Pathology of Respiratory System
“Practical”

Black: original content.
Red: Important.
Green: AlRikabi's Notes.
Grey: Explanation.
Blue: Only found in boys slides.
Pink: Only found in girls slides.
Objectives

➔ Acquire the basic knowledge of the histopathological features of lobar pneumonia, bronchopneumonia, emphysema, pulmonary embolus and pulmonary infarction.
➔ Identify the gross appearance of bronchial asthma, bronchiectasis, bronchopneumonia, lobar pneumonia, bronchogenic carcinoma, squamous cell carcinoma and metastatic carcinoma of the lung

Contents

First practical

● Allergic Alveolitis  
● Bronchial asthma  
● Bronchiectasis  
● Chronic Bronchitis  
● Emphysema  
● Lobar Pneumonia  
● Bronchopneumonia  
● Pulmonary Embolus & Infarction

Second practical

● Tuberculosis
● Lung carcinomas:  
  ○ Squamous cell carcinoma  
  ○ Adenocarcinoma  
  ○ Large cell carcinoma  
  ○ Small cell carcinoma  
  ○ Metastatic tumors  
  ○ Mesothelioma
First Practical
This view shows a BRONCHIOLE (left) and Blood Vessel (right) in cross-section as well as numerous ALVEOLI in normal lung at 100X magnification. The bronchiole inner membrane is composed of pseudostratified columnar epithelial tissue. Portions of hyaline cartilage rings can also be seen outside of the bronchiole.

**Classification of Respiratory Diseases**

1. **Inflammatory lung diseases:**
   (Asthma, cystic fibrosis, & COPD)
2. **Restrictive lung diseases:**
   (Allergic Alveolitis)
3. **Obstructive lung diseases:**
   (Bronchial Asthma, Bronchiectasis, & (COPD, CH, Bronchitis & Emphysema))
4. **Respiratory tract infections:**
   - Upper resp. tract infection (sinusitis, tonsillitis, otitis media, pharyngitis & laryngitis)
   - Lower resp. tract infection (Pneumonia & Bronchopneumonia, T.B.)
5. **Malignant tumors** (SquamousCC, adenocarcinoma, Large CC & Small CC)
6. **Benign tumors** (Pulmonary hamartoma, pulmonary sequestration)
7. **Pleural cavity diseases** (eg. Mesothelioma, effusion)
8. **Pulmonary vascular diseases** (Embolism, edema & hypertension)
9. **Neonatal diseases** (pulmonary hyperplasia)

**Restrictive Lung Disease**

- Fibrosing
  - Usual interstitial pneumonia (idiopathic pulmonary fibrosis)
  - Non-specific interstitial pneumonia
  - Cryptogenic organizing pneumonia
  - Associated with collagen vascular disease
  - Pneumocarcinosis
  - Associated with therapies (drugs, radiation)

- Granulomatous
  - Sarcoïdosis
  - Hypersensitivity pneumonia
  - Eosinophilic
  - Loeffler syndrome
  - Drug allergy—related
  - Idiopathic chronic eosinophilic pneumonia
  - Smoking-Related
  - Desquamative interstitial pneumonia
  - Respiratory bronchiolitis

*End-stage: diffuse interstitial pulmonary fibrosis (Honeycomb lung).*
Restrictive Lung Disease (Honeycomb lung) – Cut section

- Extensive fibrosis.
- Organizing diffuse alveolar damage.
- Cystic spaces

Restrictive Lung Disease (Honeycomb lung) – LPF

- Pulmonary fibrosis
- Extensive interstitial collagen deposition
- Minimal lymphocytic inflammatory infiltrate.
- Residual airspace dilation.
Hypersensitivity Pneumonitis—Histopathology & Radiogram
This case of extrinsic allergic alveolitis shows

- interstitial inflammation along alveolar ducts (bronchiolocentric distribution or peribroncholar).
- The inflammation is:
  - Diffuse
  - lacks nodularity

Hypersensitivity Pneumonitis (HP)
- Interstitial bronchiolocentric pneumonitis (Extrinsic allergic alveolitis) with:
  - Lymphocytes
  - plasma cells
  - foamy macrophages in:
    - alveolar space
    - terminal airways.
- Interstitial fibrosis,
- obliterative bronchiolitis
- intra-alveolar exudate
- Nodules of organizing fibroblasts & histiocytes
- Interstitial noncaseating granulomas
- other inflammatory cells.

manifests radiologically as a ground-glass pattern.

Hypersensitivity Pneumonitis (HP)
- Interstitial fibrosis,
- lymphocyte infiltration in the alveolar wall
- Non-caseating granuloma.
- collagen fibers hyperplasia (mainly), especially in the bronchioles due to
  - their respective muscle fibers
  - endothelial cell proliferation & thickening
Bronchial Asthma: Inflammation of the airways causes airflow into and out of the lungs to be restricted.

The muscles of the bronchial tree become tight and the lining of the air passages swells, reducing airflow and producing the characteristic wheezing sound.

Between the bronchial cartilage at the right and the bronchial lumen:
- filled with mucus at the left:
  - submucosa widened by smooth muscle hypertrophy
  - edema,
  - inflammation (mainly eosinophils).

These are changes of bronchial asthma.

Bronchus from a fatal case of bronchial asthma in a 4-year-old child showing:
- Plugging of the lumen,
- Intense inflammatory infiltrate (with eosinophils)
- Vascular congestion.

The peripheral eosinophil count or the sputum eosinophils can increase during an asthmatic attack.

Changes of bronchial asthma:
- numerous eosinophils (prominent from their bright red cytoplasmic granules in this case of bronchial asthma).
In Bronchiectasis:

- Mucus production increases
- Cilia are destroyed or damaged.
- Areas of the bronchial wall become chronically inflamed and are destroyed.

**Bronchiectasis** - Gross pathology & Colored X-ray

- Permanent dilation of bronchi and bronchioles.
- Markedly distended peripheral bronchi.

**caused by:** destruction of muscle and elastic tissue resulting from or associated with chronic necrotizing infection

**Bronchiectasis** - Gross pathology

- Bronchiectasis occurs when there is obstruction or infection with inflammation and destruction of bronchi so that there is permanent dilation.
CHRONIC OBSTRUCTIVE LUNG DISEASES
2- BRONCHIECTASIS (cont.)

Bronchiectasis – Gross pathology

The repeated episodes of inflammation can result in:
- Scarring
- Fibrous adhesions between the lobes.
- Inflammation in the septa.

(Fibrous pleural adhesions are common in persons who have had past episodes of inflammation of the lung that involve the pleura).

Bronchiectasis – HPF
- Chronic inflammation
- Variable inflammation
- Fibrosis of alveoli
- Ulceration of bronchial wall
- Ossification of bronchial cartilage
- Thickened pleura.

Bronchiectasis – LPF

Section of a dilated bronchus with:
- Florid acute on chronic inflammation of the bronchial wall
- Surrounding interstitial fibrosis.
3- Chronic Bronchitis

- Inflammatory infiltrate in bronchial walls is composed of:
  - Lymphocytes
  - Plasma cells.
- In the lumen:
  - Desquamated epithelial cells (catarrhal inflammation).
- In mucosa (often occurs):
  - Metaplasia of cylindrical ciliated epithelium into multilayered squamous epithelium.
- Goblet cells & the sero-mucous glands in the submucosal layer are:
  - Hyperplastic
- Muscularis mucosae:
  - Hypertrophic.

Early:
- Hypersecretion of mucus in large airways
- Hypertrophy of submucosal glands in tracheobronchial tree.

Later:
- Increase in goblet cells in small airways.

Chronic inflammatory infiltrates (range from absent to prominent).

Increased percentage of bronchial wall occupied by submucosal mucous glands (as measured by Reid index); this directly correlates with:
- Sputum production
- Variable dysplasia
- Squamous metaplasia
- Bronchiolitis obliterans.
CHRONIC OBSTRUCTIVE LUNG DISEASES
4- EMPHYSEMA

Clinical Features
- Emphysema patient (so called -pink puffers).
- Dyspnea
- No significant hypoxemia.
- Tend to be:
  ○ Thin
  ○ Have hyperinflated lung fields at total lung capacity
  ○ Free of signs of right heart failure.

Complications:
- Pulmonary hypertension.
- Cor pulmonale.
- Respiratory failure.
- Pneumothorax.

Normal Lung

Emphysema
**CHRONIC OBSTRUCTIVE LUNG DISEASES**

4- **EMPHYSEMA (cont.)**

The chest cavity is opened at autopsy to reveal: numerous large bullae (in the upper lobes of both lungs) on the surface of the lungs in a patient dying with emphysema.

(Bullae: large dilated air spaces that bulge out from beneath the pleura.)

**Emphysema – Gross Anatomy**

- Dilated air spaces in emphysematous lung. (Although there tends to be some scarring with time because of superimposed infections, the emphysematous process is one of loss of lung parenchyma, not fibrosis.)

**Emphysema – Gross pathology**

- A bulla (defined as: an emphysematous space larger than 1 cm).

**Bullous Emphysema – Gross pathology**

- heavy black carbon deposits lining the cavities (characteristic of smoking).

**Centrilobular Emphysema – Gross pathology**

Centrilobular emphysema: Fixed, cut surface of a lung shows:
- multiple cavities
- heavy black carbon deposits lining the cavities (characteristic of smoking).
CHRONIC OBSTRUCTIVE LUNG DISEASES

4- EMPHYSEMA (cont.)

Panacinar Emphysema – LPF

- Enlarged airspaces/alveolar spaces.
- Destruction of some alveolar septi.

Panacinar Emphysema – LPF

- Ruptured alveolar septae
- Spurs (projections of the ruptured septa air spaces).

Panacinar Emphysema - HPF

- Destruction of tissue
- Emphysematous spaces with little surface area.
- Few capillaries.
- Large air spaces.
- Large vessel at lower left.
LOWER RESPIRATORY TRACT INFECTIONS
1- Lobar Pneumonia

A closer view of the lobar pneumonia demonstrates:
- Distinct difference between the upper lobe and the consolidated lower lobe.

● Localised focus of consolidation (seen in both X-ray films taken from 2 different patients).
LOWER RESPIRATORY TRACT INFECTIONS

1- Lobar Pneumonia (cont.)

1. Congestion → (first 2 days)
2. Red hepatisation → (2nd to 4th day)
   (fibrinous alveolitis)
3. Grey hepatisation → (4th to 8th day)
   (leukocytic alveolitis)
4. Resolution → (after 8th day)

Lobar Pneumonia - Histopathology

- All the alveoli are filled with:
  - fibrinous exudate
  - fibrin threads
  - polymorphs
  - macrophages
  - RBCs.
- Alveolar walls:
  - congested
- Pleura:
  - fibrinous exudate.

Lobar Pneumonia - LPF

the alveoli are filled with:
- fibrinous exudate
- fibrin threads
- polymorphs
- macrophages
- RBCs.

Lobar Pneumonia - LPF

- the alveoli are filled with:
  - fibrinous exudate
  - fibrin threads
  - polymorphs
  - macrophages
  - RBCs.
- Alveolar wall:
  - Thickened

Lobar Pneumonia - HPF

There will be inflammatory cells (Neutrophils and macrophages).
LOWER RESPIRATORY TRACT INFECTIONS
2- Bronchopneumonia

→ In Lobular Pneumonia the consolidated areas very closely match the pattern of lung lobules (hence the term "lobular pneumonia).

→ Bronchopneumonia is classically a "hospital acquired" pneumonia seen in persons already ill from another disease e.g.: DM, old age, immune deficiency process.

- This bronchopneumonia is more subtle, but there are areas of:
  - lighter tan consolidation.
- The hilum is seen at the lower left with:
  - radiating pulmonary arteries and bronchi

This radiograph demonstrates:
- patchy infiltrates consistent with a bronchopneumonia from a bacterial infection.

Bronchopneumonia – Gross pathology

Bronchopneumonia – Cut section

Bronchopneumonia – X-Ray
Bronchopneumonia (Lobular pneumonia) is an acute exudative inflammation of the lungs characterised by:
- foci of consolidation
- normal parenchyma (surrounding the consolidation)

Usually, bronchopneumonia affects one or more lobes and is bilateral.

**Histological findings:**
- Vestibular congestion
- Acute bronchitis
- Leukocyte alveolitis

Bronchopneumonia – Histopathology

Section of the lung shows:
- foci of inflammatory consolidation surrounding bronchioles.
- Bronchioles are filled with:
  - inflammatory purulent exudate
  - show ulceration of mucosa
  - focal inflammation
  - necrosis of walls.
- Surrounding lung parenchyma shows:
  - Congestion
  - edema

At high magnification
- alveolar exudate (mainly neutrophils) is seen.
- The surrounding alveolar walls have:
  - Dilated capillaries and filled with RBC's.
This exudate gives rise to:
- productive cough
- purulent yellow sputum

Such an exudative process is typical for bacterial infection.

seen with bacterial pneumonias
PULMONARY EMBOLUS AND INFARCTION

Thromboembolism in the Lung – Gross

- **large pulmonary thromboembolism** in the pulmonary artery to the left lung.

Such thromboemboli typically originate in the leg veins or pelvic veins of persons who are immobilized.

- **Medium sized thromboemboli** (blocking a pulmonary artery to a lobule or set of lobules) can produce the lesion seen here
  - **Wedge-shaped** hemorrhagic pulmonary infarction which based on the pleura.

- Large thromboemboli can cause death.

Thromboembolism in the Lung – Gross

- **Pulmonary embolism and infarction in the Lung**
  - A longitudinal transection of a lung showing:
    - a wedge-shaped peripheral hemorrhagic infarction.
    - A thrombus (in a major branch of pulmonary artery (arrow head)).

Pulmonary Embolus with infarction CT scan

White arrows show:
- pulmonary embolism
- lung infarction.
PULMONARY EMBOLUS AND INFARCTION

Microscopic appearance of:
- Pulmonary thromboembolus (in a large pulmonary artery).
- "lines of Zahn": are interdigitating areas of pale pink and red (characteristic for a thrombus). Their presence implies thrombosis at a site of rapid blood flow that happened before death.

Fat emboli (The rounded holes that appear in the vascular spaces here in the lung).
- Fat embolization syndrome: occurs most often following trauma with fracture of long bones that releases fat globules into the circulation which are trapped in pulmonary capillaries.

A small peripheral pulmonary artery thromboembolus.

If these small PE (Pulmonary embolism) are showered into the pulmonary circulation at once or over a period of time will lead to pulmonary hypertension.
Second Practical
Tuberculosis

- Tuberculosis is a chronic inflammation caused by M. tuberculosis.
- Characterized as Histological by:
  - Central caseous necrosis
  - Epithelioid cells.
  - Multinucleated giant cells.
  - Granuloma
  - Ghon’s complex.
- Complications of TB include:
  - Amyloidosis
  - Tuberculous pneumonia
  - Miliary tuberculosis
  - Tuberculous meningitis
  - Addison disease

Pulmonary TB – Caseous Necrosis – Gross

- **secondary (reactivation) tuberculosis.**
  - Gross appearance shows:
    - Granuloma
    - Areas of caseous necrosis.
  - This pattern of multiple caseating granulomas primarily in the upper lobes is most characteristic of **secondary (reactivation) tuberculosis.**

- **secondary (reactivation) tuberculosis.**
  - Extensive caseation
  - Granulomas involving a large bronchus
  - Soft necrotic center that drain out and leave behind a cavity.
  - Cavitation is typical for large granulomas with TB.
  - Cavitation is more common in the upper lobes.

Pulmonary TB – Ghon's complex – Gross

- The ghon complex: Ghon’s focus + hilar lymph node involvement.

Primary Tuberculosis

- Primary tuberculosis is the pattern seen with initial infection with tuberculosis in children.
- Reactivation, or secondary tuberculosis, is more seen in adults.
Miliary TB of the lung

- Miliary TB can occur when:
  1. TB lung lesions erode pulmonary veins.
  2. Extrapulmonary TB lesions erode systemic veins.
- This results in hematogenous dissemination of tubercle bacilli producing myriads of 1-2 mm. lesions throughout the body in susceptible hosts.
- Miliary spread limited to the lungs can occur following erosion of pulmonary arteries by TB lung lesions.

Miliary TB of the lung - X-Ray

This chest x-ray shows a patient with miliary TB.

Miliary TB is most prominent in:
- Liver
- Bone marrow
- Spleen
- Adrenals
- Meninges
- Kidney
- Fallopian tube
- Epididymis

Miliary TB complications:
- Amyloidosis
- TB meningitis
- TB spleen
- TB of Fallopian tube
- TB epididymis

Miliary TB of the lung - Cut section

- This is a "miliary" pattern of granulomas because there are a multitude of small tan granulomas, about 2 to 4 mm in size scattered throughout the lung parenchyma.

Tuberculosis Cont’
This micrograph reveals:
- multiple granulomas.

Granulomas are composed of:
- Transformed macrophages called epithelioid cells along with lymphocytes
- Occasional PMN's
- Plasma cells
- Fibroblast

Tuberculosis Granulomas- LPF
Tuberculosis Granulomas- HPF

- Well-defined granulomas with rounded outlines.

Pulmonary TB - granuloma with central early necrosis

(→ pyknotic nuclei of epithelioid cells in the center (apoptotic bodies) are a precursor of necrosis with focal caseation necrosis.)
Tuberculosis Cont’

Tuberculosis Granulomas- HPF

(→The edge of a Granuloma is shown here at high magnification)

[1] - necrotic elements of the granuloma
  - infectious organisms.
  - ring of inflammatory component
[2] - Epithelioid cells
  - Lymphocyte
  - Fibroblasts.

Epithelioid & Giant cell

Granulomas in Tuberculosis

At high magnification: the **granuloma** containing:
- **Elongated epithelioid macrophages** with:
  1-long, pale nuclei
  2-pink cytoplasm.
- **Giant cells** (organization of macrophages into committees)

(The typical giant cell for infectious granulomas is called a **Langhan's giant cell**: has the nuclei lined up along one edge of the cell)

Acid Fast bacilli of Mycobacterium TB in the lung

(AFStain= ziehl neelsen stain) is done to find:
- the mycobacteria TB stained as red rods.
Lung carcinoma

Non-Small cell carcinoma (75% of cases)
- Squamous cell carcinoma
- Adenocarcinoma
- Large cell carcinoma

Small cell carcinoma
- The NON-small cell cancers behave and are treated similarly, the small cell carcinoma are WORSE than non-small cell carcinoma, but respond better to chemotherapy, often drastically!

1- SQUAMOUS CELL CARCINOMA:
- Most commonly found in men and correlated with smoking.
- Pathology: more differentiated, more cytoplasm, keratin whorls.
- Transforms to carcinoma in situ.
- Grading is based on the amount of keratin & cytoplasm.

Squamous cell carcinoma of the lung - Gross

- squamous cell carcinoma arising centrally in the lung (as most squamous cell carcinoma do).
  1- obstruction to the main bronchus.
  2- very firm and has a Pale, white to tan cut Surface

- squamous cell carcinoma: central cavitation (probably because the tumor outgrew its blood supply)
Lung carcinoma
1- SQUAMOUS CELL CARCINOMA (Cont.)

- A large squamous cell carcinoma of the **right upper lobe**
- It extends around the right main bronchus
- It invades into the mediastinum and
- It involves hilar lymph nodes

**Squamous cell carcinoma of the lung - CT SCAN**

- Microscopic appearance of squamous cell carcinoma showing nests of polygonal cells with:
  1- pink cytoplasm.
  2- distinct cell borders.
  3- hyperchromatic and angular nuclei.
  - Well differentiated on the middle
  - Poorly differentiated on the left

**Squamous cell carcinoma of the lung - HPF**

- 1- upper right:
  - Squamous eddy with a keratin pearl.
- 2- At the left:
  - less differentiation.
  - dark mitotic figures are seen.
  - Mitosis

**Squamous cell carcinoma of the lung - HPF**
Lung carcinoma
1- SQUAMOUS CELL CARCINOMA (Cont.)

- Neoplastic squamous cells showing:
  1- pleomorphism
  2- hyperchromatism
  3- individual cell keratinization
  4- mitoses
- areas of necrosis
- Well differentiated

Squamous cell carcinoma of the lung - HPF

- Characteristics:
  1- pink cytoplasm
  2- distinct cell borders
  3- intercellular bridges

Squamous cell carcinoma of the lung - HPF
Lung carcinoma

2. ADENOCARCINOMA OF THE LUNG

Adenocarcinoma of the lung

- The most common type of lung cancer, making up 30-40% of all cases (more common in women).
- Glandular differentiation by tumor cells
- 80% of tumor cells produce mucin.
- Not as strongly associated with a smoking history as compared to Squamous or Small Cell Carcinomas.
- Usually located in the periphery of the lungs
- Adenocarcinoma in situ - called bronchoalveolar carcinoma.
- Early and distant metastases.
- Genetic mutations: EGFR (Epithelial Growth Factor Receptor) gene mutation and Alk (Alkaline Phosphatase enzyme) gene mutation

Adenocarcinoma of the lung - Gross

Adenocarcinoma and large cell anaplastic carcinomas tend to occur more peripherally in lung.

Adenocarcinoma is the one cell type of primary lung tumor that occurs more often in non-smokers and in smokers who have quit.

X-Ray

CT scan

Chest x-ray of elderly non-smoker woman showing:
- A peripheral adenocarcinoma of the lung.

CT scans:
- Peripheral right lung nodular mass
Lung carcinoma
2. ADENOCARCINOMA OF THE LUNG (Cont)

→ Adenocarcinoma in Situ (Previously named Bronchioalveolar Carcinoma). Composed of:
  - columnar cells (proliferating along the framework of the alveolar septae).
  - Well-differentiated cells.

Adenocarcinoma of the lung
- LPF

Section of the tumor shows:
  - Moderately differentiated malignant glands lined by:
    - Pleomorphic malignant cells
    - Hyperchromatic malignant cells
    - Conspicuous nucleoli in the malignant cells.
    - Irregular nuclei
    - Prominent nucleoli
  - Desmoplastic fibroinflammatory tissue
  - Mitotic figures

Adenocarcinoma of the lung
- HPF

- Differentiated malignant glands lined by:
  - Pleomorphic malignant cells
  - Hyperchromatic malignant cells
  - Conspicuous nucleoli in the malignant cells.
Large cell carcinoma of the lung

- Can be neuroendocrine carcinoma. Probably represents undifferentiated SCC and adenocarcinomas.
- Large nuclei with prominent nucleoli.
- Variation in size and shape.
- Nuclei usually do not touch due to more cytoplasm.
- Moderate amount of cytoplasm.
- Early and distant metastases, sometimes cavitating.

Undifferentiated large cell carcinoma of the lung - Gross

Large cell carcinoma of the lung - HPF (H and E, x200)

Pleomorphic carcinoma of lung:
- (large cell and giant cell subtype.
  - composition of:
    - large cell carcinoma
    - pleomorphic multinucleated giant cells (arrows).

Large cell carcinoma of the lung - HPF

section from lower respiratory tract shows:
- neoplastic cells
- abundant pale eosinophilic cytoplasm
- surrounding infiltrate of inflammatory cells.

Large cell carcinoma of the lung - HPF

section shows:
- neoplastic cells
- abundant pale eosinophilic cytoplasm
- pleomorphic multinucleated giant cells.
Small cell carcinoma of the lung

- Highly Malignant Tumor.
- Cells are small, with scant cytoplasm, ill-defined borders, finely granular chromatin (salt & pepper pattern) and absent or inconspicuous nucleoli.
- High mitotic count
- Often extensive necrosis.
- Typically not graded as all SCLC are considered High Grade.
- Very strong relationship with smoking.
- Often lead to paraneoplastic syndromes.

Small cell carcinoma of the lung “oat cell” - Gross

- Arising centrally in this lung.
- Spreading extensively.
- The cut surface of this tumor has:
  - Soft
  - Lobulated
  - White to tan appearance.
- Caused obstruction of the main bronchus to left lung.
- The distal lung is collapsed (due to obstruction.)

- Spread of oat cell carcinoma along the bronchi.
- Speckled black rounded areas (lymph nodes with metastatic carcinoma).
Lung carcinoma

4. SMALL CELL CARCINOMA OF THE LUNG (Cont.)

The microscopic pattern of a small anaplastic (oat cell) carcinoma:
- small dark blue cells
- minimal cytoplasm
  (are packed together in sheets.)

Section of the tumor shows:
- Clusters of malignant cells which are:
  - Small
  - Round, oval, or spindle shaped
  - Prominent nuclear molding
- finely granular nuclear chromatin (salt and pepper pattern)
- high mitotic count
- Focal necrosis.

This chest radiograph demonstrates a mass lesion in the right upper lobe (oat cell carcinoma)
- Right main bronchus obstruction
- Atelectasis on the right (evidenced by a raised right hemidiaphragm)
- Diffuse pneumonia on the left

(caused by The patient aspirated gastric contents, since aspirated material could not pass the obstruction on the right).

Small cell carcinoma of the lung “oat cell” - HPF

Not Hyperchromatic
Metastatic Tumors

- LUNG is the MOST COMMON site for all metastatic tumors, regardless of the site of origin.
- It is the site of FIRST CHOICE for metastatic sarcomas for purely anatomic reasons.

Metastatic tumors of the lung - Gross

- **Multiple variably sized masses** (in all lung fields.)
- Tan-white nodules

larger but still:
- variably-sized nodules of metastatic carcinoma in lung.

characteristic for metastatic carcinoma.

→ Metastases to the lungs are more common than primary lung neoplasms.

Metastatic tumors of the lung

- Cannonball Metastases.
- Metastatic lesions of varying sizes (Large, hematogenously spread in the lungs)

→ Most often from:
  - Colon
  - Breast
  - Renal
  - thyroid primaries.

- multiple cannonball opacities (in both lung fields.)
5. METASTATIC TUMORS OF THE LUNG (Cont.)

- A nest of metastatic infiltrating ductal carcinoma (breast)
- Dilated lymphatic channel (where the nest is) in the lung. (Carcinomas often metastasize via lymphatic.)

Metastatic tumor of the lung - LPF

Coming from breast

- A focus of metastatic carcinoma on the pleural surface of the lung.

Diagnosis: pleural fluid cytology and often reveal the malignant cells

Complications: Such pleural metastases may lead to:
- pleural effusions (Ex: hemorrhagic effusions)
Mesothelioma of the lung - Gross

- Dense white encircling tumor mass (arising from the visceral pleura) is a mesothelioma.

- These are big bulky tumors that can fill the chest cavity.

- Risk factor of mesothelioma is asbestos exposure.

Mesothelioma of the lung - MPF

- High power microscopy shows:
  - Gland-like configurations formed by:
    - Micro epithelial pattern plump rounded cells

Mesothelioma of the lung - HPF

- Mesothelioma:
  - Gland-like configurations formed by:
    - Micro epithelial pattern plump rounded cells
Thank you

Team Leaders

- Raghad AlKhashan
- Mashal Abaalkhail

Team members

- Leena Alnassar
- Reema Alserhani
- Taibah Alzaid
- Lama Alzamil
- Alhanouf Alhaluli
- Sarah AlArifi
- Amirah Alzahrani
- Njoud AlAli
- Ghaida Alshehri
- Deana Awrtani
- Jehad Alorainy
- Nawaf Albhijan
- Suhail Basuhail
- Khaled Alkhani
- Muaath AlJehani
- Alwaleed Alarabi
- Mohaned Makkawi
- Abdulaziz Alghamdi
- Faisal Almuhid
- Mohammad Aljumah
- Mohammed Alhumud
- Alwaleed Alsaleh