OU-TU SCHOOL of COMMUNITY MEDICINE

Management of Massive Hemoptysis: #Winning

Bo Burns DO FACEP
Chair & Program Director

Objectives

- Review optimal intubation strategies including when to consider a surgical airway.
- Discuss methods of selective lung intubation and single lung ventilation, as well as optimal positioning of your patient.
- Discuss the role of management options including medications, endovascular techniques, and surgical intervention.

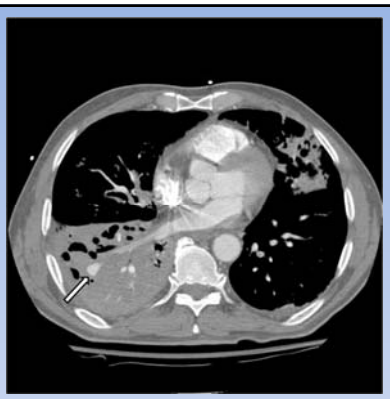
EMS has just unloaded a 52 year old guy in obvious distress, coughing up a significant amount of blood. EMS reports "he says he takes a blood thinner and may have cancer. He coughed up a ton of blood of blood in route, you should see the truck! He still sating OK, and his pressure is holding, but I'm just glad we got here. He's all yours doc…"

Definitions

- Suggested volumes range from 100 mL to more than 1000 mL.
- Origin is bronchial circulation in 95%, and pulmonary circulation in 5%.
- Alveolar hemorrhage rarely causes massive hemoptysis

Causes

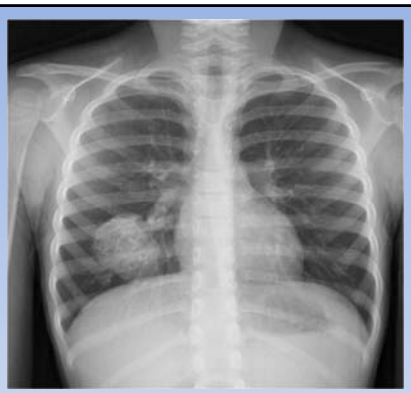
- Bronchiectasis
- TB
- Lung Malignancies
- Iatrogenic
- Trauma



When to Intubate?

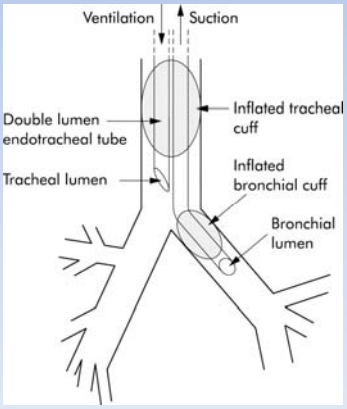
Localize

- History
- Pulmonary, GI, ENT??
- Chest X-ray



The Setup

- PPE!!
- Go big
- Suction x 2
- Bougie
- Single lumen tube
- Sitting up!
- Bleeding side down



Contents lists available at ScienceDirect

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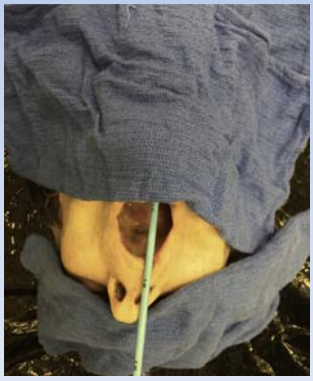
journal homepage: www.elsevier.com/locate/ajem

Brief Report

Utilization of a gum elastic bougie to facilitate single lung intubation☆,☆☆

Michael Gottlieb, MD [a,*], Vibhu Sharma, MD [b], John Field, MD [c], Michael Rozum [d], John Bailitz, MD [c]

Two investigators each inserted a bougie under video laryngoscope guidance. After passing the vocal cords, the intubator would be randomized to turn the bougie 90° clockwise (for right mainstem intubation) or 90° counterclockwise (for left mainstem intubation).



A Comparison of the Efficacy and Adverse Effects of Double-Lumen Endobronchial Tubes and Bronchial Blockers in Thoracic Surgery: A Systematic Review and Meta-analysis of Randomized Controlled Trials

Ana Clayton-Smith, Kyle Bennett, Robin Peter Alston, FRCA, MbChB, MD, George Adams, Greg Brown, Timothy Hawthorne, May Hu, Angus Sinclair, and Jay Tan

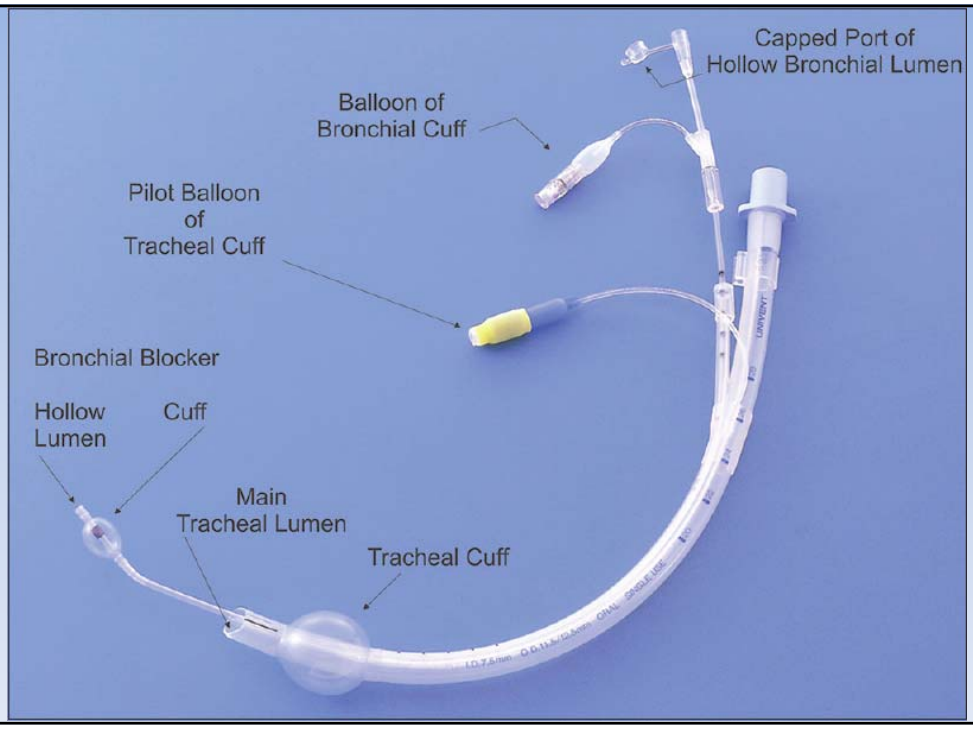
Although DLTs are easier and quicker to place for lung isolation than BBs, they are associated with more adverse effects. However, there is no significant difference in the quality of lung isolation that the 2 devices provide, and both techniques have advantages in specific clinical situations.

Trials with outcome data useful in meta-analysis (total = 13):

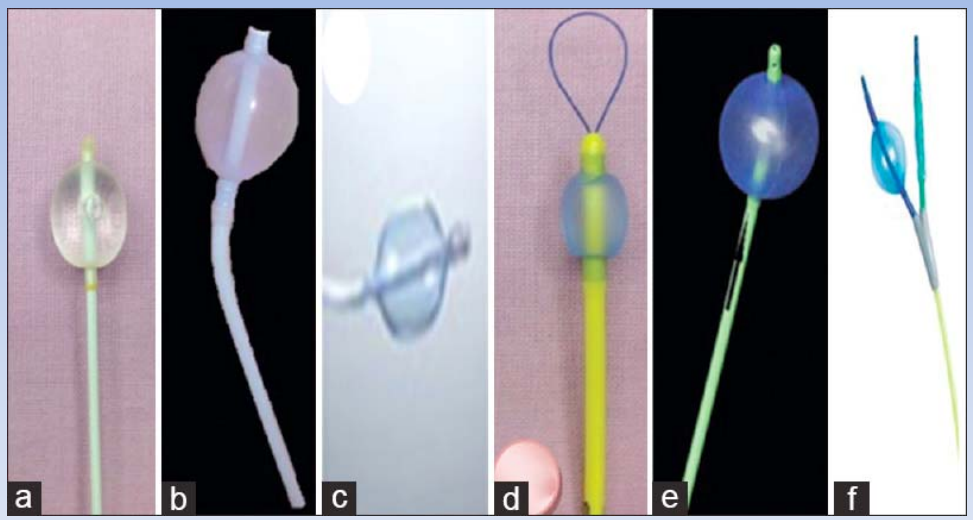
- 9 Time to position device
- 8 Frequency of malposition
- 8 Quality of lung collapse
- 5 Time taken for lung collapse
- 4 Incidence of sore throat at 24h
- 4 Incidence of hoarseness at 24h
- 3 Incidence of airway injury
- 5 Frequency of use of fiberoptic bronchoscope
- 3 Cost

Journal of Cardiothoracic and Vascular Anesthesia, Vol 29, No 4 (August), 2015: pp 955–966

https://youtu.be/w1cgx2AVC6k



Bronchial Blockers



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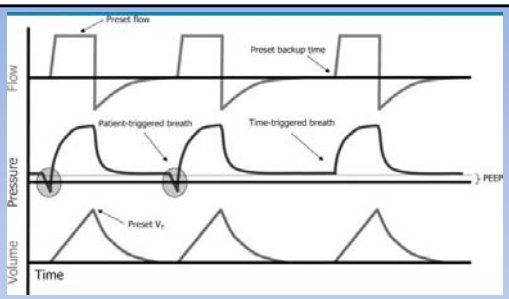
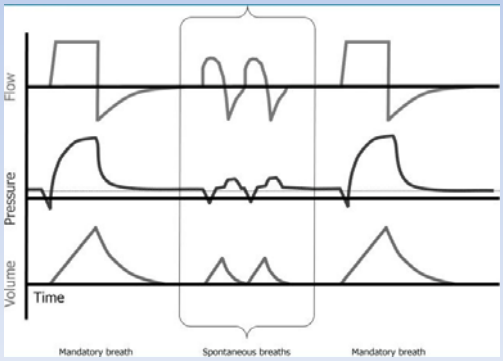
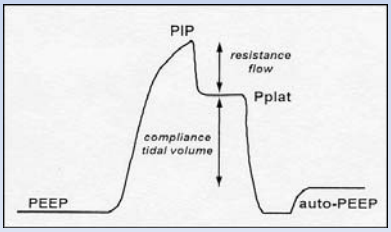


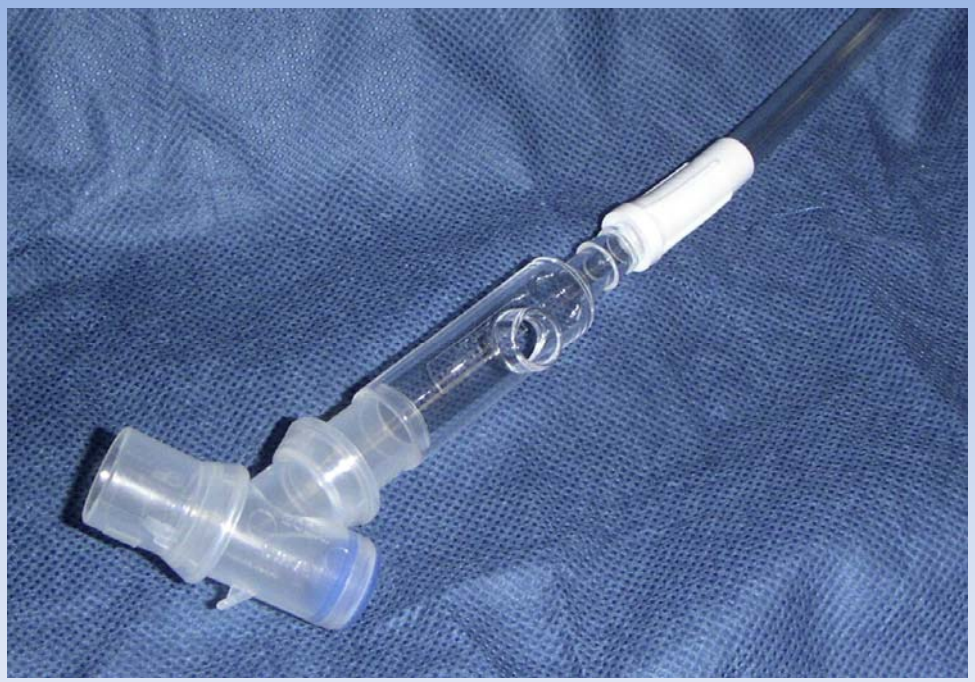


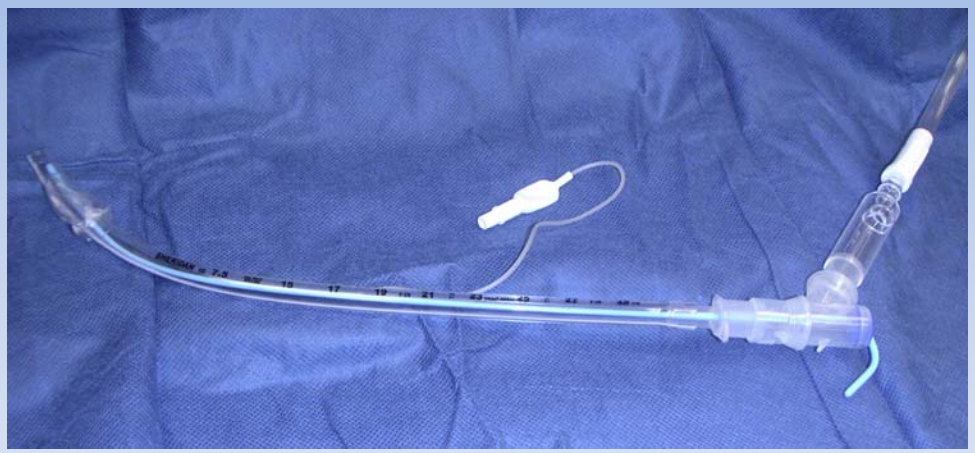
AC & SIMV

- Settings
  - TV 4-6ml/kg IBW
  - P_{plat} <30cm/H_20
  - High PEEP



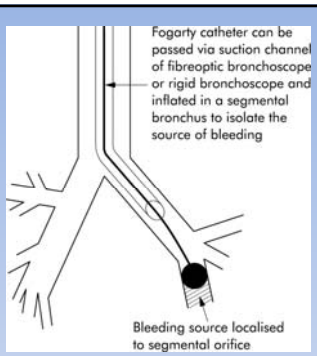
Options....





Management

- Bronchoscopy
  - Balloon tamponade
  - Iced saline lavage
  - Vasoconstrictors
  - Cryotherapy/Laser



Anaesthesia 2012, 67, 815–822

	6.0 mm*	7.0 mm	8.0 mm	9.0 mm
Cross-sectional area of tube without bronchoscope; mm^2	28.3	38.5	50.3	63.6
Remaining tube area with bronchoscope in situ; mm^2	6.8	17.0	28.7	42.1
Proportion of tube cross-section area obstructed	76.0%	55.8%	42.9%	33.8%

Arteriography

A significant amount of anatomic variability in the number and location of the bronchial arteries is common.

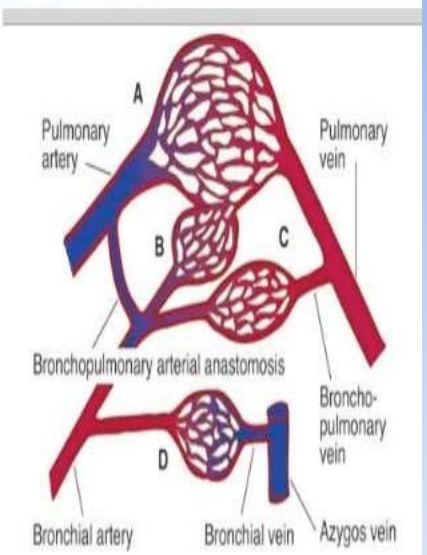
Bronchial arteries usually arise from the aorta, but sometimes they originate from the intercostal arteries.

Two Circulations in the Lung

- **Bronchial Circulation**
  - Arises from the aorta.
  - Part of systemic circulation.
  - Receives about 2% of left ventricular output.
- **Pulmonary Circulation**
  - Arises from Right Ventricle.
  - Receives 100% of blood flow.

CIRCULATION GANONG 23RD

PULMONARY CIRCULATION	BRONCHIAL CIRCULATION
• LOW-PRESSURE, HIGH-FLOW CIRCULATION	HIGH-PRESSURE, LOW-FLOW CIRCULATION
CONTAIN 100% CARDIAC OUTPUT	CONTAIN 1-3% CARDIAC OUTPUT
SUPPLIES RESPITARY BRONCHIOLS TO ALVEOLI	SUPPLIES BRONCHI TO TERMINAL BRONCHIOLS
ARIES FROM HEART	ARIES FROM AROTA
EXCEPTION ARTERY CARRY DEOXYGENETED BLOOD	SHUNT(COMMON)



Surgery?

- Patients with unilateral, uncontrollable bleeding.
- Expedite surgical intervention later if the bleeding remains brisk despite measures to control it.
- Mortality benefit?

Take Home Points

- Ensure gas exchange
- Reverse coagulation abnormalities
- Positioning
- Call for help
- Control the bleeding