PROCEDURE

Heart bypass surgery - minimally invasive

Minimally invasive heart bypass surgery restores blood flow using small chest incisions instead of opening the breastbone.

PURPOSE
Improve blood flow around blocked coronary arteries

PROCEDURE TYPE
Therapeutic; minimally invasive surgery through small chest incisions

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General

HOW LONG IT TAKES
About 3 to 6 hours

PREPARATION
Fasting and medication adjustments, especially blood thinners

RECOVERY
Several hospital days; no driving until surgical clearance

MAIN RISKS
Bleeding, infection, abnormal heartbeat, heart attack or stroke

RESULTS
Graft flow checked during surgery; recovery assessed before discharge

Overview

Minimally invasive heart bypass surgery is a type of coronary artery bypass grafting, or CABG. It creates a new route for blood to flow around a narrowed or blocked coronary artery. Coronary arteries supply oxygen-rich blood to the heart muscle.

Unlike conventional bypass surgery, it usually does not require dividing the breastbone. The surgeon reaches the heart through a small incision between the ribs or through several small openings. Robotic instruments may be used at some centres.

A healthy blood vessel, often an artery from inside the chest, is connected beyond the blockage. This new route is called a graft. The operation may treat one or more arteries, although it is most often used when a major artery on the front of the heart needs bypassing.

This remains major heart surgery despite the smaller incisions.

Why the procedure is performed

The procedure may be offered when coronary artery disease is reducing blood flow to part of your heart. Its goals are to improve blood supply, reduce angina-chest discomfort caused by limited blood flow-and protect heart function in selected situations.

Your healthcare team may consider it when:

Whether bypass surgery improves survival, symptoms, or both depends on which arteries are affected and your overall health.

- Medicines are not controlling your symptoms well enough
- A blockage is not suitable for treatment with a stent
- A durable bypass is preferred for an important coronary artery
- Your artery pattern can be reached safely through a small incision
- A hybrid approach combining surgery and coronary stenting is planned

Who should and should not have it

Minimally invasive bypass surgery is most suitable for people whose blocked arteries can be reached safely without opening the breastbone. It is commonly considered for a blockage in the left anterior descending artery, a major artery on the front of the heart. Selected people with several blocked arteries may also be eligible at experienced centres.

Your team will review your coronary angiogram, heart function, lung function, previous operations, other medical conditions, and treatment preferences. The experience of the surgical centre also matters.

A minimally invasive approach may not be the right choice if you need many complex grafts, another heart operation at the same time, or emergency surgery requiring rapid access to the whole heart. Conventional bypass may also be safer if your arteries are difficult to reach, a suitable graft vessel is unavailable, or scar tissue from earlier chest surgery blocks access.

The operation may be delayed because of an active infection, an uncontrolled medical condition, or medicines that increase bleeding risk. Severe lung disease can make the procedure difficult because one lung may need to be temporarily deflated.

The surgical team may need to change to a conventional breastbone incision if safe access

cannot be achieved.

How to prepare

Your treating facility's own instructions take priority because preparation differs with the planned technique and your medical history.

Before surgery, you may have blood tests, an electrocardiogram, chest imaging, and tests of heart and lung function. Your team will review your angiogram and check where a graft vessel can be taken from.

Give the team a complete list of prescription medicines, over-the-counter products, vitamins, and supplements. Some medicines-especially anticoagulants and antiplatelet medicines, often called blood thinners-may need to be paused or adjusted. Do not stop them unless the surgical team tells you to.

You will receive instructions about when to stop eating and drinking. Ask which regular medicines to take on the morning of surgery.

Arrange help for your return home. You will not be able to drive yourself, and everyday tasks may be tiring at first. If you smoke, stopping before surgery can help your lungs and wounds recover.

What happens during the procedure

You receive general anaesthesia, so you are unconscious and do not feel the operation. A breathing tube and monitoring lines are placed after you are asleep.

The surgeon makes a small incision between the ribs, usually on the left side of the chest. Robot-assisted surgery may instead use several small openings and a separate incision for creating the bypass.

An artery from inside the chest is commonly used as the graft. In some operations, a vessel from the arm or leg may be used.

The surgeon attaches one end of the graft beyond the blocked part of the coronary artery. This allows blood to flow around the blockage. The heart often continues beating while a stabilising device holds a small area still. Some techniques use a heart-lung bypass machine, which temporarily supports circulation.

The team checks the graft's blood flow before closing the incisions. One or more chest drains may be left in place temporarily to remove fluid or air. Temporary pacing wires may also be

used.

Recovery and what to expect afterward

Pain and soreness around the incision and ribs are expected. You may also have shoulder or upper-back discomfort. Pain medicine should make it possible to breathe deeply, cough, sleep, and begin moving. Tell the hospital team if pain is not controlled.

You may start with drinks and light food, then return to regular meals as nausea settles. A reduced appetite is common for a short time. Follow any advice about salt, fluids, and heart-healthy eating.

You will be encouraged to sit up and walk soon after surgery. Breathing exercises help reopen the lungs. Avoid heavy lifting and strenuous upper-body activity until your surgeon confirms that healing is secure. Cardiac rehabilitation provides supervised exercise, education, and support during recovery.

Do not drive home. Avoid driving while taking sedating pain medicine or while pain limits your ability to steer, turn, or brake suddenly. Resume driving only when the surgical team says it is safe.

The hospital stay is often several days. Returning to desk-based work may take a few weeks, while physical work usually requires longer. Your individual timeline will reflect the number of grafts, your recovery, and the demands of your job.

Risks and possible complications

Smaller incisions may reduce some wound and recovery problems, but they do not remove the main risks of heart surgery.

Possible complications include:

Your personal risk is affected by your heart condition, age, kidney and lung function, diabetes, previous surgery, and whether the operation is planned or urgent. Ask your surgeon to explain the risks that apply most directly to you.

- Bleeding or the need for a blood transfusion
- Infection of the chest incision or graft-harvest site
- An abnormal heart rhythm, especially atrial fibrillation
- Heart attack, stroke, kidney problems, or lung complications

- A blood clot or early blockage of the graft
- Reactions to anaesthesia
- Injury to nearby nerves, blood vessels, or organs
- Conversion to conventional open-chest surgery
- Death

Results and follow up

The surgeon checks graft blood flow during the operation and usually explains the immediate result after you are awake. Your progress is then assessed through your symptoms, heart rhythm, blood tests, mobility, breathing, and wound healing.

Follow-up visits are used to review the incision, medicines, activity, and return to work or driving. Routine testing of the graft is not always needed if recovery is going well.

Bypass surgery treats the effects of coronary artery disease but does not remove the disease itself. Medicines, cardiac rehabilitation, physical activity, not smoking, and management of blood pressure, cholesterol, and diabetes help protect the graft and other coronary arteries.

Alternatives

The realistic alternatives depend on your artery pattern and why treatment is being considered.

Medicines and lifestyle treatment avoid procedural risks. They can control symptoms and reduce future cardiovascular risk, but they do not create a new route around a severe blockage. They may not provide enough symptom relief for everyone.

Percutaneous coronary intervention , usually called angioplasty and stenting, is performed through an artery in the wrist or groin. Recovery is faster and there is no chest incision. Some complex or long blockages are difficult to stent, and repeat procedures may be more likely than after bypass in certain patterns of disease.

Conventional CABG through the breastbone gives the surgeon broad access to the heart. It may be better for complex disease, several grafts, or combined valve and bypass surgery. It usually causes more chest disruption and a longer recovery.

Hybrid coronary revascularisation combines a minimally invasive surgical graft with one or more stents. It can avoid a full breastbone incision but involves both surgical and

catheter-based treatment, sometimes on separate days.

Choosing no procedure may be reasonable in some stable situations after discussion of expected symptoms and future heart risk.

When to call your healthcare team

Contact your surgical team promptly for worsening incision pain, increasing redness or drainage, a fever, new swelling, persistent vomiting, increasing breathlessness, or a heartbeat that is repeatedly fast or irregular. Also call if your pain medicine is not working or recovery is moving backward rather than forward.

These concerns usually require prompt assessment but are not always emergencies.

Call emergency services for:

Do not drive yourself during a possible heart or stroke emergency.

- New or severe chest pressure that does not settle
- Severe difficulty breathing
- Fainting or loss of consciousness
- Sudden facial drooping, arm weakness, or trouble speaking
- Heavy or uncontrolled bleeding
- A sudden collapse or inability to wake normally

Common questions

Will I be asleep?

Yes. Minimally invasive bypass surgery is performed under general anaesthesia. You will be unconscious, and a breathing machine will support you during the operation.

Can I drive home?

No. Someone else must take you home. Do not resume driving until your surgical team clears you and you can move comfortably without sedating pain medicine.

How painful is it?

The smaller incision avoids dividing the breastbone, but the tissues between the ribs are still affected. Soreness can be significant at first and should gradually improve. Pain relief is an important part of safe breathing and movement.

When will I know if it worked?

Graft blood flow is checked during surgery, and the surgeon can usually discuss the immediate result soon afterward. Symptom improvement and overall recovery are assessed during the following days and weeks.

Is it safer than regular bypass surgery?

It may reduce blood loss, wound problems, and recovery time for appropriately selected people. It is not automatically safer for everyone. Conventional bypass can be safer when several areas of the heart must be reached.

Will I still need heart medicines?

Usually, yes. Medicines remain important for preventing blood clots, controlling cholesterol or blood pressure, and protecting your heart. Take only the medicines prescribed at discharge and ask before restarting anything that was stopped.

Sources

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