

MITRAL VALVE PROLAPSE

What Is Mitral Valve Prolapse?

Mitral (MI-tral) valve prolapse (MVP) is a condition in which one of the valves of the heart, the mitral valve, doesn't work properly. The flaps of the valve are "floppy" and don't close tightly. Much of the time, MVP doesn't cause any problems. Rarely, blood can leak the wrong way through the floppy valve, which may cause shortness of breath, palpitations, chest pain, and other symptoms.

Normal Mitral Valve

The mitral valve controls the flow of blood between the two chambers on the left side of the heart. The two chambers are the left atrium (AY-tree-um) and the left ventricle (VEN-trih-kul). The mitral valve allows blood to flow from the left atrium to the left ventricle, but not back the other way. (The heart also has a right atrium and ventricle, separated by the tricuspid (tri-CUSS-pid) valve.)

At the beginning of a heartbeat, the atria contract and push blood through to the ventricles. The flaps of the mitral and tricuspid valves swing open to let the blood through. Then, the ventricles contract to pump the blood out of the heart. When the ventricles contract, the flaps of the mitral and tricuspid valves swing shut and form a tight seal that prevents blood from flowing back into the atria.

Mitral Valve Prolapse

In MVP, when the left ventricle contracts, one or both flaps of the mitral valve flop or bulge back (prolapse) into the left atrium. This can prevent the valve from forming a tight seal, and allow blood to flow backward from the ventricle into the atrium. The backward flow of blood is called regurgitation (re-GUR-ji-TA-shun), and it can lead to symptoms and complications.

Regurgitation doesn't occur in all cases of MVP. In fact, the majority of people with MVP don't have regurgitation and never have any symptoms or complications. In these people, even though the valve flaps prolapse, the valve is still able to form a tight seal.

When regurgitation does occur, it can cause complications and troublesome symptoms such as shortness of breath, a racing or irregular heartbeat, or chest pain. Regurgitation can get worse over time and lead to changes in the heart's size and higher pressures in the left atrium and lungs. Regurgitation increases the risk for heart valve infections.

Medicines can treat MVP symptoms that cause people to worry or have discomfort. Medicines are also used to prevent complications. Sometimes a person will need surgery to repair or replace the mitral valve.

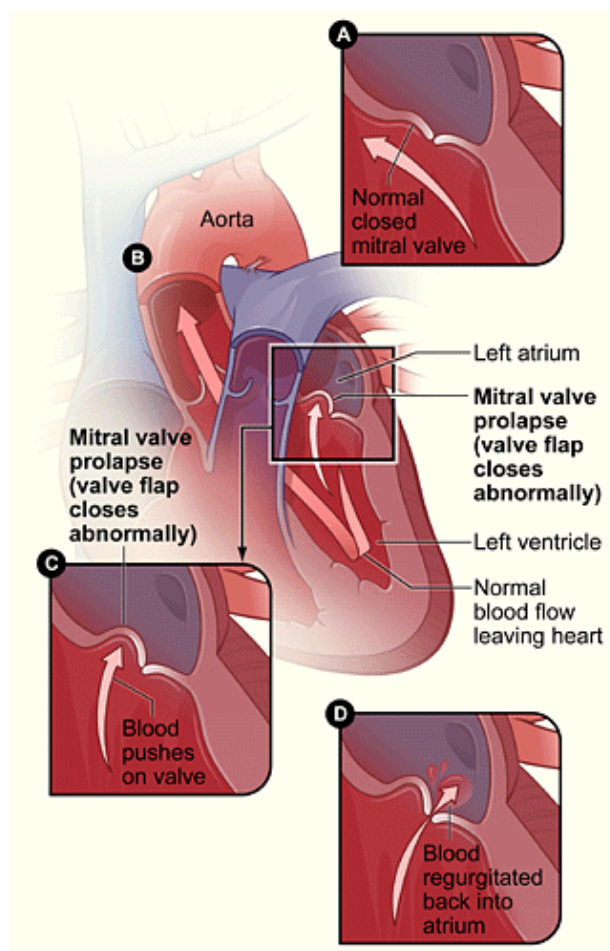


Figure A shows the normal mitral valve separating the left atrium from the left ventricle. Figure B shows the heart with mitral valve prolapse. Figure C shows the detail of mitral valve prolapse. Figure D shows a mitral valve that allows blood to flow backward into the left atrium.

MVP was once thought to affect as much as 5 to 15 percent of the population. It's now believed that many people who were diagnosed with MVP in the past didn't actually have an abnormal mitral valve. They may have had a slight bulging of the valve flaps due to other conditions such as dehydration or a small heart. However, their valve was normal and there was little or no regurgitation through the valve. Now, more precise rules for diagnosing MVP with a test called an echocardiogram make it easier to identify true MVP and to detect troublesome regurgitation. Based on these new rules, it's now believed that less than 3 percent of the population actually have true MVP, and an even smaller percentage has serious complications from it.

Outlook

In most people with MVP, the condition causes no symptoms or medical problems, and no treatment is needed. These people are able to lead normal, active lives, and they may not even know they have the condition. However, people with mild MVP are often prescribed antibiotics before dental work or certain types of surgery to prevent a heart valve infection called infective endocarditis (EN-do-kar-DI-tis). This infection is caused by bacteria that can enter the bloodstream at the time of dental work or some kinds of surgery. These bacteria can stick to and infect the heart valves in people with MVP.

Only a very small number of people with MVP have troublesome symptoms or regurgitation through the valve. They may need medicine to relieve their symptoms. A very few people with MVP may need heart valve surgery.

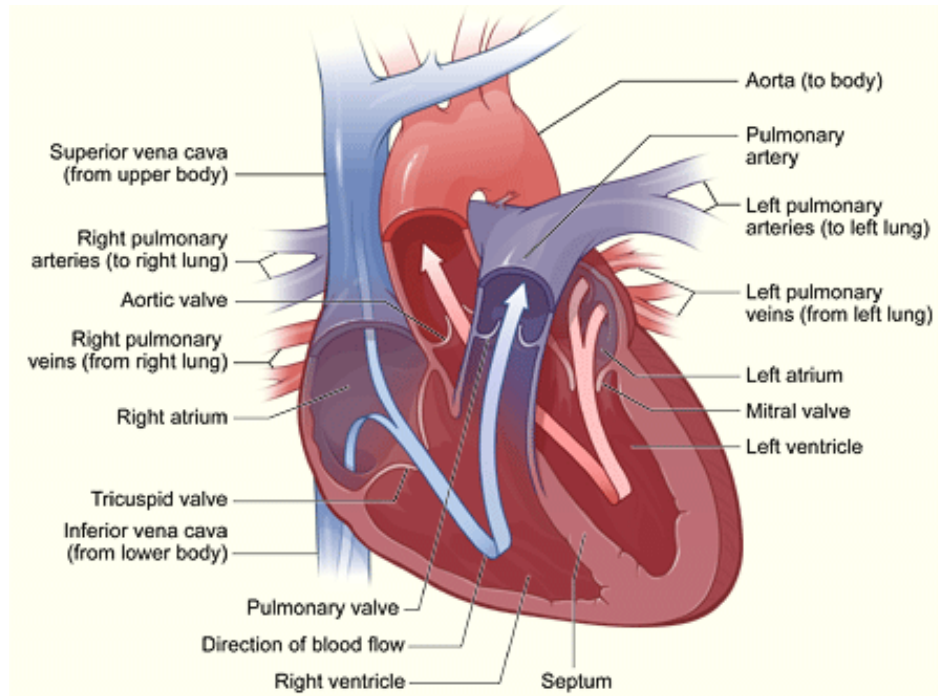
How the Heart Works

The heart is a muscle about the size of your fist. It works like a pump and beats 100,000 times a day.

The heart has two sides, separated by an inner wall called the septum. The right side of the heart pumps blood to the lungs to pick up oxygen. Then, oxygen-rich blood returns from the lungs to the left side of the heart, and the left side pumps it to the body.

The heart has four chambers and four valves and is connected to various blood vessels. Veins are the blood vessels that carry blood from the body to the heart. Arteries are the blood vessels that carry blood away from the heart to the body.

A Healthy Heart Cross-Section



The illustration above shows a cross-section of a healthy heart and its inside structures. The blue arrow shows the direction in which oxygen-poor blood flows from the body to the lungs. The red arrow shows the direction in which oxygen-rich blood flows from the lungs to the rest of the body.

Heart Chambers

The heart has four chambers or "rooms."

- The atria are the two upper chambers that collect blood as it comes into the heart.
- The ventricles are the two lower chambers that pump blood out of the heart to the lungs or other parts of the body.

Heart Valves

Four valves control the flow of blood from the atria to the ventricles and from the ventricles into the two large arteries connected to the heart.

- The tricuspid valve is in the right side of the heart, between the right atrium and the right ventricle.
- The pulmonary (PULL-mun-ary) valve is in the right side of the heart, between the right ventricle and the entrance to the pulmonary artery, which carries blood to the lungs.
- The mitral valve is in the left side of the heart, between the left atrium and the left ventricle.
- The aortic valve is in the left side of the heart, between the left ventricle and the entrance to the aorta, the artery that carries blood to the body.

Valves are like doors that open and close. They open to allow blood to flow through to the next chamber or to one of the arteries, and then they shut to keep blood from flowing backward.

When the heart's valves open and close, they make a "lub-DUB" sound that a doctor can hear using a stethoscope.

- The first sound—the “lub”—is made by the mitral and tricuspid valves closing at the beginning of systole (SIS-toe-lee). Systole is when the ventricles contract, or squeeze, and pump blood out of the heart.
- The second sound—the “DUB”—is made by the aortic and pulmonary valves closing at beginning of diastole (di-AS-toe-lee). Diastole is when the ventricles relax and fill with blood pumped into them by the atria.

Arteries

The arteries are major blood vessels connected to your heart.

- The pulmonary artery carries blood pumped from the right side of the heart to the lungs to pick up a fresh supply of oxygen.
- The aorta is the main artery that carries oxygen-rich blood pumped from the left side of the heart out to the body.

- The coronary arteries are the other important arteries attached to the heart. They carry oxygen-rich blood from the aorta to the heart muscle, which must have its own blood supply to function.

Veins

The veins are also major blood vessels connected to your heart.

- The pulmonary veins carry oxygen-rich blood from the lungs to the left side of the heart so it can be pumped out to the body.
- The vena cava is a large vein that carries oxygen-poor blood from the body back to the heart.

Other Names for Mitral Valve Prolapse

- Balloon mitral valve
- Barlow's syndrome
- Billowing mitral valve
- Click-murmur syndrome
- Floppy valve syndrome
- Myxomatous mitral valve
- Prolapsing mitral valve syndrome

What Causes Mitral Valve Prolapse?

The exact cause of mitral valve prolapse (MVP) isn't known. Most people with the condition are born with it. It tends to run in families and is more common in people who were born with connective tissue disorders, such as Marfan syndrome.

The mitral valve can be abnormal in two ways. First, the valve flaps may be oversized and thickened. Second, the valve flaps may be "floppy." The tissue of the flaps and their supporting "strings" are too stretchy, and parts of the valve flop or bulge back into the atrium. Some people's valves are abnormal in both ways. Either way can keep the valve from making a tight seal.

Who Is At Risk for Mitral Valve Prolapse?

Mitral valve prolapse (MVP) occurs in all age groups and in men and women. MVP with complications or severe symptoms is seen most often in men older than 50.

Certain conditions increase the risk for MVP, including:

- ❑ Connective tissue disorders, such as Marfan syndrome
- ❑ Scoliosis and other skeletal abnormalities
- ❑ Some types of muscular dystrophy
- ❑ Graves' disease

What Are the Signs and Symptoms of Mitral Valve Prolapse?

The majority of people with mitral valve prolapse (MVP) aren't affected by the condition because they don't have any symptoms or significant mitral valve regurgitation. Among those who do have symptoms, heart palpitations (strong or rapid heartbeats) are reported most often. Other symptoms include shortness of breath, cough, dizziness, fatigue (tiredness), anxiety, migraine headaches, and chest discomfort. Symptoms can vary widely from one person to another. They tend to be mild but can worsen over time, mainly when there are complications of MVP.

Complications of Mitral Valve Prolapse

Complications of MVP are rare, but when present, they're most often due to regurgitation of blood through the valve. Mitral valve regurgitation is most common among men and people with high blood pressure. People with severe cases of mitral valve regurgitation may need valve surgery to prevent complications.

In mitral valve regurgitation, blood flows backward from the left ventricle into the left atrium. It can even back up from the atrium into the lungs, causing shortness of breath. The backward flow of blood puts a strain on the muscles of both the atrium and the ventricle. Over time, the strain can lead to arrhythmias (abnormal heart rhythms). Regurgitation also increases the risk of infective endocarditis, an infection of the lining of the valves.

Arrhythmias

Mitral valve regurgitation can cause arrhythmia, an abnormal speed or rhythm of the heartbeat.

There are many different types of arrhythmia. The most common arrhythmias are harmless. Others can be serious or even life threatening. When the heart rate is too slow, too fast, or irregular, the heart may not be

able to pump enough blood to the body. Lack of blood flow can damage the brain, heart, and other organs.

One troublesome arrhythmia that may be seen with MVP and regurgitation is atrial fibrillation. In atrial fibrillation, the walls of the atria quiver instead of beating normally. As a result, the atria aren't able to pump blood into the ventricles the way they should.

Atrial fibrillation is bothersome but rarely life threatening unless it's very fast or unless it causes blood clots to form in the atria. Blood clots can form in the atria because some of the blood "pools" there instead of flowing into the ventricles. If a blood clot breaks off and goes into the bloodstream, it can reach the brain and cause a stroke.

Infection of the Mitral Valve

A deformed mitral valve flap attracts bacteria that may be found in the bloodstream. The bacteria attach to the valve and can cause a serious infection called infective endocarditis. Signs and symptoms of a bacterial infection include fever, chills, body aches, or headaches.

Infective endocarditis doesn't happen often, but when it does, it's serious. MVP is the most common heart condition that puts people at risk for this infection.

People with MVP and other valve problems can take antibiotics to reduce the risk of infective endocarditis. Antibiotics are often prescribed for people with MVP before dental work or certain types of surgery.

How Is Mitral Valve Prolapse Diagnosed?

Mitral valve prolapse (MVP) is most often found during a routine physical exam when your doctor uses a stethoscope to listen to your heart. Your doctor listens for a certain "click" and/or murmur. Stretched valve flaps, as seen in MVP, can make a clicking sound as they shut. If the valve is leaking blood back into the atrium, a murmur or whooshing sound can often be heard. However, these abnormal heart sounds may come and go, so they may not be heard at the time of an exam, even if you have MVP. As a result, diagnostic tests and procedures may also be needed to diagnose MVP.

Diagnostic Tests and Procedures

Echocardiogram

An echocardiogram is the most useful test for diagnosing MVP. This test uses sound waves to create a moving picture of your heart. An echocardiogram provides information about the size and shape of your heart and how well your heart chambers and valves are functioning. The test also can identify areas of poor blood flow to the heart, areas of heart muscle that are not contracting normally, and previous injury to the heart muscle caused by poor blood flow. The echocardiogram is a painless test that's used to look for prolapse of the mitral valve flaps and for backflow (regurgitation) of blood through the leaky valve.

There are several different types of echocardiograms, including a stress echocardiogram. During this test, an echocardiogram is done both before and after your heart is stressed either by having you exercise or by injecting a medicine into your bloodstream that makes your heart beat faster and work harder. A stress echocardiogram is usually done to find out if you have decreased blood flow to your heart (coronary artery disease).

Echocardiography also can be performed through your esophagus (the tube leading from your mouth to your stomach) to get a closer look at the mitral valve. A tiny probe in your esophagus takes sound wave pictures of your heart. This form of echocardiogram is called a transesophageal echocardiogram, or TEE.

Doppler Ultrasound

A Doppler ultrasound is part of the echocardiogram test. The Doppler ultrasound is used to show the speed and direction of blood flow through the mitral valve.

Other Tests

Other tests that can help diagnose MVP are:

- A chest x ray, which is used to look for fluid in your lungs or to see if your heart is enlarged.

- An EKG (electrocardiogram), which charts the electrical activity of your heart. The EKG can show abnormal heartbeats, damage to the heart muscle, and enlargement of the heart.

How Is Mitral Valve Prolapse Treated?

Goals of Treatment

The goals of treating mitral valve prolapse (MVP) are to:

- Prevent infective endocarditis, arrhythmias, and other complications
- Relieve symptoms
- Correct the underlying mitral valve problem when necessary

Who Needs Treatment

Most people with MVP don't need treatment because they don't have significant regurgitation of blood through the valve, and they have few or no symptoms. Even people who do have symptoms may not require treatment. The presence of symptoms doesn't necessarily mean that there is significant regurgitation through the valve. People with MVP and troublesome mitral valve regurgitation usually need treatment.

Specific Types of Treatment

MVP can be treated with medicine, surgery, or both.

Medicine

For people with MVP who have little or no regurgitation, medicines called beta blockers have been used to treat symptoms such as palpitations (strong or rapid heartbeats) and chest discomfort.

For people with MVP who have significant regurgitation and symptoms, the following medicines may be used to prevent complications:

- Vasodilators to widen the blood vessels and reduce the workload of the heart. Examples of vasodilators are isosorbide dinitrate and hydralazine.
- Digoxin to strengthen the heartbeat.
- Diuretics (water pills) to remove excess fluid in the lungs.
- Drugs such as flecainide and procainamide to regulate heart rhythms.

- Anticoagulants (blood thinners) to reduce the risk of blood clots forming in people with atrial fibrillation. Examples include aspirin or warfarin.
- Antibiotics to prevent infective endocarditis, an infection of the surface of the heart valves.

Surgery

Surgery on the mitral valve is done only when the valve is very abnormal and blood is regurgitating into the atrium. The main goal of surgery is to improve symptoms and reduce the risk for heart failure.

The timing of the surgery is very important. If it's done too early and your leaking valve is working fairly well, you may be put at needless risk from surgery. If it's done too late, irreversible heart damage may have already occurred.

Surgical approaches. The traditional surgical approach for mitral valve repair and replacement is through an incision in the breastbone to expose the heart. A small but growing number of heart surgeons are using another approach that uses one or more smaller incisions through the side of the chest wall. This approach can result in less cutting, reduced blood loss, and a shorter hospital stay, but it isn't available yet in all hospitals.

Valve repair versus valve replacement. In mitral valve surgery, the valve may either be repaired or replaced completely. Valve repair is preferred when possible. It's less likely to weaken the heart, lowers the risk of infection, and decreases the need for lifelong use of blood-thinning medicines. If repair isn't an option, then the valve can be replaced. Two types of substitute valves are available: a mechanical valve or a biological valve. Mechanical valves are made of man-made materials and can last a lifetime. Patients with mechanical valves must take blood-thinning medicines for life. Biological valves are valves taken from cows or pigs or made from human tissue. Many patients with biological valves don't need to take blood-thinning medicines for life. The major drawback of biological valves is that they weaken and often only last about 10 years.

After surgery, a patient usually stays in the intensive care unit in the hospital for 2 to 3 days. Most people spend about 1 to 2 weeks in the

hospital. Complete recovery takes a few weeks to several months, depending on the person's health before surgery.

Experimental approaches. Some researchers are testing the repair of leaky valves using a catheter inserted through a large blood vessel. While this approach is less invasive and can save the patient from having open heart surgery, it's only being done in a few medical centers. In addition, because it's a new procedure, it hasn't yet been shown in large studies to be better than traditional approaches.

How Can Mitral Valve Prolapse Be Prevented?

Mitral valve prolapse (MVP) can't be prevented, but some of its complications can.

People with mitral valve regurgitation and/or thickened valve flaps are at increased risk for infective endocarditis, an infection of the surface of the mitral valve flaps. To prevent infective endocarditis, antibiotics are given before dental and medical procedures that can let bacteria into the bloodstream. Antibiotics are usually given 1 hour before a procedure, and a second dose may be given later. Antibiotics are usually given for the following types of procedures:

- ❑ Dental work, including cleaning
- ❑ Surgery to remove tonsils and adenoids
- ❑ Bronchoscopy, a procedure in which a tube is put into the lungs to look at the lung passages
- ❑ Certain kinds of surgery on the digestive system, respiratory system, urinary tract, and reproductive system in women
- ❑ Antibiotics may be given at childbirth as well, although MVP by itself has no effect on pregnancy.

You doctor will prescribe antibiotics that are appropriate for the type of procedure you're having. Therefore, taking only those antibiotics prescribed, and exactly as prescribed, is important. Not taking antibiotics as prescribed can increase the risk of resistant bacteria causing a valve infection in the future. This type of infection is difficult to treat.

Living With Mitral Valve Prolapse

Most people with mitral valve prolapse (MVP) have no symptoms or problems, need no treatment, and are able to lead normal, active lives. Symptoms and complications, when present, most often can be controlled with medicines. Some people may need heart valve surgery to relieve their symptoms and prevent complications. In a few cases, complications of MVP can result in heart failure, arrhythmias, or stroke.

Ongoing Health Care Needs

If you have MVP, you should:

- Check with your health care provider if your symptoms get worse.
- Try to prevent infective endocarditis (an infection of the surface of the mitral valve flaps).
 - Tell your doctors and dentists that you have MVP. Take good care of your teeth and gums. See your dentist for regular visits.
 - Call your doctor if you have any signs of infection, such as sore throat, general body aches, and fever.
 - Take antibiotics specifically as prescribed before dental work and certain types of surgery.
- Take all medicines as prescribed, including blood-thinning and high blood pressure medicines.
- Make healthy lifestyle choices.
 - Avoid smoking and taking birth control pills, which increase the risk for blood clots.
 - Talk with your health care provider about how much and what kind of exercise is right for you.
 - Ask about any changes you need to make to your diet.

Key Points

- Mitral valve prolapse (MVP) is a heart condition in which one or both flaps of the mitral valve are floppy or thickened. These abnormal valve flaps prolapse (bulge back) into the left atrium as the left ventricle contracts. This prevents the valve from closing tightly and can allow blood to flow backward through the valve. The backward flow of blood through the valve is called mitral valve regurgitation.
- MVP is one of the more common heart valve conditions. Most often, it's a lifelong condition that a person is born with. Most people with

- MVP have no symptoms or problems, need no treatment, and are able to lead normal, active lives.
- ❑ Serious complications occur in only a small number of people with MVP. These complications include mitral valve regurgitation, arrhythmias (irregular heart rhythms), and infection in the heart (infective endocarditis).
 - ❑ The most useful test for diagnosing MVP is an echocardiogram with Doppler ultrasound.
 - ❑ Complications and severe symptoms of MVP are treated with medicines and sometimes with heart valve surgery. The preferred surgery is mitral valve repair, but the mitral valve can be replaced with a mechanical or biological valve as well.
 - ❑ MVP can't be prevented, but some of its complications can. For people with MVP with regurgitation and/or thickened valve flaps, antibiotics are recommended before many dental and medical procedures to prevent infective endocarditis.

Additional Information

- ❑ Mitral Valve Prolapse - Interactive Tutorial -
<http://www.nlm.nih.gov/medlineplus/tutorials/mitralvalveprolapse/htm/index.htm>

*Source: NHLBI
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