

Carcinoma of the lung

Carcinoma of the lung or pulmonary carcinoma is a malignant lung tumor characterized by uncontrolled cell growth in the tissues of the lung, if left untreated this growth can spread beyond the lung by process of metastasis into nearby tissue or other parts of the body. Most cancer that start in the lung known as primary lung cancer are carcinomas that drive from epithelial cells, it is however more common in men and it has poor prognosis. The incidence has shown a marked rise during recent years partly because of improve methods of diagnosis and partly due to excessive rise in cigarette smoking, both active and passive smoking are implicated in addition to inhalation of irritant materials such as silica or cobalt dust.

Clinical types:

- A. Central type:** is the commonest type form about **75%**, it arises in one of the main bronchi or their Primary division leading to bronchial obstruction with secondary changes in the lung such as atelectasis.
- B. Peripheral type:** it's form **25%** arises from the smaller bronchi and remains symptomless for long time.

Histological type:

Four main histological subtypes recognized although some cancers contain a combination of different subtypes.

1. **Adenocarcinoma:** nearly represent about **40%** of all lung cancer which usually originates in peripheral lung tissue. Although most cases of adenocarcinoma are associated with cigarette smoking, adenocarcinoma is also the most common form of lung cancer among people who have smoked fewer than 100 cigarettes in their life and those who are never smoke.
2. **Squamous cell carcinoma:** account for about **30%** of all lung cancer, they typically occur close to the large airways, a hollow cavity and associated cell death are commonly found at the center of the tumor (the tumors have tissue necrosis in the center lead to formation of a cavity).
3. **large cell carcinoma:** constitutes about **9%** of all lung cancer and are so named because the Cancer cell are large with excess cytoplasm and large conspicuous nuclei.
4. **Small cell lung cancer:** the cells contain dense neurosecretory granules (vesicles containing neuroendocrine hormones) which give this tumour an endocrine/ paraneoplastic syndrome association. Most cases arise in the large airways primary and secondary bronchi. These cancers grow quickly and spread early in the course of the disease, 60% to 70% have metastatic disease at time of presentation, this type of lung cancer is strongly associated with smoking.

Superior sulcus tumor or (Pancoast tumor): it is a low grade non-small cell lung carcinoma that grows slowly and metastasize late, infiltrate and involves lower root of brachial plexus, intercostal nerve, cervical sympathetic nerves and eroding the upper ribs producing shoulder and arm pain, Horner's Syndrome and weakness and a trophy of the muscles of the hands most commonly caused by the local extension of an apical lung tumour.

Clinical features of carcinoma of bronchus:

1. **Cough:** dry or productive.
2. **Haemoptysis.** From mild to severe and massive.
3. **Chest pain,** usually vague pain but become sharp if the parietal pleura is involved.
4. **Dyspnea.**
5. **Pleural effusion.**
6. **Anorexia and weight loss.**
7. **Clubbing of fingers,** in advanced long-standing disease.
8. **Hoarseness of the voice,** due to recurrent laryngeal nerve infiltration by the tumor.
9. **Dysphagia** due to involvement of the esophagus.
10. **Hormonal syndromes:** ectopic ACTH, ADH, hypercalcemia and carcinoid syndrome.

Diagnosis:

1. **History and physical examination.** (please check for cervical lymph nodes).
2. **Investigations:**
 - a. **Non-invasive tools:** Chest X-Ray, chest CT Scan, sputum for cytology.
 - b. **Invasive tools:** Bronchoscopy with bronchoalveolar lavage, bronchial brush and biopsy, FNAC or true-cut biopsy under C-T Scan guide, pleural fluid aspiration for cytology, diagnostic thoracoscopy and mediastinoscopy, open lung biopsy or thoracotomy to resects the affected lung lobe, lobes or to remove the whole lung (pneumonectomy).

Metastasis:

Primary lung cancers themselves most commonly metastasize to the brain, bones, liver and adrenal glands.

Lung cancer staging:

It is the assessment of the extent to which a lung cancer has been spread from its original source. As with most cancer staging is an important determinant of treatment and prognosis. In general, the more advanced stages of the cancer are the less amenable for treatment and have a worse prognosis. The initial evaluation of non-small cell lung cancer staging uses the TNM classification, this is based on the size of the primary tumour, lymph node involvement and distant metastasis. For this we have noninvasive technique such as CT scan and PET scan and invasive technique such as biopsy and surgery.

Using the TNM descriptors, a group is assigned ranging from occult cancer through stage 0, IA, IB, IIA, IIB, IIIA, IIIB and IV. This stage group assist with the choice of treatment and estimation of prognosis. For both non-small cell lung cancer and small cell lung cancer the two general types of staging evaluation are clinical staging and surgical staging. The clinical staging is performed prior to definitive surgery, it is based on the results of imaging studies such as CT Scan and PET Scan and biopsy results. The surgical staging is evaluated either during or after the operation and is based on the combination of the results of surgical and the clinical findings including surgical sampling of the thoracic lymph nodes.

Operability and resectability of the lung cancer:

Operable patient means he is generally and medically fit, and no medical contraindications for surgery. Inoperable patient means you cannot take him to the theatre because he has some serious medical illness that made him unfit for anesthesia and surgery or certain signs that made him inoperable.

Signs of inoperability:

1. Bloody pleural effusion positive for malignant cells.
2. Horner's Syndrome, indicate cervical sympathetic nerve involvement.
3. Vocal cord paralysis, indicates recurrent laryngeal nerve involvement.
4. Elevated hemidiaphragm, indicates phrenic nerve involvement and palsy.
5. SVC obstruction, due to external compression by the tumor.
6. Distant metastases.
7. If during surgery the tumour seen to be locally spreading or cannot be removed technically or fixed to the pulmonary artery or to the heart make the tumor technically unresectable.

inoperable (patient not fit for GA + tumor is advanced Stage IIIB&IV).

irresectable (technically difficult or dangerous to remove the tumor).

Treatment:

1. **Surgery:** more than 50% of the patients with lung cancer have distant metastases at the time of diagnosis. Those patients undergoing surgery, about 50% of them have unresectable tumour per-operatively. Surgery includes segmentectomy, lobectomy, bilobectomy and pneumonectomy for candidate patients.
2. **Radiotherapy:** For preoperative downstaging of the disease or postoperative it is useful for squamous cell carcinoma as adjuvant therapy.
3. **Chemotherapy:** Vincristine or Adriamycin are effective in adenocarcinoma, while Bleomycin is an antitumor antibiotic used for pleurodesis in malignant pleural effusion.

The point of metastatectomy is there treatment of choice in selected patients with metastasis to the lung, this policy may change as more effective systemic chemotherapy become available.

Differential diagnoses of a solitary lung lesion:

1. Hydatid cyst, which is more common in Iraq (endemic area).
2. Tuberculoma, one of the complications of pulmonary tuberculosis.
3. Angiomatous malformation: Pulmonary AVF and AVM.
4. Primary benign lesion: chondromas and hamartomas.
5. Primary malignancy of the lung.
6. Metastatic malignant tumour.

