

**THORACIC SURGERY DIRECTORS ASSOCIATION
BOOT CAMP
JULY 14-17, 2011**

SECTION: LUNG

Faculty

Richard Feins, MD (program director)	University of North Carolina
Jon Nesbitt, MD (course director)	Vanderbilt University
Phil Camp, MD	Brigham & Women's Hospital
Alberto de Hoyos, MD	Northwestern University
Tom Daniel, MD	University of Virginia
Mark Ferguson, MD	University of Chicago
John Hammon, MD	Wake Forest University
Mark D. Iannettoni, MD	University of Iowa
Joseph I. Miller, MD	Emory University
Mark Onaitis, MD	Duke University
Varun Puri, MD	Washington University
Norm Snow, MD	University of Illinois at Chicago
Mithran Sukumar, MD	Oregon Health & Science University
Nirmal Veeramachaneni, MD	University of North Carolina

TSDA Staff

Nancy Puckett
Executive Director

Beth Winer
Affiliate and Marketing Manager

Location

William and Ida Friday Center for Continuing Education
University of North Carolina
Chapel Hill, North Carolina

**Thoracic Surgery Directors Association
Boot Camp**

**General Thoracic Surgery
Syllabus**

LUNG

Overview

The TSDA Boot Camp will be an introduction course of technical skills needed in cardiothoracic surgery. This program is designed for first year cardiothoracic surgical residents who are currently enrolled in ACCME approved programs in the United States. The Boot Camp will allow the resident to practice techniques and learn sequence of events needed to complete basic general thoracic procedures in the operating room.

To succeed in general thoracic surgery it is necessary to combine a detailed anatomical knowledge and precise technical skills. In this section on lung resection, we will focus on the techniques of hilar dissection and lymph node removal in preparation for performing a lobectomy first in a dry lab station and then in the wet lab. The resident will perform a segmentectomy and lobectomy with complete lymph node dissection in a perfused animal model. The didactic session will review the normal anatomy of the lung with regards to the pulmonary artery and veins and bronchus and discussion of sequences of events needed to perform anatomical resections of the lung - lobectomy and segmentectomy safely.

This course will also allow the faculty and resident to identify and correct areas of weakness in technique. Our goal is to provide the resident with an understanding of the technical aspects of an anatomical lung resection, followed by direct supervision and practice, and concluded with formative feedback.

Course Schedule

Introduction

Dry Lab (Right Lung)

- Right hilar dissection
- Pulmonary artery, vein and bronchi isolation

Wet Lab (Left Lung)

- Wedge excision tumor
- Left upper lobectomy
- Hilar and mediastinal lymph node dissection
- Left superior segmentectomy

Wet Lab (Left Lung)

- Wedge excision tumor
- Left upper lobectomy
- Hilar and mediastinal lymph node dissection
- Left superior segmentectomy

Goals

Content

To understand the rationale for various lung resections and lymph node dissection

To understand the anatomy of the lung (pulmonary arteries, veins and bronchi) for the basis of anatomical resections

To learn the sequence of events to perform an anatomical and non-anatomical resection of the lung

To learn the technique of mediastinal and hilar lymph node dissection

To identify and correct areas of weakness in technique and judgment

Skills

To establish competency in open lung resections in the dry and wet lab

To establish competency in open lymph node dissection in the dry and wet lab

Program

Formative Assessment

Assessment of resident's progress with formative feedback

Evaluate surgical skills using the wet-lab

Video recording and review of surgical skills

Structures Sessions

Four hour session dedicated to lung resection and lymph node dissection

Open approach

Instrument use and selection

Anatomy recognition and knowledge

Hilar dissection and isolation of pulmonary vessels

Bronchial dissection and stapling

Fissural dissection and stapling

Stapler use and selection

Dry lab performance

Wet-lab performance

Procedures

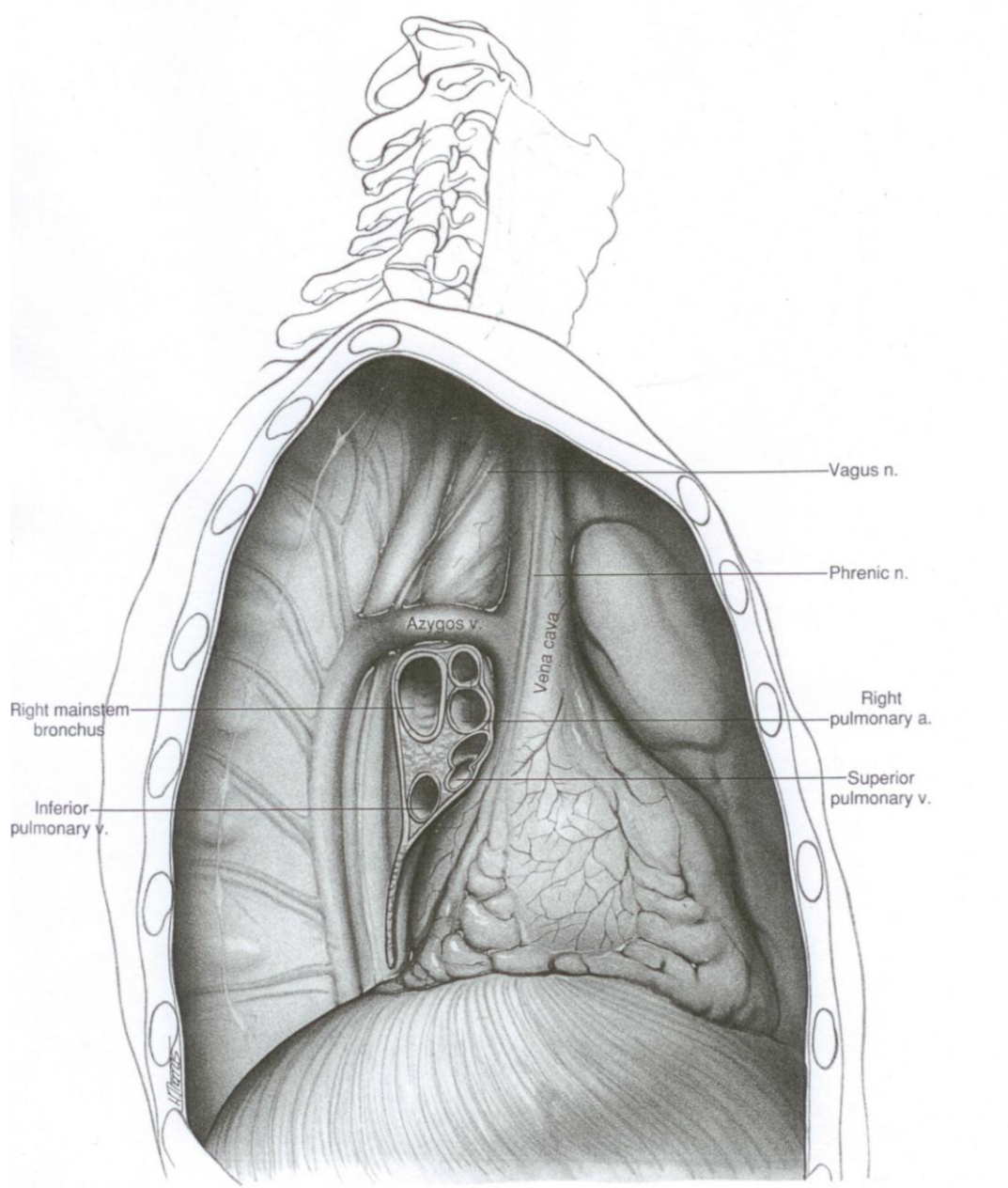
Wedge excision
Segmentectomy
Lobectomy
Mediastinal and hilar lymph node dissection

Feedback

The resident will receive guidance and formative feedback from the faculty during the dry and wet lab experience. Also, the resident will be able to provide feedback regarding the perceived relevance of the assignments and the validity of the tasks.

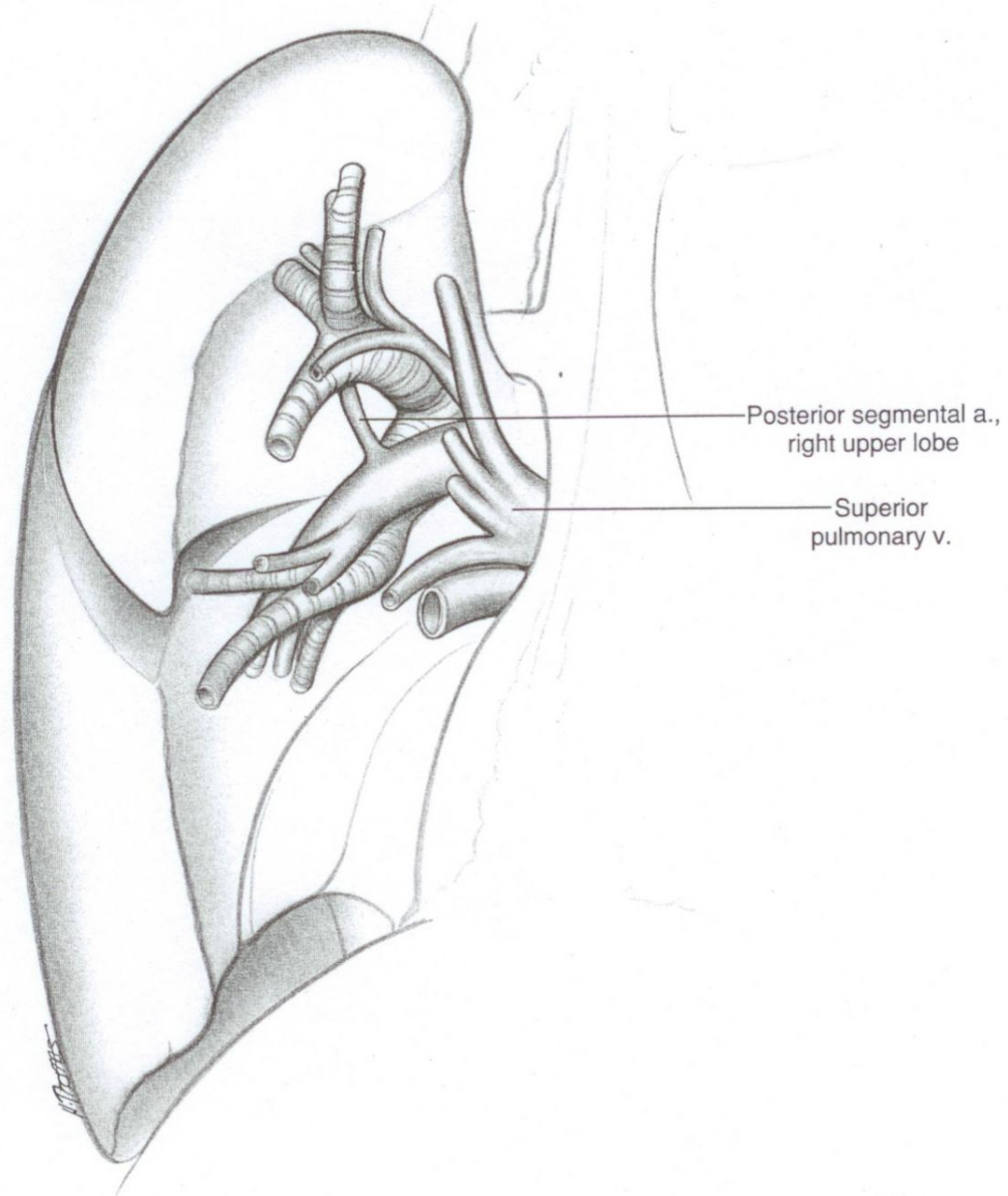
Normal Lung Anatomy

Right Hemithorax

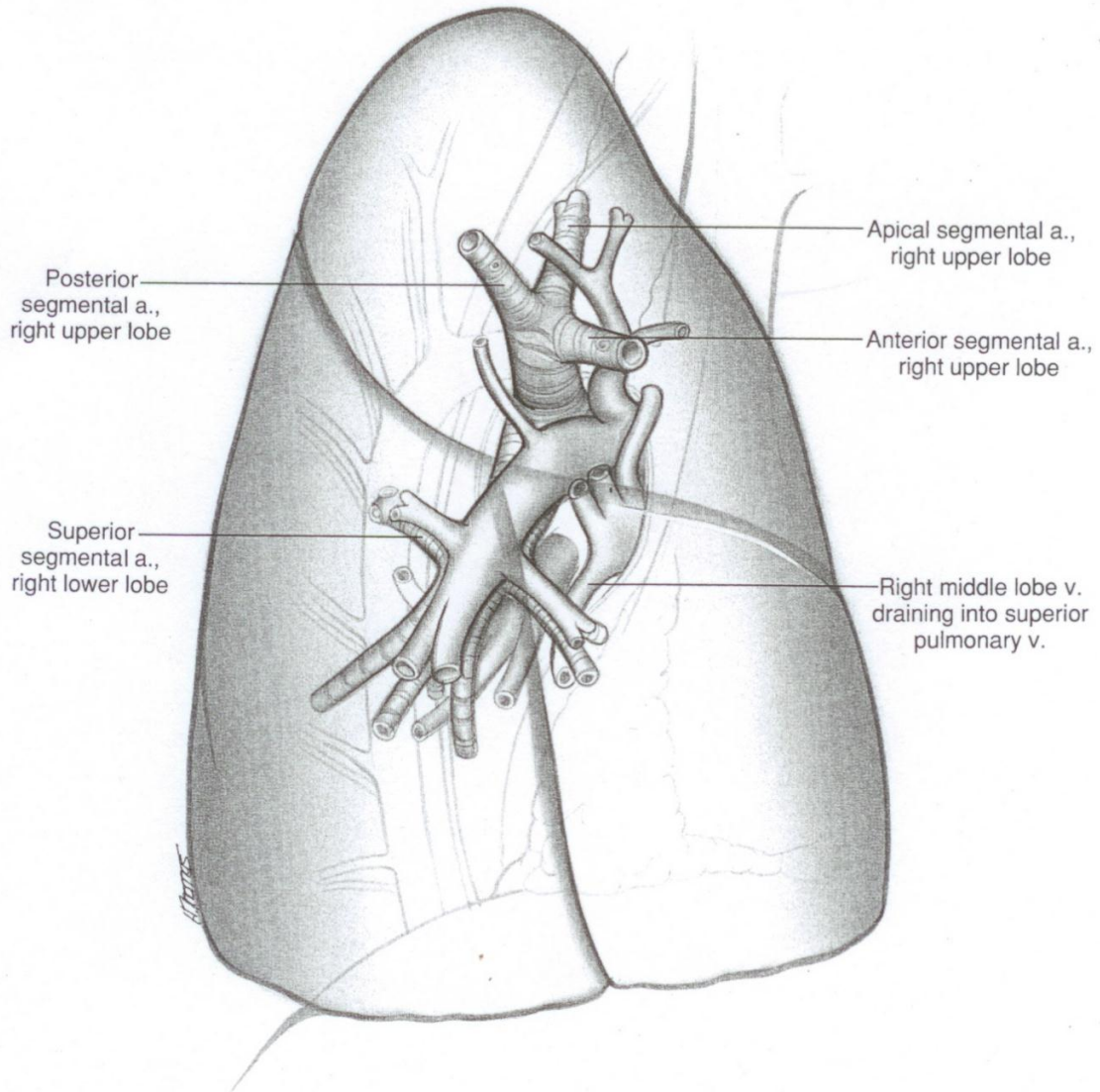


RIGHT LUNG, ANTERIOR OBLIQUE VIEW

We can see the bronchus to the right upper lobe with its trifurcation and its arterial blood supply. The posterior arterial branch to the posterior segment of the right upper lobe can be seen as it comes from the pulmonary artery caudad to the right upper lobe takeoff, rather near the longitudinal fissure. It moves posteriorly and cephalad to supply the posterior segment. This artery branch has to be looked for. It is sometimes hard to dissect and can be a source of trouble to the surgeon. The superior pulmonary vein is well seen anteriorly. The spatial configuration of the bronchi and arteries are shown, whereas the inferior pulmonary vein is seen as a main channel only.

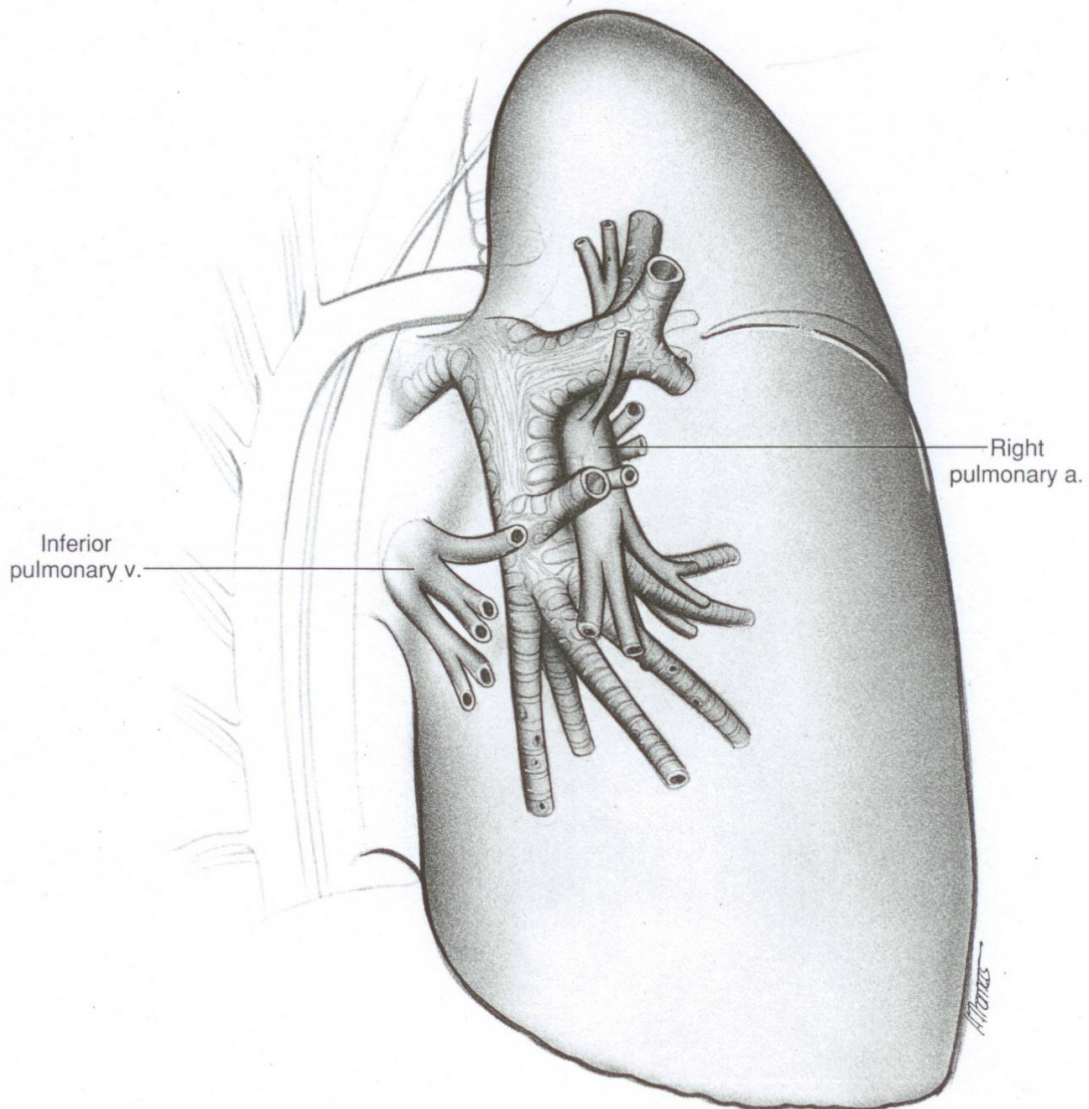


Right Lung - Lateral View

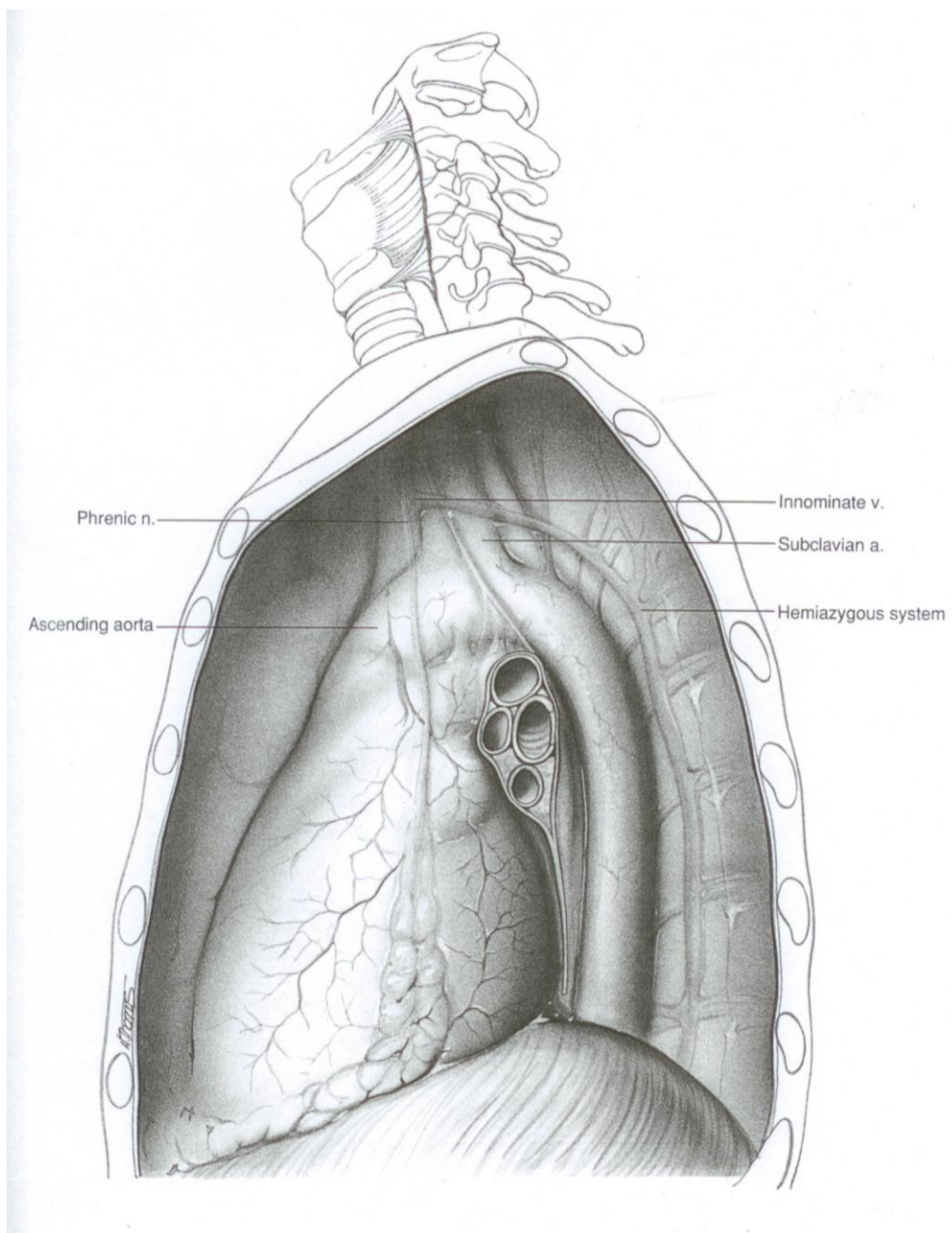


RIGHT LUNG, POSTERIOR VIEW

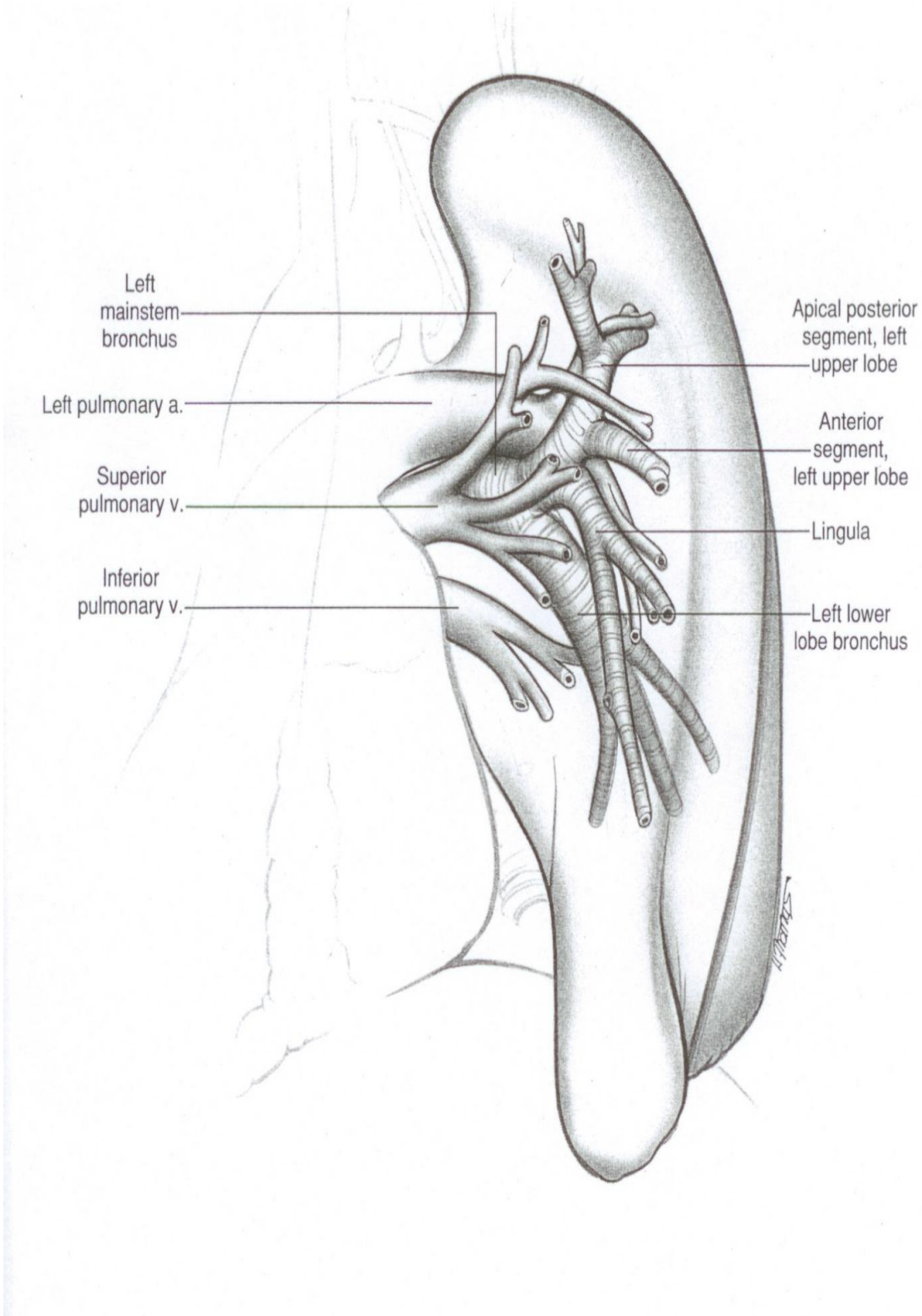
The fissure outlining the superior segment of the right lower lobe comes up quite high since this is a rather voluminous segment. The anatomy of the bronchus is seen. The cartilaginous horseshoes all face forward with their open hoops posteriorly connected by the membranous portion. This means that one has always to exercise more care in dissecting the thin posterior membranous portion of the tracheobronchial tree than the tougher anterior-cartilagenous portion of the tracheobronchial tree. It is relatively clearly shown how one can approach from posteriorly the right upper lobe bronchus since the arterial and venous supplies to the right upper lobe are primarily anterior to this lobe. It can also be seen that the main pulmonary artery runs lateral and anterior to the bronchus down the lung. The inferior pulmonary vein is primarily caudad to the bronchus intermedius. As already mentioned, these veins drain from the intersegmental planes and tend to be caudal to the bronchi in this location.



Left Hemithorax

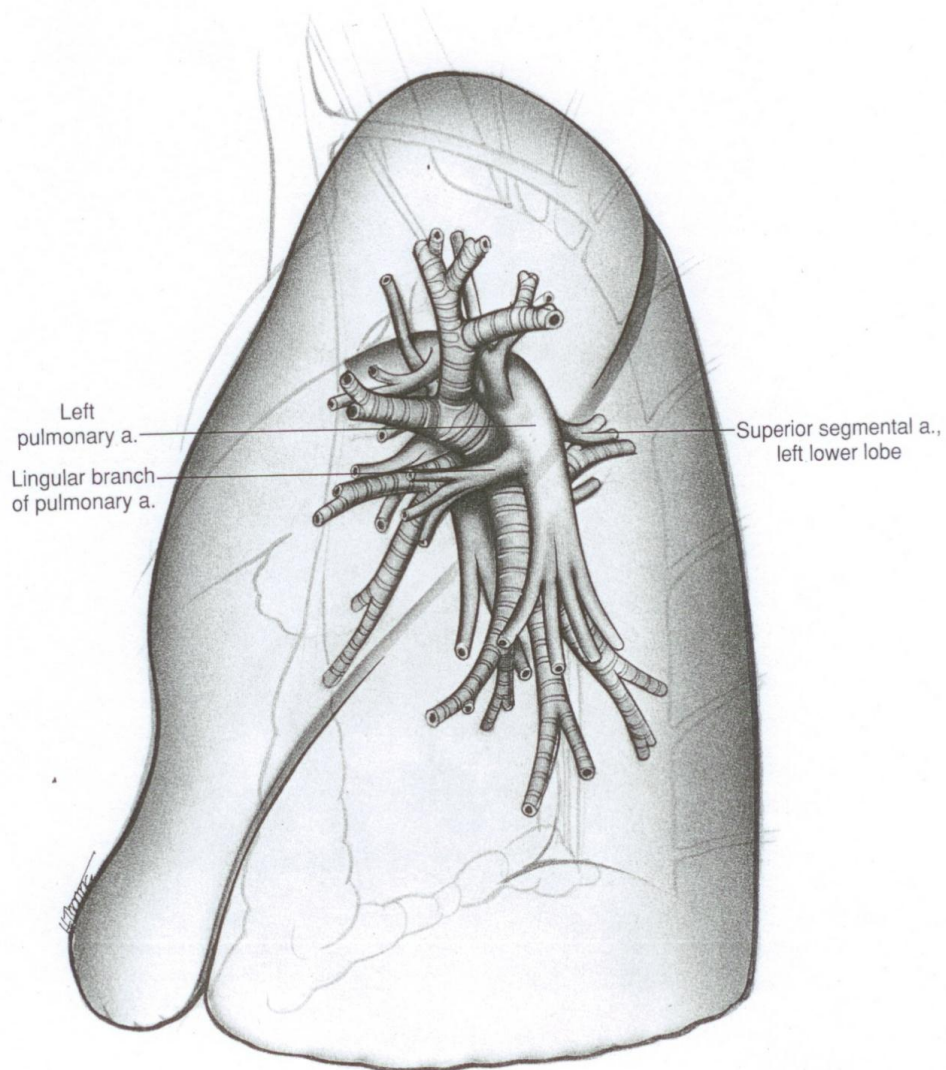


Left Lung – Anterior View



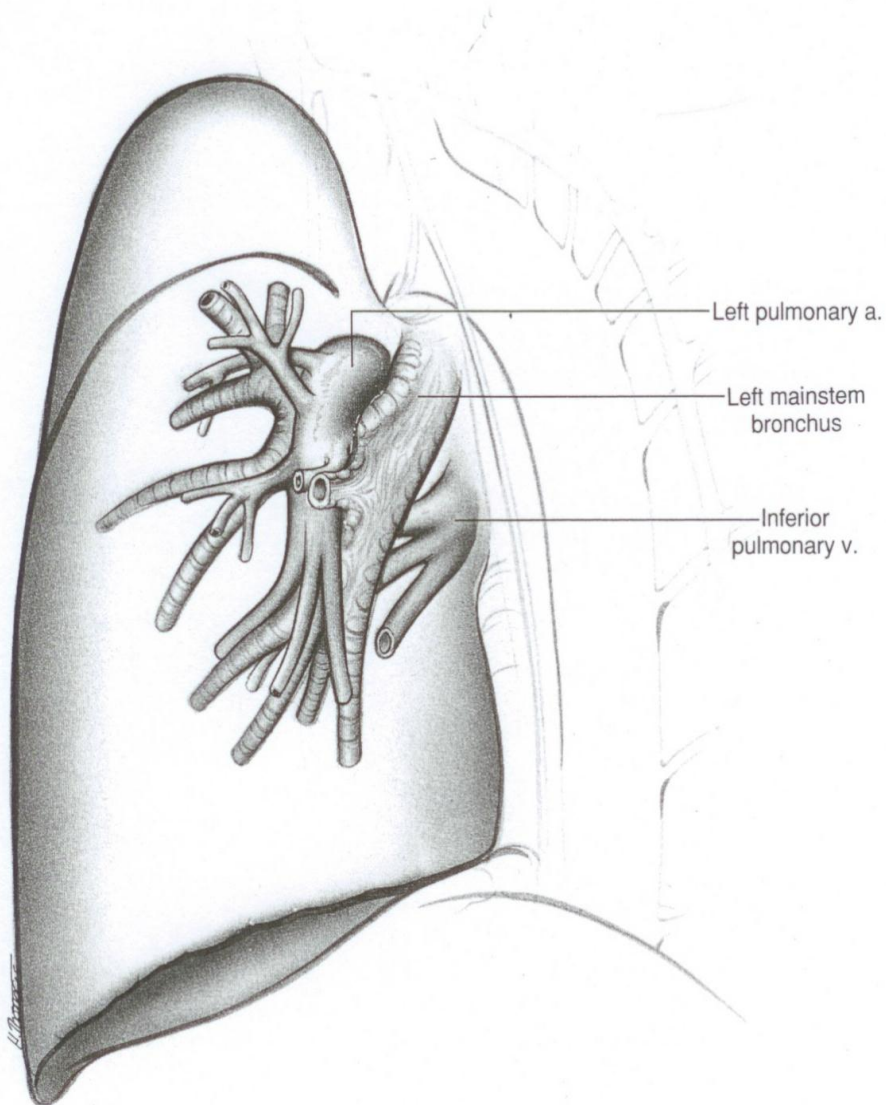
LEFT LUNG, LATERAL VIEW

This is the lateral view of the left lung. The artist has drawn in the standard anatomy which the surgeon should be familiar with and look for. As one opens the longitudinal fissure, the structure seen first is the main pulmonary artery. Here one can see the lingular artery branch, which runs anteriorly in the lowest portion of the left upper lobe. There is a more proximal arterial branch going up to the anterior segment and a branch to the posterior segment. As mentioned already, these branches are variable. The superior segmental branch can be seen running to the superior segment of the left lower lobe. The bronchus is very hard to expose in this area until the necessary branches of the pulmonary artery are divided so that the bronchus can be uncovered. The left upper lobe bronchus with its inferior division lingula and superior division containing the rest of the upper lobe segments is clearly seen. The superior segmental bronchus and then the continuation into the left lower lobe basal segmental bronchus are also seen. The inferior pulmonary vein is hidden and is not readily visible in this approach, although one can see some of it slightly anterior and caudal to the bronchus.



LEFT LUNG, POSTEROLATERAL VIEW

In this view we see the hilar anatomy from the rear. Here the pulmonary artery is seen to be the highest portion of the hilum. Caudal to that in roughly the same plane is the left mainstem bronchus. The tracheal carina is rather high near the aortic arch in this approach. The inferior pulmonary vein can be well seen here since it is in the same plane as the bronchus and caudal to it. The various branches of the upper lobe and lower lobe bronchi are well depicted. The surgeon should be very familiar with the standard anatomy in any approach to the lung but should be alert for anatomic variations, which are all too common.



SESSIONS

Total of 4 – Four hours each

4 stations (tables)

8 residents in each session (2 per table)

4 instructors in each session (1 per table)

Dry Lab Procedure (Right Lung)

Hilar dissection

Isolation pulmonary arteries and veins

Isolation of bronchi

Dissection and identify of segmental anatomy

Wet Lab Procedure (Left Lung)

Thoracotomy

Lung palpation (nodule location)

Wedge excision

Segmentectomy

Lobectomy

Hilar and mediastinal lymph node dissection

References

Text: Pearson's Thoracic and Esophageal Surgery, 3rd edition, Ed., GA Patterson, JD Cooper, J Deslauriers et al., 2008.

Text: General Thoracic Surgery, 5th edition, Ed. TW Shields, 2000.

Text: Thoracic Surgery Clinic; Thoracic Anatomy, Part 1, Ed. J Deslauriers, 2007.

Text: Thoracic Surgical Oncology. Ed., EJ Beattie, ND Bloom, JC Harvey, 1992.