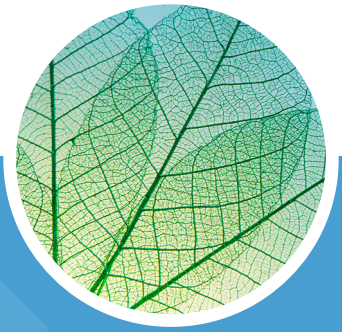
EDUCATION

Heart Valve Diseases and Treatments



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How the Heart Works

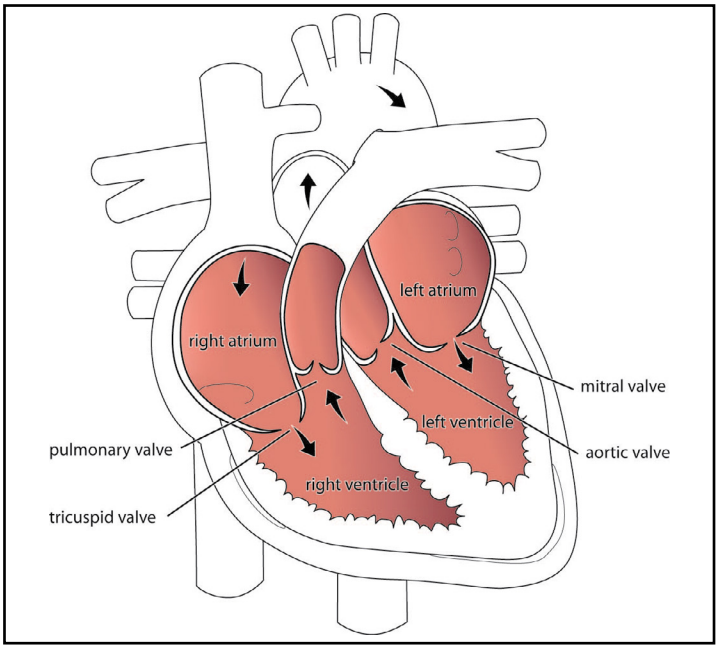
With each heartbeat, blood flows into and is pumped out of the heart. The aorta is the artery that carries blood from the heart throughout the body.

The heart has two sides. The right side receives blood from the body and sends blood to the lungs. The left side receives oxygen-rich blood from the lungs and sends blood to the body through the aorta.

Each side is divided into two chambers:

- the upper chambers are called the atria
- the lower chambers are called the ventricles.

The chambers are separated by valves that keep the blood flowing one way through the heart.

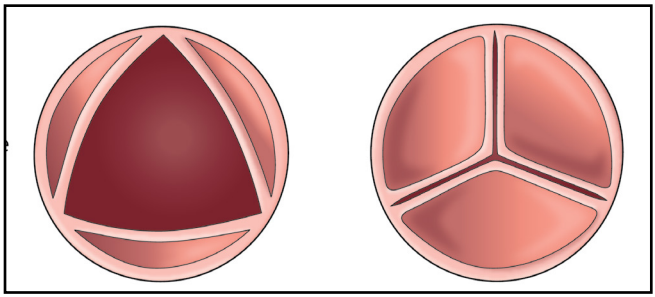


Your heart has two atria, two ventricles and four valves: two on the left side and two on the right side.

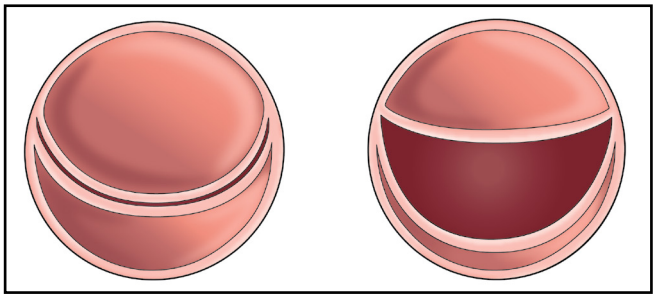
How Heart Valves Work

Valves are flaps of tissue that open and close with each heartbeat. It is important for valves to open widely and close tightly during each heartbeat to keep blood from leaking backward. There are four valves:

- Left-side valves:
  - **aortic valve**: controls blood flow from the left ventricle to the aorta, which carries the oxygen-rich blood out to your body.
  - **mitral valve**: separates the left atrium (upper left filling chamber) and left ventricle (lower left pumping chamber). It helps your heart pump oxygen-rich blood to the left ventricle.
- Right-side valves:
  - **pulmonary valve**: controls oxygen-poor blood flow from the right ventricle to the lungs
  - **tricuspid valve**: separates the right atrium (upper right filling chamber) and right ventricle (lower right pumping chamber). It helps your heart circulate the blood which has returned from your body in need of more oxygen.



The aortic, tricuspid and pulmonary valves each have three leaflets. These must fully open and close to work properly.



The mitral valve has two leaflets, which also must open and close properly.

Heart Valve Disorders

Any heart valve can have a problem. You may be born with a valve problem or develop one later in life.

- **Insufficiency/regurgitation**: This occurs when a valve does not completely close, causing blood to leak backward. Insufficiency makes the heart work harder.
- **Stenosis**: This occurs when a valve thickens or becomes stiff, keeping the valve from opening properly. Stenosis makes the heart work much harder to force blood to flow through a smaller opening.

Signs and Symptoms of Valve Disease

Some signs and symptoms include:

- shortness of breath
- fatigue, tiredness
- feeling lightheaded, dizzy or faint
- swelling in your feet, legs or stomach
- chest pain or tightening.

Shortness of breath is a sign of valve disease.

How Your Doctor Will Find (Diagnose) Valve Disease

Your doctor can listen to your heart with a stethoscope for a murmur. A murmur is a sound made by abnormal blood flow across a valve. The following are other test(s) you may need:

- **Echocardiogram**. This test is an ultrasound which lets your doctor see if your valves open and close properly. It also checks the size of your chambers and how well your heart pumps. Narrowed or leaking valves show up clearly on this test.
  - — A transthoracic echocardiogram (TTE) is usually the first test doctors do to diagnose a heart valve problem. This test gives your doctor more detailed information about the heart valves.

— A transesophageal echocardiogram (TEE) may also be needed. With this test, a tube with a small transducer that makes sound waves to create images of your heart, is passed through your mouth into your esophagus.

Because your esophagus is close to the chambers of your heart, your doctor can get clear images of the valves. You will be given medicine to make you sleepy before the tube is inserted.

A TEE can give more details than a regular echocardiogram can.

- **Electrocardiogram (or EKG)**. This test checks the rhythm of your heart, which may be changed with severe valve disease.
- **Computed tomography (or CT) angiogram**. This test uses X-ray to get images of your heart valves and chambers. This test uses contrast. **Please tell your doctor if you have had a contrast reaction. A CT study is also used to plan treatments of your heart valve, if needed.**
- **Angiogram (also called cardiac catheterization)**. This procedure involves placing one or two catheters (small tubes) in your heart from a blood vessel in your leg or arm. It gives your doctor a look inside your heart.

  It can measure pressure on either side of your heart valve to show how much narrowing there is. Your doctor may inject a dye to see how much a valve leaks.

  Your doctor may also take pictures of your heart arteries to look for blockages.

Valve Disease Treatments

It is important to get treatment right away when you have symptoms, as valve diseases can be life-threatening.

Common treatments for valve disease include:

- **Medicines.** These can treat symptoms or prevent some symptoms from occurring:
  - Diuretics (water pills) help your body get rid of extra fluid.
  - Anticoagulants (blood thinners) keep blood from clotting in and around the heart valves and the chambers of the heart.
  - You may be prescribed other medicines if you have high blood pressure or other abnormal heart responses.
- **Valvuloplasty**. This is a procedure done using a catheter (small tube) to open a narrowed valve. A catheter is threaded from the leg into the heart and inflated across the narrowed valve to help it open better. Valvuloplasty may be a treatment if you have valve stenosis.
- **Repair**. This is a surgery to treat leaky valves. It avoids the need to replace a valve with a mechanical or tissue valve. This can be done as an open heart surgery or as a catheter-based procedure.
- **Replacement**. This is a surgery to replace a valve with a mechanical or a tissue valve. It may be done as an open procedure or a catheter-based procedure:
  - Mechanical valves are very strong and will usually not need to be replaced during your lifetime. You will need to take a blood-thinning medicine (such as warfarin) for the rest of your life.
  - Tissue valves may need to be replaced in 10 to 15 years. You would not need to take a blood-thinning

medicine (such as warfarin) but you likely will need to take an anti-platelet medicine (such as aspirin) for tissue valves.

Your doctor will talk with you about the benefits and risks of each type of valve repair or surgery, and your best option.

Tips for Living With Valve Disease

Your doctor may ask you to make some lifestyle changes. These may include:

- Do not use tobacco. Smoking makes your blood vessels narrow. This makes your blood pressure go up, makes your heart pump faster, and makes it harder for oxygen to move through your body.
- Eat vegetables, fruits, whole grains, lean meats and nuts.
- Limit the amount of sugar and salt you eat.
- Get regular exercise. Depending on your health, your doctor may ask you to limit or stop competitive sports activity and certain exercises. If you have symptoms while you exercise, talk with your doctor.
- Keep all dental appointments. The health of your mouth is important for your heart health.
  - — If you have a valve replaced, you are at risk for infective endocarditis. This is an infection caused by bacteria (germs) that enter your bloodstream and travel to a valve. Your doctor will ask you to see your dentist before valve surgery.
  - — The most common causes for this infection are tooth decay and gum infection. After a valve replacement, you will need to take antibiotics before any dental procedure that may affect your gums or teeth roots. This includes routine cleanings. If you have questions, call your valve nurse before your dental visit.

- Keep all follow-up medical and dental appointments, even if you feel well.

Aortic Valve Disease

The aortic valve controls the blood flow from the lower left chamber (left ventricle) of your heart to the aorta.

It is important for valves to open widely and close tightly during each heartbeat to keep blood from leaking backward.

Two common problems with this valve are aortic regurgitation (or insufficiency) and aortic stenosis.

Signs and Symptoms

Signs and symptoms of aortic valve disease include:

- shortness of breath
- fatigue, tiredness
- feeling lightheaded, dizzy or faint
- swelling in your feet, legs or stomach
- chest pain or tightening (not common).

A normal aortic valve has three flaps (known as leaflets) which open and close tightly. This keeps the blood flowing in one direction through your heart and out into the aorta.

Aortic Regurgitation or Insufficiency

This occurs when a valve does not completely close, causing blood to flow backward into the left ventricle. Over time, the ventricle increases in size because of added blood and your heart has to work harder to pump the blood out to your body.

There are many causes:

- being born with a heart or valve problem
- infection of the heart
- injury to the chest or aorta
- rheumatic fever or other rare diseases
- aging.

Treatment options include:

- **medicine** to reduce symptoms, control blood pressure or reduce fluid in your body
- **surgery** to repair or replace the valve. (See the last section for more information.)

Together, you and your doctor will decide which treatment is best for you. If you have a mild case (few to no symptoms), you may not need treatment.

Aortic Stenosis

This occurs when a valve becomes narrow and can't fully open. As a result, blood has a hard time flowing from your heart to your aorta and the rest of your body. Your heart must work harder to pump the blood through this smaller opening. This extra work can weaken your heart over time. There are many causes:

- being born with a heart or valve problem
- calcium build-up or growth of fibrous tissue on the valve

- rheumatic fever
- radiation therapy.

Treatment options include:

- **medicine** to reduce blood pressure and control your heart rate, strengthen your heart and reduce fluid in your body
- **procedure (balloon valvuloplasty)** to make the narrowed valve opening larger
- **surgery** to replace the valve. (See the next section for more information.)

Talk with your doctor as soon as you have symptoms. Stenosis can lead to heart failure, a condition in which your heart isn't pumping blood as well as it should.

Once you have symptoms of aortic stenosis, your chance of death in two years is about 50 percent or more without treatment. If you have a valve replacement, your chance for living longer is greatly increased.

Valve Replacement Surgery

Your doctor can either repair a valve or replace it with a mechanical or tissue valve. It may be done as an open procedure or a catheter-based procedure.

— Mechanical valves are very strong and will usually not need to be replaced during your lifetime. You will need to take a blood-thinning medicine (such as warfarin) for the rest of your life.

— Tissue valves may need to be replaced in 10 to 15 years. You would not need to take a blood-thinning medicine (such as warfarin) but you likely will need to take an anti-platelet medicine (such as aspirin).

Your doctor will talk with you about the benefits and risks of each type of valve repair or surgery, and your best option.

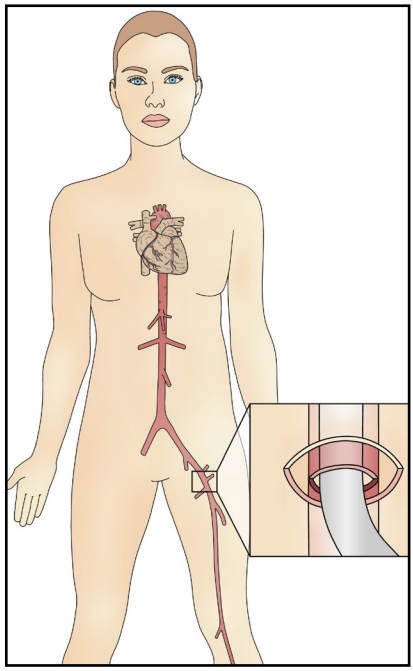
Transcatheter Aortic Valve Replacement (TAVR)

You may be able to have a valve replacement through a catheter (small tube). This depends on your health and age.

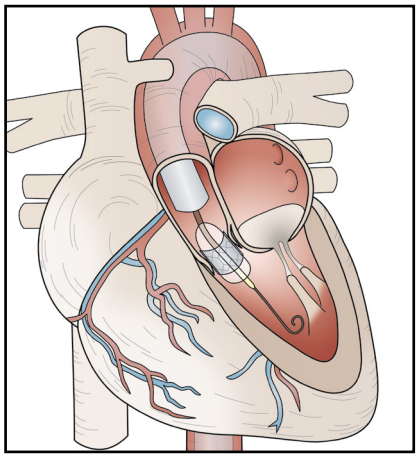
During the TAVR, your doctor will place a valve made of animal tissue into your heart using a catheter. The doctor uses imaging to guide the new valve to your narrowed valve.

Once your doctor has the valve in the right position, they expand it to hold the valve open. Your doctor then removes the catheter and the new valve stays in place.

Your doctor will use results of a CT scan to determine whether to use arteries in your legs or chest to insert the new valve.



Your doctor can replace a valve by inserting a catheter through an artery.



When the catheter is in the right place, your doctor expands the valve and takes out the catheter. The valve stays in place.

Mitral Valve Disease

A normal mitral valve opens widely and closes tightly during each heartbeat to keep blood from leaking backward.

Mitral Regurgitation

Mitral regurgitation is a common type of valve disease. It occurs when the valve flaps (leaflets) don't shut properly, causing blood to flow backward. This makes your heart work harder.

Signs and symptoms of mitral regurgitation include:

- shortness of breath
- fatigue, tiredness.

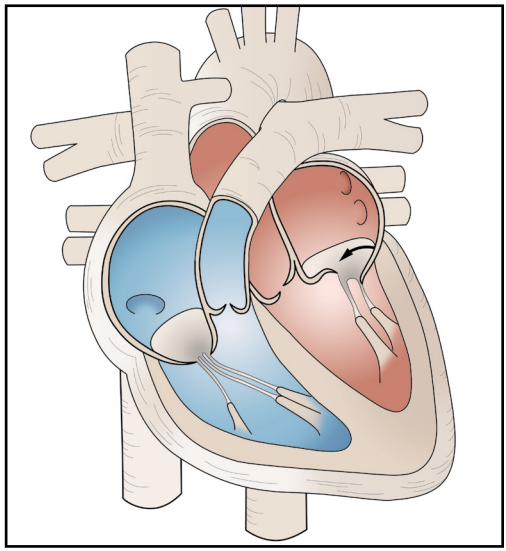
Mitral regurgitation may be caused by degeneration of the mitral valve leaflets or by or heart enlargement due to a heart attack or heart failure.

Mitral Valve Prolapse (Degeneration)

This occurs when one or two flaps bulge into the left atrium. Your doctor will find this problem by listening to your heart and doing an echocardiogram (a test that uses sound waves to see how well your valve is working).

Signs and symptoms include:

- palpitations
- chest pain
- fatigue
- shortness of breath.



Degenerative mitral regurgitation (prolapse).

Treatment options include:

- **medicine** to manage your symptoms
- **open-heart surgery** to repair or replace the mitral valve.
- **catheter-based valve repair** to fix your valve with a procedure that doesn't involve open heart surgery. (This *may* be an option for you.)

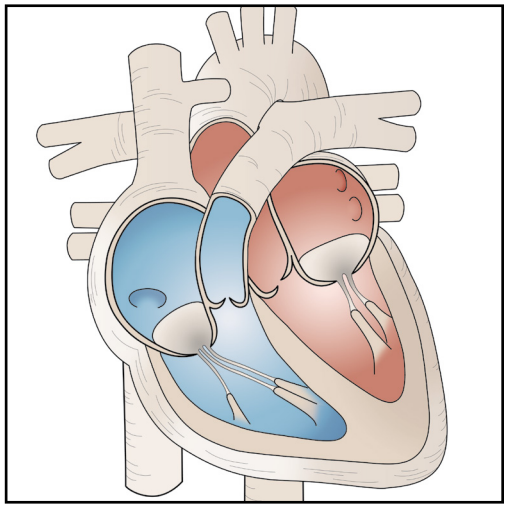
Together, you and your doctor will decide which treatment is best for you. If you have a mild case or no symptoms, you may not need treatment.

Functional Mitral Regurgitation

This occurs when your heart is enlarged due to a heart attack or heart failure. The valve leaflets are no longer able to close properly.

Therapy for this type of leaky mitral valve includes:

- **medicine** (water pills or blood pressure medicine)
- **surgery** (in certain cases).



Functional mitral regurgitation.

Mitral Stenosis

This occurs when the valve becomes narrowed and does not open fully. As a result, blood cannot flow as well from the left atrium (top chamber) to the left ventricle (bottom chamber). More blood stays in the left atrium and blood may back up into the lungs.

Causes of mitral stenosis:

- rheumatic fever
- calcium deposits on the valve
- radiation to the chest
- being born with a heart valve problem
- infection of the valve or heart muscle.

Signs and symptoms include:

- shortness of breath
- dizziness or fainting
- chest discomfort
- palpitations or irregular heart rhythms
- weakness or fatigue.

Treatment options include:

- **medicines** (to reduce fluid build-up in your body, slow your heart rate, treat heart rhythm problems or to prevent blood clots)
- **balloon valvuloplasty** (a procedure in which a balloon-tipped catheter or tube is threaded into the valve and inflated to open the valve)
- **mitral valve repair** (a surgery to remove calcium deposits or other tissue that prevents the valve from opening properly)

- **mitral valve replacement** (a surgery in which your valve is replaced by either a mechanical or tissue valve)
  - — Mechanical valves are very strong and will usually not need to be replaced during your lifetime. You will need to take a blood-thinning medicine (such as warfarin) for the rest of your life.
  - — Tissue valves may need to be replaced in 10 to 15 years. You would not need to take a blood-thinning medicine (such as warfarin) but you likely will need to take an anti-platelet medicine (such as aspirin).

Your doctor will talk with you about the benefits and risks of each type of valve repair or surgery.

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cvs-ah-26445 (2/15)