Heart valve disorders

Simple precautions prevent complex problems

You’ve known about your heart valve “murmur” for years. What you don’t know is whether you’ll ever need surgery to repair or replace the valve.

Many people with heart valve problems are concerned about the possibility of someday needing open-heart surgery.

Fortunately, the majority of people with heart valve problems won’t suffer any ill effects or ever need surgery. In addition, most people with heart valve disorders who take a few simple precautions, including regular heart checks, can often avoid complications. If symptoms of valve disease do arise, various types of surgery — often with high success rates — can fix most problems, allowing you to live a full, healthy life.

The right direction

Your heart contains four chambers. The two upper chambers (atria) receive blood, then fill the two lower chambers (ventricles), which pump blood. The ventricle on the right side pumps blood through the lungs and back to the left side of the heart. The

Valve disorders most commonly occur on the left side of the heart. For older adults, stenosis or regurgitation can occur on either valve, but the most common disorders include mitral valve regurgitation and aortic valve stenosis.
ventricle on the left side pumps blood throughout your body.

Your heart also contains four valves. With each heartbeat, these valves open and close in a coordinated manner to ensure that blood flows only in one direction. The two main problems with heart valves are:

- Narrowing (stenosis) — Any heart valve can become stiffened or narrowed, limiting blood flow.
- Backward leaking (regurgitation) — When valve leaflets don’t close tightly, blood may leak backward, in the wrong direction.

The causes of these problems vary. Some people are born with heart valve abnormalities. With age, valve wear and tear (valve degeneration) may lead to problems. Valves can also become infected by bacteria in the bloodstream, a condition called infective endocarditis.

Endocarditis is why most people with heart valve disorders have had to take a preventive antibiotic before dental work and certain surgical procedures. However, the American Heart Association recently revised its recommendations on preventive antibiotics. Many fewer people need to take them than did under the earlier recommendations. But before you make any changes, talk to your doctor about what’s best for you.

Valves may also be damaged as a result of rheumatic fever, a complication of untreated strep throat that was once a common childhood illness in the United States. It doesn’t always cause permanent damage, but if it does, valve problems may take 10 to 30 years to show up.

Detection and decisions

For many, a heart valve problem is discovered during a routine exam when a doctor, using a stethoscope, hears a wooshing or clicking noise in the heart. If a valve disorder is suspected, further testing, such as an echocardiogram, may be needed to identify what exactly is affecting the valve, to gauge the severity of the problem and to determine if there are other heart problems.

Depending on the valve involved, whether the condition is mild or moderate, and if there are no symptoms, your doctor may recommend taking a “watchful waiting” approach. With this approach, it’s important to be alert to the potential development — or worsening — of signs and symptoms and to contact your doctor right away if they occur. Signs and symptoms may include:

- Fatigue
- Breathlessness with exertion or when lying down
- Chest pain or tightness
- Swollen ankles
- Lightheadedness or fainting
- Heart palpitations or irregular heartbeat

It’s also critical to have regular evaluations to make sure the problem isn’t worsening or causing other heart problems, even if you feel fine.

Drugs play small role

Medications play a limited role in treating heart valve problems. However, your doctor may recommend certain medications to:

- Aggressively treat risk factors for coronary artery disease, especially if you have aortic stenosis, since these two often go hand in hand. Risk factors include high blood pressure and cholesterol. Drugs for these two conditions can be especially beneficial.
- Control your heart rate if you have mitral stenosis so that your left

**Mayo Clinic Health Letter**

**Managing Editor**

Aleta Capelle

**Medical Editor**

Robert Sheeler, M.D.

**Associate Editors**

Carol Gunderson

Joey Keilpor

**Medical Illustration**

Michael King

**Customer Service Manager**

Ann Allen

**Administrative Assistant**

Deborah Adler

**EDITORIAL BOARD**

Shreyasee Amin, M.D., Rheumatology; Amanda Arora, M.D., Gastroenterology and Hepatology; Brent Bauer, M.D., Internal Medicine; Tracy Berg, R.Ph., Pharmacy; Julie Bjorker, M.D., Internal Medicine; Stuart Christenson, M.D., Cardiology; Bart Clarke, M.D., Endocrinology and Metabolism; William Cilib, M.D., Gynecologic Surgery; Diane Dahm, M.D., Orthopedics; Timothy Daley, M.D., Internal Medicine; Mark Davis, M.D., Dermatology; Timothy Hobyday, M.D., Oncology; Michael Mahr, M.D., Ophthalmology; Lance Mynderse, M.D., Urology; Suzanne Norby, M.D., Nephrology; Robert Sheeler, M.D., Family Medicine; Phillip Sheridan, D.D.S., Periodontics; Peter Southorn, M.D., Anesthesiology; Mark Williams, M.D., Psychiatry; Aleta Capelle, Health Information, Ex-officio: Carol Gunderson and Joey Keilpor.

*Mayo Clinic Health Letter* (ISSN 0741-6245) is published monthly by Mayo Foundation for Medical Education and Research, a subsidiary of Mayo Foundation, 200 First St. S.W., Rochester, MN 55905. Subscription price is $27 a year, which includes a cumulative index published in December. Periodicals postage paid at Rochester, Minn., and at additional mailing offices. POSTMASTER: Send address changes to *Mayo Clinic Health Letter*, Subscription Services, P.O. Box 9302, Big Sandy, TX 75755-9302.

ventricle can fill up with blood as best as it can.

- Lower increased blood pressure if you have aortic or mitral regurgitation.
- Improve heart function if you have developed heart failure.

**Recommending surgery**

If you’re feeling symptoms of a heart valve disorder and the valve is severely damaged or not functioning properly, surgery to repair or replace the faulty valve is often recommended. However, if you’re feeling fine, your doctor may still recommend surgery, based on the severity of your valve disease and structural heart changes. Surgical options may include:

- **Widening a narrowed valve with a balloon** — Using minimally invasive techniques and without the need for open-heart surgery, a deflated balloon is positioned within a narrowed heart valve and inflated, separating valve leaflets that have become stuck together. For mitral stenosis, this can be very effective if the valve isn’t too deformed or stiff. For the more common aortic stenosis, balloon widening rarely is used as the full treatment. However, it may be used as a stopgap to relieve symptoms leading up to surgery.

- **Valve repair** — When regurgitation is a problem, open-heart valve repair may be an option. One way this may be done is by cutting away excess valve tissue. Another option may involve cinching up floppy valve leaflets — or the ring of tissue (annulus) that supports the leaflets — so that the leaflets close snugly. If your natural valve can be repaired, you’ll usually have better and longer lasting results.

- **Valve replacement** — An open-heart procedure, this involves removing the damaged valve and replacing it with an artificial valve. The replacement valve may be made of metal (mechanical) or of biological material, such as tissue from a human donor or animal.

- **Mitral valve tendon repair or replacement** — When the tendons (chordae tendineae) that help the mitral valve function become loose or break, they can be surgically tightened or replaced to help stop regurgitation.

Most procedures to repair or replace a heart valve require open-heart surgery. However, a number of surgical procedures are being studied that would allow mitral valve repair and aortic valve replacement using minimally invasive techniques. It will likely be some time before their use is widespread.

**Responding to symptoms**

When heart valve repair and replacement is recommended, it typically means that the risks involved with the surgical procedure are substantially lower than are the risks of doing nothing.

---

**Health tips**

**Sources of soluble fiber**

Fiber comes in two forms — soluble and insoluble. Soluble fiber dissolves in water to form a gel-like material. Soluble fiber may help lower your low-density lipoprotein (LDL), or “bad,” cholesterol and blood sugar, and may help protect against heart attack and stroke.

The recommended daily intake of total fiber for women over age 51 is 21 grams. For men over 51, it’s 30 grams. You can boost your soluble fiber intake with a fiber supplement (Metamucil, Konsyl, others), which typically has 2 to 3 grams per dose, or with:

- A half-cup of baked beans — or the same amount of cooked black, kidney, lima, or navy beans — will give you about 1 gram of soluble fiber.

- A pear, peach, plum or an orange contains about 1 gram of soluble fiber. An apple, mango, half-grapefruit or half-cup of blackberries each has about 1/2 gram of soluble fiber.

- Certain vegetables, such as a medium carrot, a half-cup of cooked peas, broccoli or brussels sprouts, or a medium cooked potato with its skin each has about 1 gram of soluble fiber.

- Oats — whether as a half-cup of oatmeal or oat bran or as an ounce of granola — are good for about 1 gram of soluble fiber.

- And don’t forget a cup of brewed coffee, which in a recent analysis surprisingly was shown to contain about 1 gram of soluble fiber.
News and our views

Smoking worsens degenerative knee arthritis
Here’s yet another thing to add to the long list of health problems that can be caused by smoking cigarettes: Among those with degenerative or wear-and-tear knee arthritis (osteoarthritis), smokers have greater cartilage loss and more severe knee pain than do nonsmokers. That’s according to a study led by Mayo Clinic researchers and published in the January 2007 issue of Annals of the Rheumatic Diseases.

The study involved 159 men who were at least 45 years old and had knee pain from osteoarthritis. Nineteen men, or 12 percent of the total, were still smoking. At the start of the study, magnetic resonance imaging (MRI) scans were taken of each participant’s more painful knee. In addition, the men rated their pain on a pain scale. Researchers followed up with additional MRIs on each of the men at 15 months and 30 months. Pain ratings were also noted at these intervals.

After adjusting for factors that may have influenced cartilage damage — such as weight and age — researchers found that smokers had about two-and-a-half times greater risk of cartilage loss, compared with those who had never smoked or stopped smoking. Smokers also reported higher pain scores.

Falls reduced with higher levels of vitamin D
A recent study among elderly nursing home residents found that those who took higher amounts of vitamin D experienced fewer falls.

The study, which appeared in the February 2007 issue of the Journal of the American Geriatrics Society, involved 124 nursing home residents with an average age of 89. One group took an inactive pill (placebo), while four other groups took varying amounts of vitamin D. After five months, the percentage of falls in each group was compared.

Those with the highest vitamin D intake — 800 international units (IU) — had the lowest incidence of falls at 20 percent. Among those taking placebo and those taking 200 IU, 400 IU or 600 IU of vitamin D, the rate of falls ranged from 44 percent to 60 percent. Because many also took a multivitamin, some assigned to the 800 IU group may have been getting as much as 1,200 IU of vitamin D daily.

Although vitamin D supplementation has been associated with greater muscle function and helps the body use calcium to promote bone strength, there’s debate over recommended levels. Currently, suggested intake of vitamin D for those 50 and older is 400 IU. For those 70 and older, 600 IU is the current recommendation.

But Mayo Clinic experts say research demonstrates that older adults may benefit from higher levels of vitamin D intake — if possible, in the form of vitamin D-3 (cholecalciferol) — because they’re prone to have low levels of the vitamin. Studies show that vitamin D-3 appears to be more potent than vitamin D-2 (ergocalciferol).

Increasingly, Mayo Clinic doctors are suggesting adults 50 and older consider aiming for 800 IU of vitamin D daily from a combination of food intake and supplements.

Robotics in surgery

Precision on a new scale
Have you ever watched someone play a video game? In the hands of a skilled player, the controller with all of its buttons and knobs is just an extension of what the player wants to accomplish on the display screen.

Surgery is no game, but increasingly surgeons are melding their knowledge of human anatomy with the precision of robotic technology. The results are surgical suites that — to the casual observer — may look like high-tech video game centers, complete with screens and specialized controllers to maneuver metallic arms and hands.

In the hands of highly trained surgeons, computer-assisted robotic surgery has found a place in many procedures, including treatments for prostate cancer, gynecologic cancer, hysterectomy, endometriosis, uterine fibroids and heart problems.

Small openings
For more than two decades, minimally invasive surgical techniques have allowed surgeons to use smaller incisions and specialized tools. The endoscope — a thin, fiberoptic tube featuring a tiny video camera — has revolutionized surgeons’ capabilities to perform certain procedures. Laparoscopic surgery with an endoscope can be done through several tiny incisions rather than a long incision. The endoscope becomes the surgeon’s “eyes,” projecting a magnified view of the surgical site from inside the body to a video screen.

With advances in minimally invasive techniques, laparoscopic surgery is being used in essentially all surgical specialties, including hernia repairs, and procedures on...
the heart, gallbladder, uterus, ovaries, kidneys and prostate.

**The hand off**

In 2000, the Food and Drug Administration approved the first of two robotic systems for assisting in and performing surgery. Although the systems are costly, robotic-assisted surgery is becoming increasingly common across the country, and not just in major medical centers. However, robotic surgery may not be an option for some.

Surgeons using the robotic systems say the learning curve to master the equipment is initially difficult. However, they also find the transition from the more traditional open-surgery procedures to using the robotic devices to be more easily accomplished compared with the learning curve required to shift from open surgery to performing laparoscopic procedures.

**Changing the practice**

To date, the robotic devices have been used in practically all surgical specialties. One area of change has been in treating prostate cancer.

Robotic-assisted surgery is the most common surgical treatment used to remove the prostate gland (prostatectomy) due to prostate cancer. Greater than 50 percent of prostatectomies are done with robotic assistance, and in some areas, that percentage is even higher.

The benefit of robotic surgery over traditional surgical approaches to remove the prostate gland is that it has the potential to provide an added level of precision. In robotic-assisted surgery, there’s less blood loss and the need for blood transfusions is lower. As for the rates of erectile dysfunction and incontinence after prostatectomy, they’re at least equivalent to — and at many institutions better than — the corresponding rates found after open surgery to remove the prostate.

For cervical cancer, robotic radical hysterectomy is associated with shorter operating times, less blood loss and shorter hospitalizations than is the laparoscopic approach.

**At the controls**

While doing robotic-assisted procedures, the surgeon sits at a computer console that’s several feet away from the operating table. The actual robotic device with its multiple “arms” is positioned next to the operating table. The robot’s mechanical arms are outfitted with specially designed tools as well as the system’s camera. Each of the mechanical arms features a flexible “wrist” that is capable of greater movement than is the human wrist. The surgeon uses hand controls to manipulate the position of the robot’s arms. Typically, one or two assistants are stationed at the operating table, making changes as needed to the special instruments attached to the robot’s arms.

As for the robot’s camera, it projects a three-dimensional image, allowing the surgeon to see things just as they would actually appear — only they’re much bigger. The camera can magnify what the surgeon is working on many times over. For instance, tiny blood vessels can appear as big as pencils.

Using specialized hand controls on the computer console, the surgeon’s hand movements manipulate the robot’s endoscopic surgical instruments. The tiny tools move in real time with the surgeon’s hand movements. An added advantage for the surgeon is the capability of the robot to stabilize any hand tremors. This allows for increased precision.

**What’s ahead?**

Those who perform surgery with the robotic devices expect there will be even more ways to use them in the future. It may be only a matter of time before they become the standard of care for many surgical procedures. There’s also the potential for surgery on a person who is in a different location (remote surgery).

A type of robotic surgery that’s still very much in development is surgery performed through natural body openings, such as the mouth, vagina or anus, thus decreasing the number of incisions.
The power of 3

Omega-3 fatty acids

In your quest to keep your heart healthy as you age, you exercise, eat lots of fruits and vegetables, and minimize the trans fat, saturated fat and cholesterol that you consume.

But can you do more?

Absolutely. And one easy way is to consume adequate amounts of omega-3 fatty acids. If you like to eat fish, this may be especially enjoyable, as the best source of omega-3s are fatty, cold-water fish, such as herring, mackerel, salmon, sardines and tuna. If you don’t like fish, other sources are available, including plant oils such as canola and flaxseed oils.

Not all the same

Omega-3 fatty acids are a form of polyunsaturated fat important to overall health. Fish and fish oil supplements contain two kinds of omega-3 — docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). DHA can be extracted from certain types of algae and put into supplements. For heart health, DHA and EPA appear to provide the most benefit of the omega-3s.

The main plant-based type of omega-3 is called alpha-linolenic acid (ALA). ALA has not been well studied in its own right, and potential health benefits aren’t really known. However, it’s known that a small percentage — less than 5 percent — of ALA intake can be converted into DHA by enzymes in the body. Consuming between 1 and 3 grams of ALA daily can help add to your omega-3 intake, but at this point, it appears it should probably only play a supporting role to the omega-3s obtained from fish or other foods.

Large reviews of published studies indicate that consuming DHA and EPA is generally good for heart health, particularly by reducing your risk of dying suddenly of heart disease. Still, the degree of benefit varies from study to study.

Biggest benefits

The main benefit of omega-3s as they relate to heart disease is their ability to reduce the risk of heart rhythm problems in certain groups of people, thus reducing the risk of sudden cardiac death. In addition, omega-3s may help reduce triglycerides, lower blood pressure slightly and reduce blood clotting.

For heart disease prevention, you can reap a near-maximum benefit of omega-3s by eating two, 3-ounce servings of cold-water fish a week. Doing so provides you with about 1,500 milligrams (mg) to 2,000 mg of DHA and EPA combined. More than that doesn’t appear to offer any additional preventive benefit.

Higher amounts of DHA and EPA may be of benefit for some people with established heart disease or high triglyceride levels, and can have an anti-inflammatory effect for people with rheumatoid arthritis. In addition, Mayo Clinic is participating in a large clinical trial to determine whether DHA may slow the progression of Alzheimer’s disease.

But omega-3 consumption for these problems should be done under the supervision of your doctor. Taking more than 3 grams of fish oil a day may increase your risk of bleeding, worsen heart rhythm problems in those with arrhythmias or cause other side effects.

What about toxins?

It’s important for women who are pregnant or trying to become pregnant, nursing mothers and children under 5 to limit their intake of fish. And, it’s true that some types of fish may contain significant amounts of contaminants, such as mercury, that can build up in your body over time and cause serious health problems. However, for most adults, the fish you buy at the store is generally safe when eaten in moderate amounts. You can minimize your risk of contamination exposure by:

- Limiting consumption of large, predatory fish, such as shark, tilefish, swordfish and king mackerel
- Paying attention to local state advisories on the amount of fish that can be safely caught and eaten

Fish vs. supplements

To get enough omega-3s, choosing to take a fish oil or an algae supplement — or eating one of the growing number of food products that are fortified with omega-3 — can be options, especially if you’re concerned about contaminants or just don’t like to eat fish. The amount of DHA and EPA in supplements and fortified foods varies widely. But supplements aren’t cheap, and except for people with established heart disease, the evidence of heart disease prevention isn’t quite as strong as it is with eating fish.

Fish is also a good source of lean protein and other nutrients. Fish is especially healthy when substituted for chicken, pork or beef, since those meats are higher in saturated fat and cholesterol.
Age-related hearing loss

Know the signs

Hearing loss is common with age, affecting one-third of people over age 65. Among people 75 and older, 40 percent to 50 percent have hearing loss.

For most, age-related hearing loss — presbycusis (pres-bih-KU-sis) — occurs gradually as part of the general wear and tear of aging. People often adapt to slight hearing loss without fully realizing that they’re doing so. Volume levels may creep up while listening to the radio or watching TV. Smaller gatherings or one-on-one conversations in quieter settings may be more enjoyable.

Sound mix

Presbycusis usually affects both ears equally. Age-related hearing loss is most commonly associated with changes in the inner ear. In most instances, those changes involve loss of some of the tiny receptor hair cells found in the snail-shaped cochlea. In addition, your brain may not interpret sounds as quickly as it once did.

Age-related hearing loss tends to run in families, although the degree of the problem varies. Other possible factors include:

- **The cumulative effect of loud noise** — Repetitive or long exposures to sounds over a lifetime — such as gunshots, loud music or machinery — can gradually affect your ability to hear.

- **Medications** — Some drugs can potentially harm your hearing mechanism, often on a permanent basis, and can be monitored by your prescribing doctor. Among the most commonly cited is the intravenous antibiotic gentamicin — typically used in hospital settings for severe infection — the chemotherapy agent cisplatin and some types of diuretic drugs, such as furosemide (Lasix).

With presbycusis, your ability to hear high-pitched sounds is usually affected first. Often that’s because damage occurs first to tiny hair cells at high frequency locations inside the inner ear’s cochlea. As a result, you may miss or confuse sounds in speech, such as “s” or “th” or “ff.” You might notice that the speech of women and children is more difficult to understand.

Sometimes, people with presbycusis may find loud noises or sounds especially annoying. Age-related hearing loss may also be accompanied by ringing or buzzing in your ears (tinnitus).

Confronting the problem

If you suspect your hearing isn’t what it used to be, see an audiologist to get it checked. The test results are graphed, producing a detailed audiogram. It’s also a good idea to see an ear, nose and throat specialist or your primary doctor, who can do a physical exam and medical evaluation to determine whether other treatable factors may be contributing to hearing loss.

If there’s evidence of hearing loss, your audiologist can advise you on ways to improve communication. Options include behavior changes, amplification with hearing aids or both. If hearing aids are clearly indicated, your audiologist can help guide and fit you with hearing aids suited to your needs.

What’s stopping you?

Not being able to hear can be very noticeable. But some people still shirk the idea of getting hearing aids. On the other hand, attitudes about having devices connected to the ears may be changing.

Increasingly, people of all ages go through their days wearing wireless earpieces in order to talk on their cell phones.
Second opinion

Questions and our answers

Q: Are electric toothbrushes better than regular toothbrushes?

A: Evidence is mixed on whether a toothbrush with rotating or vibrating bristle produces better hygiene than does a manual toothbrush.

Some studies have shown that properly used electric toothbrushes remove plaque and reduce gum disease more effectively than do properly used manual toothbrushes. Other studies have found only modest improvement from only one type of electric toothbrush — the kind with a rotating head that goes back and forth about a quarter turn.

However, some people find that the timing device on many electric toothbrushes helps them brush longer — two minutes is the generally recommended amount of time — and therefore more thoroughly.

Electric toothbrushes may be beneficial if arthritis or dexterity makes it difficult to brush properly with a manual brush. Still, most people can achieve good results from gentle brushing with a manual toothbrush at a fraction of the cost of an electric toothbrush.

Q: The Nutrition Facts label on a bag of almonds lists 1 gram of saturated fat per serving. Is this the same type of saturated fat that’s in a hamburger?

A: It’s true almonds contain a small amount of saturated fat. This is also true for many other foods and oils containing the good, unsaturated forms of fat, such as avocados, fish, and olive and canola oils.

There are many types of saturated fat, each identified by the type and length of the fatty acid chains they have. All saturated fats can raise the production of low-density lipoprotein (LDL), or “bad,” cholesterol in the body. Almonds and hamburgers have a couple of these fatty acid chains in common. Conversely, hamburger has some of the unsaturated fats found in almonds.

What separates almonds from hamburgers is that the predominant form of fat in an almond is unsaturated, while the predominant form of fat in a hamburger is saturated.

An ounce of almonds has about 12.6 grams of unsaturated fat and only 1.4 grams of saturated fat. In contrast, 3.5 ounces of cooked, 90 percent lean ground beef has 9.9 grams of unsaturated fat and 6.4 grams of saturated fat. Almonds also have an abundance of healthy nutrients. That makes almonds — and other products containing predominantly unsaturated fats — the healthier choice when you eat fat. But if you are watching your weight, all fats — even unsaturated ones — are very high in calories.

Q: I need to lose weight. My doctor suggested I be careful about what I drink. I’m not sure what that means. Can you explain?

A: Calories in beverages account for one-fifth of the calorie intake in America. The predominant sources are sweetened sodas and fruit-flavored drinks.

Last year, a panel of nutrition experts ranked groups of beverages according to their calorie and nutrient contents. Here’s that ranking, from best to worst:

- Drinking water. This has no calories and great health benefits.
- Unsweetened tea and coffee. Without sugar, syrups and creams, these are calorie-free.
- Low-fat and skim milk, and soy beverages that are fortified with vitamin D and calcium are good sources of calcium and vitamin D.
- Diet sodas and other diet drinks flavored with noncaloric sweeteners. These typically offer no nutrients, with few or no calories.
- Caloric beverages with some nutrients, such as 100 percent fruit juices, vegetable juices, whole milk and sports drinks.
- Sweetened drinks such as soda have little if any nutrient value.

Have a question or comment?

We appreciate every letter sent to Second Opinion but cannot publish an answer to each question or respond to requests for consultation on individual medical conditions. Editorial comments can be directed to:

Managing Editor, Mayo Clinic Health Letter, 200 First St. S.W., Rochester, MN 55905, or send e-mail to HealthLetter@Mayo.edu

For information about Mayo Clinic services, you may telephone any of our three facilities: Rochester, Minn., 507-284-2511; Jacksonville, Fla., 904-953-2000; Scottsdale, Ariz., 480-301-8000 or visit www.MayoClinic.org

Check out Mayo Clinic Health Solution’s Web site, at www.MayoClinic.com