but also for circulation problems to organs such as the brain, retinas, kidney, or lower extremities (Fig. 11).

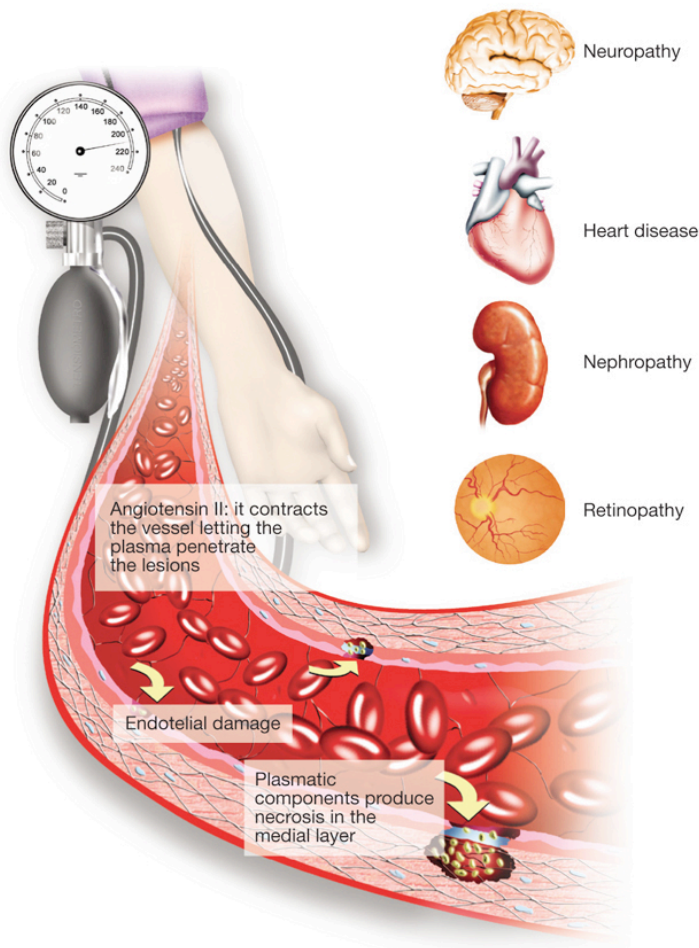
High blood pressure rarely produces any noticeable symptoms. That is why periodically checking the blood pressure is the only way to detect heart disease.

The risk of having heart disease increases when hypertension exists with other risk factors, most importantly diabetes or smoking.

Things that increase blood pressure:

- High salt intake.
- Being overweight or obese.
- Consuming alcohol.
- Smoking.
- Stress.
- Certain medicines.

## Hypertension



Things that can help control hypertension:

- Reduce or eliminate salt and products that contain conservatives (processed foods, mineral water, and pre-cooked foods).
- Follow a low-fat diet.
- Reduce the amount of alcohol consumed (one glass of wine a day) and coffee (no more than two a day).
- Don't smoke.
- Use relaxation techniques.
- Do physical exercise.

Controlling hypertension can require, in addition to diet changes, the use of medications. In 98% of patients medications will have to be continued for the rest of their lives, however, the dose may change over time.

## HYPERCHOLESTEROLEMIA

As was mentioned before, arteriosclerosis involves the hardening or loss of elasticity of the artery walls and the presence of atheroma plaques in the arteries. These plaques are primarily composed of cholesterol, cellular waste, calcium, etc. and their presence is related to an increase of cholesterol in the blood.

Cholesterol is a fatty substance that is naturally found in the body and is necessary when it is within normal range. When the levels rise excessively, they leave deposits in the inside of the arteries which make them hard and cause obstructions.

Cholesterol is produced primarily through the ingestion of certain foods, very little cholesterol is actually made by the body. Currently there is

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no doubt that high cholesterol levels increase the risk of having atherosclerosis. There are studies where they have proved that if you lower the levels of cholesterol you also will lower the risk of complications due to high cholesterol.

Cholesterol is circulated throughout the body by adhering to two types of proteins: LDL and HDL.

In lab tests cholesterol levels are read through three measurements: total cholesterol, LDL and HDL.

There is another type of fat called triglycerides, which play a secondary role in the development of atherosclerosis.

Because the majority of cholesterol in our bodies is due to the foods we consume, the first thing you should do is follow a healthy diet, avoiding foods that are high in animal fat and eating more fruits, vegetables and grains that don't contain cholesterol.

Apart from a healthy diet, these other guidelines can help you control your cholesterol:

- Maintain a healthy weight.

- Do moderate exercise (walk 1-2 hours daily)
- Stop smoking

If it's necessary, you should follow the medication indicated to you.

If you have to eat out of the house, always choose foods cooked the proper way: grilled not fried, seafood instead of red meat, and vegetables/salads!!!

## DIABETES

Glucose is a necessary substance that allows the body to function. However if there is too much glucose, it is stored in the form of fat under the skin and in the blood vessels. There exists a very high correlation between high amounts of glucose and heart attacks and diseased arteries (Fig. 12).

Normal levels of glucose are between 80 and 110 mg/dl. In order to avoid the risk of coronary damage, you must try to keep levels around these numbers through the right treatment.

It's very important to detect high glucose levels early, especially for people who have family members that have been able to gain control by use of diet, lifestyle changes, and medicine. If it's detected early enough you can avoid complications later on down the line.

If you are a diabetic:

- You should be able to distinguish which types of foods are carbohydrates, proteins, or fats. You should also be aware of which foods are full of fast absorption sugars.
- All fruits are good. There does not exist any prohibited fruit, however you may have to reduce the amount of really sweet fruits you consume.
- You should know which foods are rich in fiber. All foods that are of vegetable origin contain fiber. Fiber cannot be digested in our digestive track, therefore it helps to slow down the rate at which nutrients are circulated, which makes glucose levels not rise so fast after you eat.
- You should be able to recognize foods high in saturated fat. Olive oil is the fat of choice, but remember you must adjust the levels of it in your diet, keeping in mind that it is just as fattening as all the other fats. (1 gram of olive oil has the same amount of calories as 1 gram of bacon).
- You should use basic cooking methods (boil, bake, grill, steam) and avoid consuming foods that are fried or breaded.

## Diabetes and the metabolic syndrome

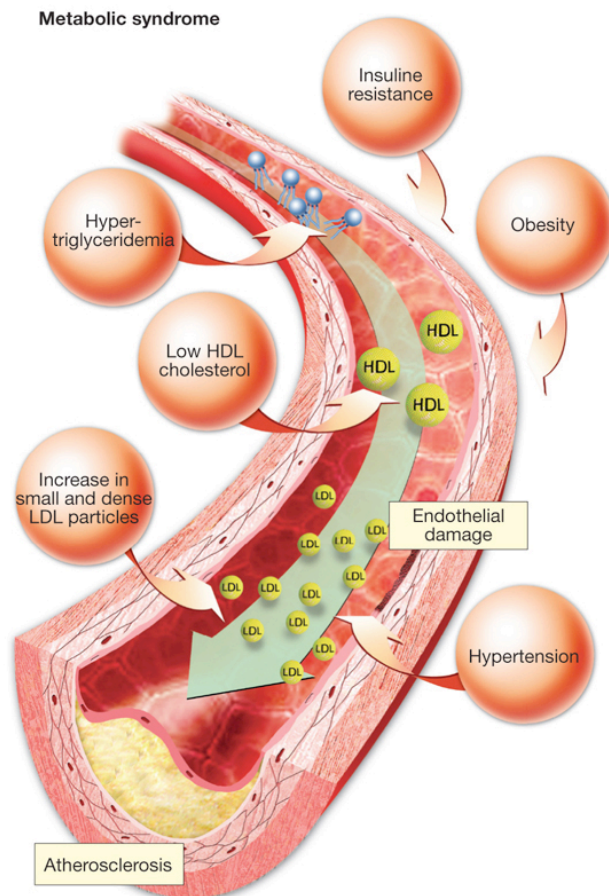


Fig. 12 © 2013 Liciteco España S.L.

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- You should avoid completely any alcoholic beverage that has a high sugar content, such as beer, sweet wine or liquor. Alcohol contains a significant amount of calories and can cause hypoglycemia hours after being consumed.
- You can drink 20 grams (two glasses) of wine a day, preferably with meals.
- You are allowed to drink sugarless sodas and coffees, teas and infusions that are sweetened with artificial sweeteners.

## SEDENTARY LIFESTYLE

Physical inactivity is an important risk factor in heart disease. It's dangerous for the heart because it is associated with poor blood circulation. Sedentary people suffer more heart attacks than those that exercise. Physical exercise reduces obesity, stress, blood pressure, glucose levels, bad cholesterol and triglycerides, and it increases good cholesterol, blood flow to the muscles, and good heart functioning.

After suffering an acute heart attack, you should start to move around as soon as possible if there have been no complications, following your doctors instructions.

After you have been discharged from the hospital and your heart disease is under control, you should start to gradually incorporate more exercise into your daily living.

Remember that physical exercise is important for you for several specific reasons and you should move as soon as possible. As you increase your physical activity you should be aware that there are two types of exercise:

- 1) Isometric or resistance: These work specific muscle groups by having them perform intense work for short periods of time (i.e. weight lifting, squash, sprinting). These are not recommended for you.
- 2) Dynamic: These work multiple muscle groups over longer periods of time (i.e. walking, bicycling, swimming). These are recommended for you.

There are certain sports which have a combination of both types of exercises such as soccer and basketball.

You should know after your discharge what is recommended:

- A) Walk on flat ground at a comfortable pace for the first 15 days. Increase the amount of walking you do until you reach 5-6 km daily, approximately over a period of time of 2 months.
- B) You should be consistent and do exercise daily, permitting yourself to rest 1 out of every 7 days.
- C) You should rest for 30 minutes after the end of each workout.
- D) Don't exercise after eating a meal, wait at least 2 hours.
- E) Stop exercising if you feel any type of discomfort, dizziness, fatigue and/or pain in the chest.
- F) Always take with you an oral vasodilator (Isosorbide or nitroglycerin) and take it if you still are feeling pain even after quitting the exercise.
- G) Don't do exercise in extreme temperatures (extreme cold or heat) as they might make it more likely that you experience pain.
- H) Avoid rough, violent or extremely difficult exercises (weights, sit ups, rowing, squash). Avoid excessive force when you have a bowel movement, while lifting weights over 13 Kg, pushing against something resistant or throwing heavy objects.
- I) During the first two months after experiencing a heart attack make sure to take plenty of 15-20 minute breaks, between 4-6 times a day.
- J) After two months have passed since the heart attack you may go up a mountain in a car to 1500 meters (without using physical effort). It is not recommended that you go above 2500 meters as there is a change in air pressure that may affect you. As far as walking, you may do so at altitudes less than 1500 meters, as long as they don't require a prolonged effort on your part.

According to how you are recovering your doctor will indicate during followup consultations the most beneficial level of exercise for you and this should be followed the same as if it were a prescription for medicine.

## STRESS

Stress, caused by our lifestyle and the society in which we live, accompanies us from the moment we wake up each day. The body when faced with certain stressful situations forms tension in the form of anxiety, fear, aggression and/or depression, which cause certain changes in the heart beat and the oxygen consumption in the body. While it may vary from person to person, stress can increase the possibility of chest angina or ischemic episodes.

There are two types of personalities in relation to stress: Type A personalities are competitive, ambitious, impatient, often find themselves fighting with themselves and their environment, and may respond with hostility if they don't reach their goals; Type B personalities are much calmer and less ambitious. Type A personalities often experience a greater number of heart attacks and chest anginas than their Type B counterparts. As a result of this information it is important to learn how to control stress with the use of relaxation techniques and self-control.

Maybe Type A people can't change their personality nor eliminate stress altogether from their lives but they should try to prevent it from reaching a dangerous level by learning their body's stress signs and registering what types of situations cause them extreme stress, such as work, family, neighbors, etc. With training they can avoid these situations or lessen their intensity. Yoga, relaxation techniques, tai-chi, meditation, and a psychological assessment / therapy may help in these cases.

There are many relaxation techniques out there, but one of the most basic is as follows:

- Sit in a chair that has a back to it so that you feel supported. Spread your legs slightly apart and let your hands rest on your thighs. Close your eyes and take three deep breaths. After that count each breath that you exhale stating in your mind "1", "2", "3", etc. so that each subsequent breath comes in slower and softer. If you notice that your mind is drifting off to some other thought, let the thought go and bring it back to counting without getting upset with yourself. Practice this technique for 5, 10, 15 or more minutes daily so that you learn how to use it when you most need it. The most important thing is that you learn how to control your breathing so that when you want to calm down you are able to slow it down by holding the inhalation in for several seconds and letting yourself exhale softly or vice versa accelerating your breaths and breathing strongly when you need to activate yourself.

## OBESITY

Obesity is the excess fat that is accumulated throughout the body. In the majority of cases it is produced by consuming more calories than one burns. The two major causes of this are poor diet and lack of exercise, although on occasion it may be due to heredity and metabolic dysfunction.

Having too much weight is directly related to high blood pressure and an increase in cholesterol, therefore proving the importance of maintaining a healthy body weight. In order to achieve this it is important to regularly adhere to a balanced diet, one that avoids fats, sweets, alcohol, or large amounts of starches and is high in fruits and vegetables.

The method that is used to evaluate whether the level of abdominal fat is within normal range is to measure the circumference of the waistline. If it is greater than 102 cm in men or 88 cm in women that indicates an excess of abdominal fat and a higher risk for heart disease.

## ALCOHOL

This is a toxin that affects the heart beat by increasing the pressure in the arteries and altering the metabolism of cholesterol. A moderate consumption of 1 or 2 glasses of wine a day does not increase the development of coronary disease.

Remember that the positive effects of consuming alcohol are infinitely less than the risk that abusing it will incur. It is a false belief that distilled alcohol (aniseed, brandy, whisky, etc.) is good for the coronary arteries.

## ORAL CONTRACEPTIVES

These tend to induce high blood pressure, obesity, and they alter the cholesterol metabolism, which increases the risk of thrombosis.

These are not recommended for women over 35 years old, especially women with other risk factors such as tobacco, diabetes, high cholesterol, and high blood pressure. Because of this you should consult with your gynecologist about other alternative contraceptives.

# Returning Home

The majority of patients that have some type of ischemic heart disease, chest pain, or heart attack should return to an active lifestyle as soon as possible.

Under normal circumstances you will be able to return to work within the second month. The type of work, and the physical and emotional demands it places on you are all factors that influence when and if you should return to it.

After a heart attack it is common to experience feelings of anxiety, depression and insecurity that at times get worse after leaving the hospital and still leave you wondering if you are cured or not. It is important to know that the area that was without blood flow can take somewhere around six weeks to form a scar, but in so doing the other regions of the heart are able to take over those functions and recover it to normal working capacity.

So now, here are a few points to remember in order to maintain a sense of security:

- 1) Always take with you a sublingual vasodilator (isosorbide or nitroglycerin)
- 2) If you experience chest pain stop the activity you are doing and rest. Take your sublingual vasodilator. You can take up to 3 at intervals of 5 minutes for each. If the pain does not go away call your doctor and go to the nearest hospital.
- 3) Always take with you a copy of your medical information.
- 4) Some of the drugs that are used to treat your heart disease may produce secondary effects such as dizziness (because it's slowing down your heart beat and lowering your blood pressure), erectile dysfunction, constipation, etc. Let your doctor know but do not take yourself off the medications without your doctor's permission. In some cases it may be necessary to modify the dose rather than suspend the medication altogether (as that can be dangerous in some situations).
- 5) Palpitations, pounding heart, or dizziness and cold sweats are not symptoms of a heart attack but may at times accompany it. In the majority of cases these are signs of the nervous system around the heart and are not that important. However it is best that you report these symptoms to your doctor.
- 6) Small prickling sensations or muscular pain in the chest is common and is not dangerous, You also had these sensations before but you are paying more attention to them now whereas before you dismissed them. If you are concerned or they remind you of a feeling related to the ones that brought you in for treatment follow the directions as you would if you were having a heart attack.
- 7) There is no relationship between how you position your body or what position you sleep in and heart disorders. There are people who are more sensitive to their heart beat when they lay on their left side.



## SEX

If there have been no complications during your treatment you can expect to restart sexual relations 15 days after having had an acute heart attack.

Sex is a physical activity equivalent to walking up 2 flights of stairs and has an additional emotional component that also increases the amount of work the heart has to perform. For this reason sex should be avoided under the following conditions:

- In extreme temperatures.
- Immediately after you eat (wait 2 hours).
- If you are tired.
- If the situation may cause more than normal stress/work for the heart (new or unknown partner, unfamiliar environment, positions that require more physical effort).
- You should rest before and after having sex (after waking up is the best moment).
- You should stop having sex immediately if you notice any chest pain or difficulty breathing.
- You should take a vasodilator (taken sublingually) before having sex if it has been prescribed to you by your doctor.
- Erectile dysfunction medications should be prescribed and usage explained by your doctor as these medications may interfere with other medicines you are taking.

## DRIVING

Driving your own car requires a relatively small amount of energy. If it is not a stressful activity for you and there are no complications, you may start driving in about 6 weeks. If you are planning a long drive it is recommended that you rest every two hours and that if you are driving within the first couple of months after having had a heart attack that the trip should not last over 4-5 hours.

## AIRPLANE TRAVEL

Flights that last over 7 hours should be postponed for at least 2 months after surgery. It's wise not to travel at all for the first month after a heart attack. If it is necessary consult with your doctor first.

# Chest Pain: What to do?

If you experience chest pain the first thing you should do is stop whatever activity you are doing right then.

- If you are in the hospital lay down and tell your nurse. Don't try to self medicate.
- If you are at home, sit or lay down.
- If you are on the street stop and sit down.
- It's important to stay calm.
- If the pain does not subside within 3-5 minutes of resting and you are not already in a hospital, place under your tongue a pill (nitroglycerin or isosorbide).
- If the pain does not go away after you have taken 3 pills at 5 minutes apart, you should call your doctor or have someone take you straight to the hospital. You should not drive yourself there.
- The nitroglycerin may cause headaches, dizziness or pounding sensations. You can avoid or lessen the dizziness by laying down after you take it. If you feel a burning sensation on your tongue that means that the nitroglycerin is active.
- If the pain goes away after you take the nitroglycerin, you may continue on with your normal day as long as you avoid physically exhausting or stressful situations at least until you consult with your doctor.

- If you notice that the pains are more frequent, intense and longer lasting or that they occur under new circumstances or without any precipitating activity or that they occur with new accompanying symptoms (lack of breath, nausea, intense sweating) you should see your doctor **immediately**.
- There are situations that increase the chances of a heart attack because you increase the heart's need for oxygen: large amounts of food, a cold environment, high elevations, warm humid climates, doing physical activity, climbing, having sex, or having heightened emotional responses.

## Final Recommendations

If you possess any risk factors (high blood pressure, high cholesterol, diabetes or obesity) and are taking medicines to manage them:

- Don't forget to take them.
- Don't stop them.

Follow a healthy diet and do regular exercise. They are an integral part of treatment even if you feel well and your levels for blood pressure, cholesterol and glucose are within normal range.

Remember that:

- If you are thinking about quitting smoking, make a radical decision and do it.
- If you try to just smoke less, research shows that you will progressively increase your consumption until you get back to your old levels.
- Smoking light cigarettes does not reduce your risk any more than regular cigarettes, as you will just make more frequent and deep inhalations in order to get the same amount of nicotine effects in the blood. In the end it's all the same!
- Smoking without inhaling is still smoking.
- If you have suffered a heart attack you should not smoke ever again. Smoking places you in a very dangerous situation that could result in death!

If you have high cholesterol you should be careful to eat a low fat diet:

- Avoid saturated fat.
- Eat vegetables and fruit at every meal.
- Eat more fish and poultry than red meat.
- Limit the amount of eggs eaten to 2-3 per week.
- Don't eat fried foods, junk foods, or pre-cooked frozen meals.
- You may use vegetable oil. Avoid palm and coconut oil.
- Don't trust foods that are labeled "cholesterol free".
- You should use simple cooking methods (boil, broil, grill, steam) and avoid fried, breaded, or greasy foods.
- Avoid products with a lot of preservatives (bread, pre-cooked meals, packet soups) instead elect fresh foods.

Learn to respond to stressful situations by using relaxation techniques, physical exercise, or by seeing a therapist/taking medications if necessary.