A Unique Challenge: Right One-Lung Ventilation in a Patient Who Had Prior Right Lower Lobectomy

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Optimum anesthetic goals during OLV of the right lung with two remaining lobes

- Lower tidal volumes
- Maintain normovolemia and avoid excess fluid transfusion
- Maintain HPV

### Physiology of OLV

- Lateral positioning increases blood flow to the dependent lung
- HPV directs the blood to the dependent lung
- The effects of shunt are minimized during OLV

### Tricks to maintain HPV during OLV

- Maintain normocarbia or mild hypocarbia
- Avoid hypercarbia, which decreases HPV
- Avoid inspired concentration of volatile anesthetic agents >1.0 MAC, which also decreases HPV

### Factors inhibiting HPV

1. Hypocarbia
2. Higher concentration of volatile anesthetic agents
3. Vasodilators (nitroglycerine, nitroprusside, hydralazine, angiotensin receptor blockers, ACE inhibitors, etc.)
4. Hypothermia

### Gas Exchange during OLV

- OLV increases shunt. Gravitational increase in blood flow to the dependent lung and HPV in the nondependent lung minimizes the shunt.
- Oxygenation: Increase in shunt decreases PaCO₂
- PaCO₂: Carbon dioxide elimination is not a problem during OLV

### Management of Hypoxia during OLV

- At onset of OLV: Begin two-lung ventilation, confirm the position of double lumen tube and bronchial blockers with bronchoscopy.
- During OLV: Confirm position as per the above, add PEEP to the dependent lung, then add CPAP to the nondependent lung.
- Avoid factors that inhibit HPV (see above)
- Clamp the ipsilateral pulmonary artery early during pneumonectomy

### Predictors of hypoxia during OLV

- Left OLV
- OLV in supine position
- Preoperative hypoxia
- Decreased FEV1 preoperatively

### Bronchoscopic identification of double lumen tube

- Identify right and left bronchus by identifying tracheal rings anteriorly
- Right upper lobe bronchus take-off at 12 o’clock position within 2.5 cm of carina and identify the trifurcation of right upper lobe bronchus
- Left upper lobe bronchus take-off at 5 cm from carina. Both upper and lower lobe bronchus must be patent during left OLV. Identify the bifurcation of left upper lobe bronchus.

### Conclusion

We managed oxygenation in this patient during OLV with limited reserve by ventilating with low tidal volumes and maintaining HPV.