Lung Cancer

Definition of lung cancer

- Malignancy arising from lung tissue

Epidemiology of lung cancer

- Commonest malignancy in western world
- Commonest cause of death in men and women in the UK
- Approximately 38 000 new cases diagnosed annually in the UK
- 90% are smoking-related

Types of lung cancer

- Non- Small cell lung cancer (NSCLC)
    - Approximately 75-80% of all lung malignancy
    - Squamous cell carcinoma
        - Commonest primary lung malignancy
        - Associated with hypercalcaemia
        - Usually presents as a mass on CXR
    - Adenocarcinoma
        - Not necessarily associated with smoking
        - Can be primary or metastatic
    - Alveolar cell carcinoma

- Small cell lung cancer (SCLC)
    - Approximately 20-25%
    - Most aggressive
        - Frequent sites of metastases are liver, bone, adrenals and brain
    - Associated with syndrome of inappropriate ADH (SIADH)
    - Chemosensitive and radiosensitive

Rarer types of lung cancer

- Carcinoid
    - 1% all tumours – 60% visible from bronchial tree
    - Vascular, tend to bleed
    - Originate from APUD
    - Only a small number lead to carcinoid syndrome
    - 5 year survival 90% with surgery
- Mesothelioma (sometimes classified as a 'lung cancer')
    - Causes - Asbestos
    - M>F
    - Presentation: Pleuritic chest pain, Pleural effusion, Anorexia, night sweats
    - Treatment: Chemo/RT, treatment of pleural effusions

Risk factors for lung cancer

- Smoking
- Scarring
- Asbestos
- Air pollution including biofuels

Presentations of lung cancer

- Local tumour effects
  - Persistent cough or change in usual cough
  - Haemoptysis
  - Chest pain
  - Shortness of breath
  - Hoarse voice – invasion of left recurrent laryngeal nerve
  - Unresolving pneumonia
  - Pleural effusion
  - Raised hemidiaphragm – phrenic nerve paralysis
- Metastatic tumour effects
  - Lymphadenopathy
  - Bone pain/ pathological fracture
  - Neurology secondary to cerebral mets
  - Hypercalcaemia effects – bony mets
- Paraneoplastic syndromes
  - Hypercalcaemia (NSCLC – especially squamous cell)
    - Due to parathyroid hormone related peptide (PTHrP)
  - SIADH (SCLC)
  - Cushing's (SCLC)
    - Due to ectopic ACTH production
  - Gynaecomastia
  - Hypertrophic pulmonary osteo-arthropathy
    - More common in squamous and adeno
  - Lambert-Eaton Myaesthenic syndrome - LEMS (SCLC)
    - Proximal limb and trunk weakness. Associated with autonomic symptoms and hyporeflexia.
  - Glomerulonephritis

Differential diagnosis of lung cancer (mass on CXR)

- Metastases
- Hamartoma
- Granuloma (TB, sarcoid)
- Abscess
- Cyst
- AV malformation
- Skin tumour

Investigation of lung cancer

- Blood
  - FBC, U&E, LFT, Ca, clotting
- Sputum cytology
  - Good for SCLC and squamous
- Urine
  - Protein (?membranous GN)
- CXR

- Can be normal. Will show location of lesion, secondary pneumonia, pleural effusion, rib destruction, mediastinal lymphadenopathy
- Diagnostic pleural tap or FNA of lymph nodes
- CT (contrast enhanced)
  - Shows local spread and secondaries
  - Include brain, liver and adrenals
- PET
  - Good for imaging mediastinum, esp to see if enlarged node are malignant
- Pulmonary function tests (for treatment)
  - FEV1<1.5 is a contraindication for surgical resection
- Bronchoscopy
  - Good for defining anatomy and taking biopsy
- Percutaneous aspiration and biopsy (under CT guidance)
  - Good for getting a sample of a peripheral tumour not accessible using bronchoscopy. 25% chance of pneumothorax so contra-indicated if FEV1 < 1

Staging of lung cancer (TNM staging System)

- Tumour (T)
  - T1 – Contained within the lung and is <3cm
    - T1a<2mc, T1b 2-3cm
  - T2 – Between 3 and 7cm across **or** has grown into the main bronchus >2cm below the carina **or** has invaded the visceral pleura **or** lobar collapse
    - T2 tumours that are 5cm or smaller are classed as T2a and those larger than 5cm are T2b
  - T3 (extrapulmonary) – larger than 7cm **or** has grown into one of the following structures:
    - Chest wall, pleura, diaphragm, pericardium, Main bronchus <2cm from carina
  - T4 (extrapulmonary) – into one of the following structures:
    - Mediastinum, large vessels, trachea, oesophagus, spine, laryngeal nerve

- Nodes (N)
  - N0 – no nodes
  - N1 – nodes nearest the affected lung
    - NB – will be removed with pneumonectomy
  - N2 – Mediastinal nodes on same side
  - N3 – Nodes on other side or above clavicles

- Metastases (M)
  - M0 – no mets
  - M1a – mets in both lungs **or** a malignant pleural effusion or pericardial effusion
  - M1b – mets elsewhere

Management of lung cancer

- Surgery
  - Mainly for NSCLC
  - Curative only in T1M0N0 non-small cell disease
  - About 5-10% of cases.
  - Operative mortality in over-65s exceeds 5-year survival

    - Contraindications
        - SVC obstruction
        - Tumour within 2cm of either main bronchus (as not enough resection margin for pneumonectomy)
        - FEV1<1.5
    - Survival improved with adjuvant chemo
        - For SCLC the median survival is 16 months. Full response rate in 40-50%, partial in a further 40%.
- Chemotheray
    - For SCLC
- Radiotherapy
    - High dose radiotherapy can be curative in patients with slow-growing squamous carcinoma
    - Causes some (often asymptomatic) pulmonary fibrosis
    - Can use chemoradiotherapy for advanced disease
- RT with palliative Intent
    - Can be used to treat haemoptysis, bone pain and SVC obstruction in the short term
        - Generally called CHART (continuous hyperfractioned RT)
    - Adjuvant chemo **chemo-RT** can extend median survival in non-small cell disease
    - Laser ablation, Interbronchial brachytherapy and bronchial stents can be used to treat occlusion of bronchi by tumour.
    - Other palliative treatments include:
        - Prednisolone to improve appetite
        - Morphine for pain
        - Regular laxatives
- Treatment of oncological emergencies
    - Superior Vena Caval Obstruction (SVCO)
        - ABC approach
        - Steroids – Dexamethasone 8mg bd
        - Radiotherapy/ chemo to treat cause
        - Intra-luminal stents
    - Cord compression
        - Steroids – Dexamethasone 4mg qds
        - Radiotherapy
        - Surgical decompression
    - Hypercalcaemia
        - Isotonic saline hydration – 3L in 24 hours at least (250ml/hr)
            - Avoid overload. Can use furosemide to increase calcium excretion
        - Steroids
        - Bisphosphonates e.g. Pamidronate 30-60mg over 2 hours, Zolendronic acid 4mg over 2 hours.

Complications of lung cancer

- Tumour
    - Local
        - Recurrent laryngeal nerve palsy
        - Phrenic nerve palsy
        - Brachial plexus invasion
        - Horner's syndrome
    - Distant
        - Mets
            - Brain, bone, liver

- Adrenal symptoms (Addisons)

- Endocrine
  - SIADH – **small cell**
    - Concentrated urine (Na >20mmol; osm > 500)
    - No hypovolaemia, oedema or diuretics
  - ACTH (Cushings) – **small cell**
  - PTH **- squamous cell**
    - Actually PTHRP
    - Can lead to hypercalcameia
- Neurological
  - LEMS (pre-synampic calcium channel Abs)
  - Neuropathy (anti-Hu)
  - Cerebellar degeneration (anti-Yo or Purkinje)
- Muscular
  - Polymyositis
  - Proximal myopathy
  - HPOA

Prognosis of lung cancer

- SCLC: untreated, the prognosis is 6 weeks
- Others depend of type, stage and grade

Common questions concerning Lung Cancer

- What are the main types of lung cancer?
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- What is a Pancoast's Tumour?
    - An apical tumour that can cause Horner's Syndrome (meisosis, ptosis, enopthalmos and anhidrosis) and weakness of small muscles of the hand (C5/6 and T1 motor loss).

- What is lymphangitis carcinomatosis?
    - Infiltration of pulmonary lymphatics by tumour. Causes cough and shortness of breath.CXR shows fine linear shadowing throughout both lung fields. Treatment with steroids. Poor prognosis.

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    - Tumour-related
        - Local
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            - Phrenic nerve palsy
            - Brachial plexus invasion
            - Horner's syndrome
        - Distant
            - Mets
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