

Video Assisted Thoracic Surgery (VATS)

Seminar Presented by
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Introduction

- Video-assisted thoracoscopic surgery (VATS) is a minimally invasive surgical procedure, used to diagnose and treat illness or injury to the lung and other organs in thorax .
- With controlled pneumothorax, the concept of thoracoscopy developed. **Jacobeus** used the cystoscope in 1910 to first visualize the pleural cavity.

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- **In the 1990's there was a sudden increase in the use of thoracoscopy. This happened due to many reasons:**
 - Miniaturization of video equipment
 - Improvement in quality of pictures and light sources
 - Single lung anesthesia improvements to allow undisturbed examination of the chest.
 - Development of staplers to enable biopsies and wedge resections.

Thoracoscopy Instruments



- Eventually, thoracoscope became part of the surgical procedure which got named as **Video Assisted Thoracic Surgery (VATS)**.

- In VATS procedures, surgeons operate through 2 to 4 tiny openings between the ribs. Each opening is less than one inch in diameter, whereas 6- to 10-inch incisions are not uncommon in open thoracic surgery.

- All VATS procedures generally start the same way.
- Patients are placed under general Anesthesia and are typically positioned on their sides. Using a trocar, the surgeon gains access into the chest cavity through a space between the ribs.
- An endoscope is inserted through the trocar, giving the surgeon a magnified view of the patient's internal organs on a television monitor.

Anatomical list of areas where VATS is done

an anatomical list of VATS includes the following:

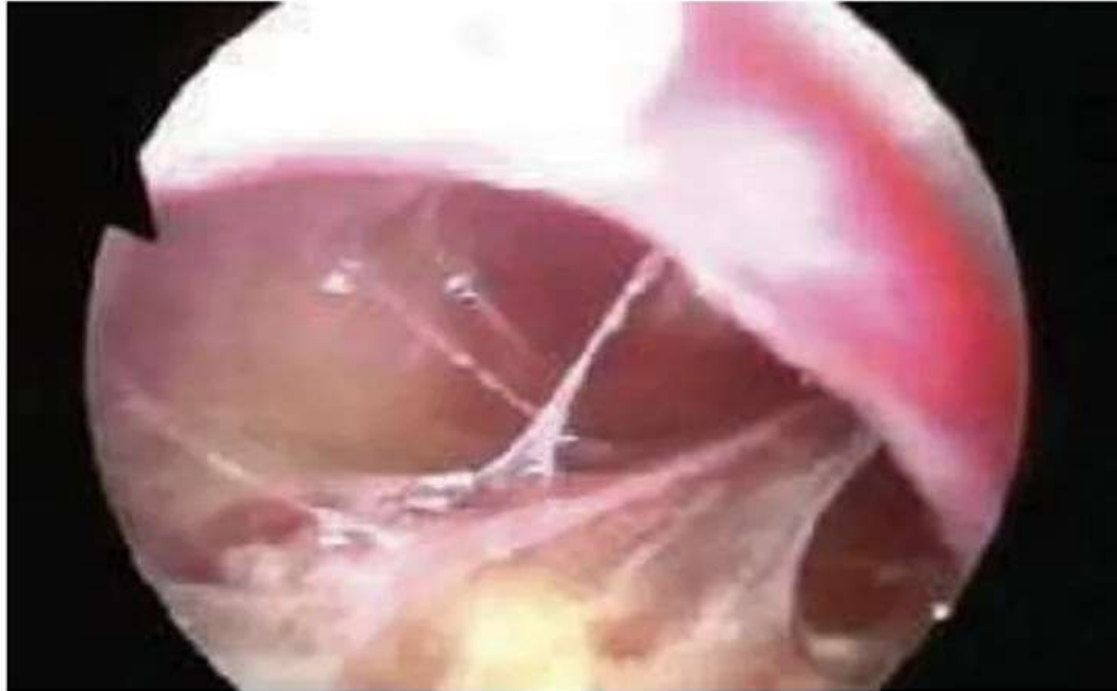
- PLEURA
 1. Visceral
 2. Parietal
- MEDIASTINUM
 1. Anterior
 2. Middle
 3. Posterior
- LUNGS
 1. Surface, wedge resection
 2. Bullae
 3. Lobe
- OTHERS
 1. Heart
 2. Pericardium
 3. Spine Surgery
 4. Sympathetic chain



INDICATIONS

Pleural Diseases

- Empyema



Empyema loculations

In case of empyema, the lung may not expand due to two reasons:

1. Multiloculated empyema at the level of parietal pleura .

2. Thickened granulation tissue over the visceral pleura.

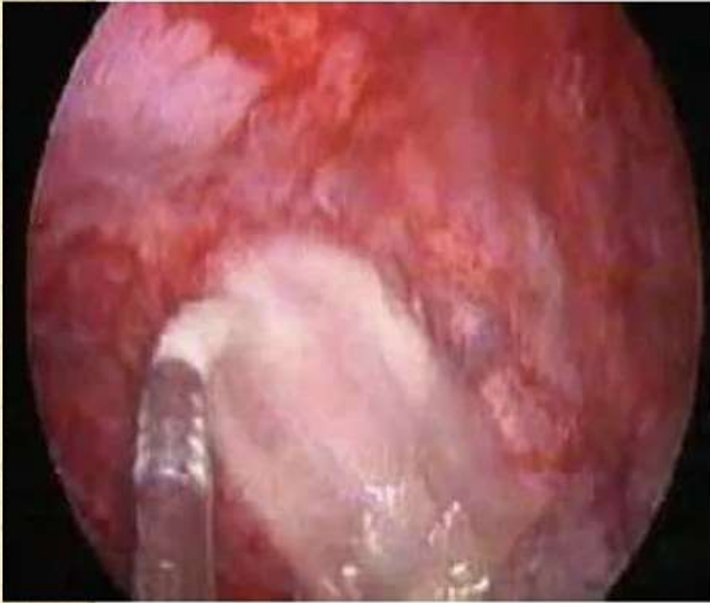
In the first situation, a Video assisted debridement if done early (within 2-3 weeks) leads to good results.

In the second situation, a decortication is needed to get the lung to expand again.

Pleural Effusion

- Thick, fibinous material that would not be likely to be completely drained by even a large-bore chest tube.
- Early thoracoscopic debridement(VATS) is indicated in such case.

- In malignant pleural effusion, Video assisted pleurodosis can be done.



Talc Slurry



Mechanical Abrasion



Post-traumatic Hemothorax

- VATS techniques have proven useful in the management of the organizing posttraumatic hemothorax in which chest tube have been unable to completely drain the fibinous clot and debris.

Pleural-based tumors

- Pleural-based tumors may be sampled and even resected using VATS.



Thick pleura excision & biopsy

- Video thoracoscopy also offers an option in the treatment of malignant pleural effusions, especially when the fluid is loculated. When tube thoracostomy results in incomplete drainage or when an attempt at chemical pleurodesis through a chest tube fails, many would proceed to thoracoscopic pleurodesis(VATS).

PARENCHYMAL DISEASE

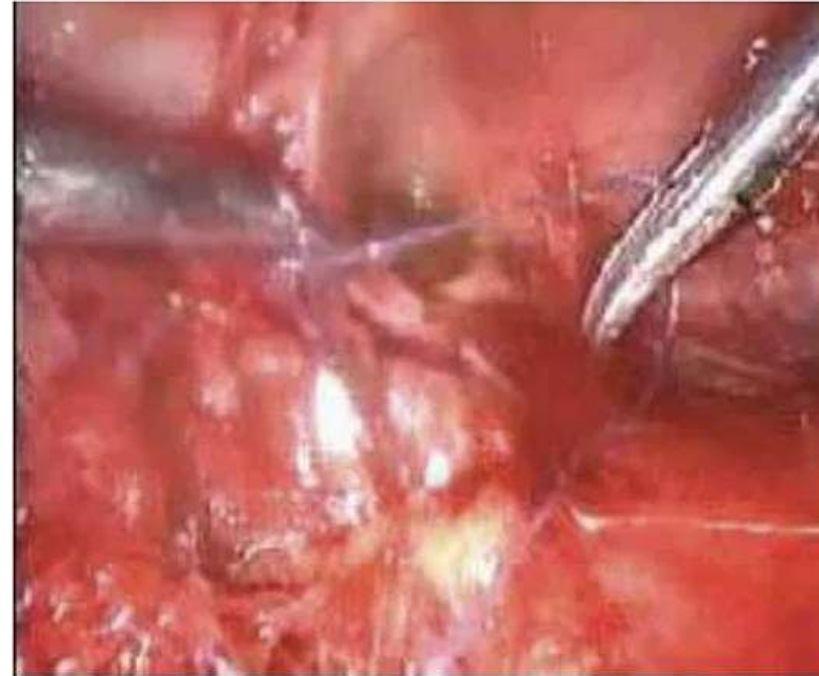
- VATS wedge lung biopsy represents a significant advance. It offers the advantage of excellent visualization of and access to the entire lung (impossible through a small thoracotomy), allowing biopsies of areas appearing abnormal and likely increasing diagnostic yield.

- Video-assisted techniques have also used the management of spontaneous pneumothorax in patient with apical blebs .
- Video assisted stapling of apical blebs can be done in such case.

- Giant bullae in case of bullous emphysema can be treated by thoracoscopic ablation of bullae by laser.
- Bronchopleural fistulae can sometimes be sutured thoracoscopically



Bronchopleural fistula



Sutured with vicryl

Pulmonary Nodule

- VATS is used to obtain solitary pulmonary nodule for histopathological examination for reliable diagnosis



Nodule picked up



Stapler applied



Specimen removal



Mediastinum

- Primary lesions of the mediastinum are ideal for VATS management. All locations of the mediastinum are accessible, and whether sampling or excision is the intent, video-assisted techniques save many patients from having to undergo thoracotomy or median sternotomy.
- Video-assisted thoracoscopic (VATS) thymectomy, excision of parathyroid adenoma.

- VATS allows biopsy, and complete resection, of almost all tumor mass of the mediastinum to be performed. Most cystic massae, such as pericardiac cysts, bronchogenic cysts, thymic cysts can be suitably treated by videothoracoscopy.
- Some solid, mainly posterior, tumors of nervous origin such as neurinomas and Schwannomas can be totally resected by VATS.

ENDOSCOPIC THORACIC SYMPATHECTOMY

- Most common indication is **hyperhidrosis** of hands.

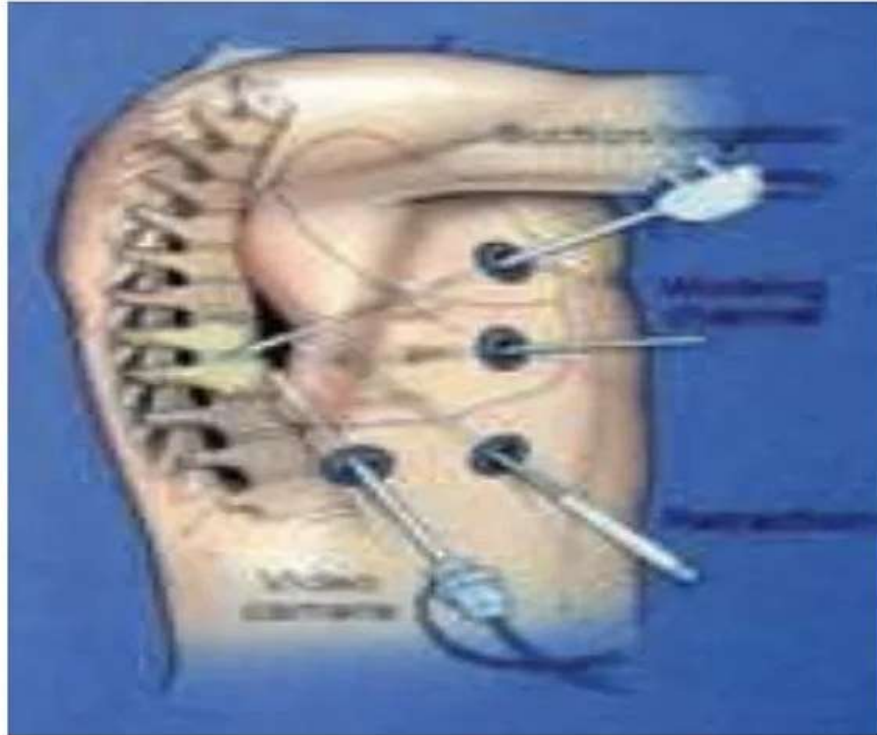


Esophageal Surgery

- Video-assisted thoracoscopy (VATS) to mobilize the thoracic esophagus in combination with a standard open laparotomy to complete the esophagectomy.
- Surgery for achalasia cardia by thoracoscopy has now been completely replaced by the laparoscopic approach. Excision of leiomyoma is done at few centres by VATS.

Spine Surgery

- Excision of symptomatic thoracic herniated discs by VATS.



- The anterior release of stiff thoracic scoliotic deformities can be done video assisted nowadays
- Drainage of paraspinal abscess due to tuberculosis can potentially become a very common indication of thoracoscopy in india .



Thoracic disc
space




Pus aspiration



Pus drainage

ADVANTAGES OF VATS OVER THORACOTOMY

- Operative time is faster or equivalent
- Blood loss is less
- Two non-randomized studies show significantly less blood loss via VATS lobectomy (150 +/-126 ml vs 300 +/-192 ml)
- Chest tube duration less (+/-)
- Pain....less

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- Short term PFT's better
 - Lower incidence of post-thoracotomy pain
 - Improved QoL
 - Less post-operative shoulder dysfunction

Especially when compared to latissimus dividing thoracotomy



Hospitalization VATS

- Shorter hospital stay
- Shorter chest tube duration 1-2 days
- Earlier return to full activities
- Less pain
- Faster recovery for high risk and frail patients

VATS Post operative pain

- Epidural less duration or no epidural
- Less use of analgesics
- Less sleep disturbances
- Lower incidence of post thoracotomy pain syndrome
- Most patients off all pain meds by POD 7.

VATS Recovery

- POD 7, 14 studies show improved PaO₂, FEV₁ and FVC
- Better 6 min walk test
- May have short and Long term quality of life improvement
- Quicker return to preoperative activity
 - VATS 2.5 mo
 - Thoracotomy 7.8 mo
- Decreased shoulder dysfunction



Oncological Comparison VATS vs Thoracotomy

- No difference in lymph node dissection
- No difference in survival curves
 - Some studies report trends in increased survival
 - VATS approach does not compromise patient survival

Survival VATS vs. Thoracotomy

