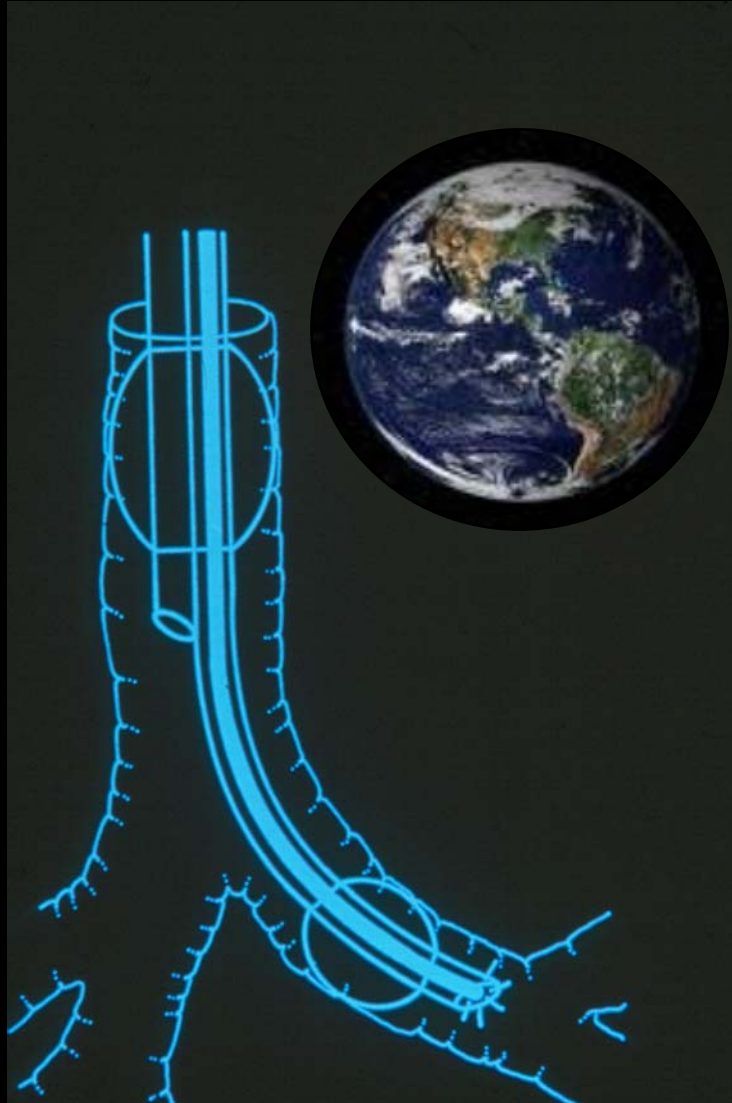


Why is Lung Isolation Difficult?

Peter Slinger
MD, FRCPC

University of
Toronto



1. Look
2. Know What You are Looking At

Disclosures:

I

C

F

O

Disclosures:

I'm

Cheering

For

Ottawa



Increasing Spectrum of One-lung Anesthesia:

- ◆ Lung Surgery
- ◆ Esophagus
- ◆ Thoracic Spine
- ◆ Autonomic Nerves
- ◆ Robotic Cardiac



Indications for Lung Isolation

Absolute:

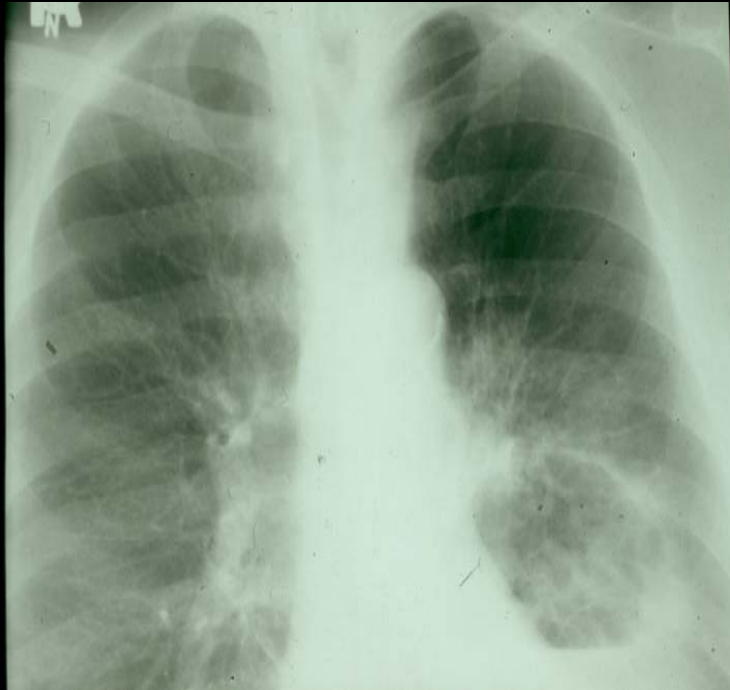
Blood

Pus

Air

Relative:

Surgical
exposure



Indications for Lung Isolation

~~Absolute:~~

Blood

Pus

Air

~~Relative:~~

Surgical
exposure



Surgical
Exposure

Lung
Protection

Blood

Pus

Fluid

Ventilation

BPF

ILV

Techniques of Lung Isolation:

- Single Lumen Tubes
- Double-lumen Tubes
- Bronchial Blockers

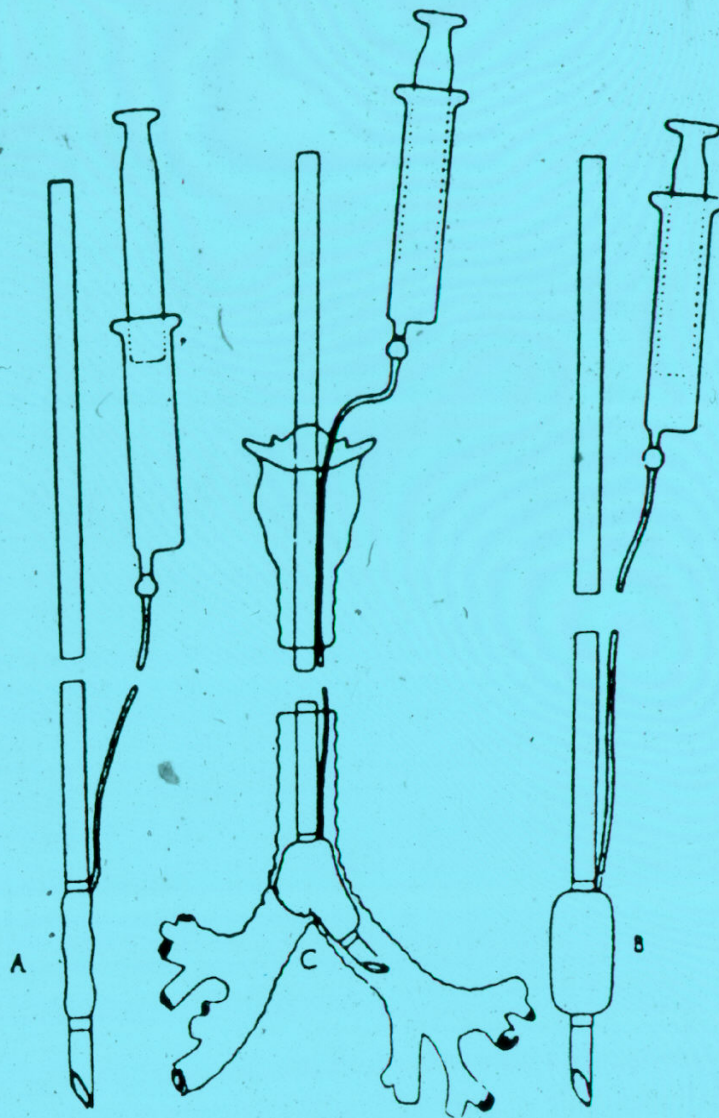
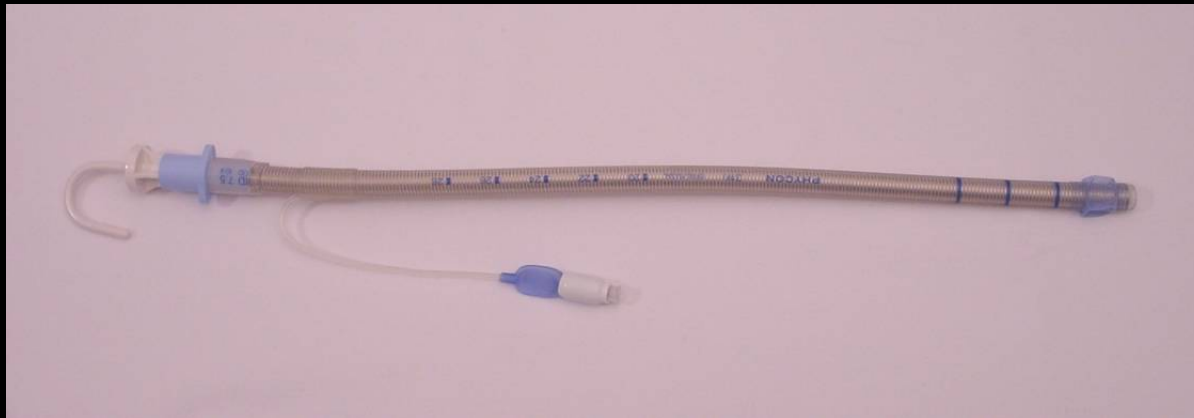
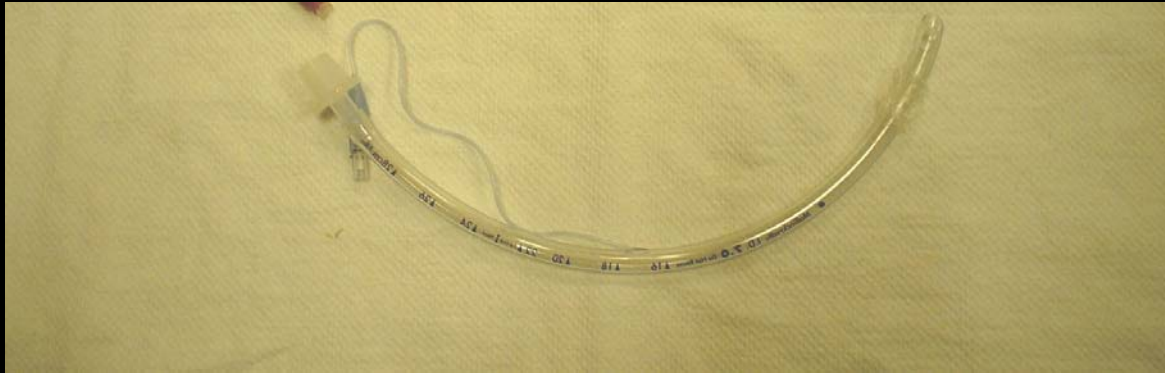


FIG. 156. GALE AND WATERS ENDOBRONCHIAL INTUBATION FOR ONE-LUNG ANAESTHESIA (1931)

Single Lumen Endobronchial Tubes



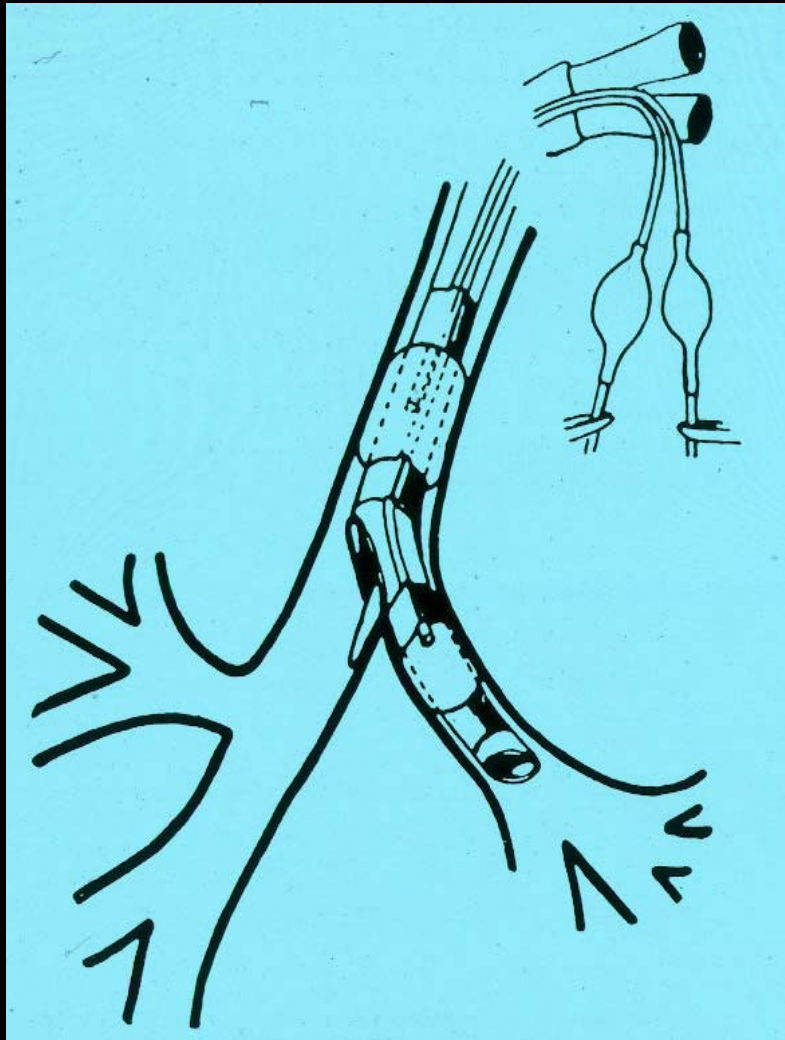
Techniques of Lung Isolation:

- ◆ Single Lumen Tubes

- ◆ Double-lumen Tubes

- ◆ Bronchial Blockers

Carlens Double-lumen Endobronchial Tube





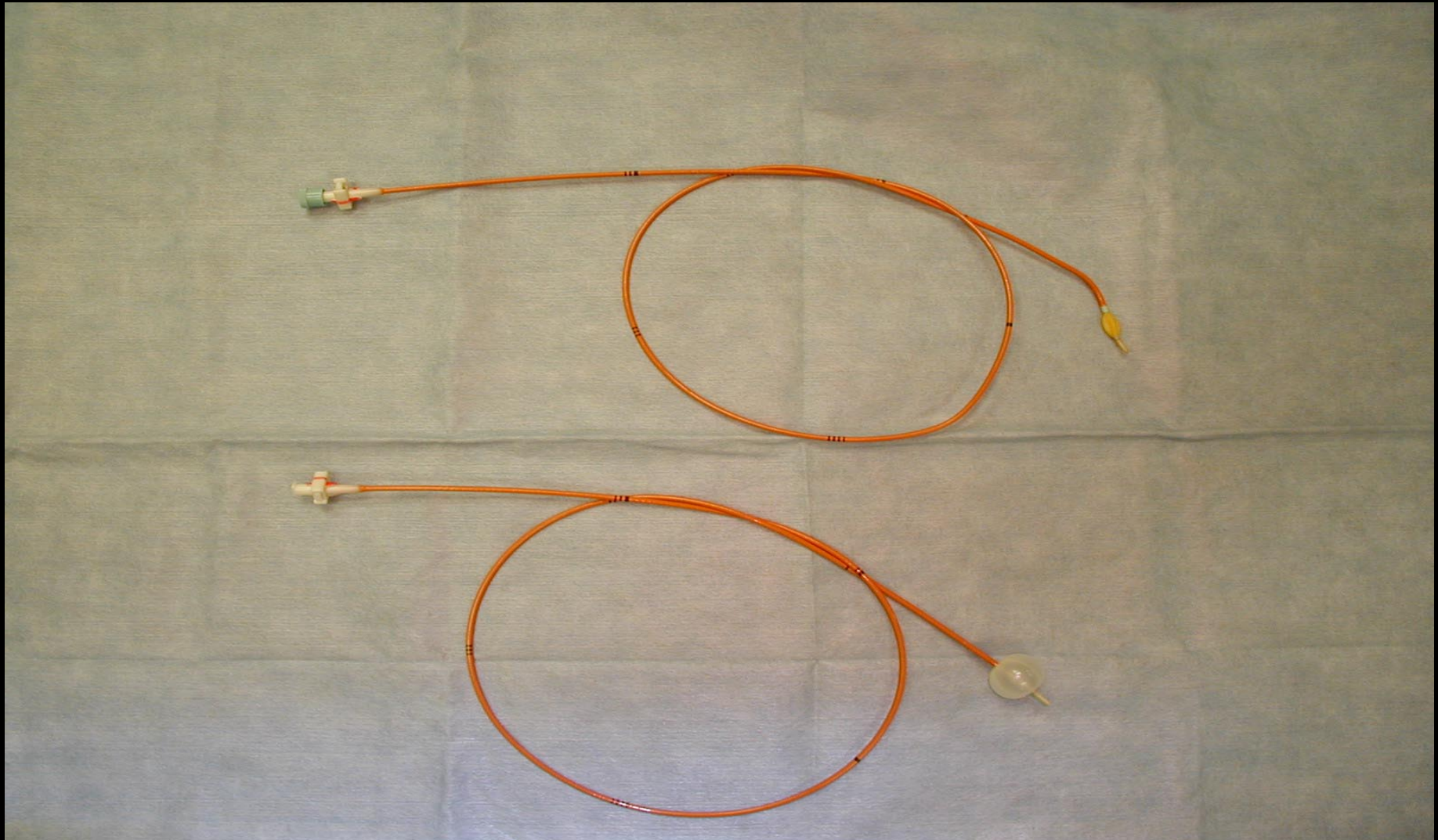
Techniques of Lung Isolation:

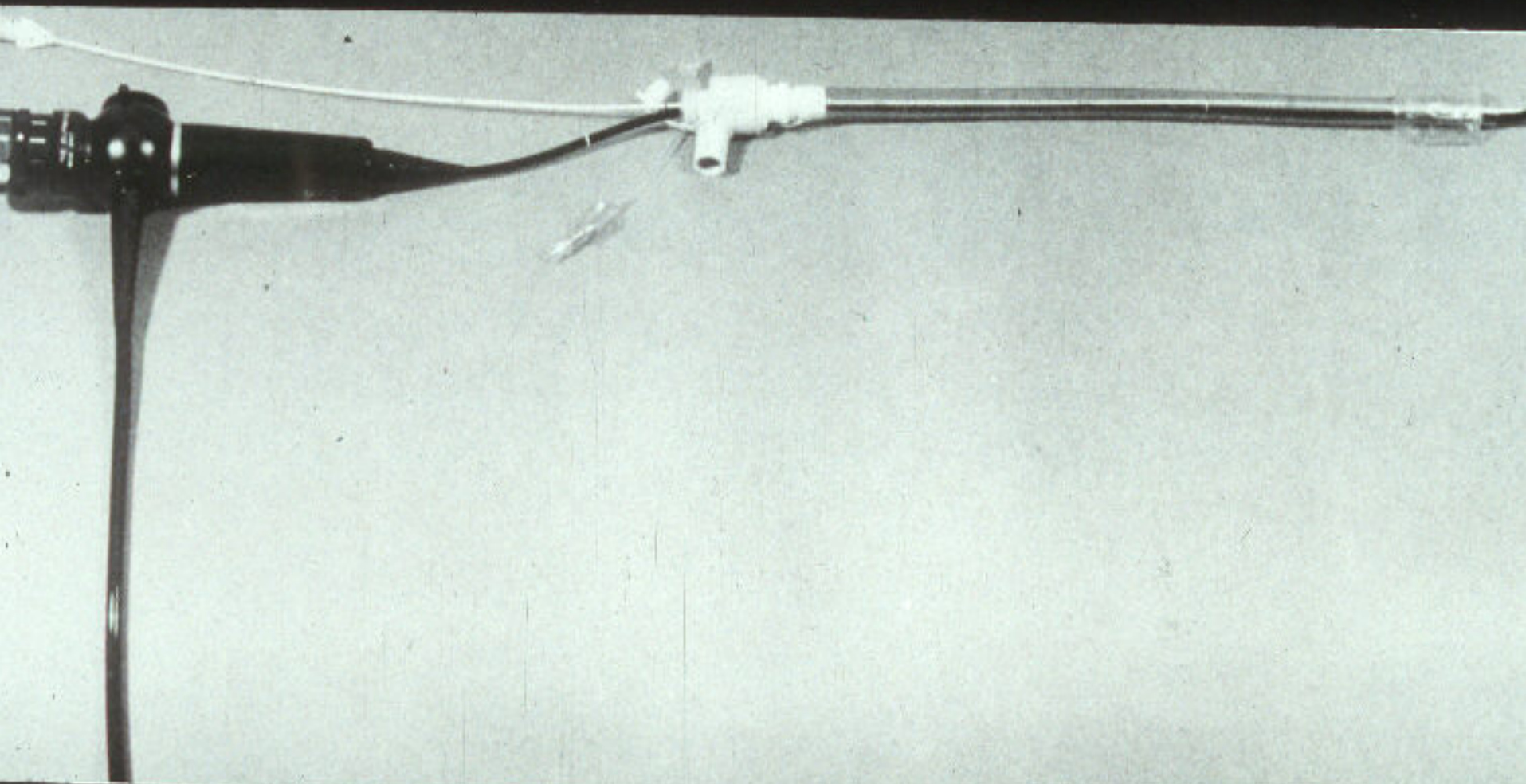
- ◆ Single Lumen Tubes

- ◆ Double-lumen Tubes

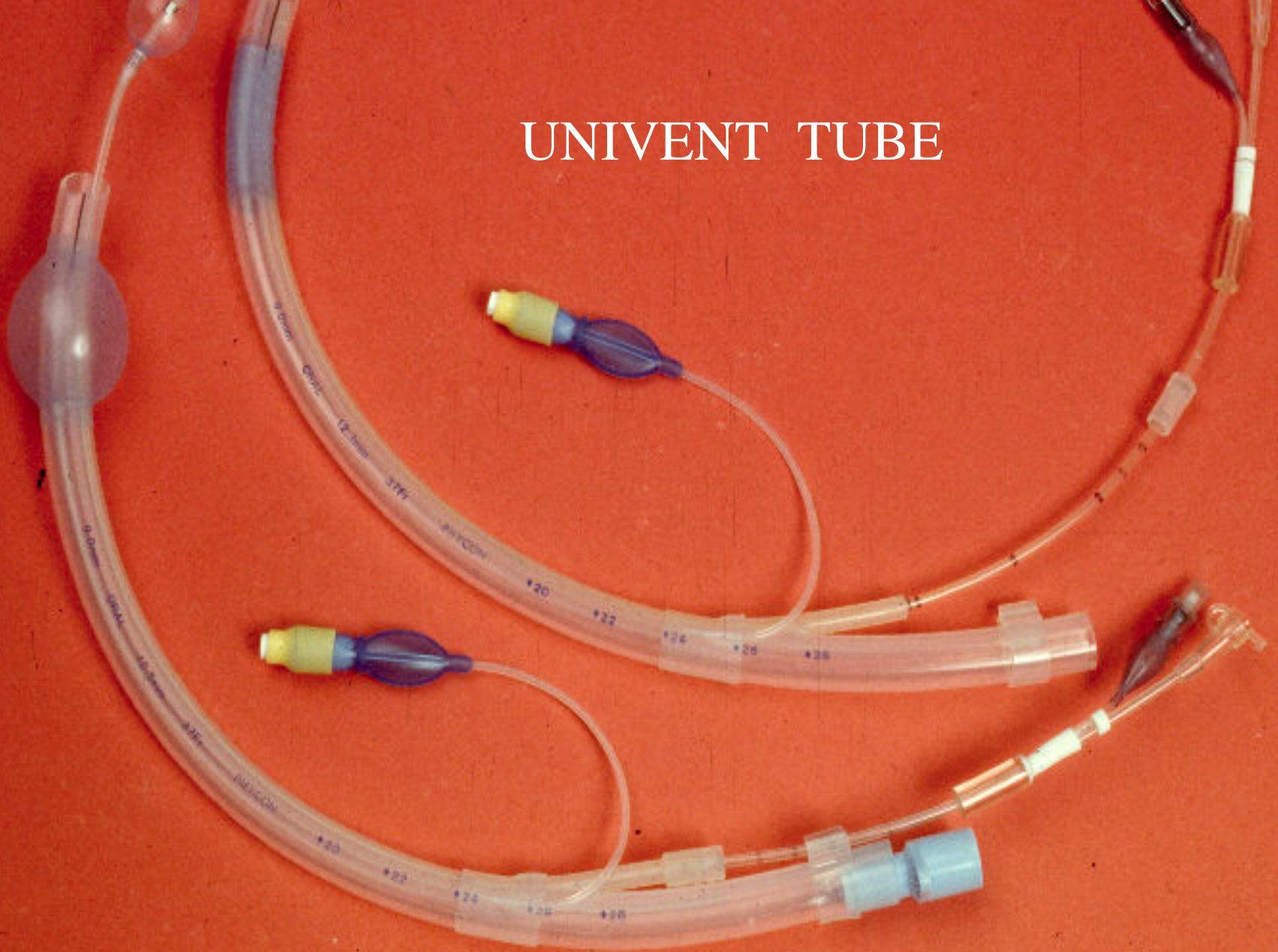
- ◆ Bronchial Blockers

8 Fr. Fogarty Venous Embolectomy Catheter, 10 cc balloon

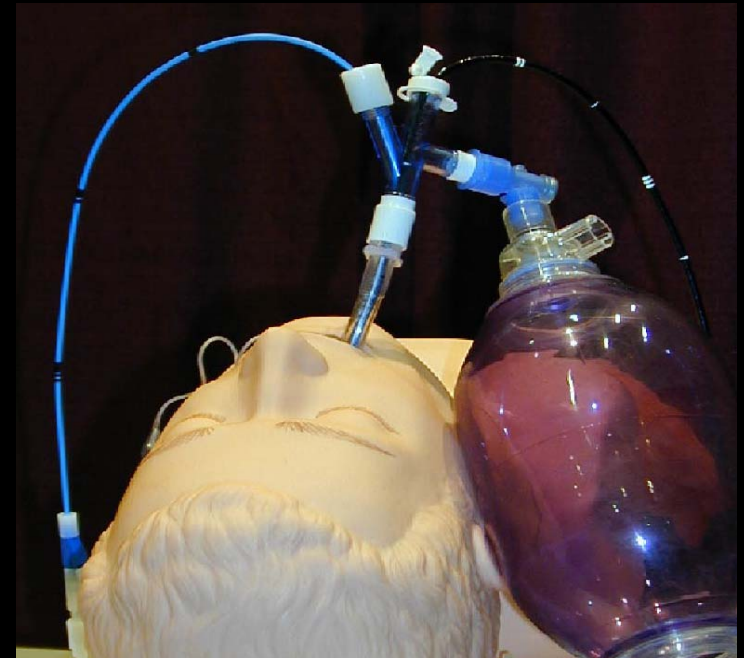
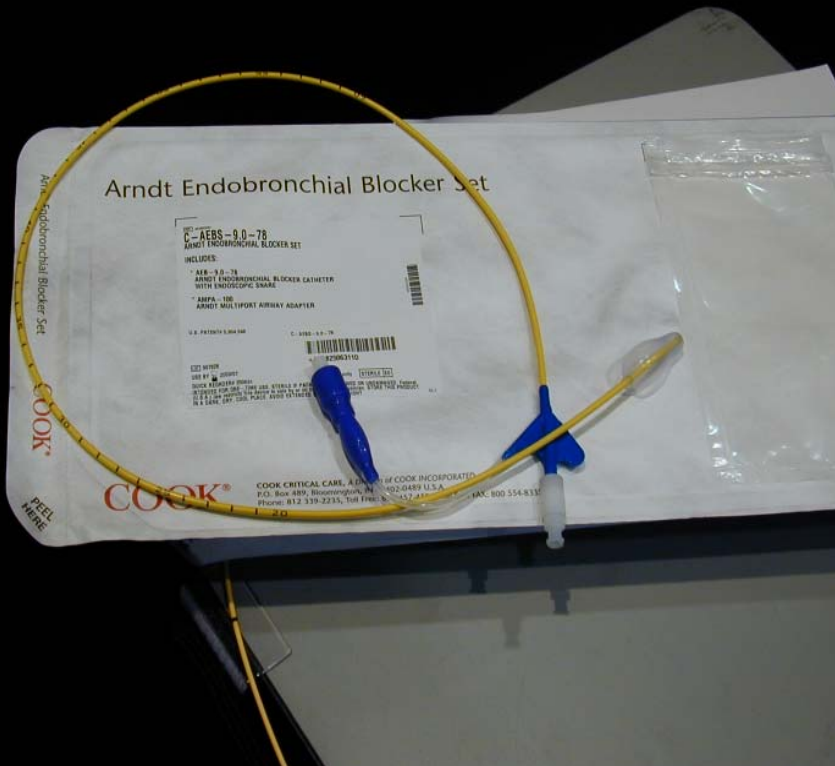




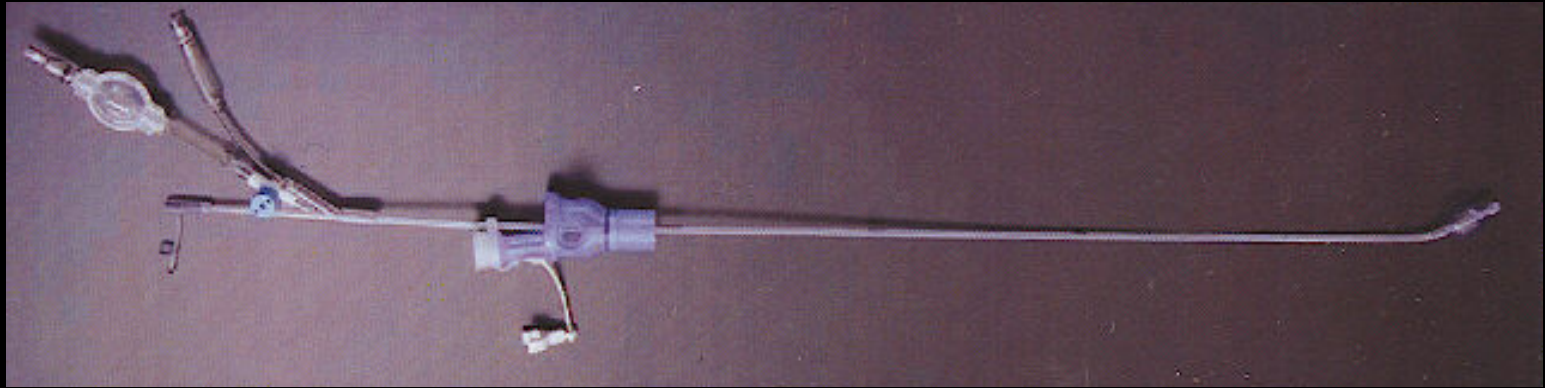
UNIVENT TUBE

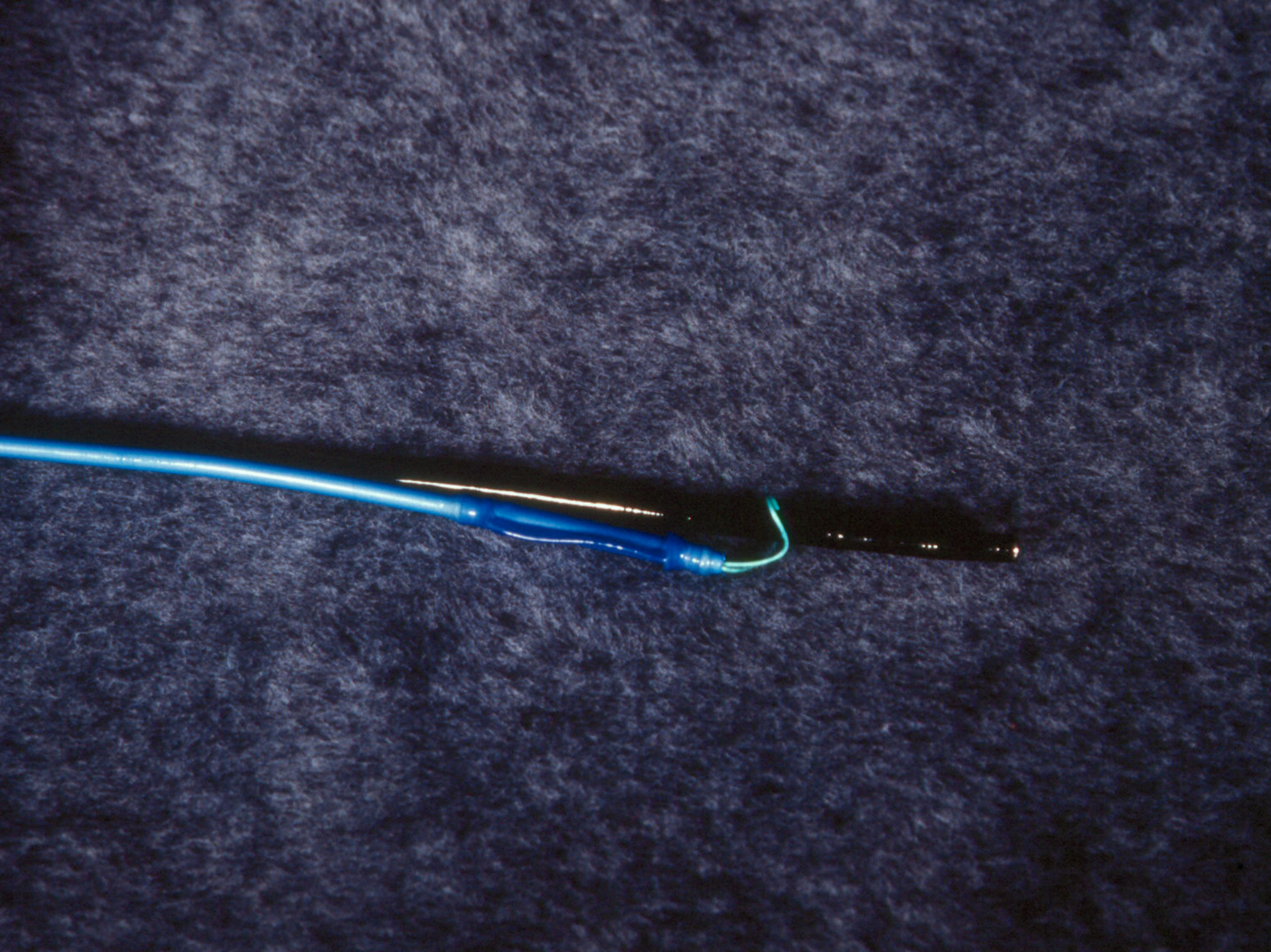


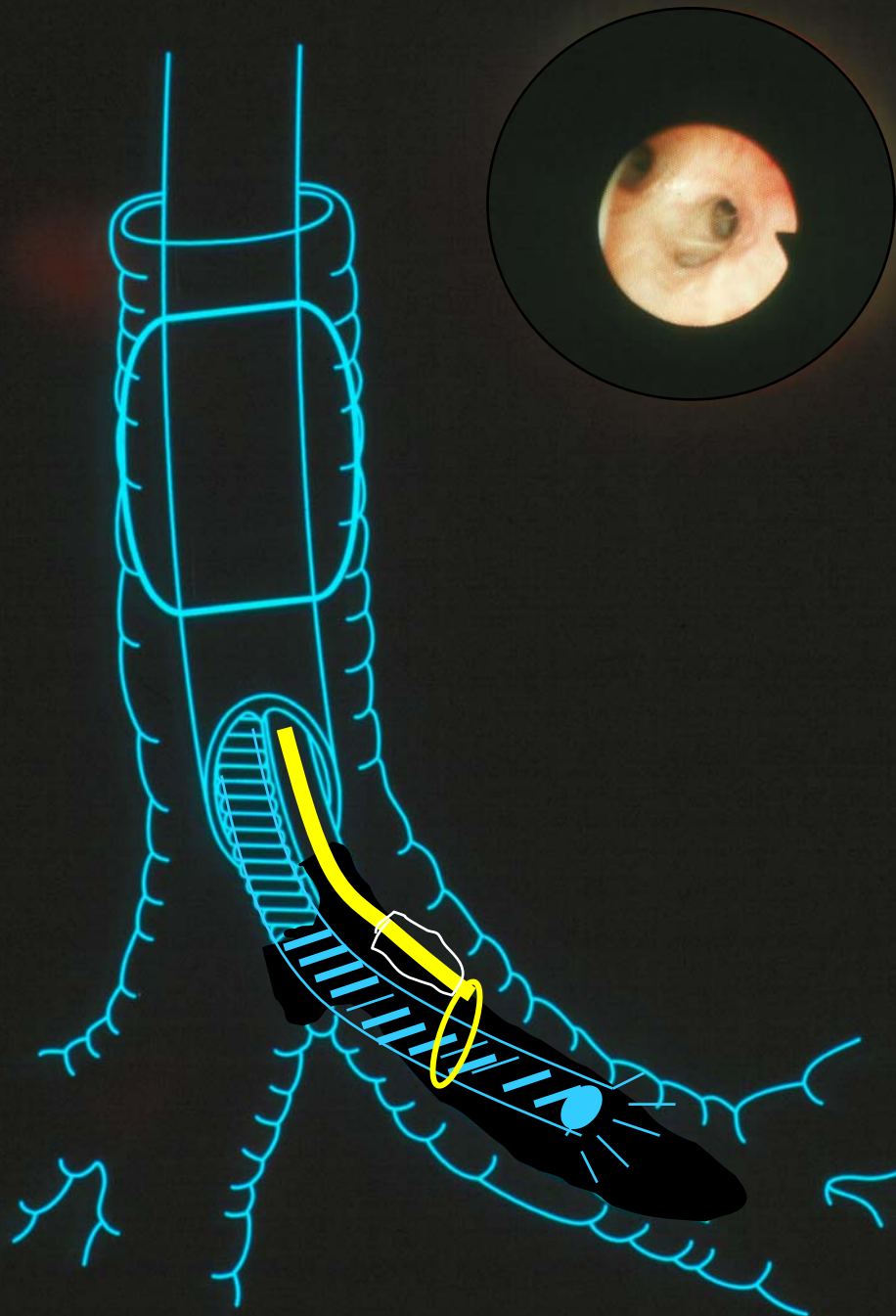
The “Arndt” Bronchial Blocker

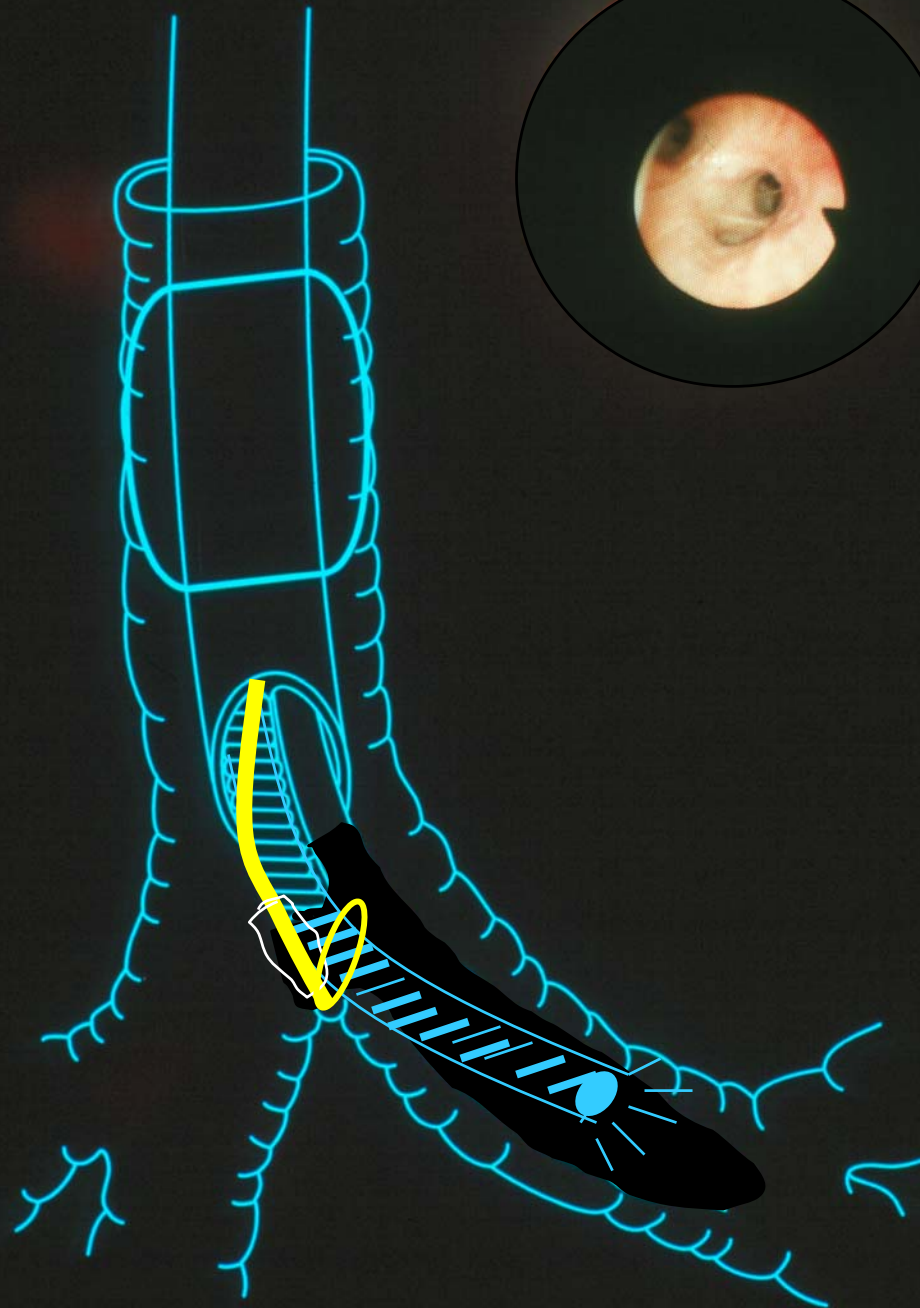


Fuji “Uni-Blocker”

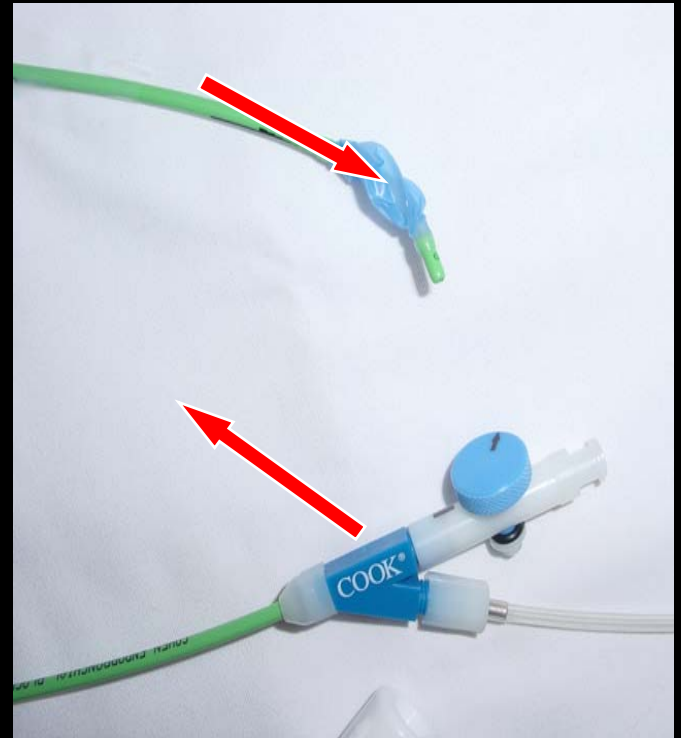








Bronchial Blockers – Cohen



New Bronchial Blockers

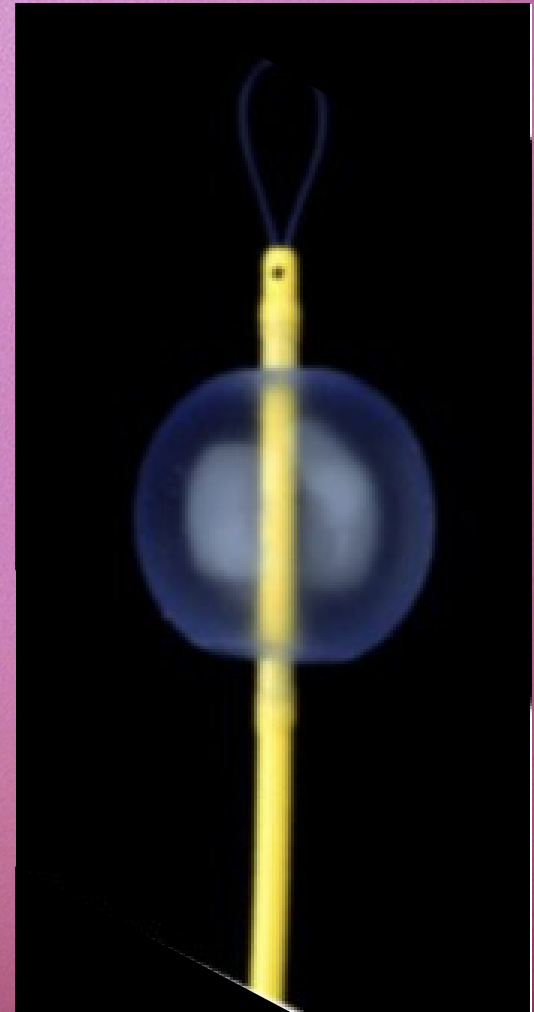
COHEN



FUJI



ARNDT



Bronchial Blocker compared to Double-lumen tube during VATS

Bauer C, et al. Acta Anaesth Scand 45: 250, 2001

<u>Method</u>	<u>Time for Placement</u>	<u>Placement Failure</u>	<u>Satisfactory Deflation</u>
DLT	2.3 min.	1/16	16/16
Left BB	4.2	3/10	10/10
Right BB	2.4	0/9	5/9

The ABC's of Lung Isolation:

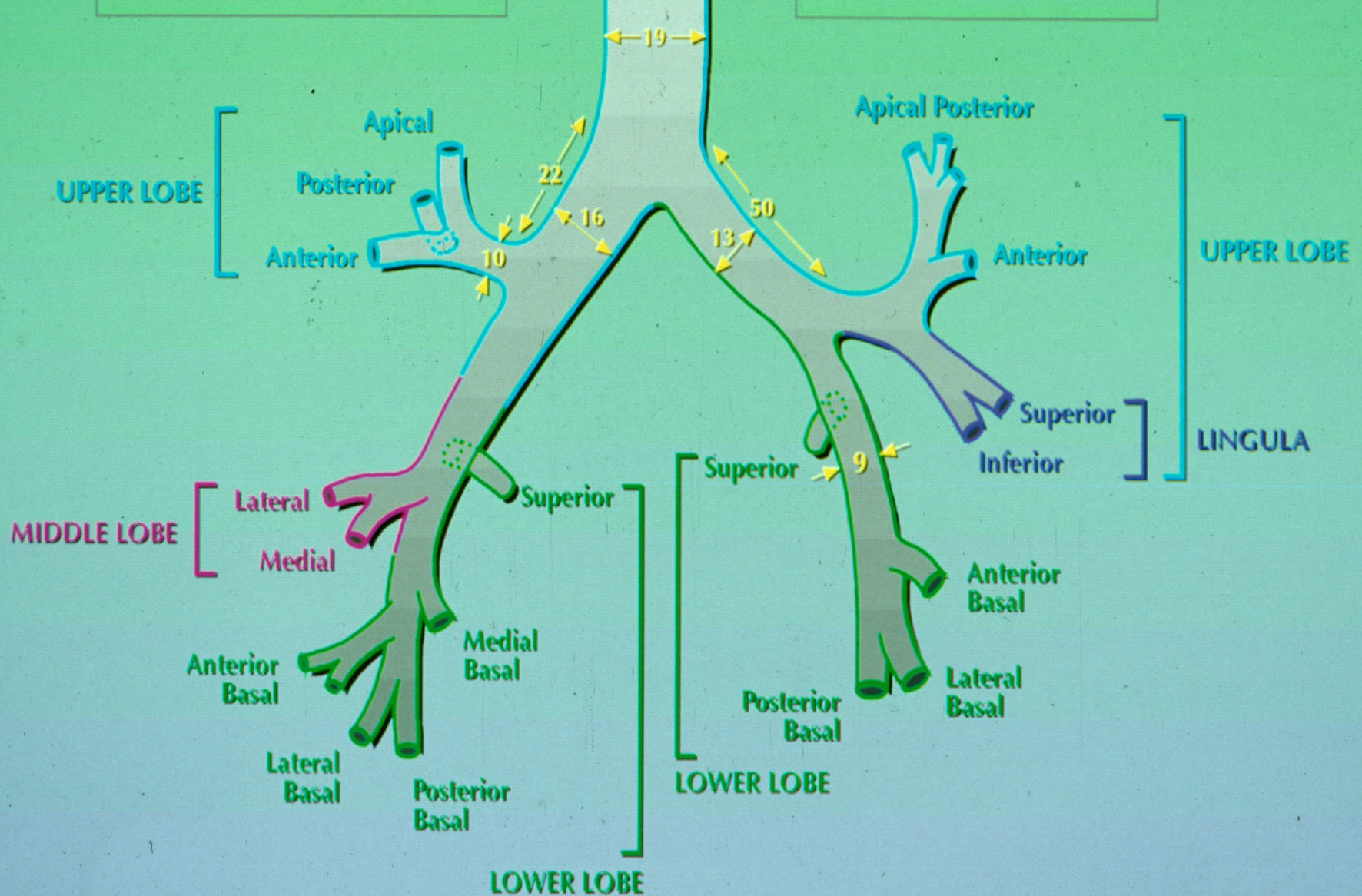
◆ Anatomy

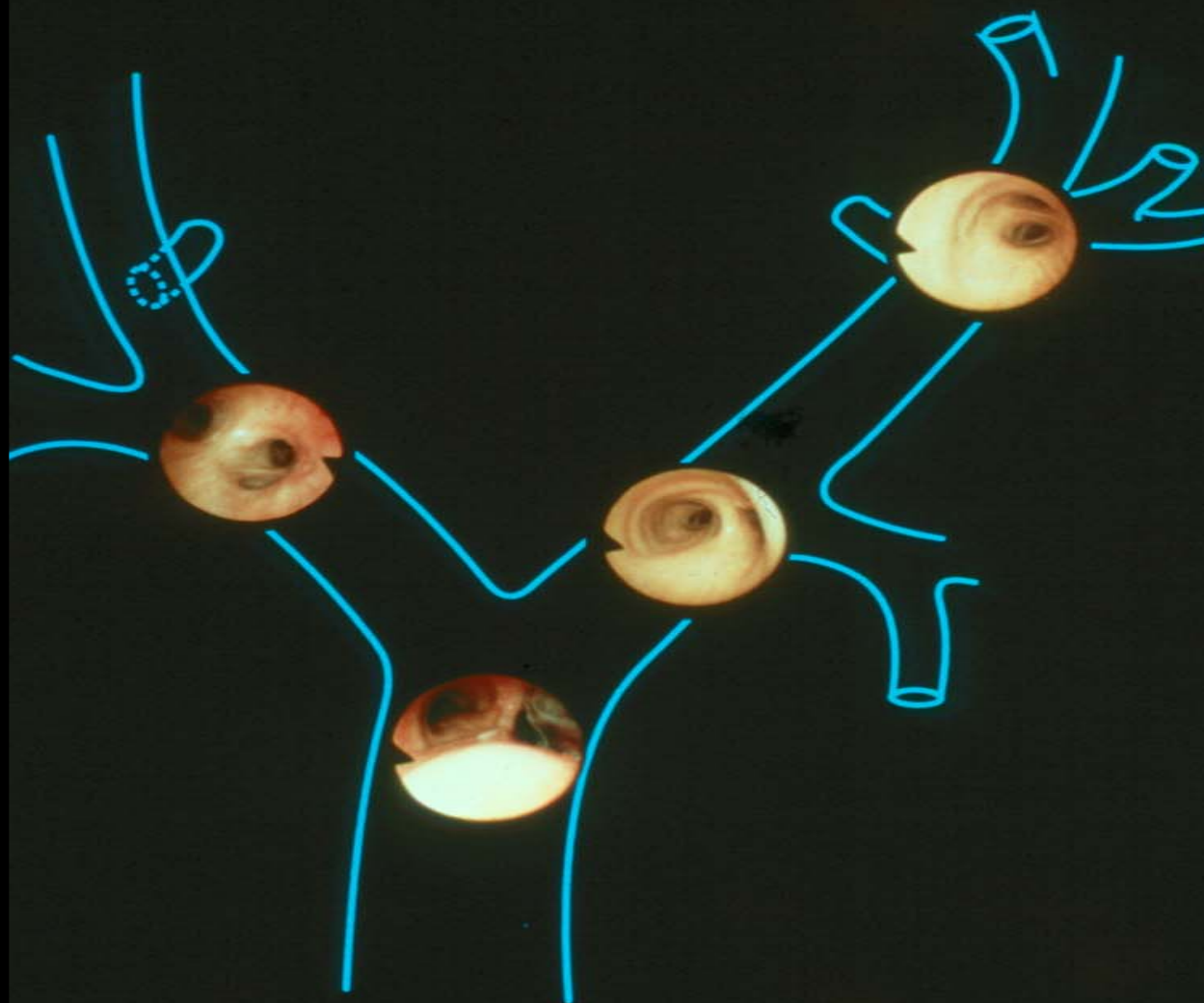
◆ Bronchoscope

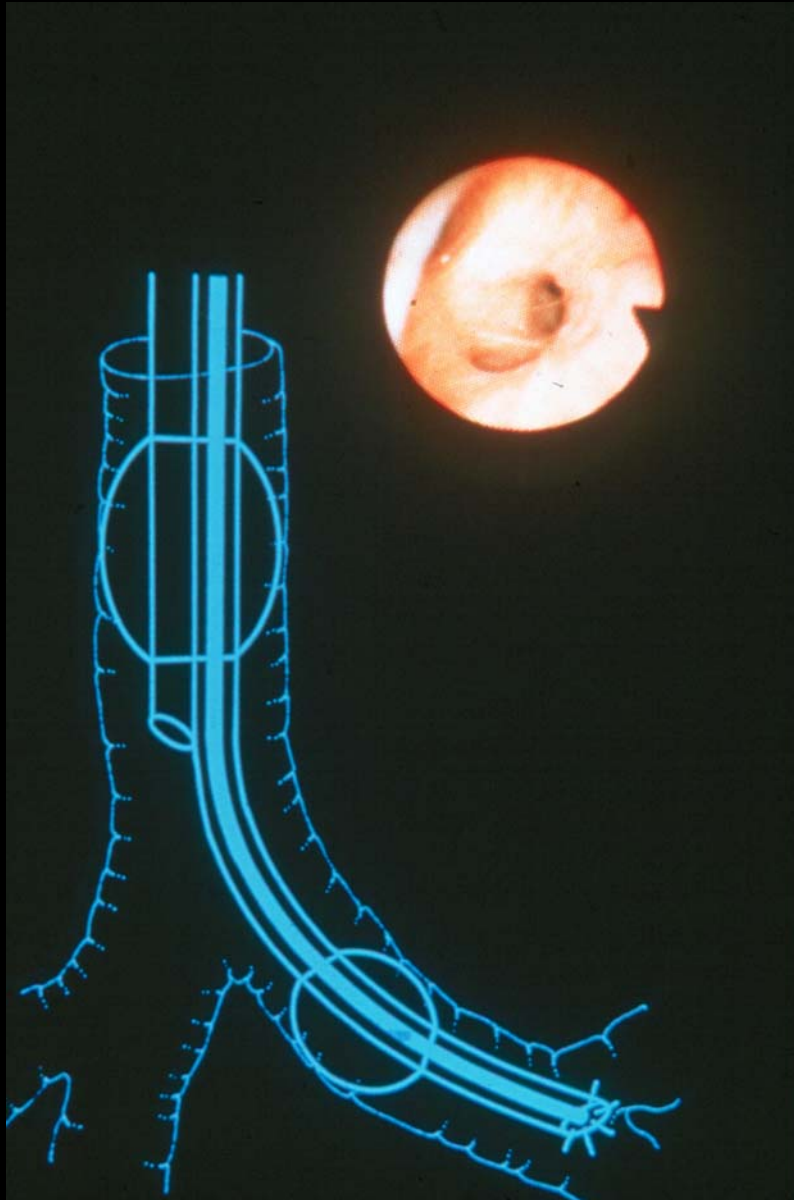
◆ Chest X-ray, CT Scan

RIGHT LUNG

LEFT LUNG







38% Incidence of major malpositions of Double-lumen Tubes and Blockers

“The most critical factor in successful placement was the anesthesiologist’s knowledge of endoscopic bronchial anatomy”

Campos JH, et al.
Anesthesiology 2006;
104: 261-6

The ABC's of Lung Isolation:

◆ Anatomy

◆ Bronchoscope

◆ Chest X-ray, CT Scan

Left double-lumen tubes

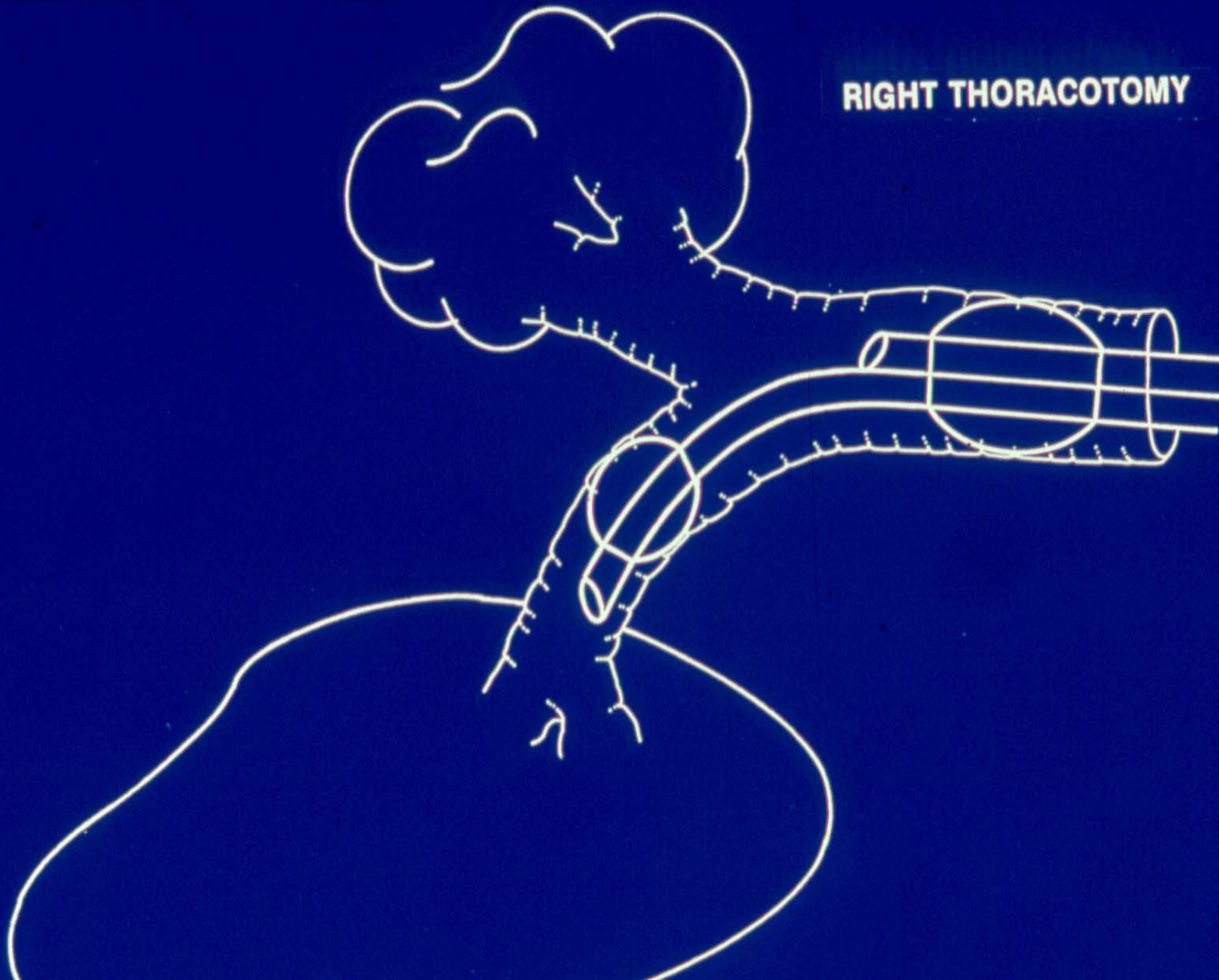
Clinical experience with 1,170 patients.

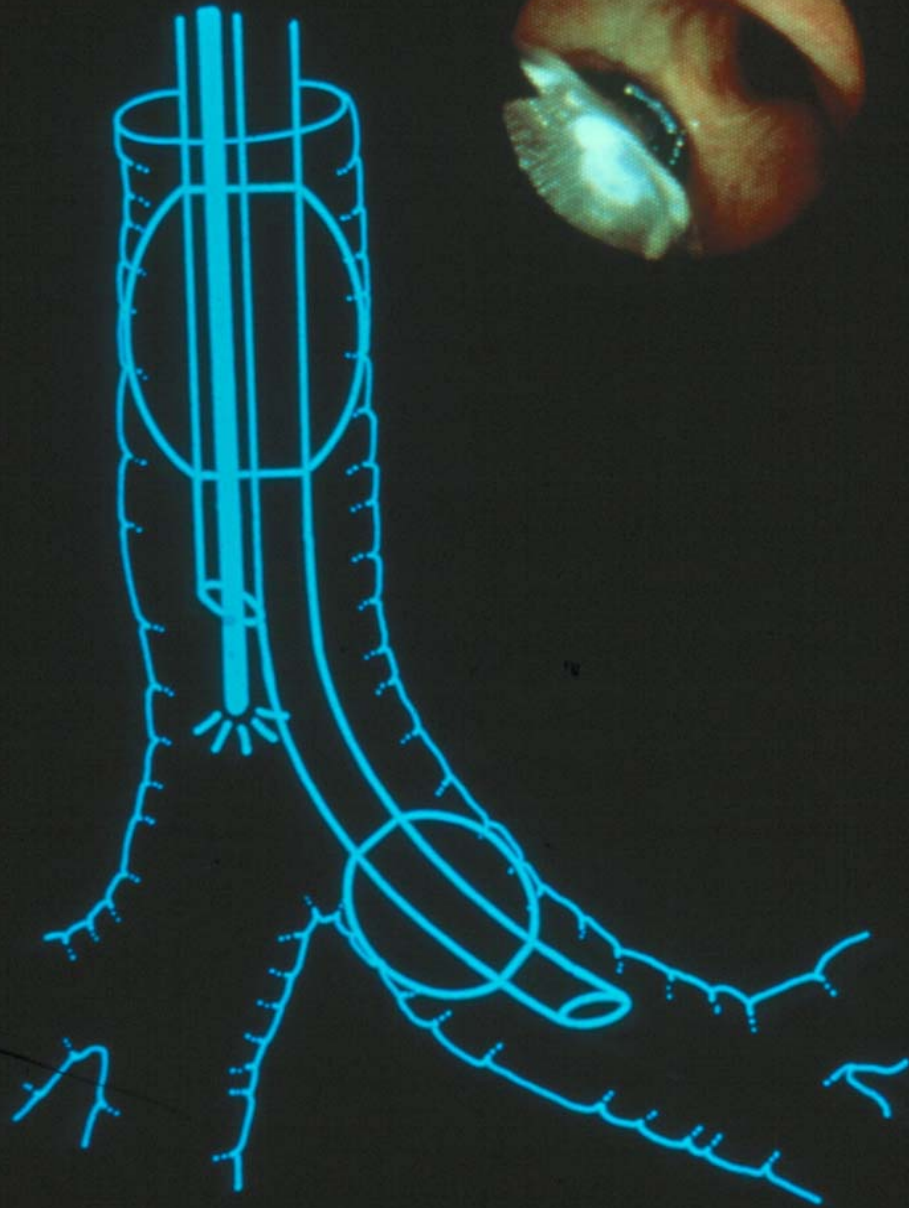
- ◆ Positioning of DLTs with auscultation and observation of chest wall movement
- ◆ “The authors find bronchoscopy unnecessary in the majority of patients and do not use it routinely.”

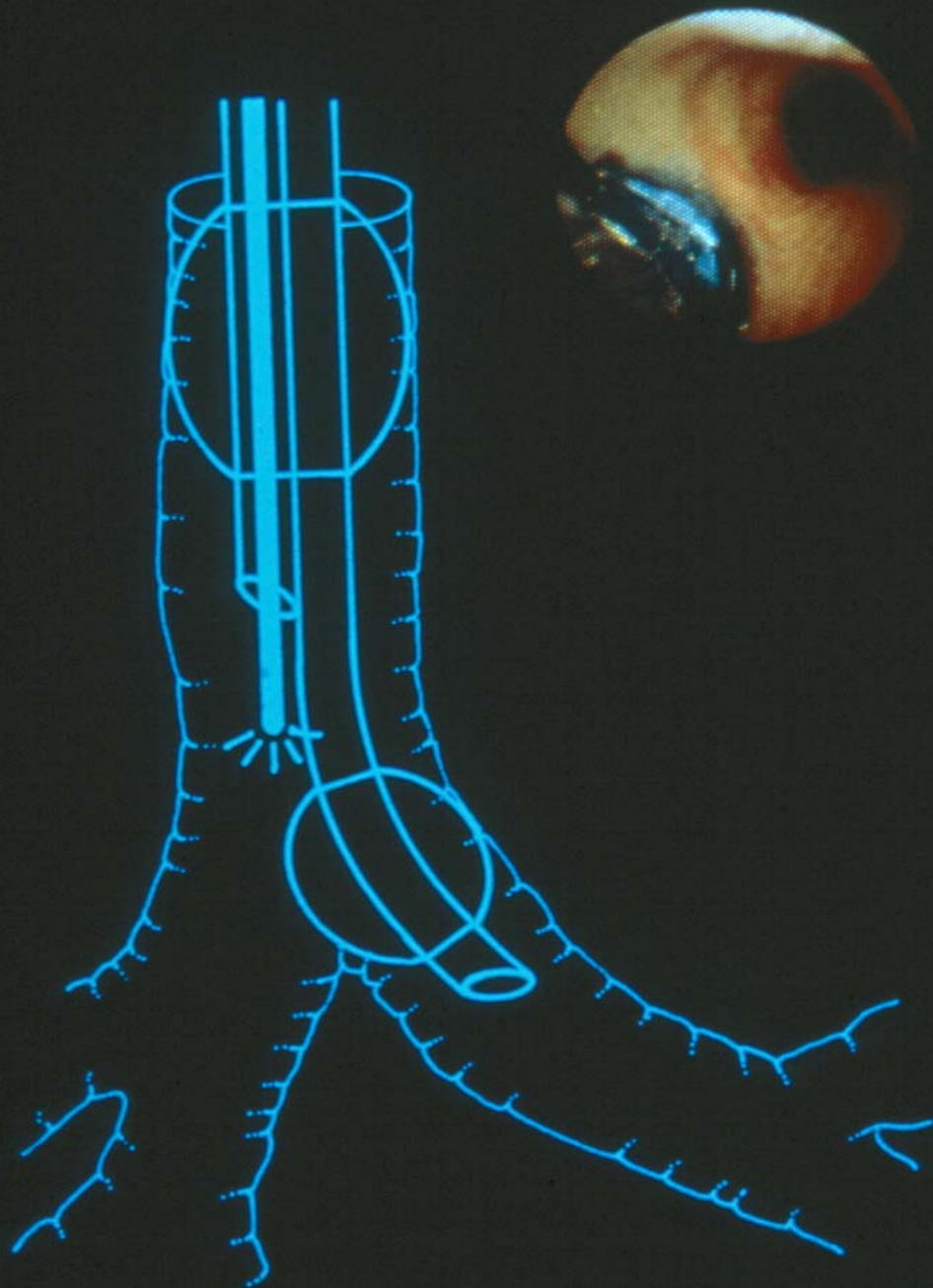


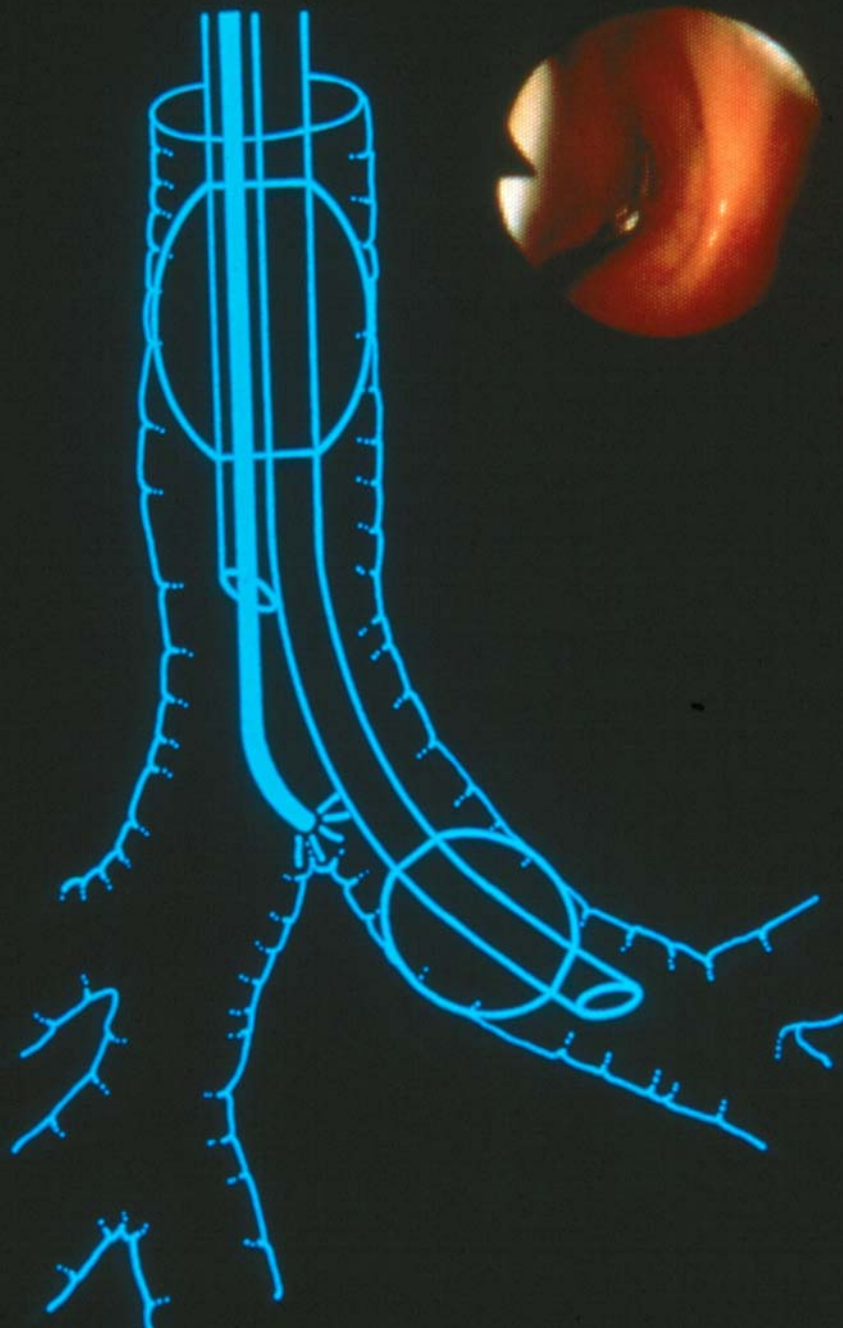
Brodsky JB, Lemmens HJM.
J Cardiothorac Vasc Anesth 2003;17:289-98

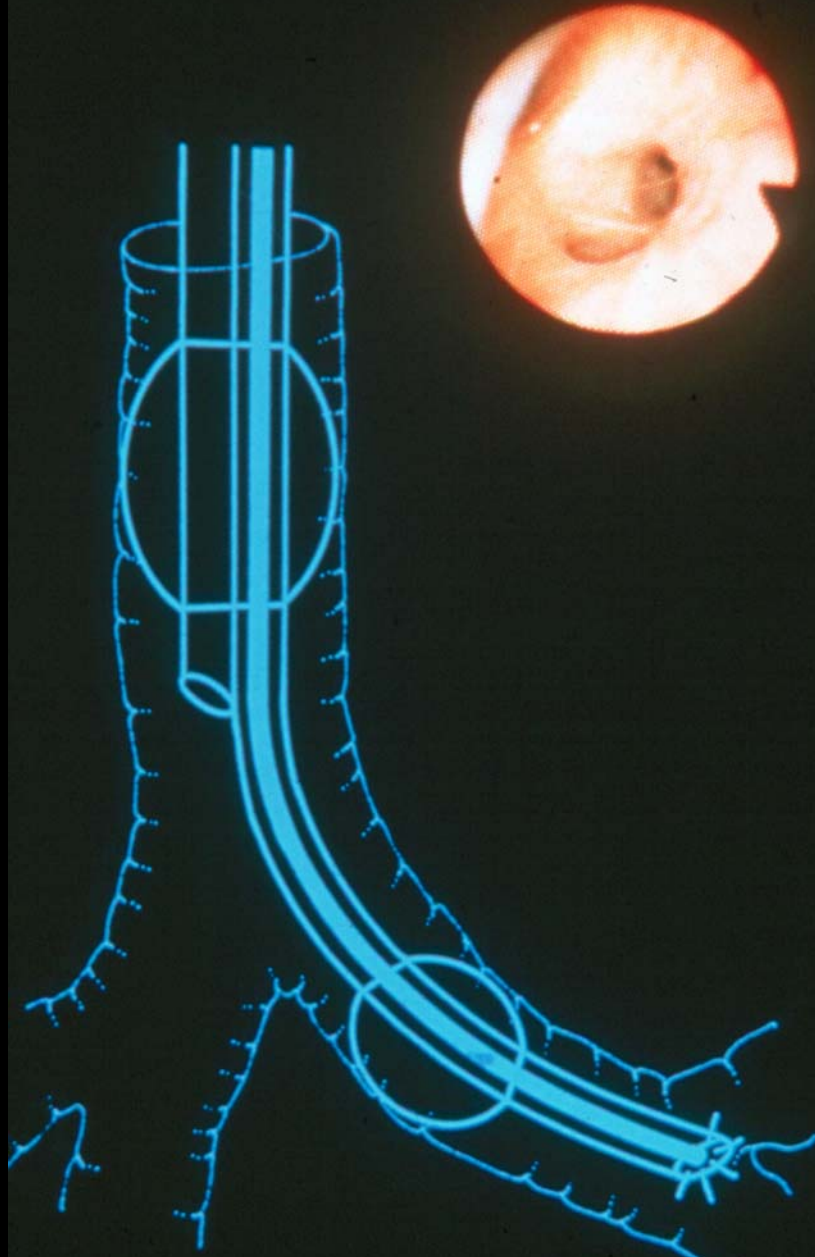
RIGHT THORACOTOMY

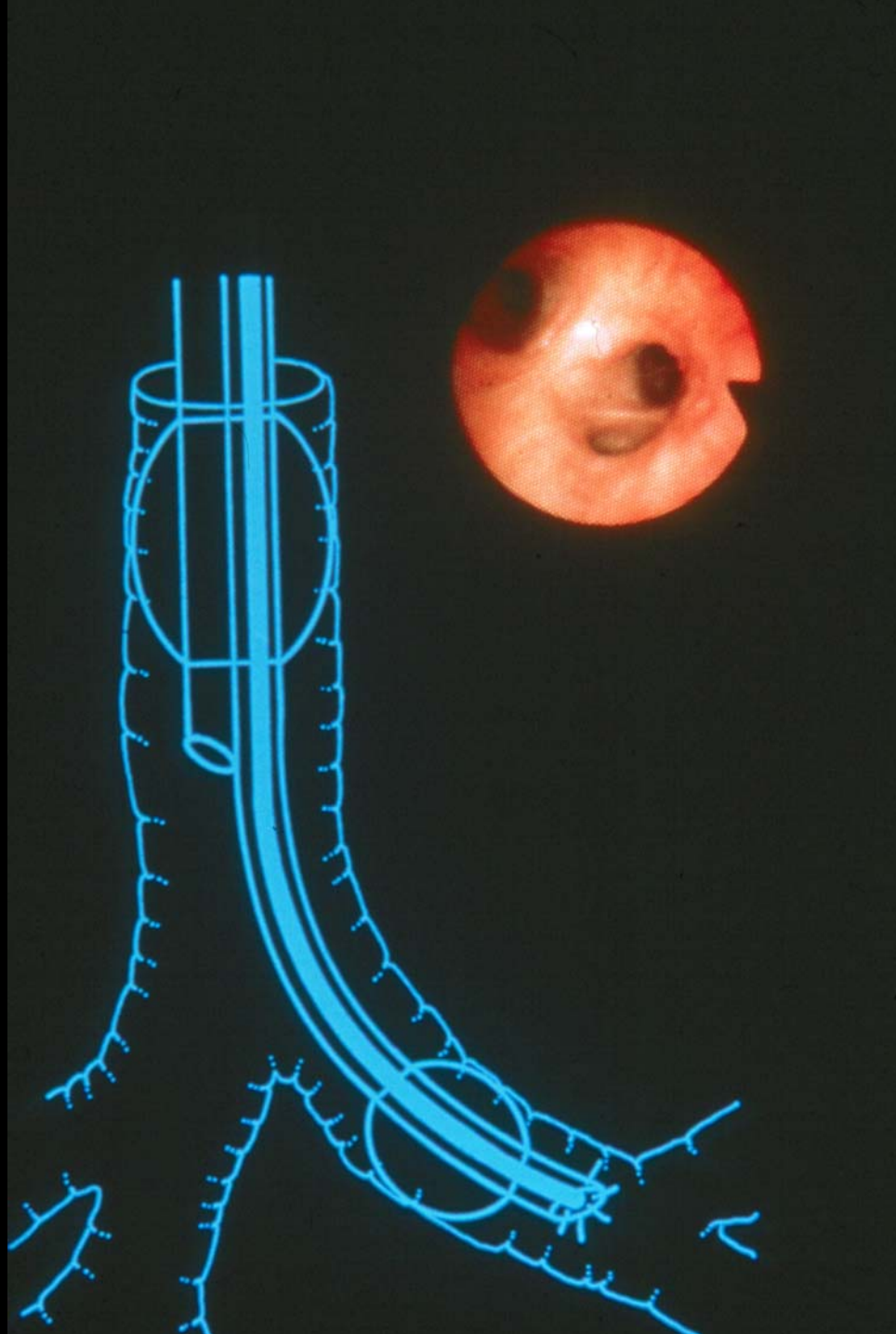








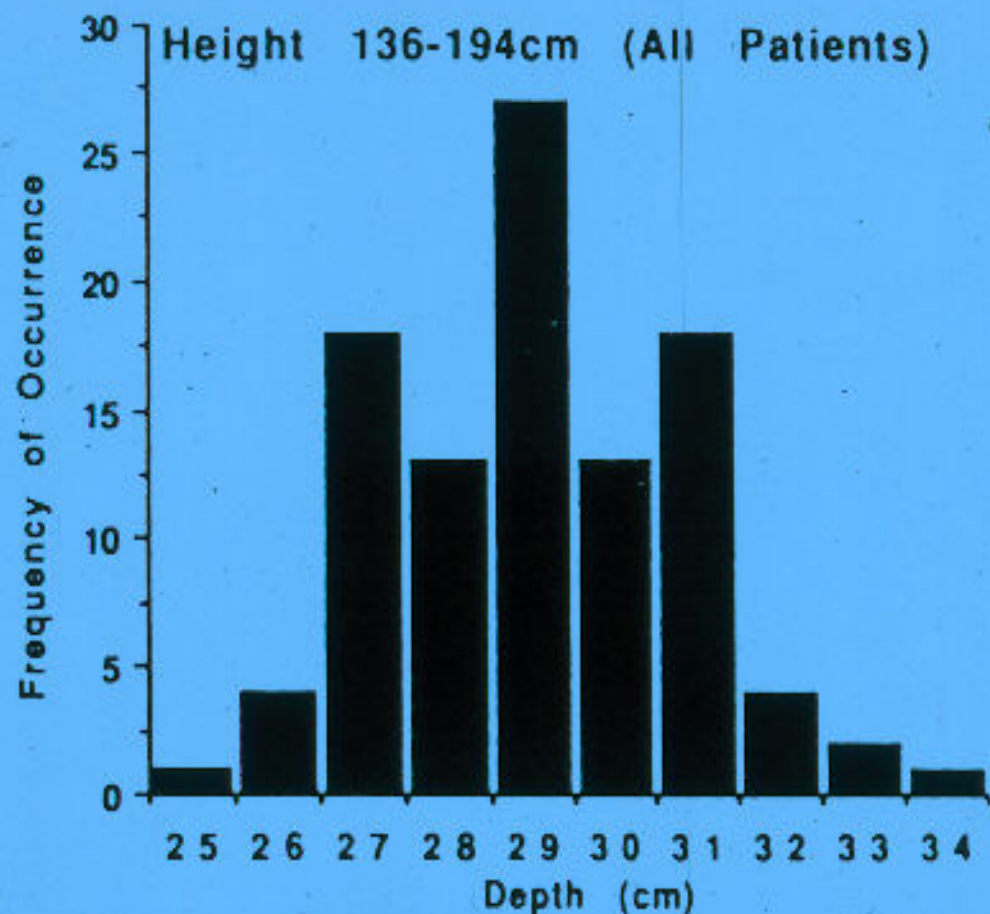




Double-lumen Tubes:

? Placement Technique

? Size



Brodsky JB, et al
Anesth Analg 73:570, 1991

Double-lumen Tubes:

? Placement Technique

? Size

Single- vs. Double-Lumen Tubes in Cross-Section



8.0

35 Fr

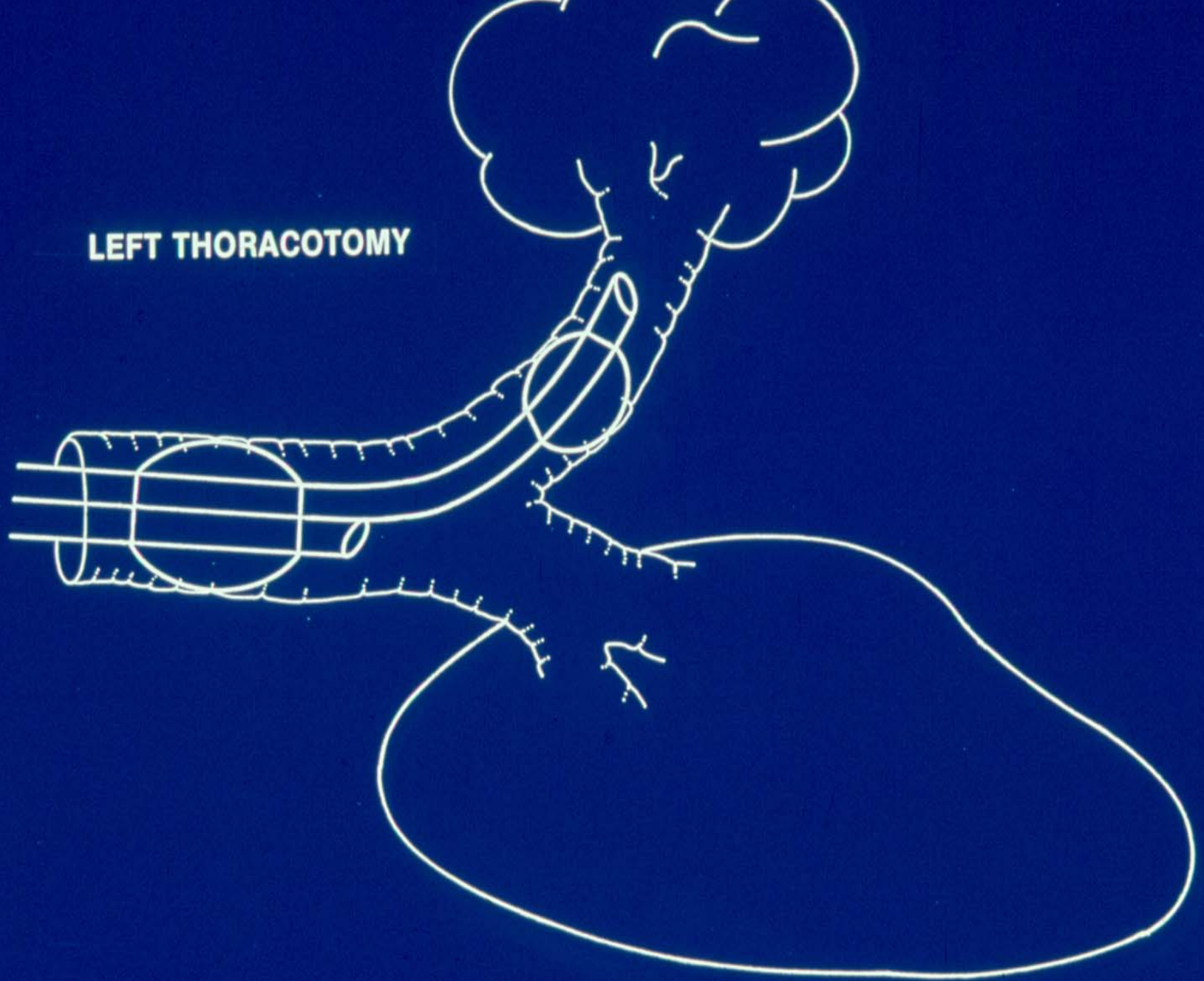
10.0

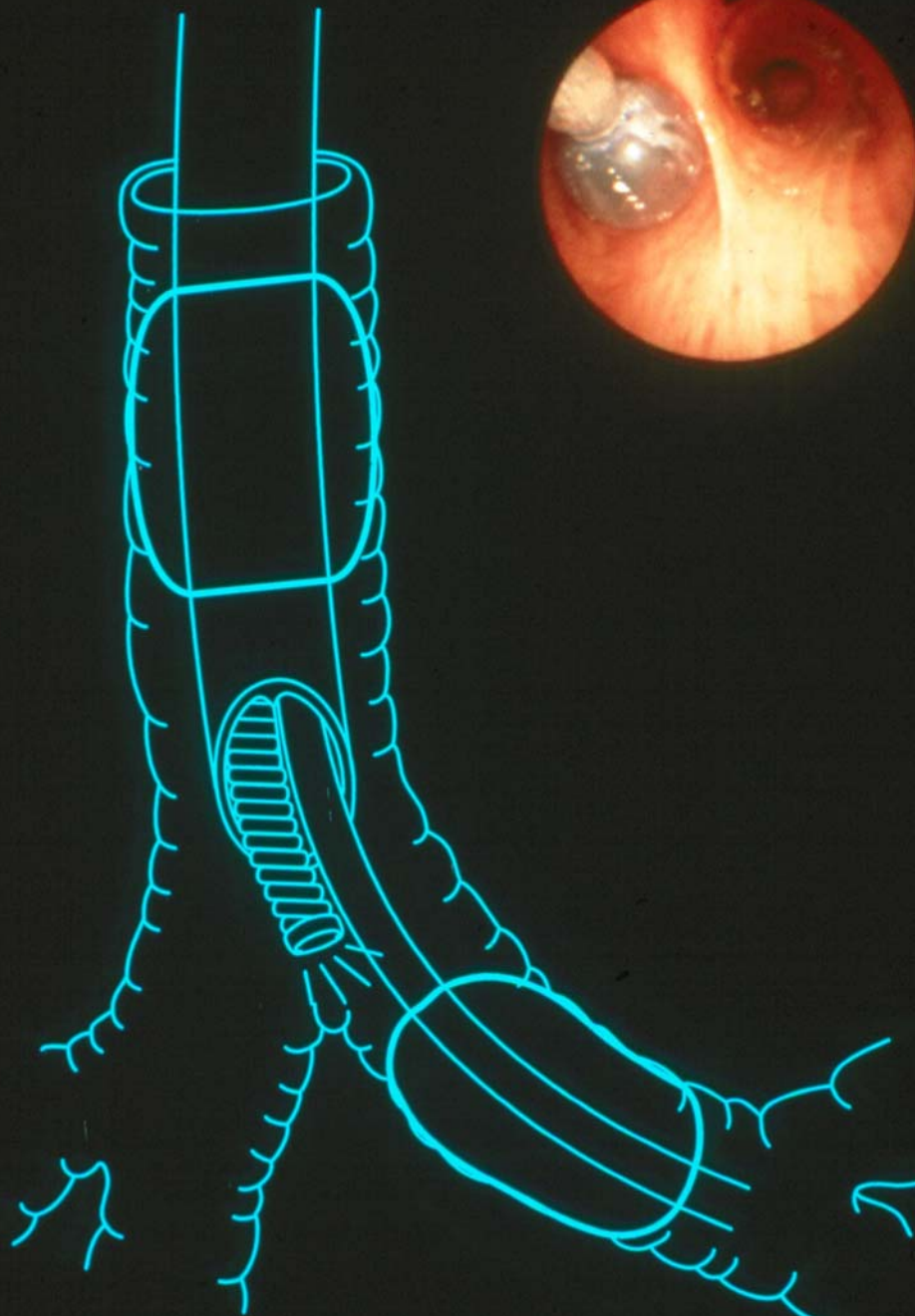
41 Fr

Suggested Sizes for Double-lumen Tubes:

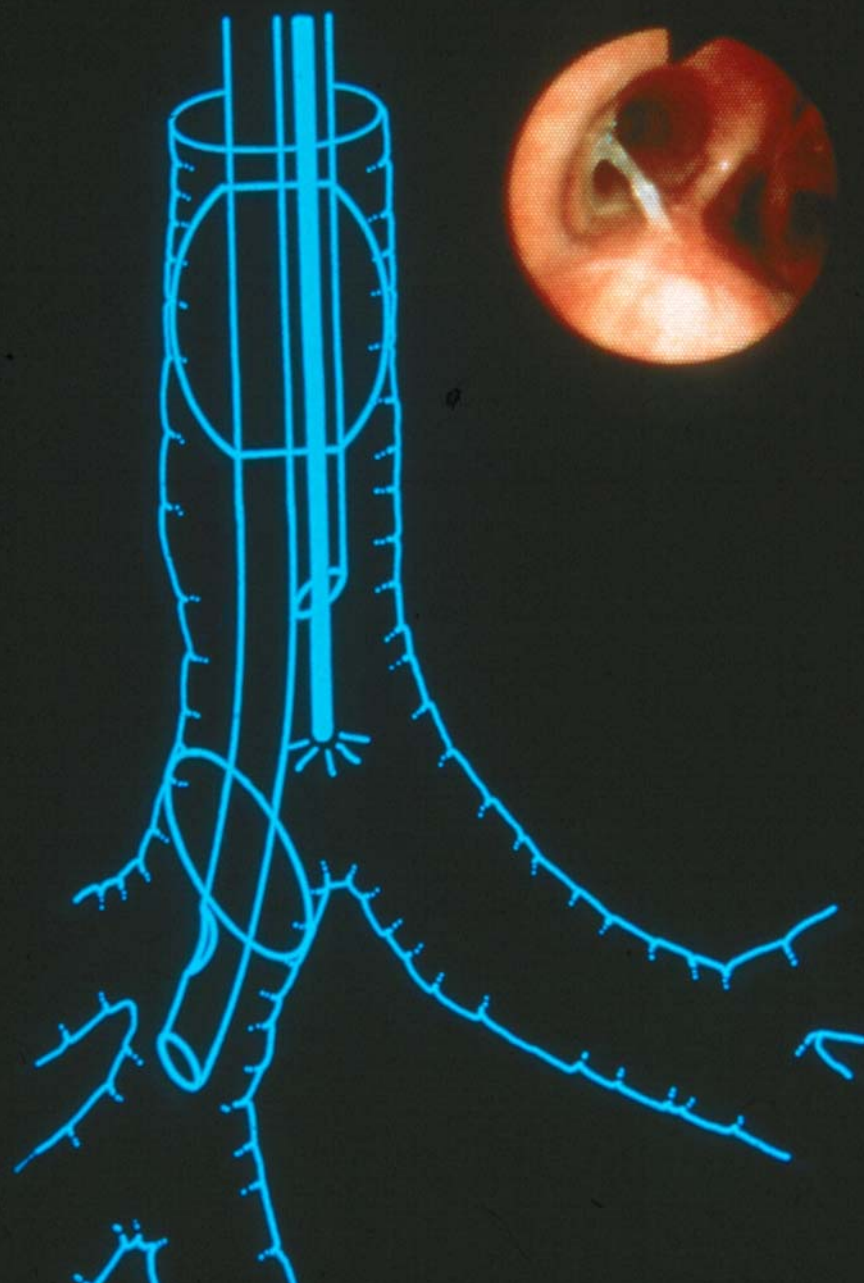
<u>Sex</u>	<u>Height</u>	<u>Size of Tube (Fr.)</u>
Female	< 160cm (63in)	35
Female	≥ 160cm	37
Male	< 170cm (67in)	39
Male	≥ 170cm	41

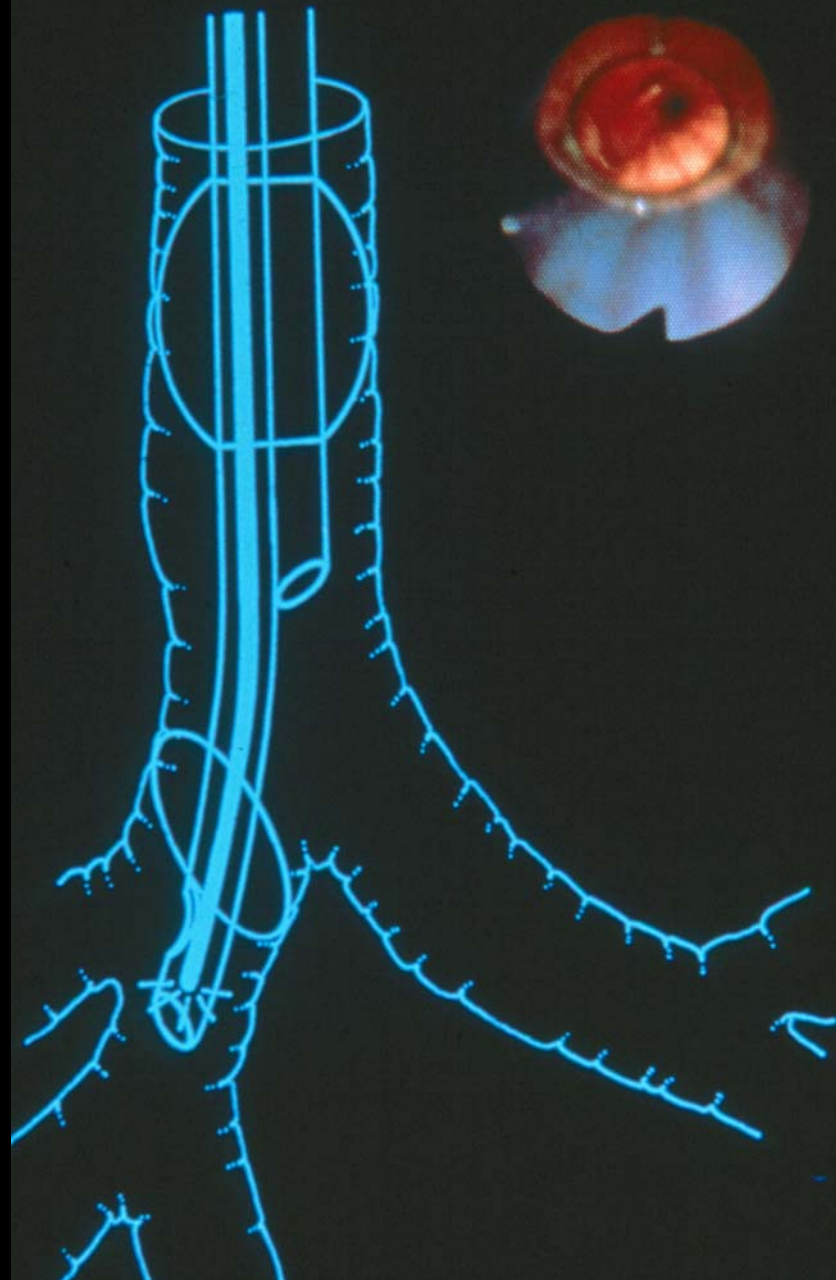
LEFT THORACOTOMY

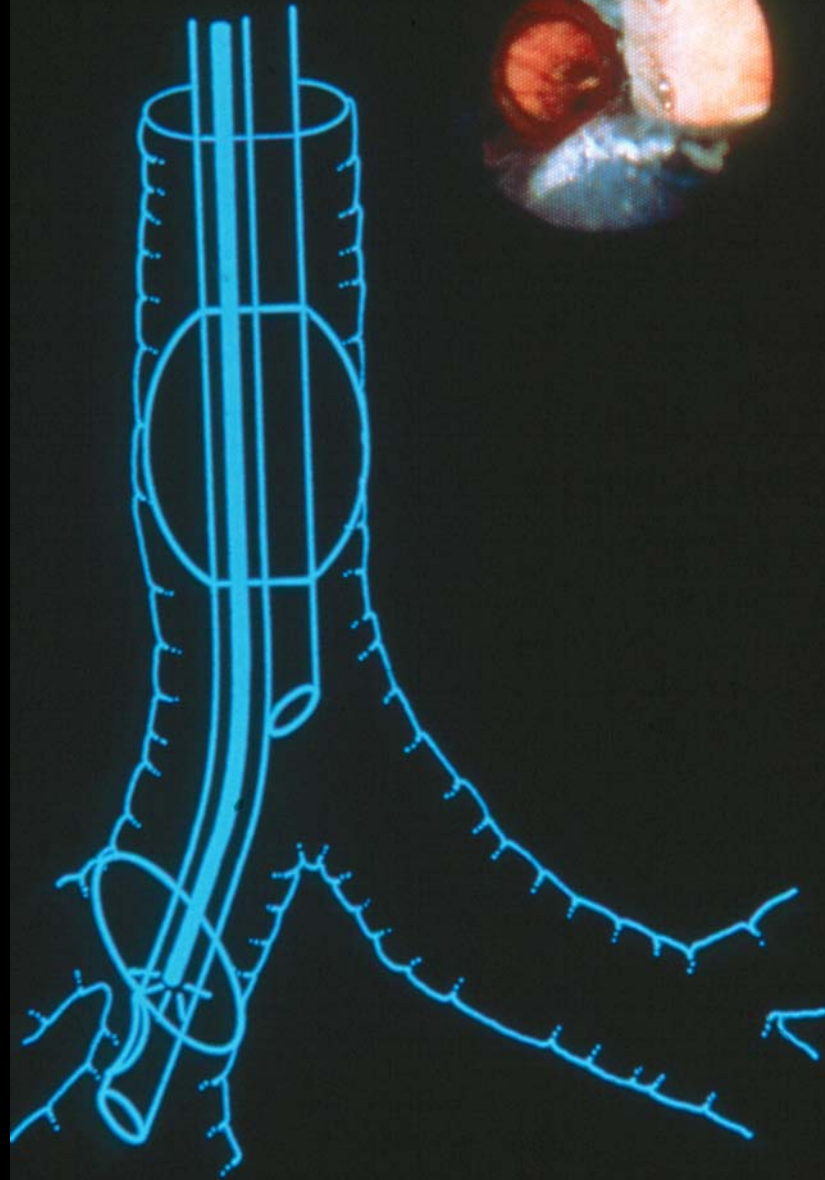


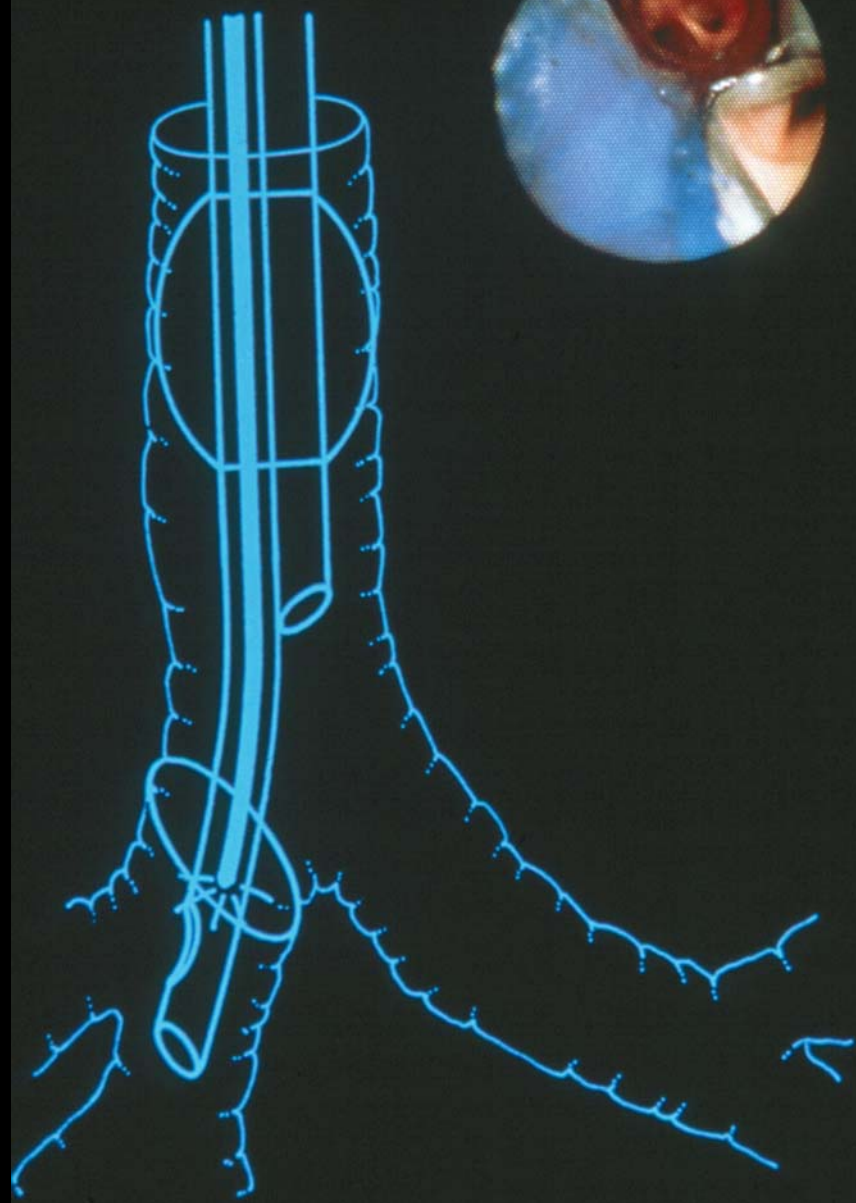


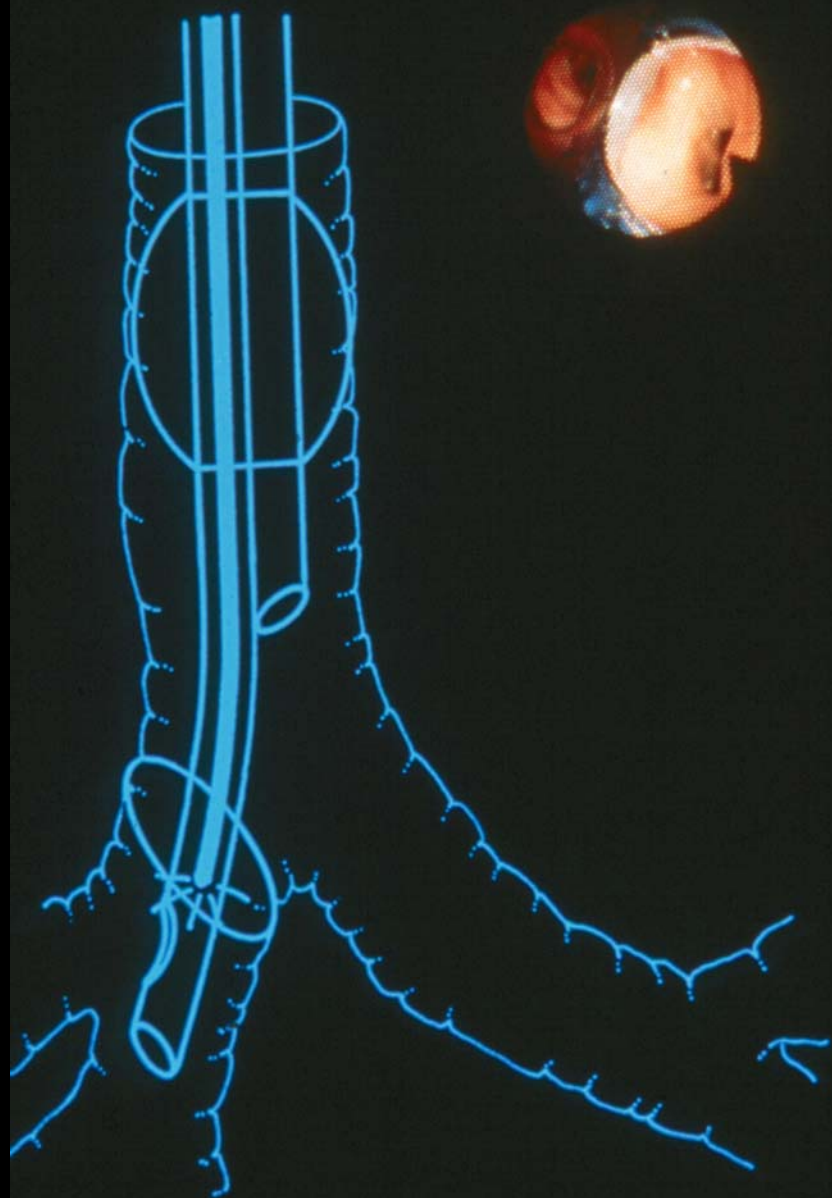






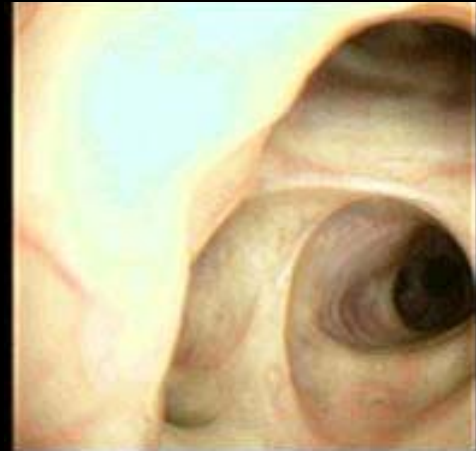
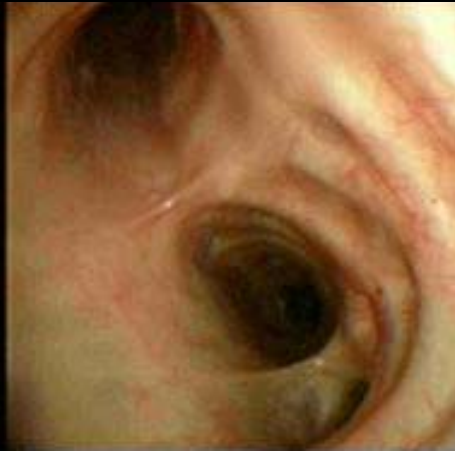






“Tracheal Bronchus”

High takeoff of Right UL Bronchus

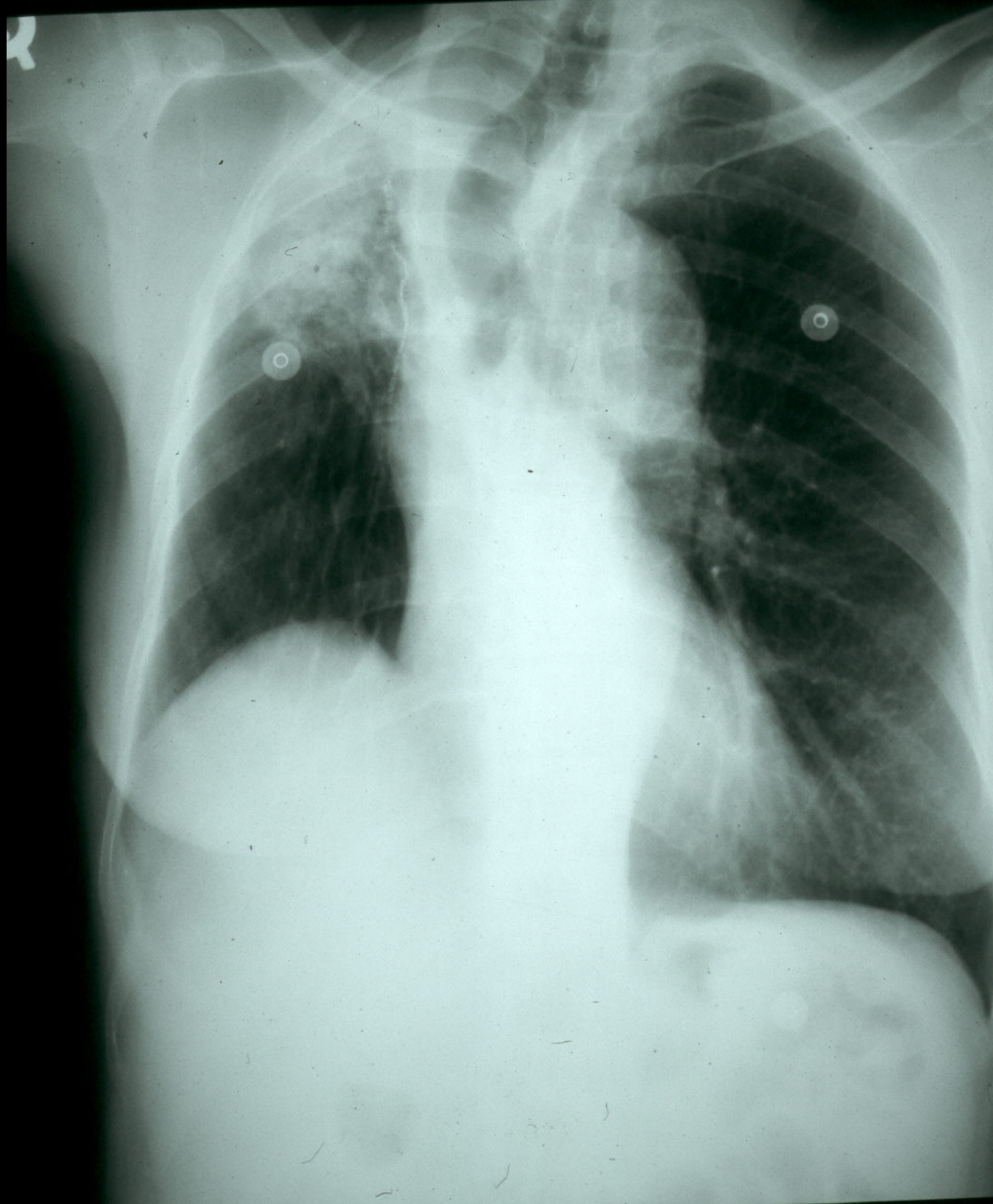


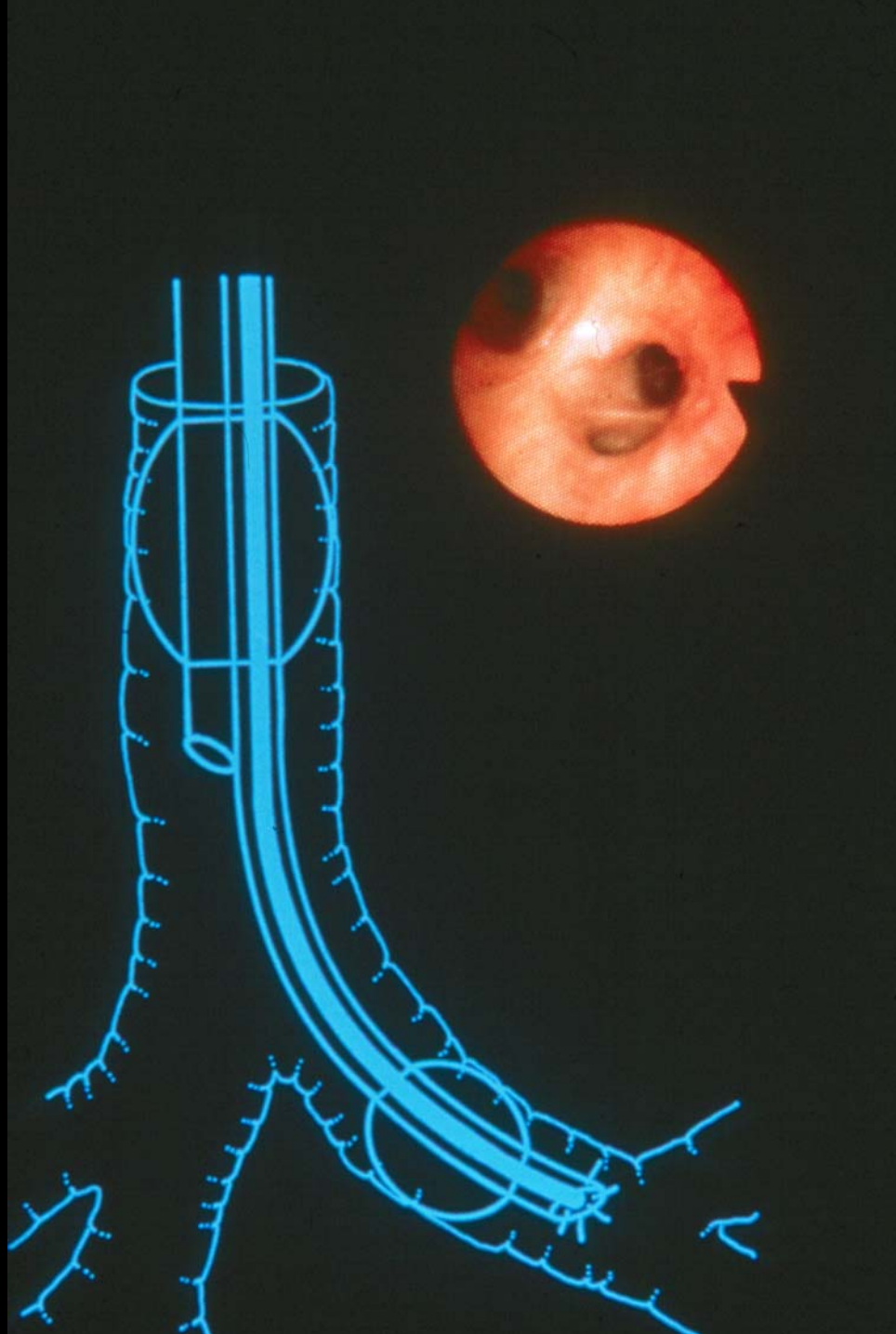
The ABC's of Lung Isolation:

◆ Anatomy

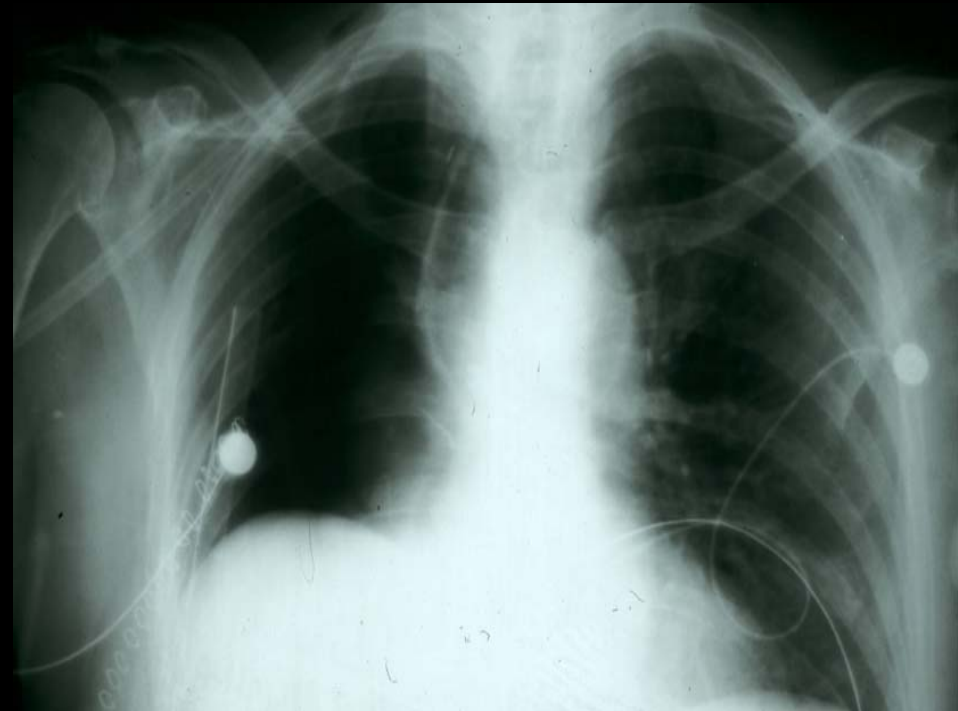
◆ Bronchoscope

◆ Chest X-ray, CT Scan

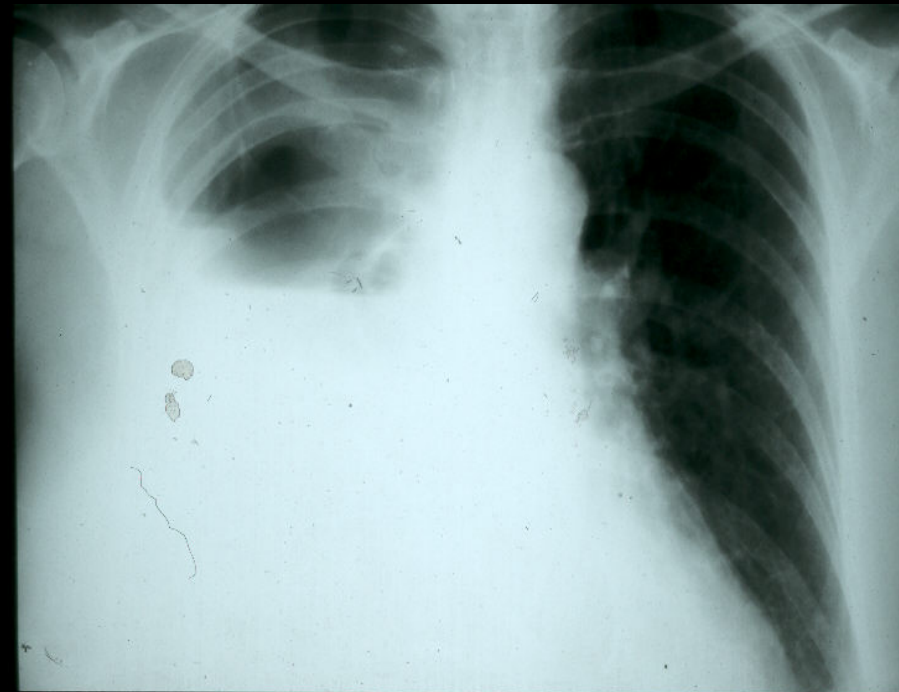




55 y.o. Female Post-op. R Pneumectomy

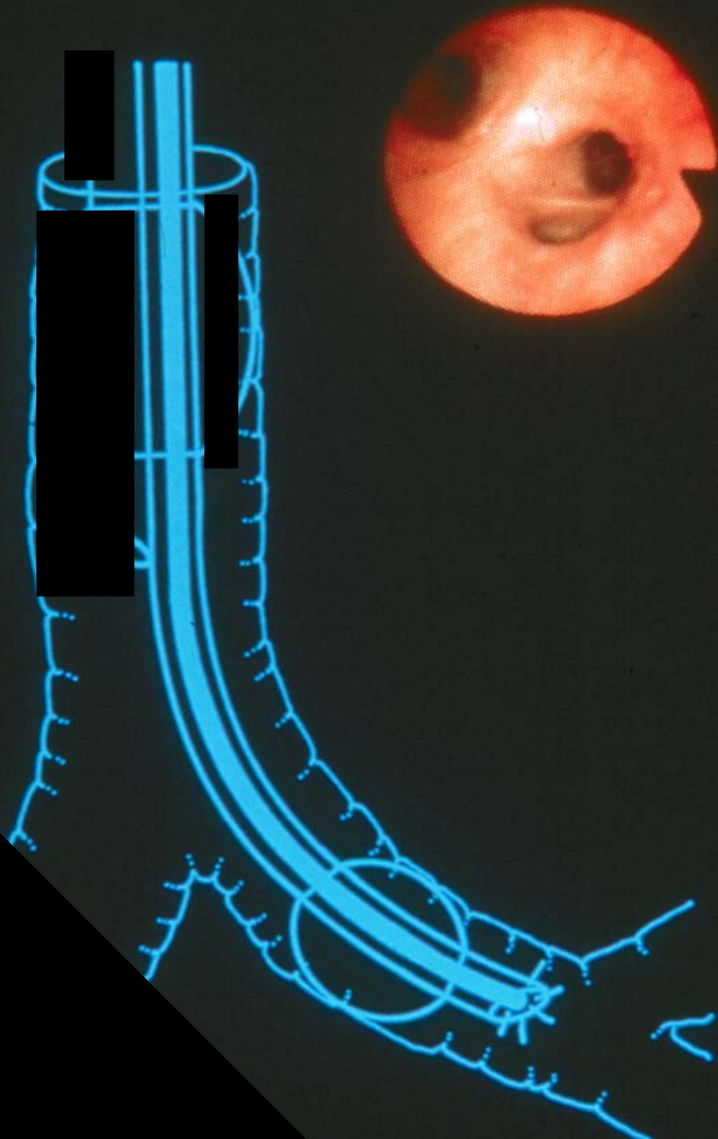


Post-op. Day 1

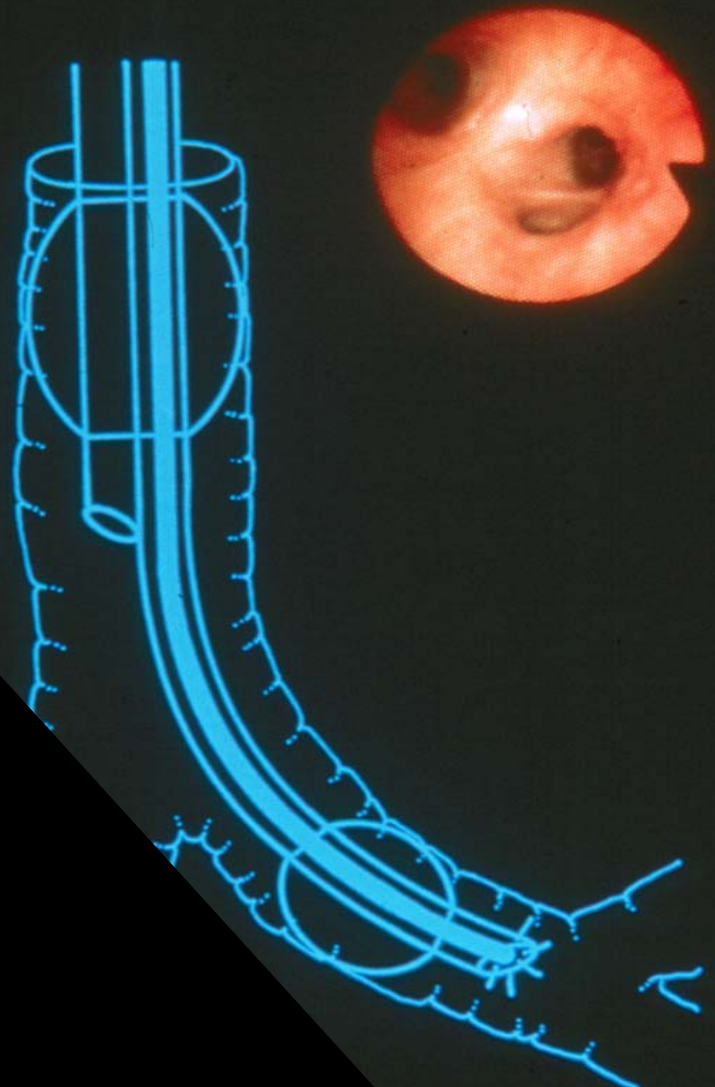


Post-op. Day 7

Single-lumen EBT



Double-lumen EBT

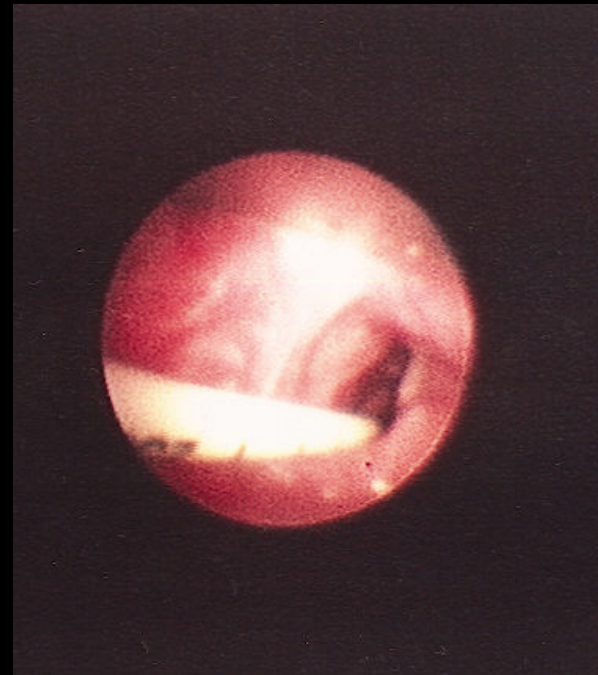


62 y.o. male, Left lower lobe Lung Cancer Previous Failed Intubation



Video-Laryngoscope + Tube Exchanger

Glidescope

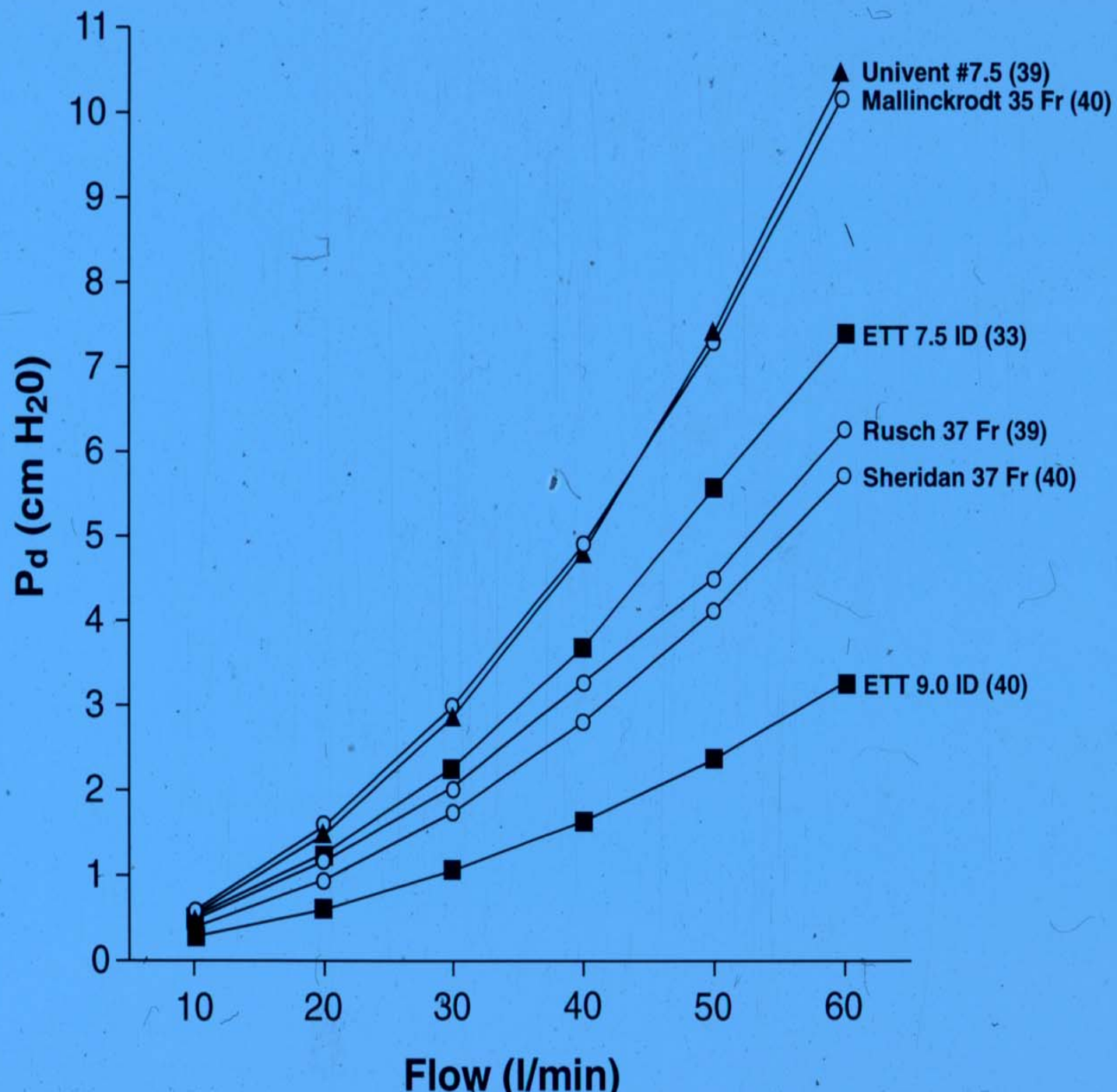


62 y.o. male, Left lower lobe Lung Cancer

Previous Failed Intubation



- ◆ ++ Drowsy at end of surgery
- ◆ ? Extubation
- ◆ ? Tube change



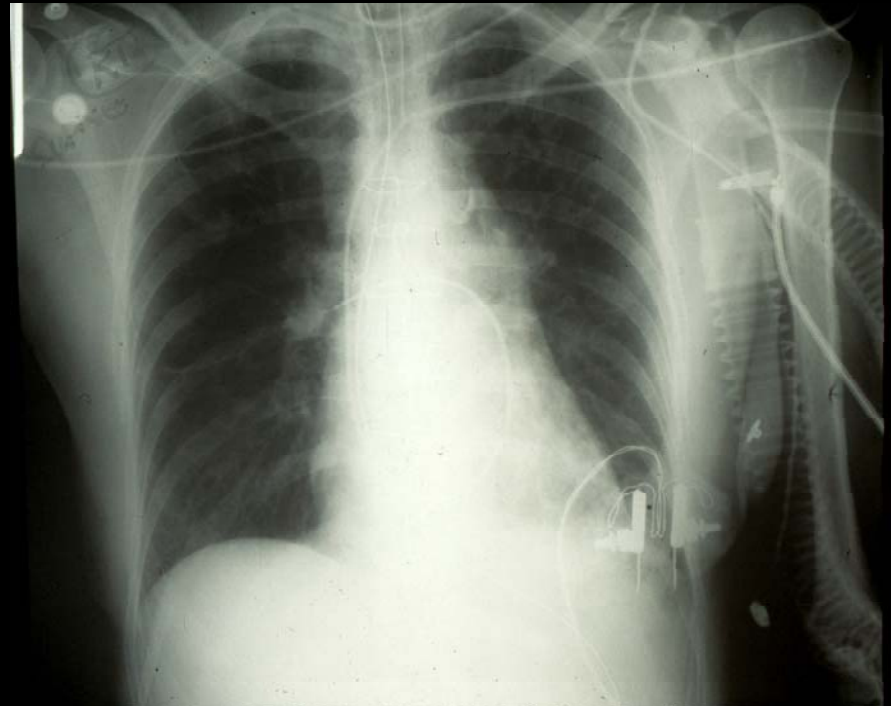


60 y.o. F, 2 hr. post-op. MVR

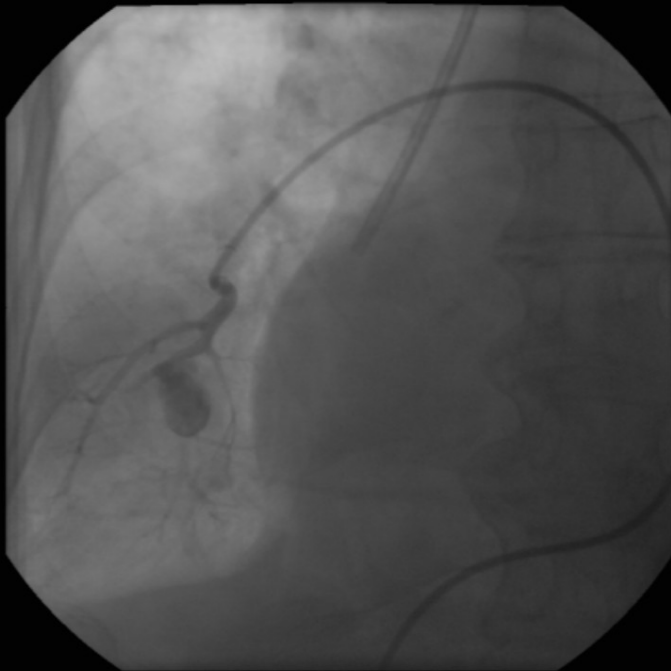
- Sudden onset
massive
hemoptysis

? dDx

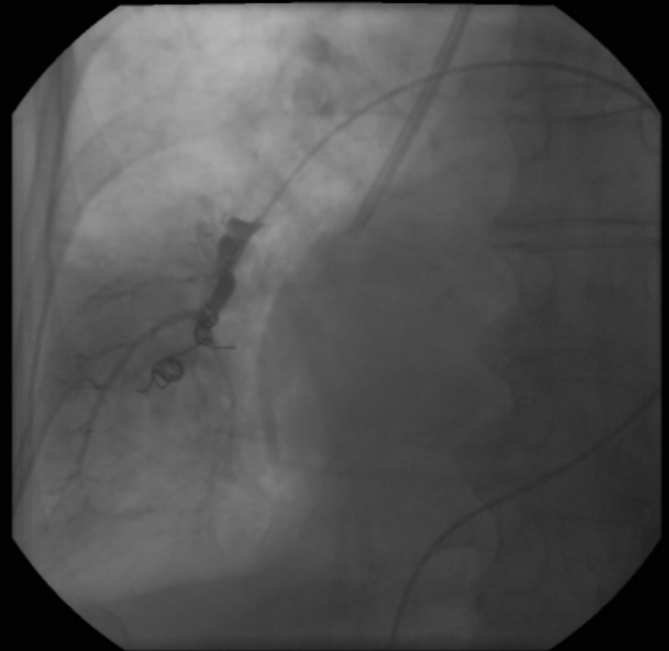
? Rx

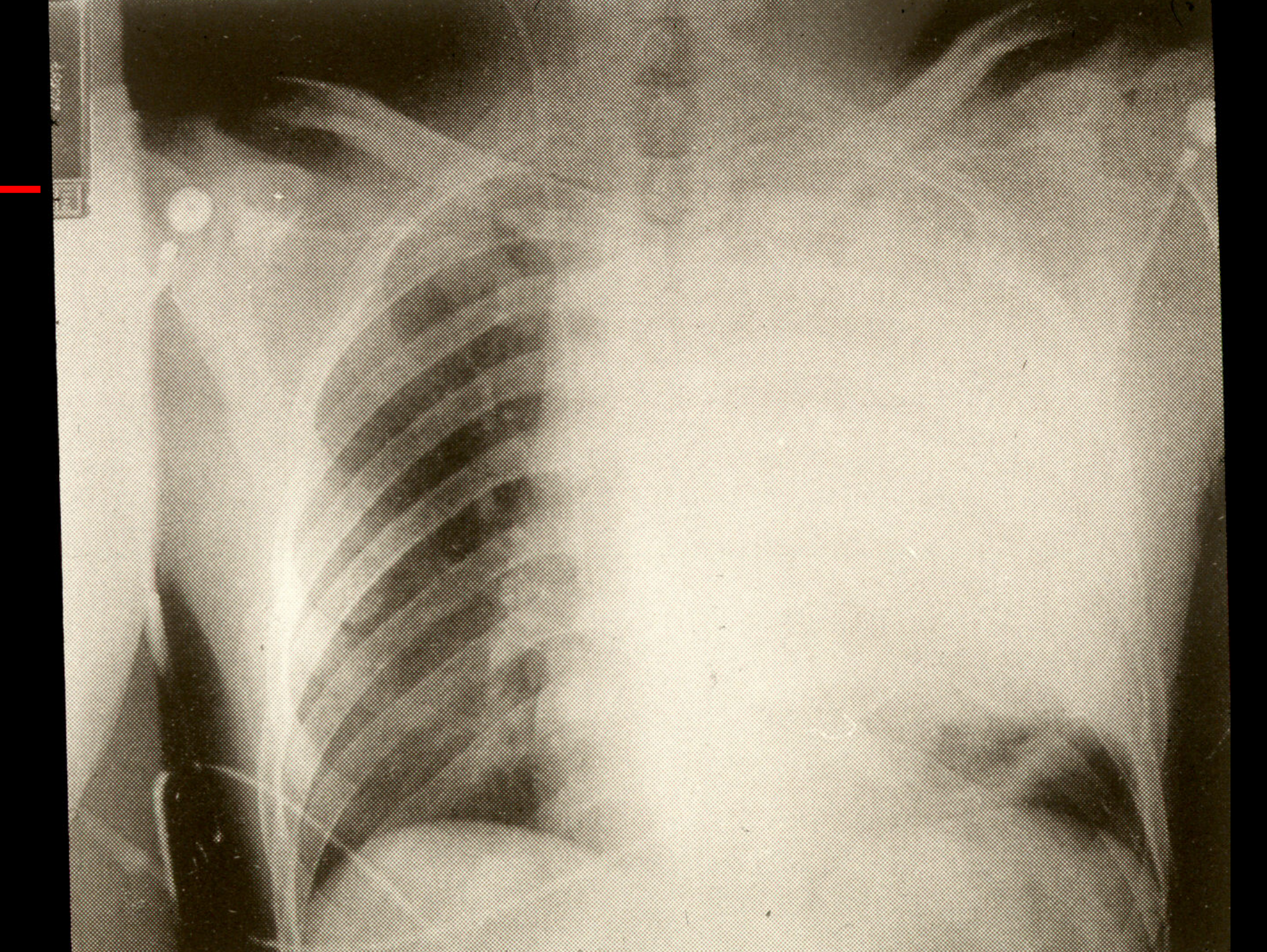


False Aneurysm
RLLobe PA



Embolization Coil
RLLobe PA





68 y.o. Female, Mid-esophageal Ca. TE Fistula







Tube Selection for Lung Isolation:

Double-Lumen Tube

- **Excellent Isolation**
- **Independent Lung Access**
- **Fixed Anatomical Design**
- **Adults**



Bronchial Blocker or (Single-Lumen EBTube)

- **Adaptability**
- **Difficult airways**
- **No need to change tube**
- **Suctioning**

The ABC's of Lung Isolation:

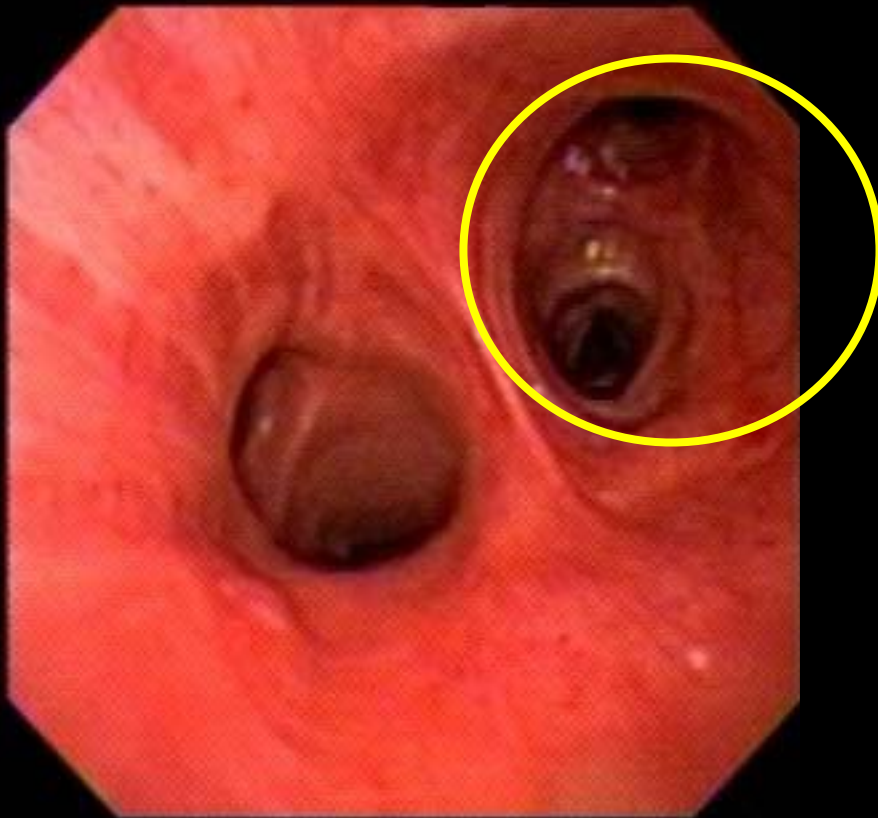
◆ Anatomy

◆ Bronchoscope

◆ Chest X-ray, CT Scan

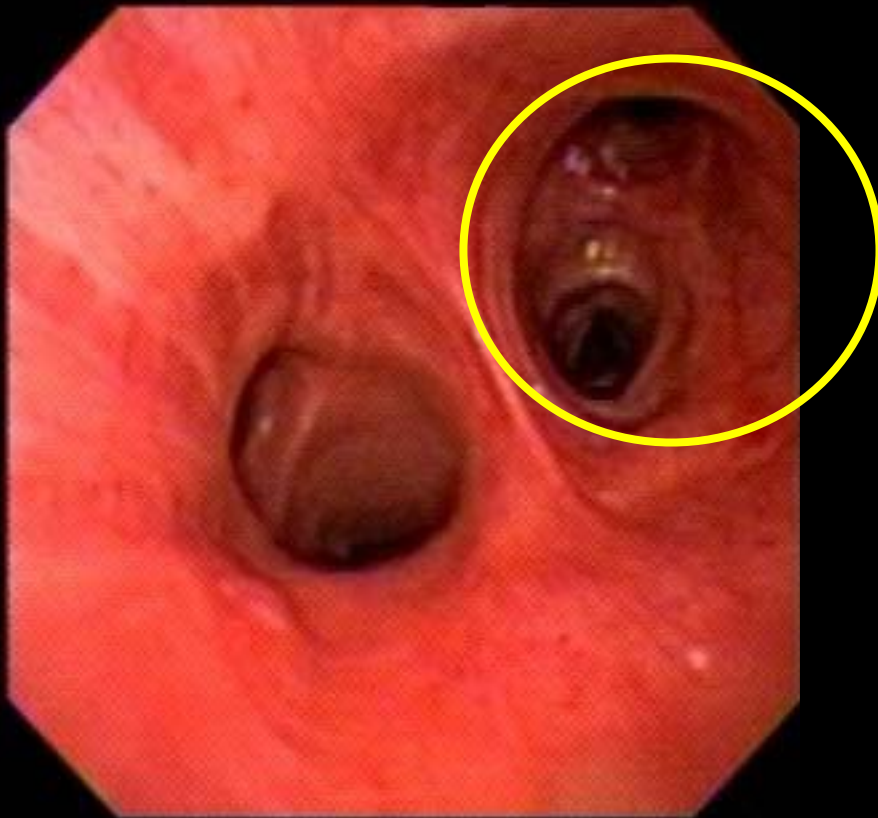
◆ Anatomy

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
- B. Left upper lobe bronchus
- C. Left mainstem bronchus
- D. Right middle lobe bronchus
- E. Right upper lobe bronchus


Teaching Bronchial Anatomy

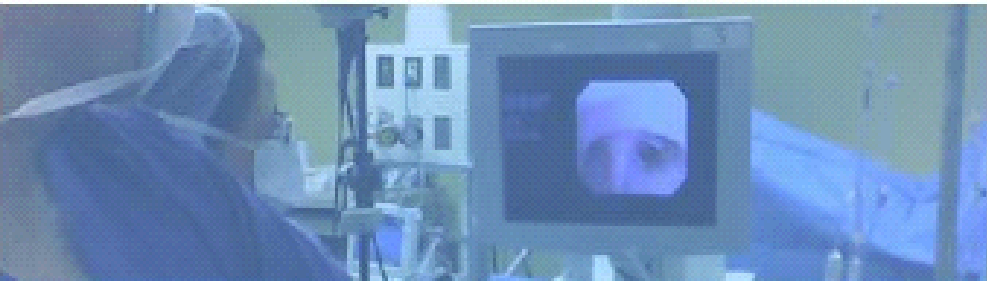


- ◆ In the OR
- ◆ Review articles/CD/DVD
- ◆ Workshops
- ◆ Virtual bronchoscopy simulator
- ◆ Online bronchoscopy simulator

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this service is a free not-for-profit continuing medical education activity which is offered to all practitioners of Anesthesia and related areas of Medicine and Surgery. By clicking on the "Bronchial Anatomy Quiz" tab, readers can complete a needs assessment of their knowledge of tracheo-bronchial anatomy, which is fundamental to the skill of lung isolation for thoracic anesthesia. After completion of the Quiz, using the user name and password generated for the Quiz, readers have access at any time to the bronchoscopy simulator which is an interactive teaching simulation of fiberoptic bronchoscopy. Also, after completing the quiz, readers will have access to several review articles on Lung isolation in the "restricted Articles" section on the homepage.

there will be a regular update of articles recently published in the medical literature and a selection of REVIEW ARTICLES pertaining to Thoracic Anesthesia.

Readers are encouraged to submit clinical questions or cases in the "Contact Us" section which will then be discussed and answered by members of the International Editorial Board. As questions are answered they will be indexed and posted on the Web site along with the discussion and will form a library for future reference.

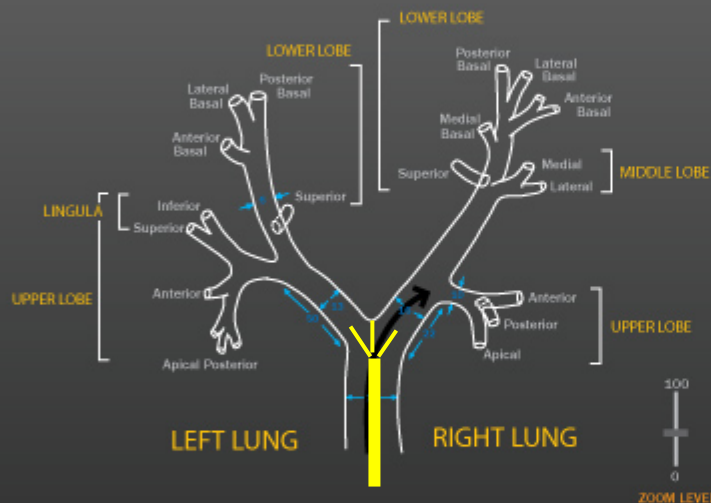
Authors and readers are encouraged to submit summaries or abstracts of relevant published information from other sources.

Simulator
Link

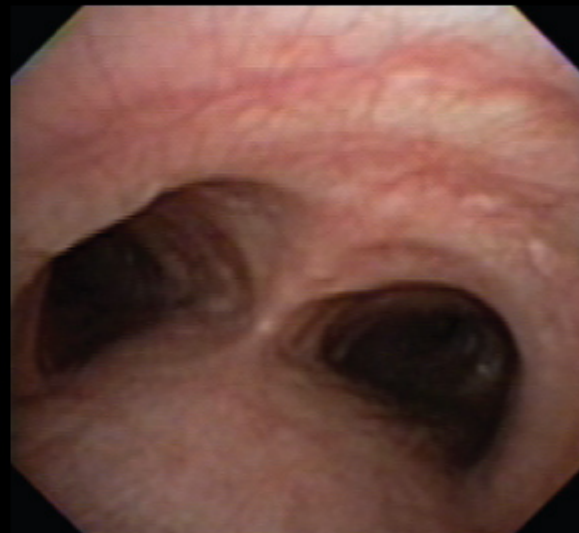


Thoracicanesthesia.com Bronchoscopy Simulation

BRONCHIAL TREE NAVIGATION MAP VIEW



BRONCHOSCOPE VIEW



Navigation Map Enabled / Disabled
Navigation Labels Enabled / Disabled
Bronchoscope Labels Enabled / Disabled



Bronchoscope Navigation