Signs and Symptoms of Lung Cancer

Mohammed Zeitouni, MD, FCCP
Consultant,
Pulmonologist and Intensivist
Department of Medicine
King Faisal Specialist Hospital
Lung cancer
Epidemiology

• Lung cancer is the most common cancer worldwide, accounting for 1.3 million deaths annually.
• Lung cancer is the leading cause of cancer-related death
• It is the most preventable form of cancer
• There are two major types of lung cancer:
  1. Non-small cell lung cancer (87%)
  2. Small cell lung cancer (13%)

Lung cancer
Epidemiology

Estimated Cancer Deaths by Site, 2012

Lung cancer survival

- Lung cancer five-year survival rates average 16%.
- Over half of people with lung cancer die within one year of being diagnosed.
- Survival for non-small cell lung cancer NSCLC is directly related to stage at time of diagnosis.
- Five-year survival ranges from >60% for stage I disease, to <5% for stage IV disease.
- Even for early lung cancers (stage I), there is a relationship between tumor size and survival.
- Early diagnosis increases overall cure rate and allows more limited surgical resection to achieve cure.
Lung Cancer Survival by Stage

Lung Cancer Diagnosis and Survival By Stage, 2001-2007

- **Diagnosis**:
  - Localized: 15%
  - Regional: 22%
  - Distant: 56%

- **5-Year Survival**:
  - Localized: 52%
  - Regional: 24%
  - Distant: 4%

Lung Cancer Symptoms

- Lungs have few specialized nerves (pain receptors)
- Symptoms are frequently **absent** until locally advanced or metastatic disease is present
- Symptoms vary depending on the type and location and size of the tumor.
- The majority (75%) of patients with lung cancer have advanced local or metastatic disease at presentation
- Many symptoms are **similar** to those of other common illnesses.
Lung Cancer Symptoms

• Early Stage:

• No signs! No symptoms!
Lung Cancer Symptoms

Symptoms result from:

• Local effects of the tumor
• Regional or distant spread
• Distant effects not related to metastases (para-neoplastic syndromes)
• Approximately three-fourths of patients have one or more symptoms at the time of diagnosis.
Lung cancer symptoms
Intrathoracic (Local) disease

- Restricted to the area where the cancer started with no signs of spread
- Cough: most common
- Blood in sputum (hemoptysis)
- Shortness of breath (dyspnea)
- Wheezing
- Chest Pain
- Pneumonia
• 50 to 75 percent of patients at presentation
• Most frequently in squamous and small cell carcinomas (central tumors)
• New onset (or change in character) of cough in a smoker or former smoker should raise suspicion that lung cancer could be present
• Bronchorrhea may be a feature of what is previously known as advanced “bronchoalveolar cell carcinoma”

“If you have a persistent cough that lasts for over 3 weeks see your GP”
Intrathoracic (Local) disease

Hemoptysis

• 25-30% of patients with lung cancer
• Bronchitis is the most common cause
• Likelihood of lung cancer 3-34% depending upon age and smoking history
• Hemoptysis in a smoker with normal chest radiograph: 5% lung cancer on bronchoscopy
• 20% of patients upon presentation
• Dull, aching, persistent pain from mediastinal, pleural, or chest wall extension
• Typically present on the same side of the chest as the primary tumor
• Presence of pain does not necessarily preclude resectability
• Obstructive pneumonitis or a pulmonary embolus related to a hypercoagulable state may be the cause of chest pain
25% on presentation due to:

- Airway obstruction: extrinsic or intraluminal
- Obstructive pneumonitis or atelectasis
- Lymphangitic tumor spread
- Tumor or bland emboli
- Pneumothorax
- Localized wheeze: Partial obstruction of a bronchus
Regionally advanced disease

Cancer has directly spread from where it started to nearby tissue or lymph nodes

- **Hoarseness**: tumors involving recurrent laryngeal nerve, causing unilateral vocal cord paresis (L>>R) with hoarseness and a bovine cough. Can be from Laryngeal cancer!

- **Stridor**: high pitched sound, usually heard while taking a breath
  Intrinsic or intraluminal narrowing of upper airways
Regionally advanced disease

- **Hemidiaphragmatic Paralysis**: Bronchial carcinoma can directly invade the phrenic nerve, causing ipsilateral paralysis of the hemidiaphragm.

- **Dysphagia**: difficulty or pain in swallowing from involvement of the esophagus by tumor or mediastinal lymph nodes.

- **Pleural or pericardial effusion** with tamponade and malignant dysrhythmias.
Regionally advanced disease

Pancoast tumor

- Tumor in the apex (the superior sulcus) of the lung can erode the ribs and involve the lower part of the brachial plexus (C8, T1 and T2), causing severe pain in the shoulder and down the inner surface of the arm and atrophy of hand muscles.

- NSCLC (typically squamous cell). Rarely SCLC.

- The sympathetic ganglion can also be involved, producing Horner's syndrome.
  - Ptosis
  - Enophthalmos
  - Miosis
  - Anhydrosis
Regionally advanced disease

Superior Vena Cava Syndrome

- Obstruction of blood flow in the superior vena cava results in signs and symptoms of *Superior vena caval* (SVC) syndrome
- *SVC obstruction* causes shorten of breath, early morning headache, facial congestion and edema involving the upper limbs; the jugular and chest veins are distended
- The chest radiograph shows widening of the mediastinum or a right hilar mass
- SCLC is the most common cause
Distant metastases

Brain

Symptoms are similar to those with other tumors

- Headaches
- Vomiting
- Nausea
- Seizures
- Weakness
- Confusion
- Visual disturbances

SCLC: 20-30% of patients at presentation

Role for prophylactic cranial irradiation

NSCLC: adenocarcinoma and least with squamous cell carcinoma. Larger tumor size and the presence of node involvement
Distant metastases

- **Bone**
  Common. Bone pain and pathological fractures

- **Liver**
  Uncommon(3%) early. Detected by liver enzyme abnormalities, CT or PET
  - Abdominal pain (right side)
  - Yellowing of the skin and eyes (jaundice)
  - Fatigue
  - Weight loss
  - Nausea
Distant metastases
Adrenal glands

- Very frequent (40%) post-mortem. Often asymptomatic
- Not all adrenal masses detected on staging scans represent metastasis. Benign lesions (adenomas, nodular hyperplasia, hemorrhagic cysts) are common
- PET may be particularly useful in distinguishing a benign from malignant adrenal mass
- MRI consistent with a benign adenoma or a negative needle biopsy can exclude metastasis
Paraneoplastic Syndromes

- Paraneoplastic Syndromes are remote effects of tumors that are not related to the direct invasion, obstruction, or metastasis
Paraneoplastic Syndromes

Hypercalcemia

- Symptoms of hypercalcemia include anorexia, nausea, vomiting, constipation, lethargy, polyuria, polydipsia, and dehydration
- Confusion, coma, renal failure and nephrocalcinosis are late manifestations
- Incidence 6% squamous cell carcinoma > adenocarcinoma > SCLC
- Poor prognostic factor usually in advanced disease (stage III or IV). Median survival of few months only
Paraneoplastic Syndromes
Hypercalcemia

- **Bony metastasis** and less commonly secretion of a parathyroid hormone-related protein (PTHrP), calcitriol or osteoclast activating factor

- Treatment with hydration and bisphosphonate for **symptomatic** patients who have serum calcium of 12 mg/dL (3 mmol/L) or higher
• 10% of patients with SCLC exhibit SIADH
• SCLC accounts for approximately 75% of all malignancy-related of SIADH
• Symptoms include anorexia, nausea, and vomiting.
• Cerebral edema when onset of hyponatremia is rapid irritability, restlessness, personality changes, confusion, coma, seizures, and respiratory arrest
• Hyponatremia resolves within weeks of starting chemotherapy
• Ectopic production of adrenal corticotropin (ACTH)
• Common in SCLC (worse prognosis) and in carcinoid tumors of the lung
• Muscle weakness, weight loss, hypertension, hirsutism, and osteoporosis
• Hypokalemic alkalosis and hyperglycemia are usually present
Lung cancer (typically SCLC): most common cancer associated with Immune-mediated paraneoplastic neurologic syndromes
Lambert-Eaton myasthenic syndrome (LEMS) precede the diagnosis of SCLC >80% of cases by months-years
• cerebellar ataxia
• sensory neuropathy
• limbic encephalitis
• encephalomyelitis
• autonomic neuropathy
• Retinopathy
• Opsomyoclonus
A CT chest or PET is indicated in current or former smokers who have a suspected paraneoplastic neurologic syndrome
• **Dermatomyositis and polymyositis**: two distinct forms of **inflammatory myopathy**, both of which are manifested clinically by muscle weakness.

• Can be the presenting symptom in patients with lung cancer or can develop after diagnosis.
Paraneoplastic Syndromes

Hypertrophic pulmonary osteoarthropathy (HPOA)

- 3% of all bronchial carcinomas, particularly **squamous-cell carcinomas** and **adenocarcinomas**.
- Symptoms: joint stiffness and severe pain in the wrists, ankles, knees and elbows with **clubbing** of the fingers.
- X-rays show a characteristic proliferative periostitis at the distal ends of long bones.
- Isotope bone scan or PET: diffuse uptake by the long bones.
- It may regress after resection of the lung tumor.
Anemia is frequent in patients with lung cancer and can contribute to fatigue and dyspnea.

Leukocytosis/thrombocytosis: 15% NSCLC bad prognosis.

Eosinophilia: rare.

Hypercoagulable disorders include:

- Trousseau's syndrome (migratory superficial thrombophlebitis)
- DVT/PE
- DIC
- Thrombotic and Nonthrombotic microangiopathy
Paraneoplastic Syndromes
Cancer cachexia or wasting syndrome

- lack of appetite
- weight loss
- weakness
- Feeling tired all the time
Conclusion

• Early detection based on symptoms is difficult in Lung Cancer
• Symptoms often do not appear until the disease has spread
• When lung cancer is diagnosed early, it is a result of Screening or testing for unrelated conditions.
• Chest x-ray and CT scan should be done if lung cancer is suspected
The clinical manifestations of lung cancer can be due to:

- Intrathoracic Local effects of the tumor (cough, hemoptysis, dyspnea)
- Intrathoracic regional effects (hoarseness, stridor)
- Extrathoracic metastases (bone, brain, liver)
- Paraneoplastic phenomena (hypercalcemia, hyponatremia, Cushing's syndrome, hypercoagulability disorders, and various neurologic syndromes).