



# Heart valve surgery

## Heart information



## Contents

<b>What are heart valves?</b>	3
<b>What is heart valve surgery?</b>	5
Valve repair	5
Valve replacement	6
What happens during heart valve surgery?	6
<b>Why do I need heart valve surgery?</b>	7
<b>What will happen after heart valve surgery?</b>	8
Will I feel pain after the operation?	8
How long will I have to stay in hospital?	8
How long will it take to recover from heart valve surgery?	9
When can I start eating again?	10
What should I be eating?	10
What if I am constipated?	10
How active can I be?	10
When can I be more physically active?	11
When can I have sex?	11
Why am I so tired?	12
Why do I feel great one day, but dreadful the next?	12
When can I return to work?	12
Palpitations	12
Heart attack	14
Endocarditis	15
<b>Will I need to take medicine?</b>	15
<b>Important things to remember about anti-coagulant medicine</b>	16
Warfarin and food	18
<b>What should I talk to my doctor about?</b>	20
<b>Glossary</b>	22



## What are heart valves?

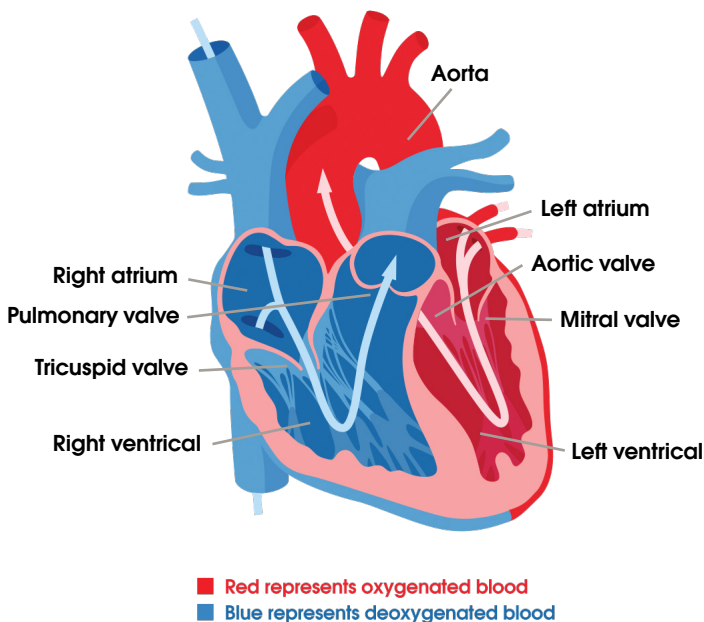
Heart valves are like one-way doors that control the direction of blood flow between the four chambers of the heart: there are two upper chambers (the atria) and two lower chambers (the ventricles) (**see the diagram on page 4**). The atria receive blood from the body and pump it into the ventricles. The ventricles pump blood away from the heart to the rest of the body.

With each heartbeat, blood is squeezed from the atria into the ventricles, and then out of the ventricles to the rest of the body. After each contraction of the atria or the ventricles, the inner flaps of the valves (often called 'cusps' or 'leaflets') come together to seal off the chambers of the heart and make sure that the blood does not flow backwards. They are forced open again by the normal pumping action of the heart to allow forward blood flow.

The four heart valves are:

- the **tricuspid valve**, on the right side of the heart, which controls the blood flow between the right atrium and the right ventricle
- the **mitral valve**, on the left side of the heart, which controls the blood flow between the left atrium and the left ventricle
- the **pulmonary valve**, on the right side of the heart, which separates the right ventricle and the pulmonary artery, the blood vessel that carries blood from the heart to the lungs
- the **aortic valve**, on the left side of the heart, which separates the left ventricle and the aorta

The diagram below shows the four chambers of the heart and the location of the valves. It also shows, using arrows, how blood flows through the heart.



Blood that has circulated through your body has had most of its oxygen and nutrients removed. It returns into the right atrium, passes through the tricuspid valve into the right ventricle, and is then pumped through the pulmonary valve into the vessels leading to your lungs.

The lungs add much needed oxygen to the blood and remove carbon dioxide waste. Now the blood returns to your heart, flowing from the lungs into the left atrium. From the left atrium, the blood passes through the mitral valve into the left ventricle. Finally, it's pumped through the aortic valve into blood vessels supplying the rest of your body.



## What is heart valve surgery?

Heart valve surgery is an operation to fix a damaged or faulty heart valve. It usually takes between four and six hours. There are two main types of heart valve surgery that you can have: valve repair and valve replacement. Your surgeon will discuss with you which type of valve procedure is most appropriate.

### Valve repair

Sometimes a faulty valve can be repaired by cutting away excess tissue in the cusps of the valve and sewing the edges together. A heart valve can also be repaired by shortening or connecting the cords that act like hinges.

Special rings called 'prosthetic rings' or 'annuloplasty rings' can also be used to narrow an enlarged valve and strengthen the repair.

Another method used to open a narrowed valve is called 'balloon valvotomy'. In this procedure, a small tube (a 'catheter') is inserted into an artery in your arm or groin and guided into your heart. Once it is positioned within the problem valve, a special balloon at the tip of the catheter is inflated to stretch the valve open. The catheter and balloon are then removed.

An advantage of valve repair operations is that it uses your own valve tissues in the repair. Sometimes a faulty valve can be repaired by cutting away excess tissue in the cusps of the valve and sewing the edges together. It can also be repaired by shortening or connecting the cords that act like hinges on the valve.



## Valve replacement

If a valve can't be repaired, it is sometimes removed and replaced with a new valve. The new valve is sewn onto a rim of tissue that is kept from the original valve.

Several types of replacement valves are used. They fall into two groups.

### **Biological tissue valves**

These are human or animal valves. Animal valves (usually taken from a cow or pig) are mounted in a cloth-covered metal or plastic frame to make them easier to insert. Human valves are taken from donated human hearts and can be sewn directly into place.

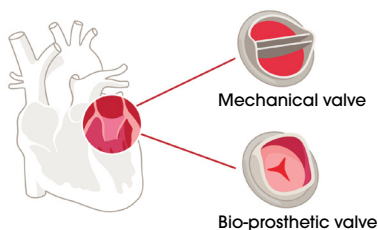
### **Mechanical valves**

These have some advantages over tissue valves as they last longer. However, blood clots can form on the synthetic material. To overcome this, you need to take anti-clotting medicine (see page 16) for life.

## What happens during heart valve surgery?

During the operation, your surgeon will cut down the midline of your chest, through your breastbone, to reach your heart. Your body will be kept cool to protect your vital organs by slowing down their working rate so that they need less oxygen. A heart-lung machine will take over the function of your heart and lungs.

If you need a blood transfusion, you should know that all blood products used for transfusion in Australia are strictly screened to protect patients against viruses that can cause hepatitis and AIDS. Sometimes you can arrange to donate some of your blood before you have surgery so that you can use it if you need a blood transfusion. However, this isn't always possible.





## Why do I need heart valve surgery?

You need heart valve surgery because your heart valves are not working correctly your doctor has diagnosed you with heart valve damage.

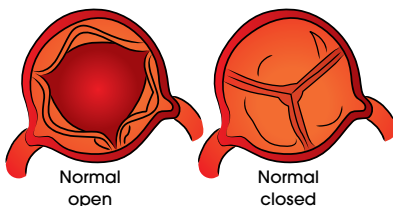
Sometimes people are born with damaged valves, which may be fixed soon after birth or later in life.

Disease or infection can also damage your valves. Rheumatic fever is a frequent cause of valve damage. It makes a valve gradually become stiff so that it doesn't open and close properly.

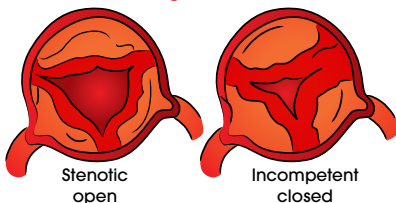
A damaged valve that limits forward blood flow by not opening properly is called a 'stenotic valve' (see diagram below). A damaged valve that doesn't close properly, allowing blood to flow back into the chamber, is called an 'incompetent valve' or a 'regurgitant valve'. Often both conditions are present.

When a valve is damaged, your heart cannot pump blood efficiently; it has to work harder to deliver oxygen-rich blood around your body. An overworked heart may begin to weaken, causing shortness of breath, pain, tiredness and a build-up of fluid in the body. If this happens, the valve may have to be replaced or repaired (see pages 5 & 6).

### Normal valve



### Damaged valve





## What will happen after heart valve surgery?

After the operation, you will be taken to a recovery area or intensive care unit for close supervision until you wake up from the anaesthetic. You will probably stay in the intensive care unit for one or two days. After the intensive care unit, you will be moved to another ward until you are ready to go home.

Before you leave hospital, your doctor will make follow-up appointments for you to discuss your medicines, wound care and activities. Your cardiologist will continue to oversee your general heart health. Your first outpatient appointment will usually be two to four weeks after you leave hospital.

About four to six weeks after leaving hospital, you will see your surgeon, or a member of the surgical team. Your doctor will check your wound and general progress, and you may also have an X-ray at this time.

### **Will I feel pain after the operation?**

You will probably feel quite sore, especially in the first few days after the operation. You will receive pain-relievers regularly to make sure that you don't feel severe pain. If the pain starts to build up, tell your nurse sooner rather than later. You and your nurse need to communicate and manage your pain together.

Medicine won't get rid of all of your pain, but it can manage it. Stronger pain-relieving medicines are usually only needed for a few days, so there is very little risk of becoming addicted to them.

### **How long will I have to stay in hospital?**

This varies depending on your condition and your response to surgery. On average, after heart valve surgery, people stay in hospital for six to nine days.





## Cardiac rehabilitation

**The Heart Foundation and World Health Organization recommend that all patients who have had a heart attack, heart surgery, coronary angioplasty, angina or other heart and blood vessel disease attend an appropriate cardiac rehabilitation and prevention program.**

**[www.heartfoundation.org.au/cardiac-services-directory](http://www.heartfoundation.org.au/cardiac-services-directory)**

### **How long will it take to recover from heart valve surgery?**

Normal recovery from heart surgery takes four to six weeks. During this time, you will begin to strengthen your muscles and return to your usual activities.

Soon after your operation, your chest wound will be exposed to the air, allowing it to dry. After a few days, the wound can be cleaned.

Sometimes wire or special strips of tape are used to hold the breastbone together. These do not need to be removed. It takes about six to 12 weeks for the breastbone to heal completely. During that time you shouldn't lift anything heavy.

After major surgery, such as heart valve surgery, recovery time may seem to pass slowly. Your body has been slowed down by the lowered activity, lack of good sleep, medicines and the surgery. You may feel drained, physically and emotionally.

Some hospitals run outpatient rehabilitation programs. These can be a very important part of your recovery and will help you to continue the gradual increase in activity you began in hospital.



**In the first few weeks after surgery, you might have trouble with your memory and concentration. This will improve steadily and should not be a problem.**

## **When can I start eating again?**

After the operation, while you are still under the anaesthetic, a breathing tube is put into your windpipe. The tube is usually removed within eight to 24 hours, and most of that time, you will have been asleep. After the tube is removed, you will be able to swallow a small amount of liquid and build up to foods over the next couple of days.

## **What should I be eating?**

1. Plenty of vegetables, fruits and wholegrains.
2. A variety of healthy protein sources, including fish and seafood, legumes, nuts and seeds. Smaller amounts of eggs and lean poultry can also be included in a heart healthy diet. If eating red meat, make sure the meat is lean and limit to less than 350 grams a week.
3. Unflavoured milk, yoghurt and cheese. People with high blood cholesterol should choose reduced fat varieties.
4. Healthy fat choices, including nuts, seeds, avocados, olives and their oils for cooking.
5. Herbs and spices added to flavour foods, instead of using salt.

## **What if I am constipated?**

Unfortunately, many pain-relieving tablets can make you constipated. The best way to prevent constipation is to eat high-fibre foods, such as bran, seeds, fruit and vegetables, and drink plenty of fluids (aim for 6–8 glasses per day). Follow your exercise program, because exercise will help promote regularity.

## **How active can I be?**

This will depend on your recovery. You will probably start just by sitting in a chair or walking around the room. Later, there will be short walks in the corridor and, eventually, stair climbing and brisk longer walks to prepare for home. Sponge baths are given right away and, within a few days, you will be able to take a shower and wash your hair.

## **When can I be more physically active?**

Once you are at home, continue with the level of activities that you started in hospital. Aim to progress your activity gradually over the weeks and months ahead as advised by your surgical team.

Set realistic goals. Don't over do it, but don't be inactive either. Rest when you need to and change an activity if it is making you too tired. Doing too much at this time won't injure the heart. It will, however, make you very tired.

If you experience chest wound complications, such as redness or weeping and/or movement of the breastbone, you should contact your surgical team for advice. You may need to stop your activity or take it a bit more slowly and allow more time for healing.

As you become more active during your recovery, you will probably get some pain associated with the wound or muscles in your chest, shoulder, neck and back. Continue to take your pain-relieving tablets (e.g. paracetamol) when you need them. You will be able to reduce these gradually. **Don't neglect any type of severe pain.**

## **When can I have sex?**

If you can climb two flight of stairs without getting chest pain or shortness of breath, you will probably be able to cope with the amount of energy required for sex. Avoid having sex after eating a large meal, drinking alcohol or when you are very tired.

You may find that some positions are more comfortable than others, because of discomfort in your chest wound. It can take time for sexual relationships to get back to normal after surgery, so try to take things slowly. Make an effort to discuss your feelings and concerns with your partner.

## Why am I so tired?

Tiredness is very common after surgery, and it's important that you rest. Have a one to two hour rest in the afternoon. Even if you don't sleep, lie down and read a book or listen to relaxing music. Try to get eight to 10 hours of sleep every night.

Sometimes you may get breathless when you exercise. This is to be expected but, if it continues after you have rested, or is associated with heart 'flutters', tell your doctor. Breathlessness can be a symptom of heart attack (see page 14).

## Why do I feel great one day, but dreadful the next?

'Up' and 'down' days after surgery are normal. The best way to overcome this is to plan something interesting to do each day. Don't alter your normal lifestyle too much. Get out of bed at the usual time and dress in day clothes.

## When can I return to work?

This decision is usually made after your four to six week check-up. It will depend on your type of work, how demanding your job is, your strength and other factors. Office workers can usually return to work in six weeks. If your work is more physically demanding, you should follow your surgeon's advice.

## Palpitations

Many people have palpitations (thumping heartbeats or fluttery feelings) after operations. Usually this is not serious. If you are having palpitations often, or they last a long time, tell your doctor.



**It's important that you are free of pain when you go to bed, so that you get a good night's sleep. You might find it helpful to learn relaxation techniques or listen to relaxation music.**



# Heart attack

A heart attack is an emergency. Getting to hospital quickly can reduce the damage to your heart and increase your chance of survival.

A heart attack happens when there is a blockage of an artery that supplies blood to your heart muscle (a 'coronary artery'). As a result, some of your heart muscle starts to die. If the artery stays blocked, the lack of blood permanently damages the area of your heart muscle supplied by that artery.

It is important that you know what to do if you or someone else has a heart attack.

## Warning Signs of a Heart Attack Action Plan



**Do you feel any**

**pain    pressure    heaviness    tightness**

**In one or more of your**

**chest    neck    jaw    arm/s    back    shoulder/s**

**You may also feel**

**nauseous    a cold sweat    dizzy    short of breath**

**Yes**

**1 STOP** and rest now

**2 TALK** tell someone how you feel

**If you take angina medicine**

- Take a dose of your medicine.
- Wait 5 minutes. Still have symptoms? Take another dose of your medicine.
- Wait 5 minutes. Symptoms won't go away?

Are your symptoms severe or getting worse?

or

Have your symptoms lasted 10 minutes?

**Yes**

**3 CALL 000** and chew 300mg aspirin, unless you have an allergy to aspirin or your doctor has told you not to take it

**Triple Zero**

- Ask for an ambulance.
- Don't hang up.
- Wait for the operator's instructions.

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## Endocarditis

People who have heart valve disease or who have had heart valve surgery are at higher risk than others of an infection called 'endocarditis'.

Endocarditis occurs when bacteria pass through the bloodstream and settle on the valve. This can cause very serious problems.

To prevent endocarditis, your cardiologist may tell you to take antibiotics before certain dental and surgical procedures and, in some cases, childbirth. If you take antibiotics, the risk of infection in these circumstances is very small. If you're not sure what antibiotics you should take or when you should take them, ask your doctor or surgeon.



### Will I need to take medicine?

If you have had a valve replacement, you may need to take an anti-coagulant (anti-clotting) medicine. These medicines stop the blood clotting easily and are used to prevent clots forming on your new valve. Warfarin is the most commonly used anti-coagulant after valve replacement surgery.

Some types of valve replacement require only two or four months of anti-coagulant treatment, but others require lifelong treatment. These medicines don't stop clotting completely, but reduce the risk of problems that can be caused by blood clots forming on your new valve.



### Infection

**Call your cardiologist or surgeon straight away if you have any symptoms of an infection, such as fever, sweating, loss of appetite, weight loss or an overall lack of energy lasting more than a week.**



## Important things to remember about anti-coagulant medicine

- Don't stop taking anti-coagulants without talking to your doctor first.
- Don't change the amount of medicine that you are taking without talking to your doctor first.
- Try to take your medicine at the same time every day, preferably in the evening. If you miss a dose, take it as soon as you remember on the same day. If you don't remember until the next day, **don't take an extra dose**, but talk to your doctor.
- If you go away, make sure that you take enough medicine with you.
- To make sure that you take the right dose of medicine, you will need to have frequent blood tests to check the time it takes clots to form. While you are still in the hospital after your operation, your doctor or nurse will probably test your blood daily. When you go home, you should have a blood test once a week. Later, it may only need to be once every four to six weeks.
- While you are taking anti-coagulants, be on the alert for signs of bleeding and tell your doctor about any unusual bleeding or bruising.
- As other medicines can interfere with anti-coagulants, don't take any medicine that your doctor hasn't prescribed. This includes 'over the counter' medicines, such as cough medicines. For minor aches and pains, take paracetamol, not aspirin or ibuprofen (as these may affect clotting). Some people may be prescribed a regular, low dose of aspirin in addition to warfarin. If this is the case, it is important not to take extra aspirin for aches and pains.



- If you are taking warfarin, you should limit the amount of alcohol that you consume as it can alter the effectiveness of the medicine.
- If you need dental work or surgery, tell your dentist or surgeon that you are taking anti-coagulants. They may tell you to temporarily stop taking them.
- If you are planning a long trip, before you leave, ask your doctor to help you to make arrangements to have any necessary blood tests during your trip.
- Always carry information about your medicine and the dose that you are taking.
- Some foods can interfere with the way warfarin works in the body. **See below for further information.**



## Warfarin and food

People taking warfarin need to be aware that certain types of foods can either enhance or inhibit the effects of the medicine. Foods high in vitamin K, such as leafy green vegetables, can reduce the effect of warfarin. Some dietary supplements may increase the effects of warfarin.

It is important to remember that these foods should not be avoided altogether, but that people taking warfarin should try to keep their intake of these foods fairly consistent.

### Foods to be aware of include:

- leafy green vegetables (such as spinach, broccoli, lettuce, cabbage, asparagus, parsley, watercress and brussels sprouts)
- canola, olive and soybean oils
- seaweed (such as in sushi)
- green and herbal teas
- liver
- spring onions



People taking warfarin should talk to a doctor if they are considering changes to their eating habits (for example, switching to a vegetarian diet, following a special meal plan to lose or gain weight, or starting or discontinuing any dietary supplements, such as fish oil supplements).

For more information, contact the NPS Medicines Line on 1300 633 424.





## **What should I talk to my doctor about?**

Heart surgery is a major event in your life and you should make sure that you are well informed about why you need surgery, and what the benefits and risks of surgery are. Below are some questions about heart valve surgery that you may want to ask your doctor.

- **What benefits will I get from the surgery?**
- **What are the risks or potential complications of surgery?**
- **Will I need a blood transfusion and can I donate blood for myself?**
- **What sort of heart valve will I receive?**
- **Will I need to take anti-coagulant medicine? If so, for how long?**
- **How much will the operation cost and how much will be covered by insurance?**
- **Is there a place nearby where my partner can stay while I'm in hospital?**
- **If I need to travel from my home to a different town for the operation, how long should I stay there after my discharge?**
- **How often should I have follow-up visits?**
- **What are the symptoms of heart valve failure?**

### **Want to know more?**

For more information, contact your GP. You can also visit [www.heartfoundation.org.au](http://www.heartfoundation.org.au)



## Glossary

### **Annuloplasty rings**

Special rings used to narrow an enlarged valve and make repairs stronger.

### **Anti-coagulants**

Medicines used to treat and prevent blood clotting inside the blood stream.

### **Aorta**

The main artery of the body. The aorta rises directly from the left ventricle (the main pumping chamber of the heart) and supplies oxygen-rich blood to all other arteries, except the pulmonary artery.

### **Aortic valve**

The valve separating the left ventricle and the aorta.

### **Atrium (plural = atria)**

One of the heart's two upper (collecting) chambers.

### **Bacterial endocarditis**

An infection of the heart valves.

### **Balloon valvotomy**

A procedure using a balloon to open stuck valves.

### **Biological tissue valves**

Valves made from human or animal tissue.

### **Heart murmur**

A swishing sound caused by blood abnormally flowing forwards or backwards in the heart.

### **Incompetent valve**

A 'leaking' valve that lets blood to flow back into a chamber of the heart.

### **Mechanical valves**

Valves made from non-biological materials, such as plastic or metal.

### **Mitral valve**

The valve between the left atrium and left ventricle.

**Murmur**

See 'heart murmur'.

**Prosthetic rings**

See 'annuloplasty rings'.

**Pulmonary valve**

The valve separating the right ventricle and the pulmonary artery.

**Regurgitant valve**

See 'incompetent valve'.

**Stenotic valve**

A narrowed, stiff valve.

**Tricuspid valve**

The valve between the right atrium and right ventricle.

**Ventricle**

One of the two main pumping chambers of the heart.

**Warfarin**

One of a group of anti-coagulant (anti-clotting) medicines.



For heart health information visit  
[heartfoundation.org.au](http://heartfoundation.org.au)

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