Minimally invasive thoracic surgery is usually performed by video-assisted thoracoscopy. During video-assisted thoroscopic surgery (VATS), it is mandatory to use one-lung ventilation (OLV) via a double-lumen tube in order to achieve a collapsed motionless lung on the thoracoscoped side. The different problems encountered during OLV during thoracoscopy include:

1. Malposition of the double-lumen tube
2. Incomplete deflation of the ipsilateral lung
3. Hypoxia
4. Pneumothorax
5. Pulmonary edema

Malpositioning of the double-lumen tube is a common problem. This can result in (1) the inability to isolate one lung in spite of clamping; 2) inability to deflate the ipsilateral lung; (3) inadequate ventilation of the contralateral lung.

INCOMPLETE DEFLATION OF THE IPSILATERAL LUNG

Inability to deflate the lung on the thoracoscoped side may result from:
1) Malposition of the double-lumen tube, 2) Intrapleural adhesions, 3) Excessive intrapleural suctioning during thoracoscopy.

HYPOXIA

One-lung ventilation creates an obligatory right-to-left transpulmonary shunt through the nonventilated lung. The degree of shunt is decreased by collapse and hypoxic pulmonary vasoconstriction in the nonventilated lung, and by gravital increase of blood to the dependent ventilated lung. The effect of gravity will be important when the patient is in the lateral position since gravity causes a vertical gradient in the distribution of pulmonary blood flow.

PNEUMOTHORAX

1. Intrapleural carbon dioxide insufflation
2. Spontaneous Pneumothorax
3. Barotrauma
4. Surgical air leak

PULMONARY EDEMA

There are three types of pulmonary edema that can complicate thoracoscopy:
1) Negative pressure pulmonary edema (NPPE)
2) Re-expansion pulmonary edema
3) Paradoxical pulmonary edema