Robotic & Minimally Invasive Thoracic Surgery: Your Questions Answered by Gary Chmielewski, MD, FACS

An educational resource for patients and families exploring thoracic surgical care.

Q1: Can you tell us about your thoracic surgery program and the conditions your team treats?

Our thoracic surgery program is dedicated to providing advanced, compassionate care to patients with diseases of the chest, including the lungs, esophagus, mediastinum, chest wall, and diaphragm. Our team includes board certified thoracic surgeons, pulmonologists, oncologists, radiologists, advanced practice providers, and specialized nursing staff who collaborate to deliver personalized treatment plans.

We are a high-volume center with expertise in both robotic and video-assisted thoracoscopic surgery (VATS), allowing us to offer minimally invasive options to the vast majority of our patients. Our multidisciplinary tumor board meets regularly to review complex cases and ensure every patient receives the most up-to-date, evidence-based care.

Key highlights of our program:

- Dedicated thoracic surgery operating suites with state-of-the-art robotic platforms
- Seamless coordination between surgery, oncology, radiation therapy, and pulmonary rehabilitation
- Lung cancer screening program using low-dose CT scans for high-risk individuals
- Patient navigation services to guide you through every step of your care journey
- Active participation in clinical trials offering access to the latest treatments

Q2: What is minimally invasive thoracic surgery, and how is it performed?

Minimally invasive thoracic surgery (MITS) refers to surgical techniques that access the chest cavity through small incisions — typically 0.5 to 1.5 cm — rather than the large chest-opening incision (thoracotomy) used in traditional open surgery. The two primary approaches are:

Robotic-Assisted Thoracic Surgery (RTS): The surgeon operates from a console, controlling robotic arms that hold the camera and surgical tools. The robotic system provides three-dimensional, magnified visualization, tremor filtration, and a greater range of motion than the human wrist, enhancing precision in confined spaces like the chest.

Video-Assisted Thoracoscopic Surgery (VATS): The surgeon inserts a tiny camera (thoracoscope) and specialized instruments through small incisions between the ribs. The camera transmits high-definition images to a monitor, guiding the surgeon throughout the procedure.

Both approaches allow surgeons to perform complex procedures — including lung resections, esophageal surgery, and thymectomy — with significantly less trauma to surrounding tissue than open surgery. This results in decreased length of hospital stay and a quicker return back to your life.

Q3: What are other treatment methods for common thoracic conditions?

Thoracic conditions are often managed through a combination of approaches, and surgery is just one part of a broader treatment landscape. Common treatment modalities include:

Non-Surgical Treatments:

- Chemotherapy and targeted therapy — for lung cancer and other thoracic malignancies
- Immunotherapy — harnessing the immune system to fight cancer
- Radiation therapy (including stereotactic body radiation, SBRT) — for early-stage lung cancer or patients who cannot undergo surgery
- Bronchoscopic procedures — including endobronchial ultrasound (EBUS) for diagnosis and airway stenting for obstruction
- Pulmonary rehabilitation — to optimize lung function before and after treatment
- Medical management — for conditions like empyema, pleural effusion, or early-stage infections using antibiotics or drainage

Surgical Options (Beyond Minimally Invasive):

- Open thoracotomy — still used in select complex cases requiring maximum exposure
- Lung transplantation — for end-stage lung disease such as severe COPD or pulmonary fibrosis
- Chest wall reconstruction — for tumors or traumatic injuries involving the ribs or sternum
- Esophagectomy — removal of part or all of the esophagus for cancer, achalasia, or benign end-stage esophageal disease.

Q4: What types of conditions does thoracic surgery treat?

Thoracic surgeons are trained to diagnose and treat a wide range of diseases affecting the organs and structures within the chest. These include:

Lung Conditions:

- Lung cancer (non-small cell and small cell)
- Pulmonary nodules (suspicious spots requiring biopsy or removal)
- Emphysema and severe COPD (lung volume reduction surgery)
- Lung infections — abscess, fungal infections, or cavitary disease
- Pneumothorax (collapsed lung)
- Benign lung tumors and cysts

Esophageal Conditions:

- Esophageal cancer
- Achalasia (difficulty swallowing due to impaired muscle function)
- Gastroesophageal reflux disease (GERD) — anti-reflux procedures
- Esophageal diverticula

Mediastinal and Other Chest Conditions:

- Thymoma and thymic cancer
- Mediastinal tumors and cysts
- Myasthenia gravis (thymectomy)
- Pleural disease — mesothelioma, empyema, recurrent pleural effusions
- Chest wall tumors and deformities
- Hyperhidrosis (excessive sweating — treated via sympathectomy)
- Diaphragm disorders
- Thoracic Outlet Syndrome (TOS)

Q5: What are the benefits of minimally invasive thoracic surgery?

Minimally invasive approaches offer significant advantages compared to traditional open chest surgery. Evidence from large clinical studies consistently demonstrates:

- **Less pain:** Smaller incisions cause less trauma to muscles, nerves, and ribs, resulting in significantly reduced postoperative pain.
- **Shorter hospital stay:** Most patients are discharged within 1–4 days, compared to 5–10 days following open surgery.
- **Faster return to normal activity:** Patients typically resume light activities within 1–2 weeks and return to full function within 4–6 weeks.
- **Reduced blood loss:** Precise instrumentation minimizes intraoperative bleeding and lowers the likelihood of transfusion.
- **Lower infection risk:** Smaller wounds are less prone to surgical site infections.
- **Better cosmetic outcomes:** Small port-site scars are far less visible than a traditional thoracotomy incision.

- **Comparable or superior oncologic outcomes:** For lung cancer surgery, VATS and robotic resections achieve equivalent or better lymph node staging and long-term survival compared to open surgery.
- **Preservation of lung function:** Less surgical trauma helps patients maintain better respiratory capacity after surgery.

Q6: Who are the best candidates for minimally invasive thoracic surgery?

Most patients requiring thoracic surgery are potential candidates for a minimally invasive approach. A thorough preoperative evaluation helps determine the best technique for each individual. Ideal candidates generally include:

- Patients with early to intermediate stage lung cancer (Stage I–IIIA) requiring lobectomy or segmentectomy
- Individuals with pulmonary nodules that need diagnostic removal or biopsy
- Patients with mediastinal tumors, thymoma, or myasthenia gravis requiring thymectomy
- Those with recurrent or symptomatic pleural effusions requiring drainage and pleurodesis
- Patients with esophageal conditions including achalasia or early-stage esophageal cancer
- Individuals with hyperhidrosis requiring sympathectomy
- Patients with spontaneous or recurrent pneumothorax

Factors that may affect candidacy include prior chest surgery, severe adhesions, active infection, or tumors involving major blood vessels. However, even patients previously considered poor candidates for minimally invasive surgery can often benefit from robotic techniques due to their enhanced visualization and precision. Our team evaluates each patient individually.

Q7: What is the recovery time and success rate of these surgeries?

Recovery Time:

Recovery varies based on the type and extent of surgery, the patient's overall health, and the underlying condition being treated. General timelines for minimally invasive thoracic procedures:

- **Hospital stay:** Typically 1–3 days for most VATS or robotic lung resections; longer for more extensive procedures.
- **Return to light activity:** Most patients resume walking, self-care, and light household tasks within 1–2 weeks.
- **Return to work:** Desk-based or sedentary work: 3–4 weeks. Physical or manual labor: 6–12 weeks.

- **Full recovery:** Most patients achieve full functional recovery within 4–8 weeks for standard procedures.
- **Pain management:** We minimize the use of prescription pain medication and focus on over-the-counter analgesics typically for 1–2 weeks after surgery. We also use cryoablation during surgery to numb the chest wall nerves and lower requirements for pain meds.

Success Rates:

Success is measured differently depending on the condition being treated:

- **Early-stage lung cancer (Stage I):** Five-year survival rates of 80–92% following complete surgical resection.
- **Pneumothorax repair:** Recurrence rates of less than 5% following VATS pleurodesis or pleurectomy.
- **Thymectomy for myasthenia gravis:** Approximately 30–50% of patients achieve complete stable remission; the majority experience meaningful symptom improvement.
- **Esophageal achalasia (Heller myotomy):** Over 90% of patients experience significant long-term relief of swallowing difficulty.
- **Para-esophageal hernia repair and anti-reflux procedures**: Strive for 90% control of symptoms, off medications, and recurrence rates < 10%.
- **Conversion to open surgery:** Robotic and VATS procedures are converted to open thoracotomy in fewer than 5% of cases.

Q8: Is there anything else you would like to highlight for patients?

Absolutely. Here are several important points we want every patient and family member to know:

You are more than a diagnosis. Our entire team is focused not only on treating your condition but on supporting your quality of life, emotional wellbeing, and long-term health. We encourage open dialogue — no question is too small.

Seek a second opinion when warranted. For complex or serious diagnoses, a second opinion from an experienced thoracic center can provide peace of mind and may reveal additional treatment options.

Lung cancer screening saves lives. Annual low-dose CT screening is recommended for adults aged 50–80 with a significant smoking history (20 pack-years or more, currently smoking or quit within the past 15 years). Early detection dramatically improves outcomes.

Pulmonary rehabilitation matters. Patients who participate in pulmonary rehab before and after surgery consistently experience better outcomes, fewer complications, and faster recovery.

Technology continues to advance. Robotic surgery platforms, AI-assisted surgical navigation, and fluorescence-guided surgery are among the rapidly evolving tools our team employs to improve precision, safety, and outcomes.

Smoking cessation is critical. If you smoke, quitting even a few weeks before surgery significantly reduces anesthesia-related risks and improves healing. Our team can connect you with cessation resources.

To schedule a consultation or learn more about our thoracic surgery program please call 407.821.3550. AdventHealth Thoracic Surgery at Innovation Tower. 265 E Rollins St, Suite 5300. Orlando, FL 32804