

# Neoplasms of the Lung

## Neoplasm of the lung:

- Most common cause of death from a malignancy in both male and women
- Risk of death has increased steadily

## Pathology and pathophysiology:

- Most important etiology – cigarette smoking
- Passive smoker – increase the risk by 35 – 50% among nonsmokers
- Can be divided into:

- adenocarcinoma
  - Squamous cell carcinoma
  - Large cell carcinoma
  - Small cell carcinoma

## Adenocarcinoma:

- most frequent – 50%
- usually peripheral and are not always associated with smoking
- histologically into acinar, papillary, bronchoalveolar forms
- prognosis usually worse than that of other adenocarcinoma
- “scar” carcinoma – arise from previous area of inflammation, healed infiltrates, granuloma, TB but with better prognosis

## Squamous cell carcinoma:

- 2nd most common – 30%
- always related to smoking
- originate centrally, grow towards the mainstem bronchus and pulmonary parenchyma, and include the regional, hilar, and mediastinal lymph nodes

## Large cell carcinoma:

- occurs as peripheral lesions
- rapidly invade the lung parenchyma and tend to metastasize early

## Small cell carcinoma:

- distinguished by the presence of cytoplasmic neurosecretory granules on EM
- almost always unresectable and then to metastasize early to the liver, brain, bone, adrenal

## Bronchopulmonary carcinoids:

- are low grade neoplasm
- contain neurosecretory granules and may produce peptide hormones
- have much better prognosis

## Clinical manifestations:

- May first be seen as an asymptomatic mass discovered on routine chest radiograph
- Centrally located lesions - cough, stridor, wheezing, hemoptysis, dyspnea, and chest pain

- Peripheral tumor – pleuritic and musculoskeletal pain
- SCC may undergo cavitation and occur as a lung abscess
- Involvement of the recurrent laryngeal nerve is associated with hoarseness
- Tumors arising from the endothoracic fascia of the lung apices (Pancoast tumor) may invade the 8th cervical and 1st thoracic nerve and the sympathetic chain and occur with arm and shoulder pain and Horner's syndrome (enophthalmus, ptosis, meiosis, ipsilateral anhidrosis)
- Malignant pleural and parietal effusions result in dyspnea and arrhythmias
- Tumor invading the right hilum and mediastinum can result in the superior vena caval syndrome – plethora, venous distension of arm and neck, edema of face, neck and arms
- Paraneoplastic syndromes are associated with small cell lung cancer – hypercalcaemia, neuropathies, myopathies, and hypertrophic pulmonary osteoarthropathy from ectopic production of PTH, ACTH, ADH, and calcitonin

### **Diagnosis and staging:**

- Extremely important because the staging determines prognosis and the selection of treatment protocols
- The workup of all pulmonary malignancies begins with a chest radiograph
- Pulmonary neoplasm may appear as a single solitary nodule, a pneumonic infiltrate, or a hilar mass (compare with old film taken before)
- Elevation of diaphragm and the presence of a pleural effusion are ominous signs and usually are associated with unresectable tumors
- CT scans have become more important – detect enlarged hilar and mediastinal nodes and possible liver and adrenals metastases
- Bronchoscopy is helpful in determining the presence or extent of endobronchial lesions
- Bronchial biopsy, brushings and washing are used to make histologic diagnosis
- PET – differentiate benign from malignant pulmonary nodules by demonstrating increased glucose metabolism in malignant cells
- Thoracoscopy is helpful to confirm pleural invasion and the biopsy of subaortic, paraesophageal, carinal, and hilar lymph nodes

### **Determination of resectability:**

- Surgical excision offers the best hope for cure
- Definitive contraindication:  
distant metastases  
Malignant pleural or pericardial effusion  
Contralateral and extrathoracic adenopathy  
Involvement of the laryngeal nerve
- Relative contraindication: poor pulmonary function  
Presence of T4 and N2 disease

### **Surgical procedures:**

- Must remove the entire tumor with adequate margins, while preserving the maximal amount of functional lung tissue
- Lobectomy is commonly performed
- Segmentectomy and wedge resections are best performed for T1 lesions and patient with limited pulmonary reserve
- Although dissection of the mediastinal lymph node may improve the accuracy of staging, it has no impact on patient survival

### **Management of small cell lung cancer:**

- SCL has a dismal prognosis, with a 2-year survival of only 10%
- Mainstay of therapy - multiple chemotherapeutic agents
- With limited SCL, combination of chemotherapy and radiation therapy are instituted, followed by a repeated set of whole body scan to exclude distant metastases
- If none is found, surgical resection is performed followed by postoperative radiation therapy and chemotherapy

### **Benign tumor of lung:**

- Usually asymptomatic and are first seen as peripheral lesions on routine chest radiograph
- A conservative pulmonary resection (wedge or segmentectomy) should be performed
- Hamartomas are the most common, asymptomatic and appear as solitary pulmonary nodule.

They contain cartilaginous tissue and calcium deposits

Presence of popcorn calcification is pathognomonic

- Bronchial adenomas are the second most common

Majority are carcinoids

10-15%, atypical cells will be found, which are associated with higher incidence of regional lymph node spread and a poorer 5-year survival

### **Preoperative evaluation of pulmonary function:**

- All patients in whom a pulmonary resection is planned should undergo pulmonary-function testing and measurement of arterial blood gases

- Pulmonary function testing:

by spirometry

vital capacity (VC) - maximal volume of air that can be exhaled/inhaled after maximal expiration/inspiration

- FEV1 - volume of air expired in 1 sec and tests maximal expiratory airflow

Decreased in obstructive and may also decrease in restrictive disease

Ratio FEV1: VC - decrease in obstructive but normal in restrictive

- DLCO - a single-breath CO diffusion capacity test to measure pulmonary diffusion capacity

reduction may be due to collagen diseases, sarcoidosis, infiltrative, emphysema

- ABG - for assessing oxygenation

Increased level of Pco<sub>2</sub> are associated with increased incidence of

postoperative pulmonary complication

- V/Q scan - measure the distribution of ventilation compared with blood flow in the

various segment of the lung

provide a more accurate estimation of the amount of normal-function in lung that will remain after a pulmonary resection

- Preoperative evaluation of operative risk:

- patients with FEV1 of > 0.8L have a moderate risk of severe postop complication

- risk becomes prohibitive with FEV1 < 0.5L

- the presence of pulmonary hypertension and hypercapnia ( Pco<sub>2</sub> > 45) are relative contraindication

- MVO<sub>2</sub> - measurement of maximal oxygen consumption may be an important predictor of patients outcomes

Reference :

Essential of surgery - chapter 28, disorders of trachea, chest wall, pleura, mediastinum, and lung Page 347

