PROCEDURE

Lung surgery

Lung surgery removes, repairs, or samples lung or nearby chest tissue.

PURPOSE
Remove, repair, biopsy, or drain lung or chest tissue

PROCEDURE TYPE
Diagnostic or therapeutic; minimally invasive or open surgery

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General anaesthesia

HOW LONG IT TAKES
About 1 to 6 hours, based on operation complexity

PREPARATION
Fasting, medication review, breathing tests, and smoking cessation

RECOVERY
Several hospital days; no driving until cleared

MAIN RISKS
Air leak, bleeding, pneumonia, blood clots

RESULTS
Operative findings immediately; pathology usually within days

Overview

Lung surgery is an operation on a lung or nearby structures inside the chest. It may be used to remove abnormal tissue, obtain a biopsy, repair damage, or treat a problem such as a collapsed lung.

The amount of tissue removed can range from a small wedge to an entire lung:

Many operations are performed through several small cuts using video-assisted thoracoscopic surgery, called VATS, or robotic-assisted surgery. Open surgery, called a thoracotomy, uses a larger cut between the ribs. The safest approach depends on what needs to be done, its location, and your overall health.

Lung transplantation is also lung surgery, but it involves different assessment, risks, and long-term care than the operations covered here.

- Wedge resection: removes a small, wedge-shaped piece
- Segmentectomy: removes one anatomical section of a lung lobe
- Lobectomy: removes one of the lung's lobes
- Pneumonectomy: removes an entire lung
- Pleural surgery: treats the thin layers covering the lungs and chest wall

Why the procedure is performed

Lung surgery may be offered to diagnose or treat:

For suspected or confirmed lung cancer, surgery is usually considered when the abnormal area can be removed and testing suggests you could tolerate the loss of lung tissue. Nearby lymph nodes may also be removed or sampled to check whether cancer has spread.

- Lung cancer or a growth that may be cancer
- A lung nodule that cannot be diagnosed another way
- Cancer that has spread to the lung in selected cases
- Repeated lung collapse, also called pneumothorax
- Damaged or infected lung tissue
- Large air spaces called bullae
- Fluid, infection, or abnormal tissue around the lung
- Certain airway or chest injuries

Who should and should not have it

Lung surgery may be suitable when it offers a reasonable chance of diagnosis, cure, symptom relief, or prevention of another serious chest problem. Your team considers the expected benefit, the amount of lung that would remain, and your ability to recover.

Before cancer surgery, imaging and sometimes lymph-node tests help determine whether the cancer can be fully removed. Breathing tests estimate how well your lungs may work afterward. Heart health, mobility, frailty, nutrition, and other medical conditions also matter.

Surgery may not be the right option when:

An operation may be delayed for an active chest infection, unstable heart condition, poorly controlled medical problem, or medicines that increase bleeding risk. Smoking does not

automatically rule out surgery, but stopping beforehand can reduce breathing and wound complications.

- A cancer cannot be removed completely or has spread widely
- Remaining lung function would probably be too limited
- Severe heart, lung, or other illness makes the risks greater than the likely benefit
- Another treatment is expected to work as well with less risk
- You do not want surgery after discussing its benefits and trade-offs

How to prepare

Your treating facility's own instructions take priority because fasting times, medication plans, and admission arrangements are not the same for every operation.

Assessment may include blood tests, an electrocardiogram to check heart rhythm, chest imaging, and pulmonary function tests that measure breathing capacity. Some people need exercise testing, heart tests, bronchoscopy, or additional scans.

Tell the team about all medicines, supplements, allergies, previous reactions to anaesthesia, and any history of bleeding or blood clots. Do not stop a blood thinner like warfarin or apixaban , aspirin, diabetes medicine, or other prescribed drug unless the team gives you a specific plan.

You will be told when to stop eating and drinking. Arrange help at home and transport after discharge. Pack comfortable clothing and supportive footwear if you will stay in hospital.

If you smoke or vape, stopping as early as possible can help your lungs clear mucus and heal. Your team may also teach deep-breathing exercises or recommend activity and nutrition measures before surgery.

What happens during the procedure

You receive general anaesthesia, so you are unconscious and do not feel the operation. A breathing tube is placed in your airway. During part of the procedure, the anaesthesia team may ventilate one lung while the surgeon works on the other.

The surgeon reaches the chest through small cuts for VATS or robotic surgery, or through a larger thoracotomy incision. The planned tissue is biopsied, repaired, or removed. If cancer is being treated, nearby lymph nodes may be sampled or removed.

The surgical approach sometimes needs to change after the operation begins. For example,

minimally invasive surgery may be changed to an open operation if there is bleeding, difficult anatomy, or a finding that cannot be managed safely through small cuts.

One or more chest tubes are usually left in place. These flexible tubes drain air and fluid so the remaining lung can expand. The cuts are then closed with stitches, staples, or surgical glue.

Afterward, you go to a recovery area. Some people need closer monitoring in a high-dependency or intensive care unit, particularly after a larger operation.

Recovery and what to expect afterward

Pain is expected around the cuts and chest tube. Open surgery often causes more discomfort than minimally invasive surgery. Pain relief may be given through tablets, injections, an epidural near the spine, or a nerve block. Tell the hospital team if pain stops you from coughing, breathing deeply, or walking.

You may start with drinks and then food as you wake fully and nausea settles. Appetite can be reduced for a while. Small, protein-rich meals and enough fluids may be easier during early recovery.

Staff will encourage deep breathing, coughing, and walking soon after surgery. You may use an incentive spirometer, a handheld device that guides slow, deep breaths. These steps help reopen the lungs and lower the risk of pneumonia and blood clots.

The chest tube is removed when drainage is acceptable and there is no important ongoing air leak. Hospital stay can range from a short admission after a small procedure to a week or longer after major surgery or complications.

Do not drive while taking opioid pain medicine or until you can comfortably turn, react quickly, wear a seat belt, and perform an emergency stop. Follow your surgeon's clearance and local driving rules.

Returning to work may take several weeks. A desk-based role is often possible sooner than heavy physical work. Recovery is usually longer after thoracotomy or removal of a large amount of lung. Increase activity gradually and follow lifting restrictions from your surgical team.

Risks and possible complications

Your team should explain the risks that apply to the exact operation. Possible complications include:

After lung tissue is removed, breathlessness can be greater than before, especially with exertion. Breathing tests help estimate this risk, but they cannot predict recovery perfectly.

Major complications such as severe bleeding, heart problems, respiratory failure, or death are possible. Individual risk is influenced by the type of surgery, how much lung is removed, and your heart and lung health.

- Air leaking from the lung longer than expected
- Bleeding or the need for a blood transfusion
- Pneumonia or another infection
- Blood clots in a leg or lung
- Abnormal heart rhythm, especially atrial fibrillation
- Breathing problems or a need for temporary breathing support
- Fluid or pus collecting around the lung
- Ongoing pain, numbness, or sensitivity near the cuts
- Reactions related to anaesthesia

Results and follow up

The surgeon can usually explain what was seen and done shortly after the operation. If tissue was removed, a pathologist examines it under a microscope. This identifies the type of abnormality and, for cancer, may show its size, lymph-node involvement, surgical margins, and other features.

Pathology often takes several days, but complex testing can take longer. Ask when and how you will receive the result rather than assuming that no news means a normal result.

Routine follow-up checks your wounds, breathing, pain, activity, and pathology results. Stitches or staples may be removed if they are not dissolvable. If cancer was found, the results help determine whether monitoring, chemotherapy, radiotherapy, targeted treatment, or another treatment should be discussed.

Alternatives

The realistic alternatives depend on why surgery was offered.

A needle biopsy or bronchoscopy can collect tissue without removing part of the lung. These

procedures usually have a shorter recovery, but they may miss the abnormal area or provide too little tissue for a firm diagnosis.

Repeated scans can monitor some small or low-risk nodules. This avoids immediate surgery, but delays certainty and may allow a harmful growth to change before treatment.

For some early lung cancers, stereotactic body radiotherapy delivers focused radiation without an operation. It may be suitable when surgery is unsafe or not wanted, but it does not provide the same full surgical specimen or lymph-node assessment.

Thermal ablation destroys selected small tumours using heat or cold through a probe. Recovery is generally shorter, but it is not suitable for every size or location and may have a higher chance of local recurrence than surgery in some settings.

Drug treatment or conventional radiotherapy may be more appropriate for cancer that has spread or cannot be removed. These treatments can control disease but may not offer the same chance of cure as surgery for an operable early cancer.

For recurrent pneumothorax or pleural fluid, alternatives may include observation, needle drainage, a chest tube, or medicines placed into the chest to seal the pleural space. Less invasive choices may involve less recovery but can have a greater chance of the problem returning.

When to call your healthcare team

Contact your surgical team promptly for a fever, worsening redness or drainage from a wound, increasing breathlessness, pain that is not controlled, repeated vomiting, or new swelling in one leg. Also call if a chest-tube site continues leaking fluid or air after discharge.

Seek emergency help for severe or sudden difficulty breathing, chest pain with sweating or faintness, coughing up more than a small streak of blood, fainting, confusion, blue or grey lips, or uncontrolled bleeding.

Routine questions about pathology, activity, wound care, or returning to work can usually wait for normal clinic hours or your scheduled follow-up.

Common questions

Will I be asleep?

Yes. Lung surgery is normally performed under general anaesthesia, so you are unconscious. A breathing tube supports breathing during the operation.

Can I drive home?

No. You will need someone else to drive after discharge. Do not resume driving until you are off sedating pain medicine, can move safely, and have been cleared under your team's advice and local rules.

How painful is lung surgery?

Some pain is expected, particularly with coughing and movement. Minimally invasive surgery often hurts less than an open thoracotomy, but either approach requires planned pain control.

When will I know the results?

Your surgeon can usually discuss the operation soon afterward. Microscopic examination of removed tissue generally takes several days, with longer waits possible for special tests.

Will I be able to breathe normally afterward?

Many people adapt well after a small resection. Breathlessness may increase after larger operations, especially during exercise. Your preoperative breathing tests help estimate how much function is likely to remain.

How long will I have a chest tube?

It stays until the lung is expanded and air and fluid drainage have fallen to an acceptable level. This may be a short period or several days if an air leak continues.

Sources

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- Society of Thoracic Surgeons. Lung Cancer Surgery . Patient guide to surgical assessment, procedures, and recovery.
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- Batchelor TJP, Rasburn NJ, Abdelnour-Berchtold E, et al. Guidelines for Enhanced Recovery After Lung Surgery: Recommendations of the Enhanced Recovery After Surgery Society and the European Society of Thoracic Surgeons . European Journal of Cardio-Thoracic Surgery. 2019;55(1):91-115.