ROY CASTLE
LUNG CANCER
FOUNDATION

Robotic-assisted surgery (RAS) for lung cancer

Robotic-Assisted Surgery: A Patient's Guide

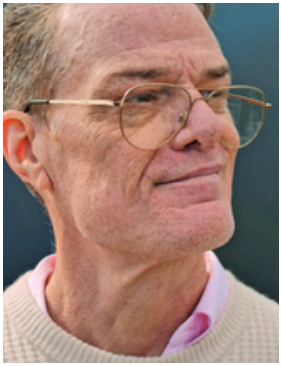
If you've been told you may need lung surgery, you might have heard about robotic-assisted surgery.

This booklet explains:

- what it involves
- why it may be recommended
- what to expect
- the potential benefits and risks.

It also includes questions you can ask your surgical team to help you feel informed and confident about your care.

Remember that most healthcare professionals are only too happy to answer your questions and help you with things that may be unclear or causing you concern.



If you still have questions and want to talk to someone, call our free and confidential **Ask the Nurse** service on **0800 358 7200** or email: **lungcancerhelp@roycastle.org.**

You can also talk to other people affected by lung cancer on our forum: **healthunlocked.com/lungcancer**

What is robotic-assisted lung surgery?

Robotic-assisted thoracic surgery (RATS), or robotic-assisted surgery (RAS) is a form of minimally invasive surgery used by the surgeon to remove part (or all) of a lung or a tumour. It is an advanced version of keyhole surgery, also known as video-assisted thoracoscopic surgery (VATS), offering greater precision and control.

The surgical tools are inserted into the chest through a few small cuts (incisions). The surgeon controls the precise and delicate movements of these instruments from a console with a high-definition 3D view of your chest.

This approach aims to combine the benefits of minimally invasive techniques with improved vision and fine instrument control.

Who is it recommended for?

Surgery for lung cancer is usually considered for people with early-stage non-small cell lung cancer (NSCLC) who are fit enough for an operation.

The type of surgery you have - open surgery, video-assisted thoracoscopic surgery (VATS), or robotic-assisted surgery - depends on factors such as the type and stage of your tumour, your lung and heart function, and your overall health.

Your surgical team will make these decisions based on national guidance and expert assessment of your individual situation.

"When you have early stage disease, one of the biggest advantages of robotic-assisted surgery is it can help us do lung sparing surgery. That means we can take away the diseased part of the lung but leave all the healthy bits of lung alone and that helps people get back on their feet far quicker.

When it comes to more advanced disease, we can do more complex operations as robotic-assisted surgery. This potentially means even people with more complex lung cancer you can still have the operation done minimally invasively."

Miss Stephanie Fraser
Consultant Thoracic Surgeon at Guy's and St Thomas' NHS Foundation Trust

What happens during the robotic-assisted procedure?

Preparing for the operation	The procedure is performed under general anaesthesia. You are positioned on your side so the surgeon can access the lung through the chest. Several small incisions (usually 3-4) are made between the ribs. These incisions are much smaller than in open surgery.
Setting up the robotic-assisted system	The robotic-assisted instruments (controlled by the surgeon) are inserted through the small incisions. Each arm holds a different instrument: • A camera which provides the surgeon a magnified, high-definition 3D view inside the chest. • Surgical tools for cutting, grasping, or sealing tissue. The surgeon sits at a console nearby in the operating theatre using hand and foot controllers to move tiny instruments that bend and rotate in ways human hands cannot, with sub-millimetre precision.
Removing the tumour	The surgeon identifies and carefully removes the part of the lung containing the tumour. This could be: • A lobectomy (removal of a lung lobe), • A segmentectomy (removal of a smaller section), • Or, less commonly, a pneumonectomy (entire lung). Nearby lymph nodes are also removed for testing, to check if the cancer has spread.
Finishing the operation	Once the tumour and tissue are removed, the instruments are withdrawn. A chest drain is left in place to remove air or fluid and help the lung re-expand. The small incisions are closed with stitches.

Once the surgery is complete, you'll be cared for in a recovery area until you are awake, comfortable, and ready to return to your ward.

Most patients who have robotic-assisted surgery spend 3–5 days in hospital *(compared to 7–10 for open surgery).*

Potential benefits of robotic-assisted surgery

- Robotic-assisted surgery typically involves smaller incisions, resulting in less pain and minimal scarring.
- People often experience shorter recovery time and can return to daily activities more quickly.
- Normally there is less blood loss which reduces the need for transfusions
- Surgeons can have a higher level of precision and control, allowing for safer and more accurate surgery
- There is a lower risk of complications overall, meaning fewer infections and post-operative issues
- People can have reduced post-operative pain and shorter hospital stays.

"I was diagnosed with stage one adenocarcinoma, which measured 4cm. I had robotic-assisted thoracic surgery. I just came bouncing back after the surgery. It's hard to believe half a lung gone through a keyhole!"

Liz, underwent robotic-assisted surgery in 2024

It is important to note that benefits can vary and depend on the individual's health and clinical needs.

Risks and considerations

Robotic-assisted surgery is generally considered safe, but like all major surgeries, it carries certain risks and considerations.

While the robotic-assisted approach can reduce complications compared with open surgery, patients may still experience bleeding, infections, or air leaks from the lung after the procedure. As with any major surgery, there is also a small risk of injury to nearby organs such as blood vessels, the heart, or nerves, though this is rare.

The procedure itself requires general anaesthesia, which carries its usual risks, particularly for patients with existing heart or lung conditions.

Surgery times may be longer and not all hospitals have access to this technology.

Some patients - such as those with very large tumours or a history of extensive chest surgery - may not be suitable candidates for a robotic-assisted approach.

How do surgical outcomes compare?

Robotic-assisted lung surgery has been shown in numerous studies to be both safe and feasible for patients with early-stage lung cancer.

Compared with traditional open surgery, minimally invasive approaches - including robotic-assisted techniques - are generally associated with smaller incisions, less trauma, and potentially faster recovery, often resulting in shorter hospital stays. When compared with another minimally invasive method, video-assisted thoracoscopic surgery (VATS), evidence indicates similar outcomes overall.

Studies show that robotic-assisted surgery can offer slightly less blood loss, more thorough lymph node removal, and shorter hospital stays in certain cases. However, further research, particularly larger randomised trials, is needed to provide clear evidence supporting RAS over VATS.

It is important to note that better outcomes are not guaranteed. As with any type of surgery, results depend on several factors, including the experience of the surgeon, the hospital's case volume, and the patient's tumour type, tumour location, lung function, and overall health.

The most important step is to have a fully informed discussion with your surgical team to determine the approach that is best suited to you.

Recovering from surgery

Recovery after robotic-assisted surgery involves several important steps to support healing and reduce the risk of complications.

Most people stay in the hospital between 2-3 days or longer, depending on the type of surgery and how quickly they recover. Effective pain management is essential, both for comfort and to allow deep breathing and early movement; this may involve oral or intravenous medications.

Physiotherapy and breathing exercises play a key role in recovery. Gradually increasing activity and practicing breathing exercises can help improve lung function and reduce the risk of complications such as pneumonia.

If a chest drain is used, hospital staff will provide instructions on how to care for it, when it can be removed, and what signs of infection or fluid leakage to watch for.

Preparing for discharge is important: bring an up-to-date list of medications, arrange for a family member or carer to collect you, and make a note of any questions about your recovery or signs to watch for.

After you are discharged, you'll usually have follow-up appointments to monitor recovery, review imaging, and discuss any ongoing symptoms or concerns.

When to seek help

Contact your healthcare provider promptly if you experience severe pain, shortness of breath, fever, redness or discharge around surgical sites, or any sudden changes in health.

Your healthcare team is also available to provide emotional support and can guide you to counselling or patient support groups if needed.

Robotic-assisted surgery didn't just save my life. It let me keep living it on my own terms.

Without it, I would have had open surgery to remove my whole lung, and my career as cabin crew would have been over. Instead, my surgeon only needed to remove one lobe, and I was back at work – and back in the air – just three months later.

Samantha

Questions to ask your healthcare team

Before choosing robotic-assisted surgery as a treatment option, you should fully understand the expected benefits, side-effects and risks.

Ask your thoracic surgeon or lung cancer nurse specialist these questions at your next visit. Learn as much as you can about your treatment and get an idea of the expected outcome.

Can you describe what robotic-assisted lung surgery is?

How would robotic-assisted surgery differ from open surgery or VATS?

What are the likely benefits for me? (recovery time, pain, complications)

What are the risks specific to me?

Is my cancer the right type/stage for robotic-assisted surgery?

What is the plan if the operation needs to be converted to an open procedure?

What will my typical hospital stay and recovery look like?

Who should I contact if I have problems after surgery?

Thoracic surgeon

Name:

Phone number:

Thoracic nurse specialist

Name:

Phone number:

About our lung cancer information

We believe information that is clear, accurate, evidence based, up to date and easy to use allows people to become better informed and more involved in their health and care.

Our information is written either by our information team or by lung cancer experts. We have a panel of lung cancer experts made up of doctors, nurse specialists and other health professionals involved in the treatment and care of people affected by lung cancer. These people help us on a voluntary basis. You can find out about our Expert Panel at www.roycastle.org/expertpanel.

Our information is also reviewed by members of our Reader Panel (made up of people who have personal experience of lung cancer). This makes sure our lung cancer information meets their needs. You can find out about our Reader Panel at www.roycastle.org/readerpanel.

You can find references to sources of information within this booklet at www.roycastle.org/evidence

If you have suggestions for new publications or additions or improvements to our existing range of booklets and factsheets, please let us know at info@roycastle.org.

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Roy Castle Lung Cancer Foundation is the charity that gives help and hope to people affected by lung cancer. The charity has two aims – supporting people living with lung cancer and saving lives.

Supporting people living with lung cancer

Working closely with lung cancer nurses, we provide information, run lung cancer support groups and offer telephone and online support. Our patient grants offer some financial help to people affected by lung cancer.

Saving lives

We fund lung cancer research, campaign for better treatment and care for people who have lung cancer, and raise awareness of the importance of early diagnosis. Our lung cancer prevention work helps people to quit smoking and encourages young people not to start smoking.

Contact us

For more information, call our Lung Cancer Information and Support Services:
0333 323 7200 (option 2) or visit our website: www.roycastle.org

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