Lung Cancer

Pathology	• Small cell lung cancer represents 25%. **Non-small cell represents 75%**, and includes squamous cell carcinoma (30%), adenocarcinoma (35%), large cell carcinoma (5-10%), and bronchoalveolar carcinoma. **Tissue biopsy is needed** to distinguish the two.
Risk Factors	• **Cigarette smoking** (>85% of patients) with a linear relationship between pack-years and risk. Adenocarcinoma has the lowest association with lung cancer. Passive smoke, redone (high levels in basements), and COPD (independent risk factor even after smoking is taken out). Asbestos (common in shipbuilding and construction, car mechanics, and painting professions) and smoking synergistically increase risk of lung cancer.
Local Symptoms	• Most commonly associated with **squamous cell**. Airway involvement can lead to cough, hemoptysis, obstruction, wheezing, and dyspnea. Recurrent pneumonia (post obstructive).
Constitutional Symptoms	• Anorexia, weight loss, and weakness. Usually associated with advanced disease.

Lung Cancer (cont)

Staging	• NSCLC uses the TNM system. • SCLC is either limited (confined to chest plus supraclavicular nodes--but not cervical or axillary nodes) or extensive (outside the chest and supraclavicular nodes).
Prognosis	• In SCLC, 5-year survival is 10-13% for limited disease and **1-2% for extensive disease**. 85% of SCLC have extensive disease at time of presentation. Overall 5-year survival for lung cancer is 14%.
Metastatic Disease	Most common sites are brain, bone, adrenal glands, and liver.
Malignant Pleural Effusion	Occurs in 10-15% of patients. Prognosis is very poor and equivalent to distant metastases.

Types

Features of NSCLC	• Squamous (20-25% of lung cancer) is **usually central and can have necrosis/cavitation**. It is associated with **hyperCa** and the leading cancer in nonsmokers. • Adenocarcinoma (40-50%) is often **peripheral**, involves **pleura** in 20% of cases, and can be associated with **pulmonary fibrosis, clubbing, and hypertrophic osteoarthropathy**. • Large cell (5-10%) is usually peripheral and associated with gynecomastia and galactorrhea.

Types (cont)

Features of SCLC	• Accounts for 10-15% of cases. • **Central**, tend to narrow bronchi by extrinsic compression, and widespread metastases are common (50-75% of patients at presentation). • Associated with **Cushing syndrome, SIADH**, and Lambert-Eaton syndrome.

Solitary Pulmonary Nodule

Pathology	Single, **well circumscribed** nodule on CXR without associated mediastinal or hilar lymph node involvement. Has a wide differential diagnosis.
Diagnosis	Flexible bronchoscopy for central lesions, transthoracic needle biopsy, PET scan.
CXR	If stable for more than 2 years, likely benign. Malignant lesions grow relatively rapidly. Growth over days is usually infectious or inflammatory (not malignant).
Indications of Benign Nodule	Younger age (50% chance of malignancy if patient is >50), nonsmoker, **smaller size (<1cm)**, **smooth/discrete borders**, dense, central calcification (eccentric asymmetric calcification indicates malignancy), no change in size.
Low Probability Nodules	Get serial CTs.
Intermediate Probability	<1cm: serial CTs.



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Solitary Pulmonary Nodule (cont)

Intermediate Probability >1cm	**PET scan**. If positive, transthoracic needle aspiration biopsy or fiberoptic bronchoscopy, then excise the nodule.
High Probability	Excision

Syndromes

SVC Syndrome	• Occurs in 5% of patients and is cause by **obstruction of the SVC** by a mediastinal tumor (most commonly SCLC). Associated with **facial fullness, dyspnea, venous congestion, facial and arm edema**, dilated veins over the anterior chest, arms, and face, and JVD.
Phrenic Nerve Palsy	• Occurs in 1% of patients: destruction of phrenic nerve by tumor, as the phrenic nerve courses through the mediastinum to innervate the diaphragm. Results in **hemidiaphragmatic paralysis**.
Recurrent Laryngeal Nerve Palsy	• Occurs in 3% of patients. Causes hoarseness.
Horner's Syndrome	• Due to invasion of cervical sympathetic chain by an apical tumor. • Symptoms include **unilateral facial anhidrosis, ptosis, and miosis**.

Syndromes (cont)

Pancoast's Tumor	• Superior sulcus tumor. • Apical tumor involving C8 and T1-T2 nerve roots, causing **shoulder pain radiating down the arm**. • Usually squamous cell cancers. • Symptoms include **pain, UE weakness** due to brachial plexus invasion, supraclavicular lymph node enlargement, and weight loss. • Associated with Horner's Syndrome (ipsilateral ptosis, mitosis, enopthalmos, and anhidrosis) 60% of the time. Usually NSCLC.

Syndromes (cont)

Paraneoplastic Syndromes	• **SIADH in SCLC** (10%). • Ectopic ACTH secretion in small cell carcinoma. PTH-like hormone secretion is squamous cell carcinoma (constipation, thirst, anorexia). • Hypertrophic pulmonary osteoarthropathy in adenocarcinoma and squamous cell carcinoma, associated with **severe long bone pain**. • Eaton-Lambert Syndrome most common in SCLC and looks like myasthenia gravis (proximal muscle weakness/-fatigablity, diminished deep tendon reflexes, paresthesias), digital clubbing.

Treatment

Treatment of NSCLC	**Surgery is the best option**, but patients with metastatic disease outside the chest are not candidates. Recurrence can occur even after complete resection. Radiation is important. Chemotherapy is of uncertain benefit.



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Treatment (cont)

Treatment of SCLC	For limited disease, **combo chemoradiation** therapy used initially. For extensive disease, chemotherapy alone as the initial treatment. If the patient responds, prophylactic radiation decreases incidence of brain metastases and prolongs survival. Usually unresectable.

Testing

CXR	**Most important study for diagnosis**. Demonstrates abnormal findings in nearly all patients. • Stability of an abnormality over a 2 year period is almost always associated with a benign lesion. • May show pleural effusion, which should be tapped and examined for malignant cells.
CT Scan	With **IV contrast**. Very useful for standing and accurate in revealing LAD in mediastinum. Can demonstrate extent of local and distant metastasis.
Cytology of Sputum	Diagnoses **central tumors** in 80% of cases but not peripheral lesions. Provides highly variable results. If negative and clinical suspicion is high, further tests are indicated.

Testing (cont)

Bronchoscopy	Can only be inserted as far as secondary branches of bronchial tree. Useful for diagnosing **central visualized tumors** but not peripheral lesions. The larger and more central a lesion, the higher the diagnostic yield. For visible tumors, bronchoscopy is diagnostic in >90% of cases.
PET Scan	Provides additional information that primary tumor is malignant, detect lymph node and intrathoracic and distant metastases.
Transthoracic Needle Biopsy	Highly accurate and useful for **diagnosing peripheral lesions** as well. Under fluoroscopic or CT guidance. Invasive procedure only used in selected patients.
Mediastinoscopy	Allows direct visualization of superior mediastinum. Identifies patients with advanced disease who would not benefit from surgical resection.

Mediastinal Mass

Causes	**Metastatic cancer** is the most common cause in older patients. If anterior, thyroid, teratogenic tumors, thymoma, or lymphoma. If middle, lung cancer, lymphoma, aneurysms, cysts, or Morgagni hernia. If posterior, neurogenic tumors, esophageal masses, enteric cysts, aneurysms, or Bochdalek's hernia.

Mediastinal Mass (cont)

Clinical Presentation	Usually asymptomatic. If symptoms are present, usually due to compression or invasion. **Cough from compression of trachea or bronchi, sometimes with hemoptysis**. Chest pain, dyspnea, post obstructive pneumonia, dysphasia (esophageal compression), **SVC syndrome, hoarseness (compression of recurrent laryngeal)**, Horner's (compression of sympathetic ganglia), diaphragm paralysis (compression of phrenic).
Germ Cell Tumors	**Anterior mediastinal mass with elevated levels of BhCG and AFP**. Occur primarily in young male patients and are locally invasive. BhCG occurs in both seminomatous and nonseminomatous germ cell tumors, but only the latter makes AFP. Diagnosis confirmed with biopsy. Usually primary tumors and not metastatic from the testicles.
Diagnosis	CT is test of choice. Usually discovered incidentally on CXR.



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