Anesthesia for Minimally Invasive Thoracic Surgery

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Peter Slinger MD, FRCPC
Increasing Spectrum of Video-Assisted Thoracic Surgery (VATS)

- Lung
- Esophagus
- Spine
- Autonomic Nerves
- Robotic Cardiac
Anesthesia for Minimally Invasive Intrathoracic Surgery

- Management of OLV: Changed Strategies
- Lung Isolation: New Priorities New Methods
Gas Mixture During Two-lung Ventilation vs. Lung Collapse During One-lung Ventilation

2LV Gas Mix:
- **O2**
- **N2O/O2**
- **Air/O2**

Time OLV min. (FiO2 1.0)
One-Lung Ventilation (OLV): Prevention and Treatment of Hypoxemia

- High FiO2
- Continuous Positive Airway Pressure (CPAP) Non-ventilated Lung
- Positive End-Expiratory Pressure (PEEP) Ventilated Lung
- HFPPV, Partial Vent.
Treatment of Hypoxemia during One-lung Ventilation

“Are you still ventilating the lung?”
Treatment of Hypoxemia during One-lung Ventilation

Imagine That You’re a Red Cell in the RV...
Fig. 1. Classical static pressure-volume curve of the lung. Volume for a given pressure is much greater on the deflation limb than on the inflation portion. Symbols are referenced in the text.
Static Compliance curve of the Ventilated (dependent) lung, 57 y.o. female, FEV1= 72%

One-lung, Static Compliance Curve

32 y.o. male, FEV1 = 102%
Total Endoscopic Esophagectomy: R. VATS + Laparoscopy + L. Neck incision

Prolonged One-Lung Ventilation
# Individualizing One-lung Ventilation:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Exceptions</th>
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<tbody>
<tr>
<td><strong>Tidal Vol.</strong></td>
<td>5-6 ml/kg</td>
<td><strong>Pk. a/w P&lt;35</strong></td>
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<tr>
<td><strong>PEEP</strong></td>
<td><strong>Total 5 cm.</strong></td>
<td><strong>Plat. a/w P&lt;25</strong></td>
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<tr>
<td><strong>Resp. Rate</strong></td>
<td>12</td>
<td><strong>Not added if COPD</strong></td>
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<tr>
<td><strong>Mode</strong></td>
<td>Vol.-Cont. Vent.</td>
<td><strong>Maint. N PaCO2</strong></td>
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<td></td>
<td></td>
<td><strong>P-C V:LTx, Pneumnx</strong></td>
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Anesthesia for Minimally Invasive Intrathoracic Surgery

- Management of OLV: changed strategies
- Lung Isolation: New Priorities
  New Methods
Indications for Lung Isolation

**Absolute**

**Relative?**
The ABC’s of Lung Isolation:

◆ Anatomy
◆ Bronchoscope
◆ Chest X-ray, CT Scan
Video-Assisted Thoracoscopic (VATS) Lobectomy:
VATS Lobectomy:
VATS Lobectomy:
VATS Lobectomy:
VATS Lobectomy:
VATS Lobectomy:
DLT vs. Blocker for VATS?

**Double-lumen Tube**
- Excellent Isolation
- Independent Lung Access
- Fixed Anatomical Design

**Bronchial Blocker**
- Adaptability
- No need to change tube
- Left-sided Surgery
- Non-pulmonary surgery
Devices for Lung Isolation used by Anesthesiologists with Limited Thoracic Experience.


“…the most critical factor in successful placement was the anesthesiologists knowledge of endoscopic bronchial anatomy.”
The structure seen in the Yellow circle is?

A. Right Bronchus intermedius
B. Left upper lobe bronchus
C. Left mainstem bronchus
D. Right middle lobe bronchus
E. Right upper lobe bronchus
The structure seen in the Yellow circle is?

A. Right Bronchus intermedius
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Teaching Bronchial Anatomy

- In the OR
- Review articles/CD/DVD
- Workshops
- Virtual bronchoscopy simulator
- Online bronchoscopy simulator
www.thoracicanesthesia.com

Google: Thoracic Anesthesia