

Video-Assisted Thoracoscopic Surgery (VATS) in Young Male Smokers with Thoracic Trauma: A Case Series

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Abstract: This case series presents the anesthetic management and perioperative challenges encountered in young male smokers undergoing Video-Assisted Thoracoscopic Surgery (VATS) following thoracic trauma. The unique concerns in this subgroup include impaired pulmonary function due to smoking, trauma-induced respiratory compromise, and technical demands of one-lung ventilation. We discuss anesthesia strategies tailored for each case including preoperative evaluation, intraoperative ventilatory support, hemodynamic monitoring, and postoperative analgesia. The results underscore the critical role of anesthesia in optimizing patient outcomes during minimally invasive thoracic procedures.

Keywords: Anesthesia, VATS, thoracic trauma, one-lung ventilation, smokers, pain management

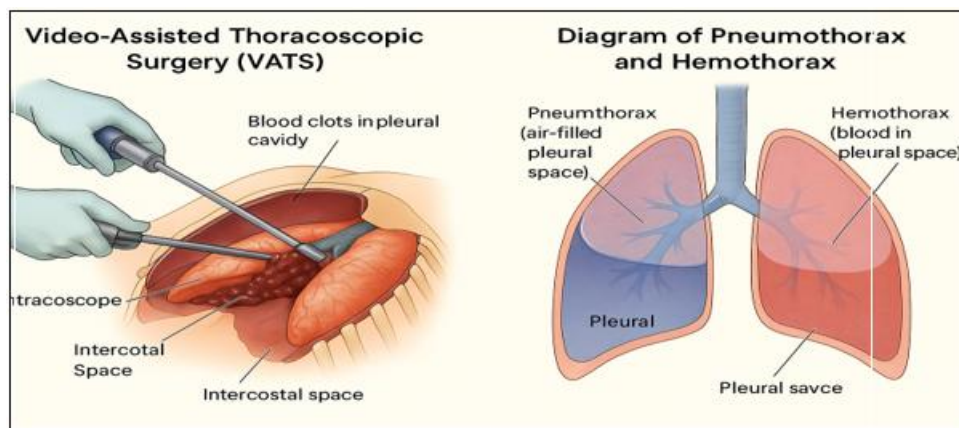


Figure 1: Schematic illustration of thoracic trauma management. Left: VATS approach showing thoracoscope, instrument ports, and clotted hemothorax evacuation. Right: Diagrammatic view of pneumothorax and hemothorax in pleural space. Used for conceptual illustration.

1. Introduction

Thoracic trauma in young male smokers presents a dual challenge to anesthesiologists: the acute physiological insult from trauma and the chronic respiratory impairment from tobacco use. Video-Assisted Thoracoscopic Surgery (VATS) is increasingly used to manage hemothorax, pneumothorax, and lung contusions with minimal invasiveness. However, its success relies heavily on anesthetic techniques such as effective lung isolation, maintenance of oxygenation during one-lung ventilation, and multimodal analgesia. This case series examines four VATS procedures with a focus on anesthetic considerations and perioperative care.

2. Materials and Methods

This retrospective case series was conducted in the Department of Anaesthesiology at a tertiary care center, involving four male patients aged 24 to 35 years with chronic smoking history and post-traumatic thoracic injuries. All patients underwent Video-Assisted Thoracoscopic Surgery (VATS) between January 2023 and March 2025.

Each patient presented following blunt or penetrating thoracic trauma, confirmed radiologically to have injuries such as retained hemothorax, clotted hemothorax, air leak, and empyema. The decision for VATS was taken by the trauma team after failure of conservative or ICD management.

Case Presentations

Case 1: A 28-year-old male smoker with blunt chest trauma and clotted hemothorax. Anesthesia involved left-sided double-lumen intubation, invasive blood pressure monitoring, and thoracic epidural analgesia. VATS decortication was successful with minimal blood loss.

Case 2: A 35-year-old smoker with penetrating chest injury and air leak. Anesthesia included bronchial blocker insertion, total intravenous anesthesia (TIVA), and ultrasound-guided paravertebral block. Air leak was repaired thoracoscopically.

Case 3: A 30-year-old male with retained hemothorax. Preoperative optimization included nebulization and incentive spirometry. One-lung ventilation achieved with a

right-sided double-lumen tube. Clot evacuation and pleurodesis were uneventful.

Case 4: A 24-year-old smoker with delayed respiratory deterioration. Anesthesia plan adapted for suspected empyema. Central line, arterial line, and lung isolation used. Pleural washout and decortication were performed.

Preoperative Evaluation

Comprehensive anaesthesia assessment included history (10–20 pack-years smoking), respiratory complaints, and trauma details. Examination revealed decreased breath sounds and chest wall tenderness.

Key investigations were:

- ABG for oxygenation and ventilation
- Chest X-ray and HRCT thorax for pathology
- Routine labs, ECG, echocardiography

Case-specific findings:

- Case 1: 28M, blunt trauma, clotted hemothorax, left lung collapse
- Case 2: 35M, penetrating injury, persistent air leak, lung laceration
- Case 3: 30M, neglected trauma, loculated hemothorax, rib fractures
- Case 4: 24M, delayed empyema, organized pleural fluid

Pulmonary optimization with bronchodilators, chest physiotherapy, and high-risk consent was completed.

Anaesthesia Protocol

Airway Management:

- Case 1 & 3: DLT (37 Fr) with FOB confirmation
- Case 2 & 4: SLT + bronchial blocker due to distorted anatomy

Monitoring:

- ASA standard + IBP, CVP (2 & 4), temperature, EtCO₂

Induction:

- Fentanyl (2 µg/kg), Propofol (2 mg/kg), Vecuronium (0.1 mg/kg)
- Maintenance: Sevoflurane/Desflurane in 50:50 air:O₂, adjusted FiO₂

OLV Strategy:

- TV: 5–6 mL/kg, PEEP 5 cm H₂O
- Desaturation in Case 4 managed with reinflation, FiO₂ 1.0

Fluids:

- RL guided by vitals, PRBC in Case 1 (400 mL blood loss)

Analgesia:

- Case 1 & 4: Epidural (T8–T9), bupivacaine + fentanyl
- Case 2 & 3: USG paravertebral block (20 mL 0.25% ropivacaine)
- All: IV paracetamol, ketorolac

Postoperative Care

- Extubation in OR; HDU monitoring
- Analgesia with epidural/paravertebral, paracetamol
- Respiratory support: oxygen, physiotherapy

Postop Events:

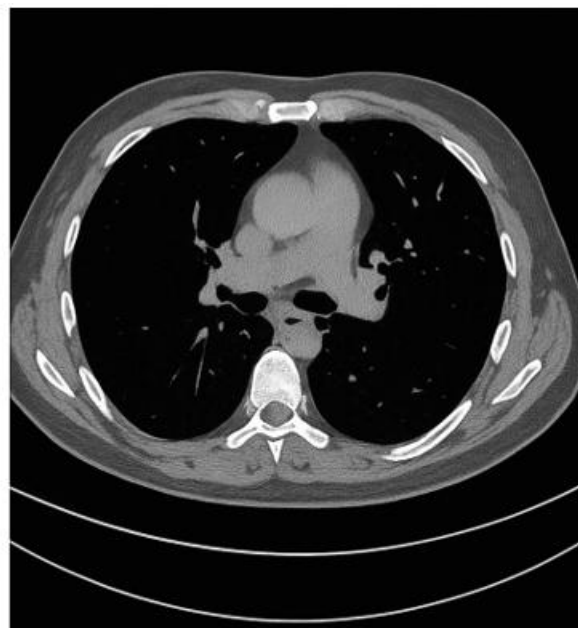
- Case 1: Fever POD 2, resolved with antibiotics
- Case 2: Subcutaneous emphysema, resolved
- Case 3: Atelectasis on CXR, physiotherapy
- Case 4: Epidural-induced hypotension, fluid-responsive

Data Collection

Patient characteristics, trauma details, anaesthesia technique, complications, and outcomes were documented and analyzed descriptively.



Chest Radiograph



Chest CT Scan

Figure 2: Representative radiologic imaging consistent with hemothorax in thoracic trauma. Left: Chest X-ray showing blunted costophrenic angle and homogeneous opacity. Right: Axial CT chest showing hyperdense pleural collection suggestive of clotted hemothorax. Illustrative image for Case 1.

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3. Results

All patients tolerated anesthesia and surgery well. One-lung ventilation was successfully maintained in all cases without hypoxia. Mean anesthesia duration was 110 minutes. Postoperative analgesia with epidural or paravertebral blocks significantly reduced opioid requirements. No major anesthesia-related complications were observed.

4. Discussion

Anesthetic management in thoracic trauma patients undergoing VATS requires a comprehensive approach. Smoking history increases the risk of hypoxemia, mucus plugging, and delayed recovery. One-lung ventilation is essential for surgical exposure but can compromise gas exchange. Use of lung isolation devices tailored to patient anatomy, vigilant monitoring, and judicious fluid management are key. Multimodal analgesia, particularly regional techniques like epidurals or paravertebral blocks, contribute to enhanced recovery and reduced opioid burden. This series emphasizes the need for individualized anesthetic plans based on trauma severity and pulmonary reserve.

5. Conclusion

VATS in young male smokers with thoracic trauma can be safely conducted under general anesthesia with lung isolation. An experienced anesthesia team, careful preoperative preparation, and effective postoperative pain control are vital for optimal outcomes. This case series reinforces the importance of anesthesia in ensuring the success of minimally invasive thoracic procedures.

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