

Changsha Magill Medical Technology Co. Ltd.

Innovation for Better Health

SafeLM[®] Video Laryngeal Mask System

The First and Only 3rd Generation Laryngeal Mask

Tubeless Thoracic Anesthesia

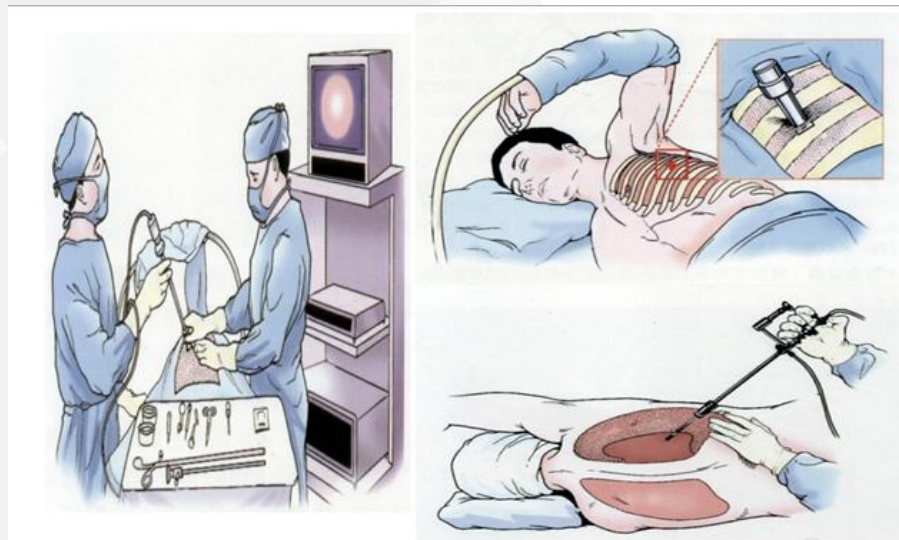


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Video-assisted thoracoscopic surgery (VATS)

VATS involves establishing 1 to 3 operation channels on the patient's chest wall to insert the endoscopic lens and surgical instruments into the chest cavity. The surgeon diagnoses and treats diseases within the thoracic cavity by watching the real-time magnified images on the monitor.



Lateral decubitus position, ventilated lung dependent

Compared with traditional thoracotomy, it has many clinical advantages such as **less trauma, less pain, faster postoperative recovery and fewer complications.**

Mechanical Ventilation (MV) vs Spontaneous Ventilation (SV)

Aspect	Spontaneous Ventilation	Mechanical Ventilation
Who initiates breaths	Patient	Ventilator
Control of RR & VT	Variable, patient-dependent	Fully controlled or assisted
Common anesthesia context	Light GA, deep sedation, regional anesthesia	General anesthesia with muscle relaxation
Airway reflexes	Partially preserved	Absent
Aspiration risk	Higher	Lower (with cuffed ETT)
Airway device	Mask/LMA common	ETT required

- Prefer **Spontaneous Ventilation** When:
- Short procedures
 - LMA or facemask anesthesia
 - Difficult airway (maintaining SV during induction)
 - Poor cardiac reserve
 - Regional anesthesia with sedation

- Prefer **Mechanical Ventilation** When:
- Major surgery
 - Use of muscle relaxants
 - Prone, laparoscopic, or thoracic surgery
 - Need for controlled CO₂ (neurosurgery)
 - Long procedures



Common Terms and Acronyms

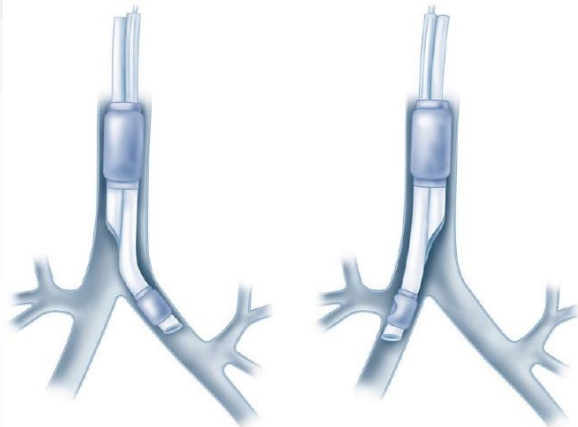


FIGURE 25-6 Correct position of a left- and right-sided double-lumen tube.

One-lung ventilation (OLV) is an anesthetic technique in which one lung is intentionally ventilated while the other is allowed to collapse to provide surgical exposure, most commonly during thoracic procedures.

Double-lumen tube (DLT): A double-lumen tube has two separate channels that allow independent ventilation or isolation of each lung, making it the most common and definitive method for lung isolation during thoracic surgery.



Single-lumen tube (SLT):

A single-lumen tube ventilates both lungs together and requires an additional device (such as an endobronchial blocker) to achieve lung isolation.



Common Terms and Acronyms



Coaxial Placement of
Arndt Endo-Bronchial
Blocker

EZ Blocker



- BBs are placed through an SLT
- Eliminates the need to change a DLT to an SLT (ICU transfer)
- Can be used for patients with difficult airways

Endobronchial blockers (BB): Endobronchial blockers are inflatable devices placed through or alongside a single-lumen tube to occlude a mainstem or lobar bronchus, enabling selective lung isolation without using a double-lumen tube.



Advantages and Disadvantages of DLT

Advantages	Disadvantages
Independent ventilation of each lung in unison or separately	Bulky size and stiff
Treatment and prevention of desaturation	Difficult to intubate with a DLT depending on mouth opening/tongue size/patient anatomy
Suctioning and flexible bronchoscopy facilitated by large luminal access	In cases of a compressed tracheobronchial tree the placement of a DLT may be impossible due to size/rigidity
Solid structure and improved cuff seals prevent easy dislodgement	Difficulty managing DLTs in ICU, usually exchanged to SLTs. Process of exchange can be dangerous due to airway edema/secretions
	Difficult for bronchoscope due to extended length of each tube and narrowed crescent shape of the tracheal lumen

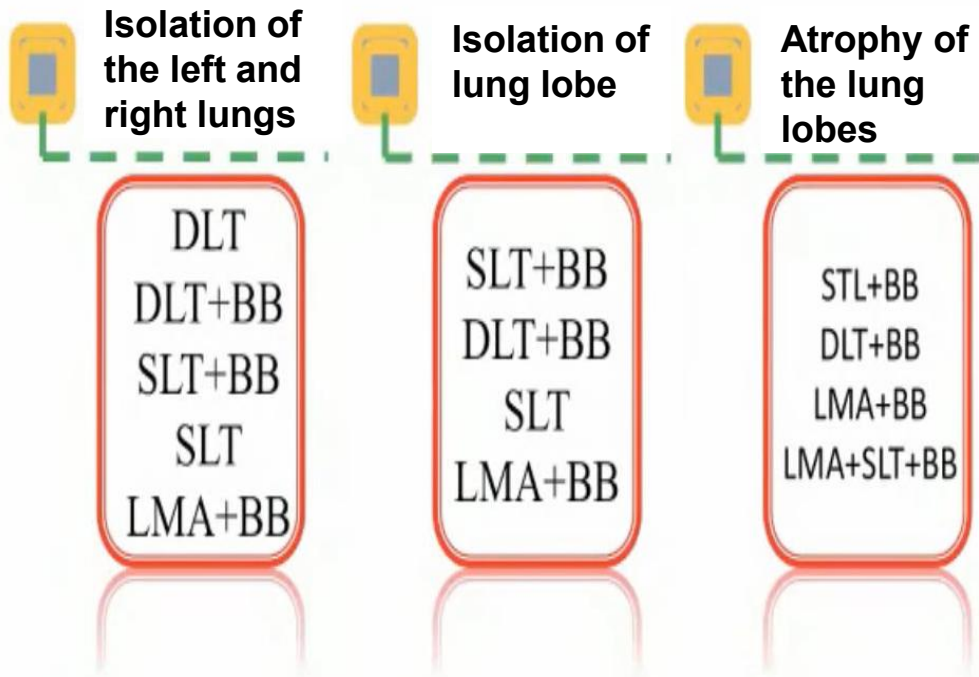


Key Points

- Larger in diameter and stiffer/longer than SLTs
- More difficult to place
- Using video laryngoscope
- Malposition is a risk



Thoracoscopic lung isolation



DLT: Double-Lumen Tube SLT: Single-Lumen Tube BB: Bronchial Blocker LMA: Laryngeal Mask



Current clinical problem in airway management during thoracic surgery

- **The double-lumen tube** is currently the first-line gold standard airway management tool for general anesthesia thoracic surgery.
- **Ventilation injury**: Barotrauma caused by mechanical ventilation leads to lung injury, intubation injury and other airway injuries.
- **Airway stress reaction**: The double-lumen tube has a relatively thick diameter, which can easily stimulate the sympathetic nerves related to the airway. It promoting the secretion of catecholamines and leading to hemodynamic instability.
- **Adverse reactions of muscle relaxants**: postoperative respiratory muscle weakness, hypoxia, respiratory tract obstruction



Tubeless anesthesia



Usual thoracic anesthesia	Tubeless anesthesia
DLT	LMA
NMBAs	—
—	TPVB (thoracic paravertabral block) Vagus nerve block
Opioid drug	—

Tubeless anesthesia: Replacing DLT with **LMA**, substituting general anesthesia with **ultrasound-guided regional block** to preserve spontaneous breathing for avoid mechanical ventilation. It can **reduce perioperative stress responses and postoperative discomfort** in patients, **accelerate recovery and improve prognosis**.

Review > [Transl Lung Cancer Res. 2021 Aug;10\(8\):3503-3519. doi: 10.21037/tlcr-21-663.](#)

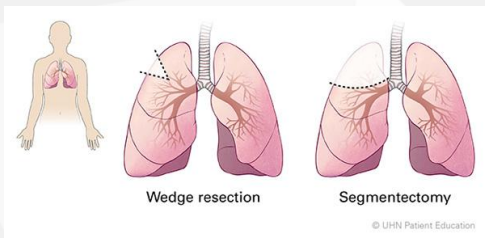
Tubeless video-assisted thoracic surgery for pulmonary ground-glass nodules: expert consensus and protocol (Guangzhou)

He J, Liang H, Wang W et al. Tubeless video-assisted thoracic surgery for pulmonary ground-glass nodules: expert consensus and protocol (Guangzhou). *Transl Lung Cancer Res.* 2021 Aug;10(8):3503-3519. doi:10.21037/tlcr-21-663. PMID: 34584853; PMCID: PMC8435391.



Can be used for:

- Wedge lung resection
- Mediastinal mass resection
- Anatomical lung segmentectomy
- Lobectomy
- Mediastinal mass resection
- Tracheal resection
- Sleeve lobectomy



Benefits

1. Significantly mitigates the effects of mechanical ventilation
2. Avoid potential injury associated with intubation
3. Avoid side effects of muscle relaxants
4. Faster recovery of respiratory muscle function, lower incidence of postoperative morbidity
5. Lower rise in D-dimer vs traditional, ?reducing effect of thromboembolism
6. Reduce anesthetic time
7. Accelerate post-op recovery by encouraging early ambulation



Advantages and disadvantages of tubeless thoracic anesthesia

	DLT	Tubeless
Advantages	Stable airway A stable operative field	Avoid damaging the ventilator Avoid adverse reactions of NMBAs Avoid intubation and mechanical ventilation injuries
Disadvantages	Intubation-related complications Ventilation-related complications Residue of NMBAs	Intermediate intubation Aspiration pneumonia Anesthesia techniques have high requirements



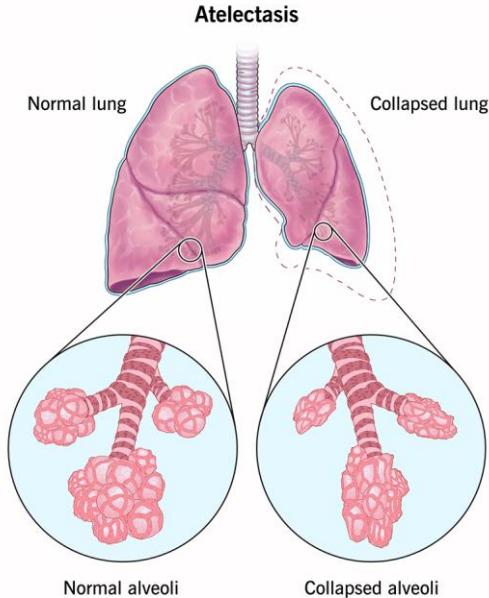
The airway management challenges faced by anesthesiologists during tubeless thoracic anesthesia

- Blind insertion may cause **injury and increase the occurrence of postoperative pain and bleeding** in the larynx
- **Air leakage, as well as regurgitation and aspiration** when changing to a lateral position
- It is not easy to **switch BBs or SLT** when converting to thoracotomy or discontinuing tubeless anesthesia
- **laryngospasm**

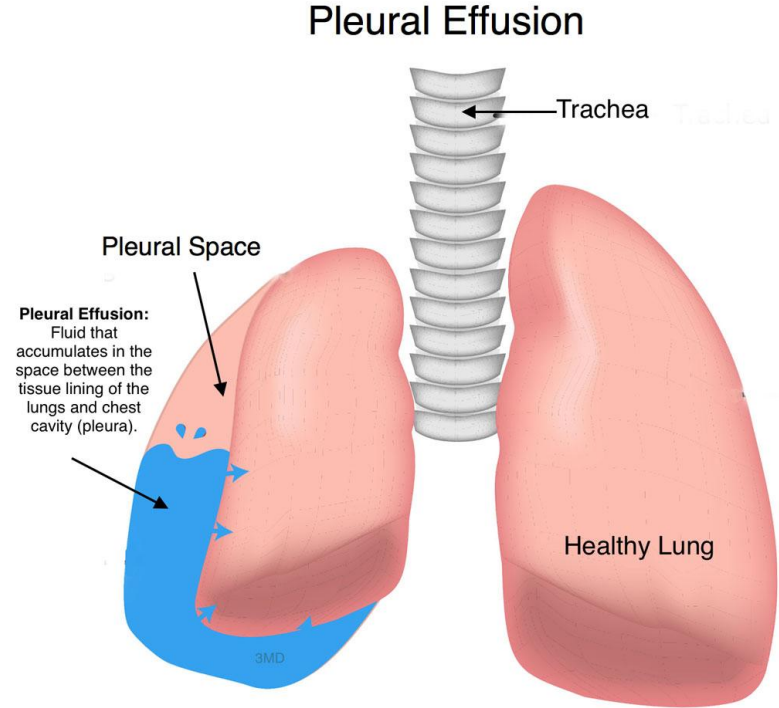


Potential airway safety risk

Postoperative complications specific to tubeless VATS



- Blood/mucus plugging of the airway
- Poor lung reinflation caused by air leaks or inadequate postop suctioning
- Intensive physiotherapy





SafeLM for continuous observation of the glottis is suitable for lateral position surgery



intelligent airway monitoring function

- **real-time monitoring around the glottis** can effectively prevent air leakage and aspiration, especially for lateral position.
- **Intelligent airway monitoring function:** it can automatically identify and alarm, effectively preventing the occurrence of aspiration pneumonia and **laryngospasm** caused by the reflux of gastric contents into the airway



SafeLM promptly addresses the occurrence of hypoxemia caused by laryngospasm

- In addition, if there is a decrease in oxygen saturation during the operation, SafeLM can be determined at the **first time whether hypoxemia is caused by laryngospasm**
- the anesthesiologist will increase the depth of anesthesia or muscle relaxants can be used in a timely manner for treatment.

智能监控气道手术腹腔镜



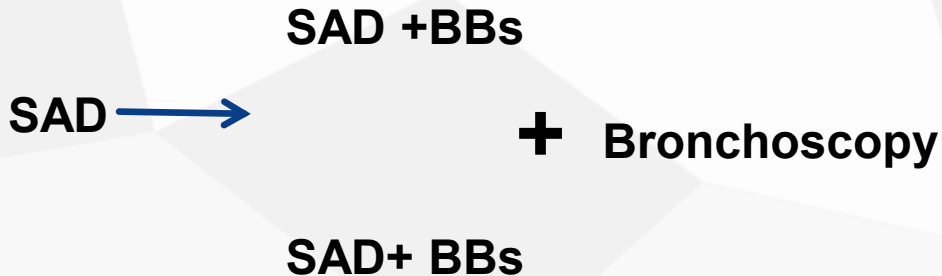


SafeLM guides BBs or SLT into the glottis

When patients have extensive pleural adhesions and need to be **converted to thoracotomy**, SafeLM can guide the BBs to enter the glottis under video guidance. In addition, SafeLM also converts **SAD to SLT + BBs** without bronchoscopy .



Convert





SafeLM is used in tubeless thoracic surgery cases



SafeLM+BBs for tubeless thoracic anesthesia by Hong kong professor





SafeLM has been published two articles about tubeless thoracic anesthesia

上海医学 2022 年第 45 卷第 3 期

· 175 ·

· 论著 · 麻醉学 ·

可视喉罩联合支气管封堵器降低胸腔镜肺切除术后咽喉疼痛发生率

王嘉锋 赵珍珍 包睿 朱文忠 卞金俊

0.05)。结论 SafeLM 可视喉罩联合支气管封堵器可有效应用于胸腔镜辅助下肺切除术的全身麻醉,可减少双腔气管导管插管引起的术后咽喉疼痛和气管插管引起的血流动力学紊乱。

临床麻醉学杂志 2025 年 11 月第 41 卷第 11 期 J Clin Anesthesiol, November 2025, Vol.41, No.11

· 1137 ·

· 临床研究 ·

喉罩联合支气管封堵器对胸腔镜肺切除术患者术中肺功能的影响

李义 李冲 孟磊 张焕焕 张倩



迈吉尔SafeLM® 视角可调可视喉罩系统

真可视,见未来!

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