PROCEDURE

# Aortic valve surgery - minimally invasive

Minimally invasive aortic valve surgery repairs or replaces the heart's aortic valve through a smaller chest incision.

**PURPOSE**
Restore blood flow through a damaged aortic valve

**PROCEDURE TYPE**
Therapeutic minimally invasive surgery through a small chest incision

**WHERE IT IS DONE**
Operating theatre

**ANAESTHESIA**
General

**HOW LONG IT TAKES**
About two to four hours

**PREPARATION**
Fasting and medication changes, including blood thinners

**RECOVERY**
Several days in hospital; no driving until cleared

**MAIN RISKS**
Bleeding, infection, stroke, abnormal heart rhythm

**RESULTS**
Valve function assessed immediately after surgery

## Overview

Minimally invasive aortic valve surgery repairs or replaces the valve that controls blood flow from the heart into the aorta. The surgeon reaches the heart through a short cut in part of the breastbone or between the ribs on the right side. Although the incision is smaller than in standard open-heart surgery, this is still major heart surgery and usually requires a heart-lung machine.

Most people have valve replacement. Mechanical valves are durable but usually require lifelong anticoagulant medicine. Biological valves are mainly made from animal tissue and can wear out over time. Selected valves can be repaired.

This operation differs from transcatheter aortic valve replacement (TAVR), which places a valve through a blood vessel without a surgical chest opening.

## Why the procedure is performed

Surgery may be offered when the aortic valve is severely narrowed, called aortic stenosis, or does not close properly, called aortic regurgitation. Both conditions make the heart work harder and can eventually weaken it.

Treatment may be recommended because of symptoms, reduced heart function, or test results showing severe disease. Symptoms can include breathlessness, chest discomfort, fainting, or reduced exercise ability.

The aim is to improve blood flow, relieve symptoms, reduce strain on the heart, and prevent further damage. Timing depends on symptoms, ultrasound findings, general health, and the benefits and risks of each treatment option.

## Who should and should not have it

Minimally invasive surgery may suit people who need aortic valve repair or replacement and can safely undergo general anaesthesia and heart-lung bypass. It is often considered when the aortic valve is the main part of the heart requiring surgery.

It may not be suitable if you need several procedures at once, such as complex multiple-valve surgery or extensive coronary artery bypass surgery. Previous chest surgery, unusual anatomy, heavy calcium deposits, or serious medical conditions may make standard surgery or TAVR safer.

Surgery may be delayed for an active infection, including some dental infections, or another condition needing treatment first. Emergency or highly complex surgery may require a full breastbone opening for faster, wider access.

Your heart team should compare minimally invasive surgery, standard surgery, and TAVR based on your anatomy, age, surgical risk, preferences, and possible future valve treatment.

## How to prepare

Follow your treating facility's instructions, as preparation varies.

Tests may include blood tests, an electrocardiogram, an echocardiogram, chest or blood vessel imaging, and coronary angiography. A dental assessment may be requested because mouth infections can spread to a replacement valve.

Tell the team about every medicine, supplement, and non-prescription product you use. Blood

thinners and some diabetes medicines need special planning. Do not stop prescribed medicine unless your team tells you when and how.

You will receive instructions about:

Stopping smoking can improve breathing and wound healing. Tell the hospital if you develop fever, a cough, skin infection, dental problem, or other illness before surgery.

- When to stop eating and drinking
- Which medicines to take on surgery day
- Washing your skin before admission
- What to bring to hospital
- Arranging help during early recovery

## What happens during the procedure

You receive general anaesthesia and remain unconscious. A breathing tube and monitoring lines are placed.

The surgeon makes a small incision through part of the breastbone or between the ribs. A heart-lung machine temporarily circulates and oxygenates the blood while the heart is stopped. The surgeon removes the damaged valve and inserts a replacement, or repairs the valve when suitable. Ultrasound checks valve function and blood flow.

The heart is restarted, and you are separated from the heart-lung machine. Temporary pacing wires and chest drains may remain in place before the incision is closed.

If safe access is not possible through the small opening, the surgeon may enlarge it or change to a full breastbone opening.

## Recovery and what to expect afterward

Pain or soreness around the chest, shoulder, or upper back is expected. Tell the team if pain medicine does not allow you to breathe deeply, cough, sleep, and move.

You will gradually return from drinks and light food to a heart-healthy diet. Reduced appetite and constipation are common. Walking and breathing exercises begin early to reduce complications.

Increase activity gradually while following limits on lifting, pushing, pulling, and strenuous exercise. Cardiac rehabilitation can provide supervised exercise and recovery education.

Do not drive home or resume driving until your surgeon clears you and you can turn, brake suddenly, and wear a seat belt without significant pain. Follow local licensing and insurance rules.

Hospital stay and return to work depend on complications, recovery, and job demands. Full recovery often takes several weeks despite the smaller incision.

## Risks and possible complications

Possible complications include:

Mechanical valves usually require lifelong anticoagulation, which increases bleeding risk. Biological valves generally do not require lifelong anticoagulation solely because of the valve, but they may wear out and require another procedure.

A smaller incision may reduce some wound problems and shorten recovery for selected people, but it does not remove the major risks of heart surgery.

- Bleeding requiring transfusion or another operation
- Infection of the wound, breastbone, lungs, or valve
- Stroke, heart attack, organ injury, or death
- Abnormal heart rhythms, including atrial fibrillation
- Need for a permanent pacemaker
- Blood clots or leakage around the replacement valve
- Kidney or breathing problems
- Reaction to anaesthesia

## Results and follow up

The valve is checked during surgery and afterward with an echocardiogram. Before discharge, you should receive instructions about wound care, activity, medicines, and follow-up. Ongoing reviews may include periodic echocardiograms.

If you have a mechanical valve, regular blood tests are needed to keep anticoagulation within the prescribed range. Never change the dose yourself.

Tell dentists and other healthcare professionals that you have had valve surgery. Your team will explain whether antibiotics like amoxicillin or doxycycline are needed before particular

dental procedures.

## Alternatives

- Standard surgical valve replacement: Uses a full breastbone opening and provides wider access, which may be preferable for complex or combined procedures.
- TAVR: Places a valve through a catheter, usually from the groin. Recovery is often faster, but suitability depends on anatomy, age, risk, durability planning, and future coronary access.
- Monitoring and medicines: Scans may be appropriate before disease meets treatment criteria. Medicines can ease symptoms but cannot open a severely narrowed valve or repair a major leak.
- Balloon aortic valvuloplasty: Temporarily stretches a narrowed valve, usually as a bridge to replacement or in selected circumstances.
- Ross procedure: In selected younger people, the pulmonary valve replaces the aortic valve. It can avoid a mechanical valve but involves two valves.

## When to call your healthcare team

Call emergency services for severe trouble breathing, fainting, sudden severe chest pain, heavy uncontrolled bleeding, or signs of stroke such as facial drooping, arm weakness, or new difficulty speaking.

Contact your surgical or cardiology team urgently for:

Use the contact instructions in your discharge plan for routine questions.

- Fever or chills
- Increasing wound redness, warmth, swelling, opening, or drainage
- New or worsening breathlessness
- A continuing fast, irregular, or pounding heartbeat
- Rapidly increasing leg swelling or body weight
- New calf pain or one-sided leg swelling
- Unusual bleeding, black stools, or blood in urine
- Worsening pain or pain not controlled by prescribed medicine

## Common questions

Will I be asleep?

Yes. General anaesthesia keeps you unconscious, and a breathing machine supports you.

Can I drive home?

No. Arrange transport home and do not drive until your team clears you and local requirements are met.

How painful is it?

Chest, shoulder, and upper-back soreness are common. Pain should gradually improve and remain manageable with prescribed treatment.

When will I know if it worked?

The valve is checked during surgery and with an echocardiogram afterward.

How long will I stay in hospital?

Many people stay several days. Complications or slower recovery may extend the stay.

Will I need blood thinners like warfarin or apixaban afterward?

A mechanical valve usually requires lifelong anticoagulation. Treatment after a biological valve depends on the valve, heart rhythm, and other conditions.

## Sources

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