

*Step by step through*

# ANGINA

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## **Produced by the Irish Heart Foundation**

This booklet is one of the publications in our patient information series. For a complete list of patient booklets, see page 32.

### **Acknowledgments:**

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## **INTRODUCTION**

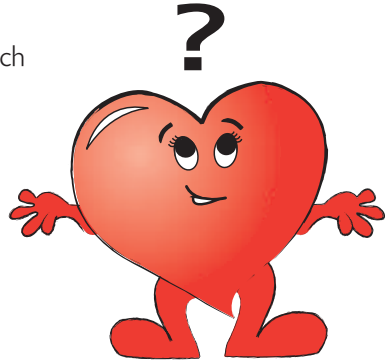
We have designed this booklet to add to the information that you have already received from your doctor and to take you through angina step by step.

## *Contents*

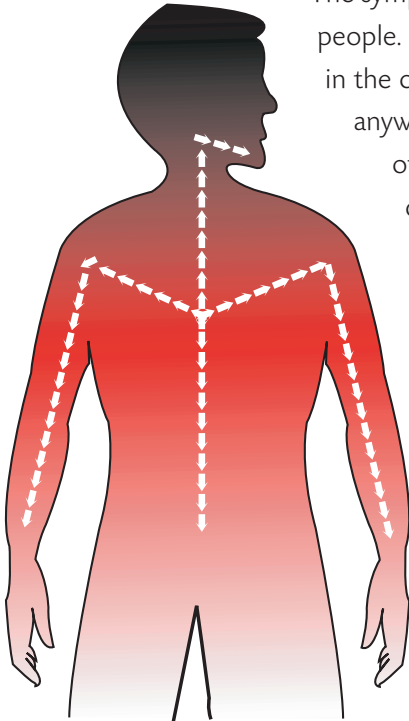
What is angina	4
What are the symptoms of angina?	4
What causes angina?	5
What narrows our arteries?	7
What factors contribute to narrowing our arteries?	8
What brings on an anginal attack?	10
What is variant angina pectoris (Prinzmetal's angina)?	14
Does angina mean I am going to have a heart attack?	15
What questions will my doctor ask me?	16
What would my doctor look for on my examination?	16
What investigations are carried out?	17
How we treat angina?	18
What medicines are used and how do they work?	18
Is it safe to have alcohol if I am taking heart medicines?	20
Is it safe to make love if you have angina ?	20
What can I do to help myself ?	22
Things you can do to reduce angina	23
How can I reduce my risk factors?	24
Do I need to have an angioplasty or stent ?	24
Do I need to have bypass surgery ?	25
If I have angina are my family at risk ?	26
Are there any new treatments for angina	26
Summary	27
Daily Charts	28-30
Body Mass Index chart	31

## ***What is Angina ?***

Angina is short for the term angina pectoris, which means chest cramp in Latin. It is discomfort you experience when your heart cannot get enough blood. The discomfort does not damage your heart but is a warning symptom that there is a problem with the blood supply to your heart.



## ***What are the symptoms of Angina ?***



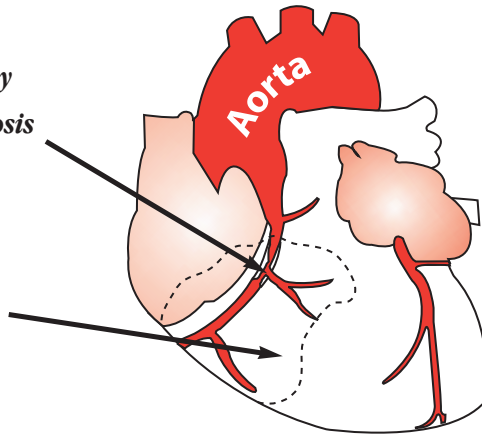
The symptoms of angina vary among different people. The discomfort ranges from a tightness in the chest to severe pain. It may develop anywhere from your belly button up to the top of your jaw and down both arms. The discomfort often starts in your chest and spreads to your arms or your hands and even up to your neck or jaw.

Sometimes it spreads around your back. The pain or discomfort is usually continuous. Sharp, stabbing pains are usually not angina. You will usually suffer angina when you are walking or doing something that takes some effort. It lasts longer than a few seconds and eases off when you rest. It may also develop if you become very stressed

and eases off as you become more relaxed. The pain does not usually vary with breathing or with changing your posture as is the case with problems in your lungs or chest wall. Angina usually gets worse if you continue to do exercise. If you have chest pain but can still run around and do physical activity you are unlikely to have angina.

***Narrowing in the coronary artery due to atherosclerosis***

***Area of the heart that is suffering during exercise and stress***

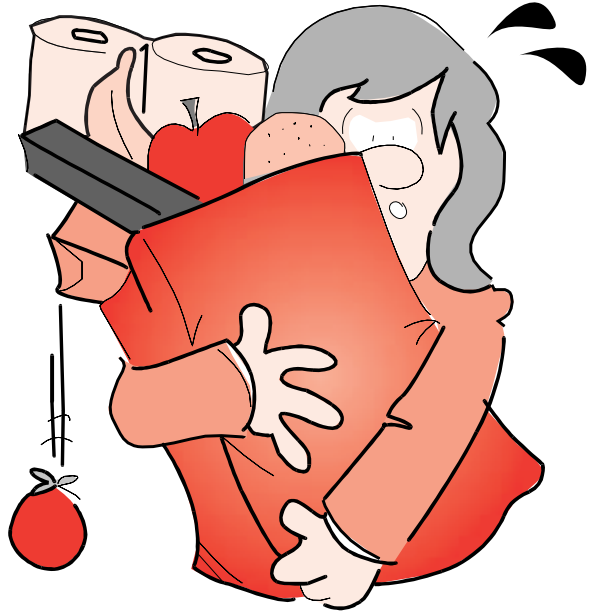


## ***What causes Angina ?***

Our heart is basically a muscular bag, which squeezes and pumps blood around our bodies. Like all muscles, it requires its own blood supply to provide it with oxygen and energy nutrients. The blood is supplied to the heart through the coronary arteries. These arteries can normally adapt when the heart needs more blood during exercise. However, if the arteries are narrowed due to a build up of plaque, then the artery may not be able to supply enough blood for the heart during exercise. This means that the portion of the heart muscle supplied by the narrowed artery will not have enough oxygen. To protect itself from further lack of oxygen, your heart produces angina to stop you from doing more exercise.

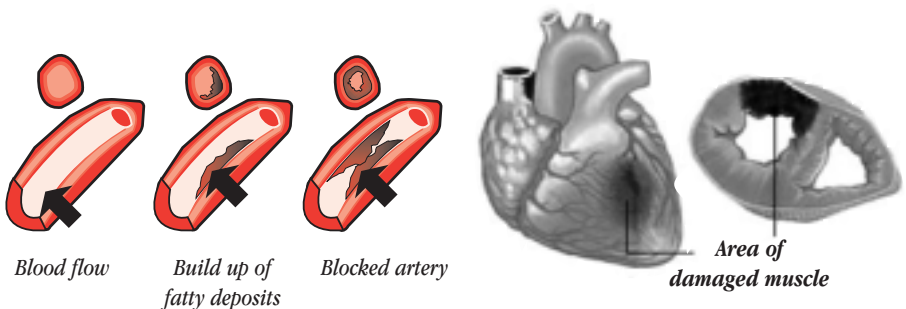
Some conditions make angina happen more often. These include high blood pressure, lack of blood (anaemia), cold weather, heavy meals, smoking, being overweight and carrying heavy loads. The reason for this is that these conditions cause the heart to need more blood or that the supply of blood is reduced. Simple measures to reduce angina, include avoiding exercise after meals for 2 hours,

reducing weight, giving up smoking, covering your face with a scarf in cold weather. Many patients need to take medicines called anti-anginal drugs. The more severe the narrowing in the coronary arteries, the lower the amount of exercise needed to produce angina. If the artery is completely blocked, you may suffer angina when you are resting, and if the block stays for a long time, the heart muscle will die, which is what happens with a heart attack.



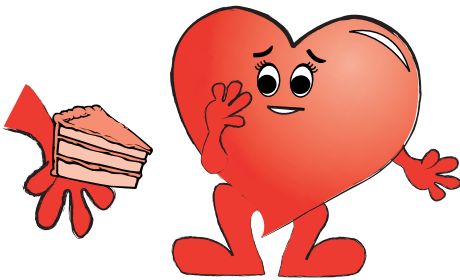
## ***What narrows our arteries ?***

Except for a few rare exceptions, the condition that narrows our coronary arteries is called atherosclerosis (hardening of the arteries) which is translated as hardened gruel (porridge). This term describes the appearance of the hard yellow white plaque, which covers the inner lining of the arteries. The rate at which the plaque grows depends on a number of factors such as your sex, cholesterol level, smoking habits, blood pressure, presence of diabetes and your genes. Although coronary arteries adapt initially to plaque, they eventually narrow as the plaque grows bigger. As the plaque grows they may also become weaker and break. When this happens, the inner lining of the artery tears. Blood will clot at this site to try to seal the tear. This could result in more narrowing of the artery so that it is less able to transport blood to the heart muscle. So, growth of plaque and it's occasional tearing leads to continuous narrowing and possibly complete blockage of the coronary arteries.



## *What factors contribute to the narrowing of our arteries ?*

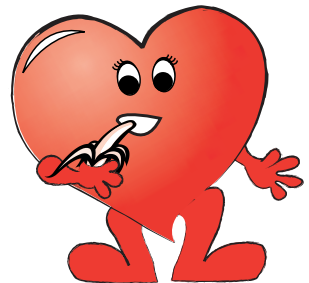
In most cases our coronary arteries are narrowed due to atherosclerosis. This condition is brought about by many factors, but some of the main factors include having high cholesterol, smoking, having high blood pressure, have diabetes, being overweight and not being very active.



**Cholesterol:** Cholesterol is a fatty substance. Many people have too much cholesterol in their blood.

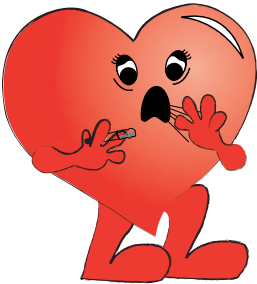
The cholesterol coats the insides of their arteries, choking them up. Most people can reduce the amount of cholesterol in their blood by eating less fatty foods. If you have high cholesterol, bringing it down will help reduce the risk of having a heart attack. (See our leaflet, *What is Cholesterol all about.*)

**High Blood Pressure:** If your blood pressure is high you have a greater risk of having a heart attack or stroke. People who smoke and have high cholesterol are more at risk. Anyone can have high blood pressure. It does not cause any discomfort. Many people have high blood pressure without realising it. If you have high blood pressure, your doctor can give you tablets to help bring it back to normal. There are also a lot of things you can do to bring down your own blood pressure. Cutting down the amount of salt you eat and reducing your weight (if you are overweight) will help. So will eating less fats and more fruit and vegetables. You should avoid drinking



too much of alcohol. The rules about 21 units for men and 14 units for women do not apply to people who suffer from high blood pressure. You should avoid alcohol or drink less than 10 units a week. Exercise reduces blood pressure over time. Have you checked your blood pressure recently? How about the rest of your family? Your doctor will do it for you in a few minutes.

Many people find that their angina is worse when their blood pressure is high. Remember that it increases your heart's work. Having your blood pressure controlled will reduce the amount of angina you have.

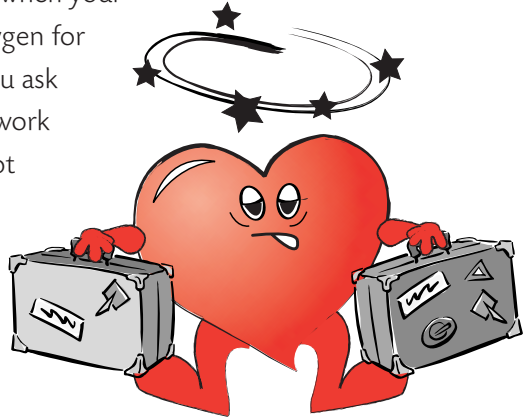


**Smoking:** The facts speak for themselves. Smoking brings on angina attacks and increases your risk of having a heart attack. Smokers get almost three times as many heart attacks as people who do not smoke. People who go on smoking after a heart attack are twice as likely to die as people who stop smoking. No matter how long you have been smoking, your health will benefit if you stop. There is almost no such thing as too late to stop now.

**Diabetes:** Having diabetes increases your risk of atherosclerosis three times. It has been shown that if your diabetes is controlled well, it will reduce your risk of a heart attack. However, it is very important if you have diabetes that you never smoke, keep your cholesterol very low and you have your blood pressure controlled, preferably with an ACE inhibitor (a special drug for treating high blood pressure).

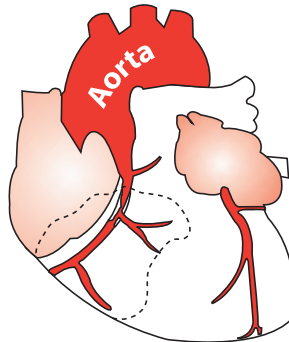
## *What brings on an angina attack ?*

An angina attack is brought on when your heart is not getting enough oxygen for its needs. This can happen if you ask your heart to do a lot of extra work and the coronary arteries do not bring in enough blood to the heart muscle. An example of extra work is when you ask your heart to beat faster and also to work against a higher blood pressure.



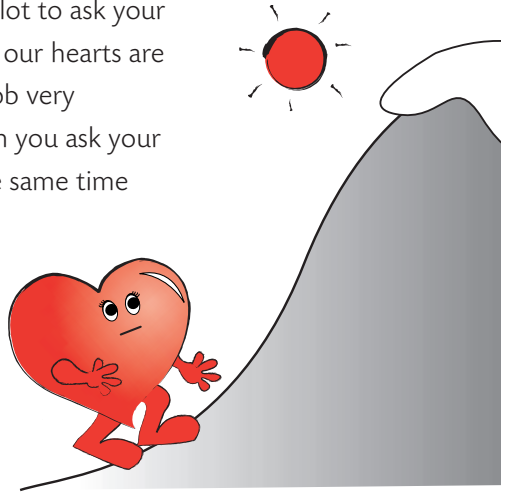
Think of your heart muscle trying to pump blood out through the aortic valve to the main artery - the aorta. To open the valve and let the blood out is like asking your heart to push open a door. If you have high blood pressure there is a big weight on the other side of the door pushing against you as you open the door. This pressure is a bit like the amount of weight you ask a weight lifter to lift.

### *Pumping blood through the aortic valve*



Now the second part of the work is how often he has to lift the weight every minute. If you have a very fast heart rate, this means the weight lifter (your heart) has to push up a weight many times every minute which makes the heart's workload greater.

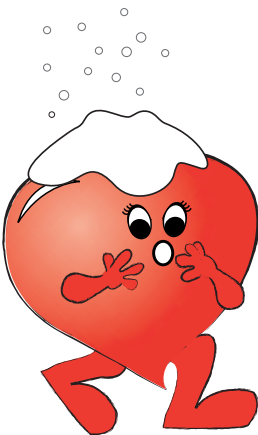
Now just in case you think this is a lot to ask your heart to do, remember this is what our hearts are designed to do and they do their job very effectively. The problem arises when you ask your heart to do a lot of work but at the same time you do not give it enough fuel to do the work. The fuel (oxygen and energy source) is brought into your heart muscle through the coronary arteries. If these arteries are narrowed or if the amount of fuel in the blood is not enough (due to the lack of oxygen or red cells that carry it around), your heart muscle will not have enough energy to do its work. It will then complain by giving you angina. An example of bringing on angina would be a person who has a narrowed coronary artery who decides to walk up a hill. Going up the hill will make the person's heart go faster and the blood pressure increase.



You may find that you get angina in the cold weather or by exercising soon after a meal.

The reason for this is that cold weather, particularly on your face makes the coronary arteries tighten up and so less blood can get to the heart muscle.

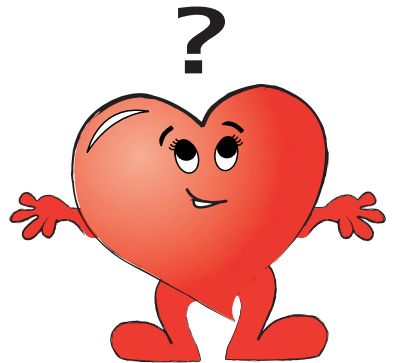
After a meal a lot of blood goes to your stomach which means that your heart has to do more work in pumping the blood around your body. It's like running on the outside lanes of a track rather than on the inside lanes.



***Have I mild or severe angina ?***

Although you may feel that having angina is the same for everyone, there are certain differences that are important to know. Some people only get angina if they do a lot of strenuous activities. In these people, it is likely that the narrowing in their arteries is not very severe or that the narrowing is in a place that supplies only a small amount of heart muscle. Other people may suffer angina when they do very little activity. These people may have a severe narrowing in one or more of their coronary arteries or the narrowing is in an area that supplies a very large amount of heart muscle.

This is a typical example but in many situations, there is more to getting mild or severe angina than just how narrow the artery has become. As mentioned before, it all depends on the balance between your blood supply and the demands placed on your heart. In some people, when their angina has become worse it is not because there was a change in the narrowing in their arteries but because there is an increased demand for oxygen or a reduced supply of blood. This can happen for example, if you develop very high blood pressure, which puts a big demand on your heart. Another example would be a person who has become anaemic (has a low blood count) or has a chest infection that leaves them with less oxygen in their blood. In this situation they may get angina more easily because there is less blood carrying oxygen to meet the needs of the heart. Correcting the blood pressure, anaemia or chest infection may get rid of the angina in this instance.

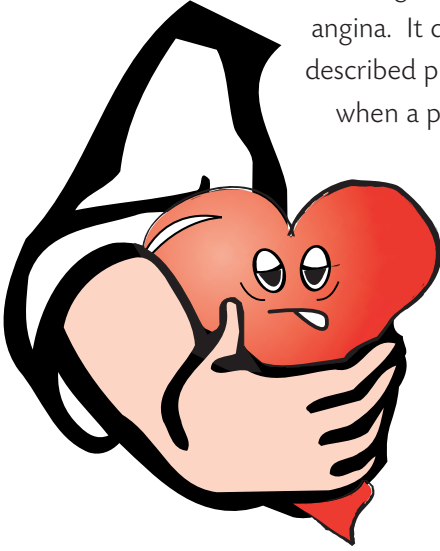


***What is unstable angina ?***

Unstable angina is when you get the symptoms of angina when you are resting or not doing anything very strenuous. If you previously suffered angina symptoms, but now find that they are happening more often and with less and less activity, you have unstable angina.

Unstable angina is caused when the coronary arteries have become severely narrowed in a short time. This is often due to the fact that plaque in the artery tears and a clot forms in this area, which severely reduces the amount of blood supplied to the heart. This is a serious condition and requires medical attention immediately.

## *What is variant angina pectoris (Prinzmetal's angina)?*



Variant angina pectoris is also called Prinzmetal's angina. It differs from the typical angina described previously. It almost always happens when a person is resting. It doesn't usually follow a period of exercise. Attacks can be very painful and in the same areas as regular angina. This type of angina is caused by spasms (sudden narrowing) in the coronary arteries. It may be associated with the following problems if the spasm lasts a long time.



Heart attack (acute myocardial infarction).



Abnormal heart rhythm (called an arrhythmia).

This type of angina could also lead to sudden death.

A spasm in the coronary artery is the usual reason for variant angina. About two-thirds of people who experience spasms in the coronary artery have severe atherosclerosis in at least one of the major coronary arteries.

People with variant angina may go through an acute, active phase. In people who experience spasms, anginal attacks or a heart attack may happen during the following 6 months or more. Up to 20% of patients may have a heart attack and up to 10% may die. People who

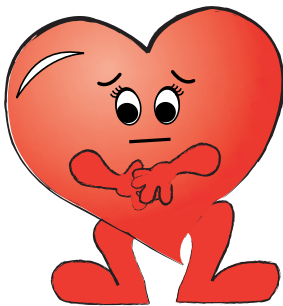
develop serious heart rhythm disturbances (arrhythmias) when they have the painful spasm are at greater risk of sudden death.

Most people who survive a heart attack or this initial three to six month period will become stable and their symptoms and risk of heart attack will reduce over time. Long-term survival is excellent, ranging from 89% to 97% at five years. Patients who do not have severe coronary narrowings have an excellent long-term outlook. Treating blood pressure and cholesterol can reduce the risk of spasm in the coronary artery. It is important to avoid drugs such as beta-blockers as they can make the spasms worse. Calcium channel blockers and nitrates are the preferred drugs.

## ***Does angina mean I am going to get a heart attack ?***

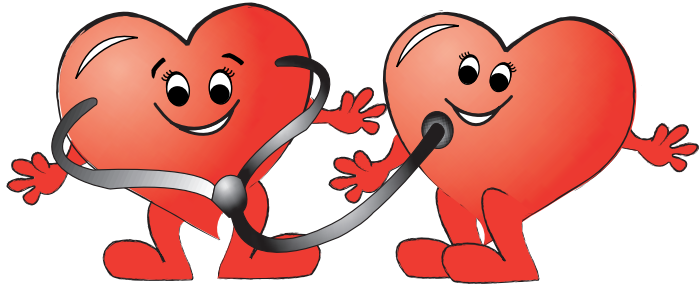
No!. It is not the case that if you have angina you will definitely have a heart attack. However, people who suffer angina are more likely than others to have a heart attack. Remember angina is the way your heart tells you that it is lacking oxygen when you are doing an activity or are stressed. If you are having continuous pain while you are not doing much activity, you may have unstable angina, which could lead to a heart attack if not treated. Many people have angina, but it can be prevented if it is recognised and the correct action is taken.

More importantly, the disease causing this symptom may be reversed or at least stabilised. It is very important that everyone who has angina receives treatment for their symptoms and works towards reducing their risk of having a heart attack.



## *What questions will my doctor ask me ?*

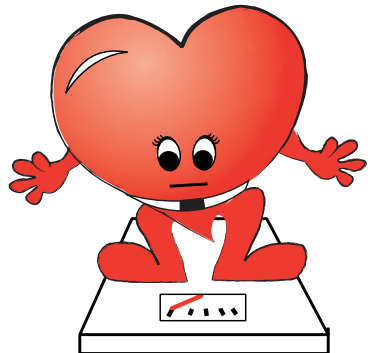
Your doctor will ask you a lot of different questions as he or she tries to find out the cause of your chest pain. Your chest has a lot of parts that can cause pain and it is often difficult to know exactly what part of your chest is causing the pain.



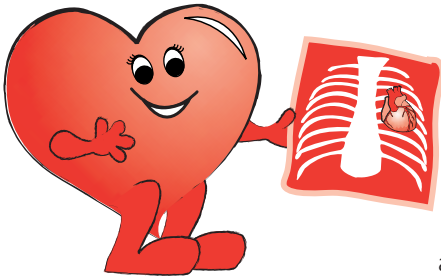
Your doctor will ask you questions about the type, duration and severity of your pain. You will be asked what you do that brings on the pain or what you do when the pain is present. It is unusual for people with anginal pains to be able to carry on doing activities without the discomfort getting worse. Your doctor may also ask you questions about the medication you use, whether you have lost blood or have symptoms of a chest infection.

## *What would my doctor look for on my examination ?*

In many people with angina there is very little to find on an examination. However, your doctor will look at your overall appearance to see if you are pale (anaemic), are blue (cyanosed), have signs of being a smoker or are overweight. He will also look around your eyes for signs of having a high cholesterol level. He or she will check your pulse and blood pressure and listen to your heart. They may also listen to the carotid arteries in your neck and feel the pulses in your legs.



## What investigations are carried out ?

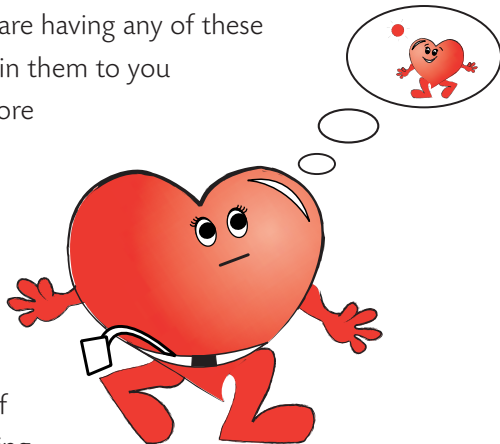


Angina is a sign that your heart cannot get enough blood to do its work. Your doctor will have to find out if this is happening. In many cases they will be able to find out by asking you about your symptoms. They may also arrange to do tests.

There are some tests, which may help the doctor. You will have an electrocardiogram (ECG) done while you are resting, and you may have it done while you are exercising to see how your heart reacts to exercise. An x-ray of the heart is also useful.

These simple tests are often all that is needed. However more complicated tests are sometimes required. The most common of these is an x-ray of the arteries of your heart. This is called an angiogram. If you are having any of these tests, your doctor will explain them to you beforehand. If you need more information, just ask.

One of the most important parts of the investigation is finding out about your risk factors. Do you have high blood fats? If so, is it because you are eating



too much fats? Have you got high blood pressure? The answers to all these questions will help the doctor to treat you and to advise you about things you can do to help yourself.

## ***How do we treat Angina?***

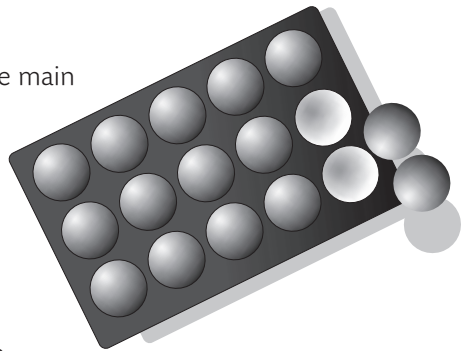
There are two aims in treating angina

1. To allow you to lead a normal, symptom free, healthy life
2. To stop your heart disease from getting worse.

## ***What medicines are used and how do they work ?***

Many drugs are used to treat angina. The main drugs used are called nitrates, beta-blockers and calcium channel blockers.

***Nitrates*** increase the size of the coronary arteries to allow more blood to flow through the coronary arteries to the heart muscle. They also open up other blood vessels (in particular your veins), which bring blood back to your heart. By reducing the amount of blood coming back to your heart it reduces the amount of work your heart has to do. The problem with taking these medicines is that they can give you a headache and flushing. This is because your brain and skin may also get more blood. You may also feel light-headed if your blood pressure falls a little.



There are short-acting and long-acting types of nitrates. The short-acting glycerine tri-nitrate (GTN) can be given in a small tablet that you put under your tongue. There is also a short acting form of GTN that comes in a spray. You should spray this under your tongue. It is best to use

these short acting forms of nitrates before you do any activity such as walking, climbing, making love, carrying bags or getting into what you know will be a stressful situation. The longer acting forms will help you avoid angina during your daily activities. These are tablets which you may swallow or keep inside your mouth between your cheek and teeth. It is not unusual to be taking both short and long acting forms of nitrates.

Always carry your tablets or spray with you in your pocket. Check the expiry date.

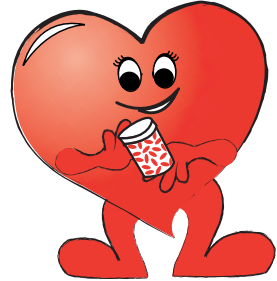
***Betablockers*** are a class of anti-angina drugs that work to make your heart go slower. They also lower your blood pressure and reduce the amount of oxygen your heart needs. They are very effective in treating angina. However, some people taking betablockers may find that they get cold hands and feet. They may also find that they have less energy or in the case of men, have difficulty maintaining erections. Betablockers can also make asthma worse or cause pain in the calves of people with diseased arteries in their legs.

You should discuss these problems with your doctor. There are a number of different betablockers and your doctor will let you know which one is suitable for your needs. He or she will also adjust the dose of these drugs so that you have less problems.

***Calcium channel blockers*** are commonly used to treat angina. They open up arteries and also reduce the work load of your heart. There are many different types of these drugs and they differ in their actions. Some are better at slowing heart rates, and others work better in reducing blood pressure.

Some people who take these medicines develop swelling in their feet. This is not a major problem but you should discuss this with your doctor if it starts to bother you.

There are also other newer drugs used to treat angina which help the cells in the heart muscle work better when the oxygen supply is poor. They are usually added on as part of your treatment if the other drugs mentioned above are not relieving your angina well enough.



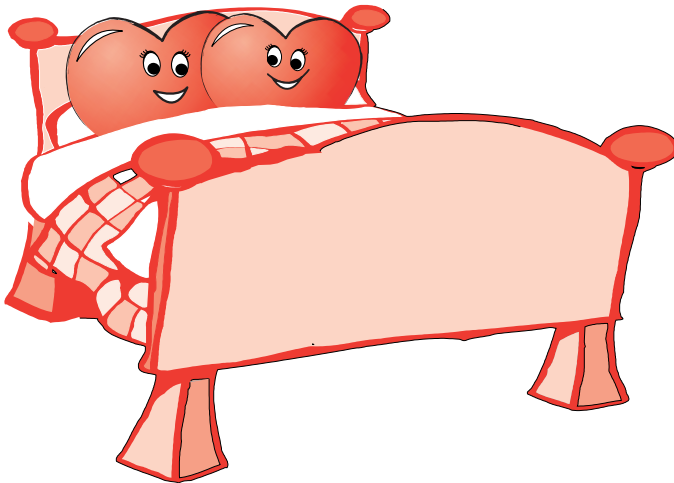
### ***Is it safe to drink alcohol if I am taking heart medicines ?***

There are very few heart drugs that it is not safe to take a small to moderate amount of alcohol with. However, too much alcohol is very damaging to your heart as it weakens the heart muscle and puts the heart into abnormal rhythms. Too much alcohol will also increase your blood pressure and give you abnormal fats in the blood so it may have a long-term harmful effect on your heart's arteries. It is not safe to have too much alcohol if you take the drug warfarin.

### ***Is it safe to make love if I have angina?***

Making love with your usual partner does not need to put too many demands on your heart. You should not be afraid to make love if you have angina. However, if you find that making love does produce angina pains, you should stop and rest. It is important to consult your doctor so that they can arrange for you to have a stress test to see how much activity your heart can cope with.

You should use your GTN before making love as this will cause less angina. It is not uncommon for men to have impotence or some problems maintaining erections once they are diagnosed with heart disease. This may be due to emotional upset rather than having a medical problem. They may become depressed or anxious and this is the problem rather than true impotence. Sometimes the problem is related to medicines they are taking. Beta-blockers often cause this problem and your doctor may adjust your medicines as necessary.

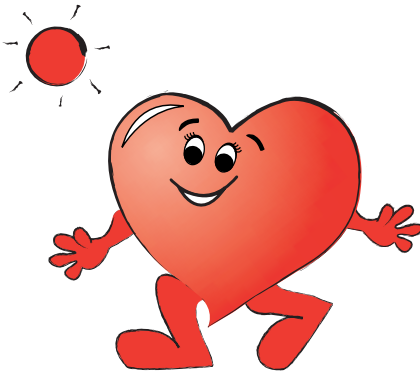


In some situations, you may need to use a drug like Viagra. This has been shown to be successful in many cases but there is a risk if someone taking nitrates uses Viagra. This is because, when taken together, both drugs can lower your blood pressure. This would be dangerous for your heart. You should discuss using Viagra with your doctor, as it may be possible to alter your anti-angina medicines so that you do not take nitrates.

## ***What can I do to help myself ?***

It is often very easy to think that you cannot control your health and that only your doctor and some magic drugs are going to keep you well. This is certainly not true. There are many things you can do to reduce the amount of angina attacks you may get. There are also important things to do to improve the state of your arteries.

Remember the reason we get angina is because our heart is not getting enough oxygen for its needs. There is a balance between supply and demand, which has been upset. To reduce the demands on your heart you might think you should not move at all. However, there are simple things you can do to reduce the demands on your heart.



## Things you can do to reduce angina



Do not exercise for at least 2 hours after a meal



Avoid eating heavy or large meals



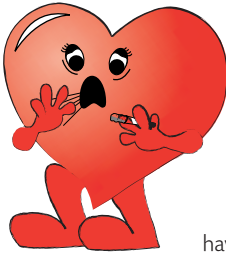
Do not carry loads that are too heavy or wear heavy clothing.



If you are walking outdoors in cold weather always wear a hat and make sure you cover your face with a scarf. The reason for this is that cold air on your face tightens up your arteries.



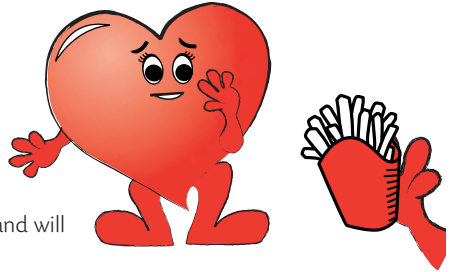
Use your GTN spray before doing any moderate activities.



It is absolutely essential that you stop smoking. It causes your arteries to tighten up and it reduces the amount of oxygen in your blood.



Regular walking will have a beneficial effect on your weight, blood pressure and cholesterol, and will reduce your angina.



Eat a healthy diet containing fruits and vegetables and avoid high fat foods.



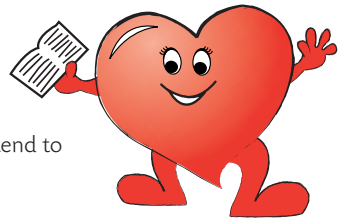
Drink alcohol in moderation. Too much alcohol increases your blood pressure and weight.



Reduce the amount of salt in your diet if suffer from high blood pressure. Use black pepper or herbs for flavour



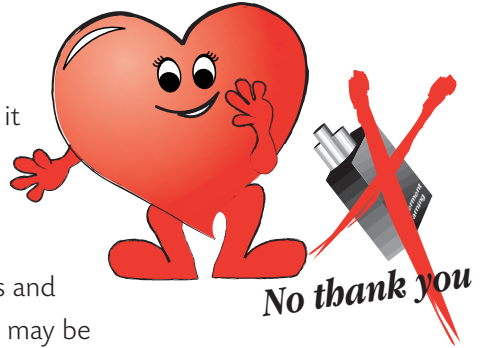
Keep a careful angina diary (See back of this book), you may identify some things that tend to bring on your attacks.



Keep a lifestyle diary to see how you are improving.

## *How can I reduce my risk factors?*

Giving up smoking is the single most effective thing you can do. You can save a small fortune, have the holiday you needed, feel healthier and have less angina. But it is not easy to do.



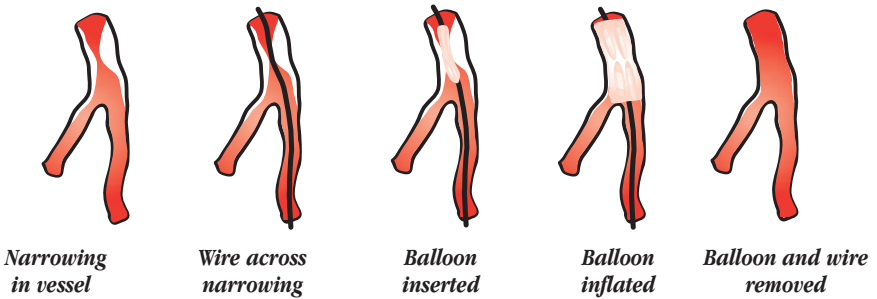
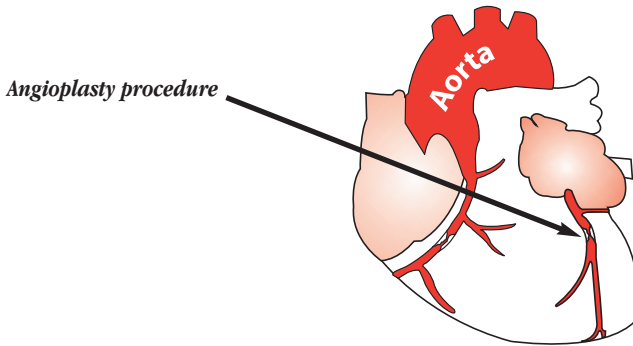
However, if you knew that smokers are more likely to have bigger heart attacks and die more often from heart attacks, you may be more determined to quit.

There are many medicines available to help you stop smoking. These include nicotine replacement therapy, which allows you to get rid of your urge to smoke while you are learning to avoid the bad habit. However, you should use these medicines with care when you have angina. You should consult your doctor before you have any treatment. There are also newer agents that work on your brain to switch off your desire to smoke and these have been shown to be quite useful. They have not been shown yet to have a harmful effect in patients with angina. Again you should consult your doctor about this form of treatment.

## *Do I need to have an angioplasty or stent ?*

Your doctor will tell you if you need an angioplasty or stent. The usual sign that you need this procedure is when your angina is not controlled with medicines alone. However, in some situations your doctor may feel that the disease in your arteries is quite severe and you need an angioplasty, even though your angina may not be severe.

An angioplasty involves inserting a balloon into the narrowed section in your artery and pushing the plaque outward so that the narrowing in the artery is removed. A stent is a little metal cage that can be expanded inside the artery to keep the plaque out of the central channel in the blood vessel so that blood can get to the heart muscle.



### ***Do I need to have bypass surgery ?***

Your doctor will tell you if you need bypass surgery. The usual sign that you need this surgery is when your angina is not controlled with medicines alone. However, in some situations your doctor may feel that the disease in your arteries is quite severe and you need surgery, even though your angina may not be severe.

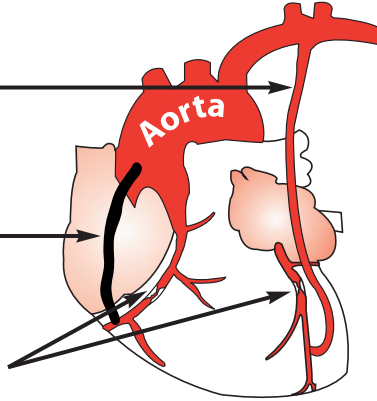
Bypass surgery involves taking veins from your legs, or arteries from your arm or chest and using them as a new channel to bring blood around the narrowed areas in your artery.

***Coronary artery bypass graft***

***Left internal mammary artery***

***Vein taken from your leg***

***Narrowings in coronary artery***



## ***If I have angina are my family at risk ?***

One in three Irish people have a parent, brother or sister with heart disease. If you suffer from angina, it is very important that your close family relatives are checked for heart disease risk factors. These include high cholesterol, smoking, high blood pressure, diabetes and being over weight.

## ***Are there any new treatments for angina ?***

In some patients it may not be possible to relieve their angina with drugs bypass or angioplasty. This is very rare and only happens in people who have severe disease in their arteries or in people who cannot have one of these procedures. This may be because the arteries are too small to fix or impossible for your doctor to reach to put in a bypass graft. In this situation, there have been new developments in using a laser to bore small holes between the inner chamber of the heart and that area of heart muscle that is causing the angina. This allows blood to flow into that area directly from the inner

heart chamber. The procedure is called trans myocardial revascularization (TMR). It is only performed in certain centres around the world. You should discuss this procedure with your doctor if your angina cannot be cured with standard treatment.

## *Summary*

Angina is a message from your heart to tell you that it is suffering from a lack of blood carrying oxygen. This is usually due to a narrowing in the coronary arteries supplying blood to your heart muscle. There is an important balance between the amount of blood your heart muscle demands and the ability of the coronary arteries to supply that blood. The demands on your heart are increased by exercise, high blood pressure, exercise and infections, a low blood count (anaemia) or lack of oxygen. Correcting this imbalance allows patients to live their lives without pain. This is achieved through

lifestyle changes and use of anti-anginal drugs. However, the

other important aspect of treating angina

is to prevent the disease in the arteries

getting worse. This is the best long

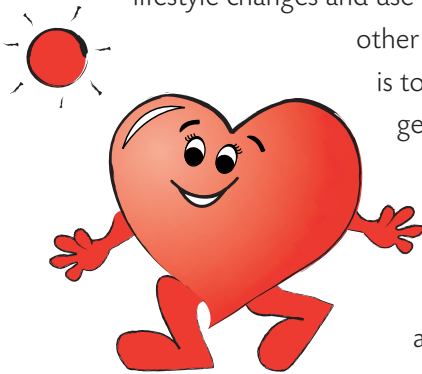
term strategy and is achieved by

reducing cholesterol and blood

pressure, giving up smoking,

loosing weight and becoming more

active.



*My risk factors and targets*

DATE										TARGETS
CURRENT SMOKING LEVEL	Cigs per day									ZERO
WEIGHT										
HEIGHT										
Body Mass Index BMI = WEIGHT (KILOGRAMS) ÷ HEIGHT (METRES SQUARED)										BMI 20-25
BLOOD PRESSURE										<130 /85
LACK OF EXERCISE										30 minutes exercise most days
ALCOHOL										No more than 14 units -women No more than 21 units -men No more than 10 units if you have high blood pressure
DIABETES										HbA1c <7.0%
CHOLESTEROL										<4.5 mmol/L
TRYGLICERIDES										<1.5 mmol/L
LDL CHOLESTEROL										<2.6 mmol/L
HDL CHOLESTEROL										>1.2 mmol/L (Men) >1.4 mmol/L (Women)

*Medication prescribed by my doctor*



NAME OF MEDICATION	DOSE	TIMES PER DAY

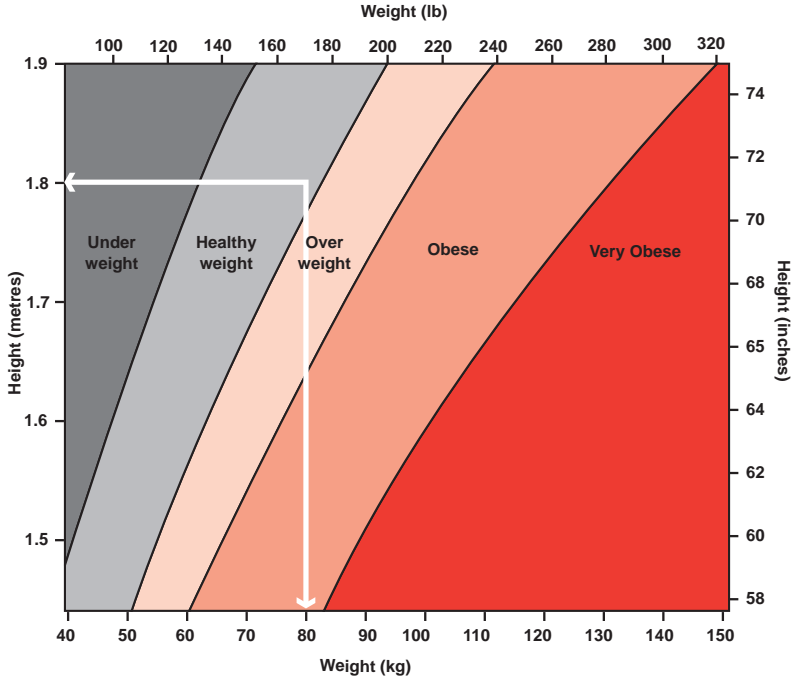
**WARNING**

Use only the medication prescribed for you. Always tell your doctor if you are on any other medication prescribed at another centre. Some drugs do not mix well and can change the action of the other drug.



## Body Mass Index Chart

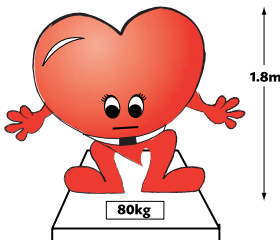
This is a measure of your weight in relation to your height. The formula is your weight in kilograms divided by your height in metres squared. You can read off your own BMI zone from this chart.



### BMI

- |              |                                     |
|--------------|-------------------------------------|
| less than 20 | - underweight                       |
| 20-24.9      | - healthy weight                    |
| 25-29.9      | - overweight (should lose weight)   |
| 30-39.9      | - obese (needs to lose weight)      |
| more than 40 | - severe obesity (must lose weight) |

$$\text{Body Mass Index} = \frac{W(\text{kg})}{H(\text{M})^2}$$



**EXAMPLE**

$\frac{80 \text{ Kilograms}}{1.8 \text{ metres squared}}$	$\frac{80}{1.8 \times 1.8} = 24.69 = \text{Healthy Weight}$
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***Step by Step through angina is an Irish Heart Foundation patient information publication. Other titles in this series are***

- Stroke: a guide for those affected by stroke and their carers
- Things you should know about blood pressure
- Things you should know about heart surgery
- Heart attack
- Living well with heart failure
- Step by step through cardiac catheterization and angioplasty
- Inheriting heart disease

Please contact us if you would like to order other publications. For further information, please visit our web site - [www.irishheart.ie](http://www.irishheart.ie)



## *Notes*

## *Notes*

## *Notes*

The Irish Heart Foundation is the only national voluntary organisation dedicated to the reduction of death and disability from heart disease through research, education and community service.



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