

Lecture six

Tumors Of The Lung



432 Pathology Team

Done By:

Abdulmajeed Aljasser

Reviewed By: Fahad Aldhahri

Respiratory Block



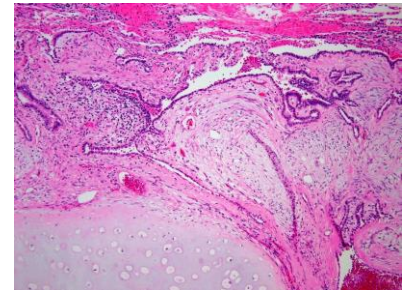
Tumors of the Lung

- They are divided into two types: Benign & Malignant.
- The malignant tumors of the lung are much more common than benign.
- Metastatic tumors (not primary) to the lung are more common than the primary.
- The areas which transfer the tumor to the lung are:
 - 1- Gastro intestinal cancer ex: colon carcinoma.
 - 2- Female genital system.
 - 3- Female breast.

Benign tumor of the lung:

Chondromatous hamartoma (Adenochondroma)

INTRODUCTION:



- Hamartoma is regarded by some scientists as a form of malformation (not a real tumor) & others regard it as a tumor, because it is **an abnormal accumulation of tissues which are indigenous to the area from where they arise.**
- **Most of the time hamartoma is benign** tumor but teratoma could be benign or malignant.

Chondromatous hamartoma

- Chondromatous hamartoma of the lung is formed by respiratory & columnar epithelium, it may also be present with cartilage, connective tissue and fat which are **in abnormal amounts and arranged haphazardly.**

NOTE: all these types of tissues are found normally in the lung thus, it's a hamartoma not a teratoma.

- The epithelium and tissues are presented in abnormal amount & abnormal position.
- Chondromatous hamartoma is usually found incidentally in routine chest examination without any previous complaints from the patient.
- The patient has a well circumscribed and rounded lesion in the lung.

Malignant tumors of the lung:

INTRODUCTION:

- ❖ Malignant tumors of the lung are mainly caused by:
 - **Smoking** is the major cause of lung tumors:

Despite the fact that smoking can initiate cancer, it can also cause the development of lung disease to cancer, ex: COPDs.
 - Irritation & air pollution
 - Radiation : mainly Radium and Uranium.
 - People who get in contact with nickel and chromate.
 - People who get in contact with asbestos
 - Asbestos can cause the following:
 - Interstitial lung disease
 - Fibrosis of the pleura
 - Mesothelioma
 - Bronchial carcinoma
 - They arise mostly from epithelium(carcinoma)
- ❖ Clinical presentation:
 - The patient is usually a smoker
 - He is present with usual cancer symptoms(non-specific):
 - Unexplained weight loss
 - Unexplained anemia
 - Malaise
 - Unexplained fever
 - Cachexia
 - Inappropriate hormone secretion
 - Paraneoplastic syndromes
 - He is present with lung cancer specific symptoms:
 - Cough associated with hemoptysis
 - Chest pain
 - Dyspnea
 - Complications:
 - Secondary broncheactasis
 - Pleural effusion
 - Metastasis
 - Finger clubbing
 - Endocrine related problems

1- Squamous cell carcinoma(Bronchogenic):

- Most common causes:

- 1- Smoking.
- 2- Exposure to radiations (radium & uranium)
- 3- Exposure to nickel, chromates & asbestos.

- Always present as a central hilar mass (near to the hilum).

- Manifestations:

- Patient gets hypercalcemia due to increase parathyroid hormone (PTH) secretion.



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Pathogenesis:

Smoking → Chronic irritation & inflammation → Metaplasia (Respiratory epithelium to squamous) → Metaplastic squamous become atypical (precancerous) → Dysplasia (polymorphism, hyperchromatism, abnormal N/C ratio) → Cancer symptoms

- Squamous cell carcinoma has specific manifestations:
 - Inappropriate parathyroid hormone (PTH) like activity
 - The inappropriate PTH results in Hypercalcemia
- **Keratin**: Presence of keratin in the neoplasm is a sign of well differentiation.

(A), basal cell (or reserve cell) hyperplasia

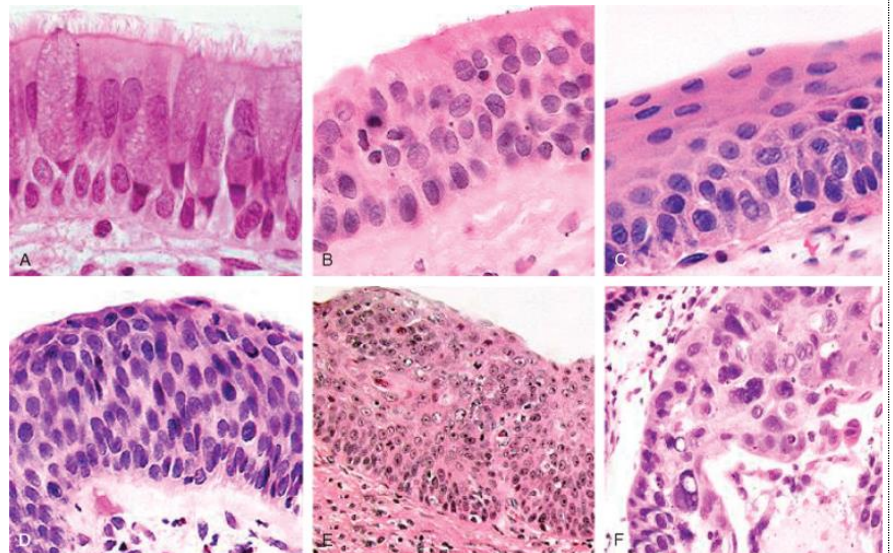
(B) squamous metaplasia

(C) appearance of squamous dysplasia

(D), characterized by the presence of disordered squamous epithelium, with loss of nuclear polarity, nuclear hyperchromasia, pleomorphism, and mitotic figures. Squamous dysplasia may, in turn, progress through the stages of mild, moderate, and severe dysplasia. Carcinoma-in-situ (CIS)

(E) is the stage that immediately precedes invasive squamous carcinoma

(F) Unless treated, CIS will eventually disrupt basement membrane and progress to invasive cancer



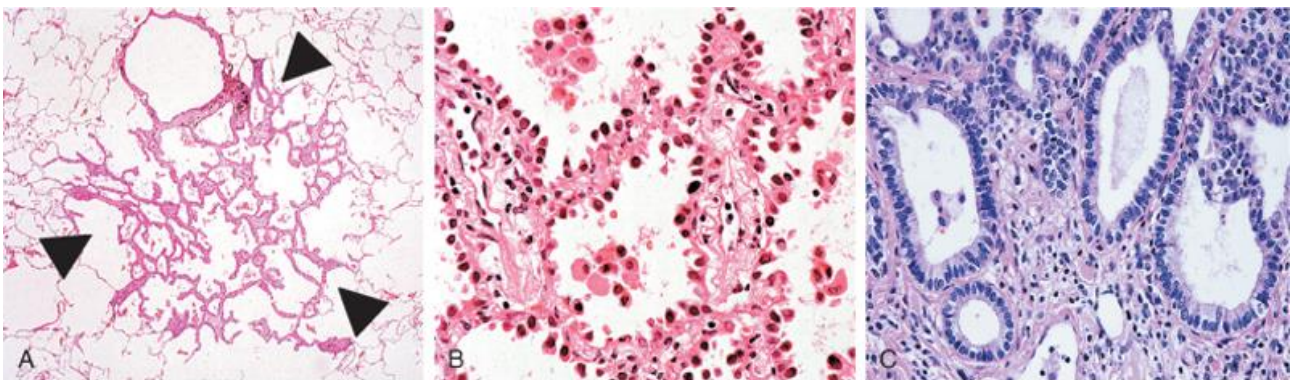
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2- Adenocarcinoma:

- Adeno carcinoma is a glandular neoplasm which is **NOT LINKED TO SMOKING**.
- Patients usually present with **peripheral subpleural mass** related to a scar. and it is the most common type of lung carcinoma.
- It usually forms glands and secrete mucin.
- It **may** present with hematological and coagulation Paraneoplastic syndrome.
- It has a mutated gene called **EGFR** (epithelial growth factor receptor) and this gene presents in **20-30%** of the patients who have adenocarcinoma tumor.

Bronchioalveolar carcinoma:

- It is a special type of adenocarcinoma that arises from **Clara** cells.
- An important characteristic of the tumor is that it **tracks and grows along the wall of the alveolar basement membrane, and does not cause desmoplasia**.
- It.
- It is also called **in situ adenocarcinoma** because it **doesn't invade** the basement membrane.



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A: The putative precursor lesion of invasive adenocarcinomas is known as atypical adenomatous hyperplasia, (*arrowheads*), which presents typically as multifocal nodules.

B: Bronchioloalveolar carcinomas are a variant of adenocarcinoma that grow along existing structures and do not demonstrate evidence of stromal, vascular, or pleural invasion.

C: Invasive adenocarcinoma, with stromal invasion and desmoplasia.

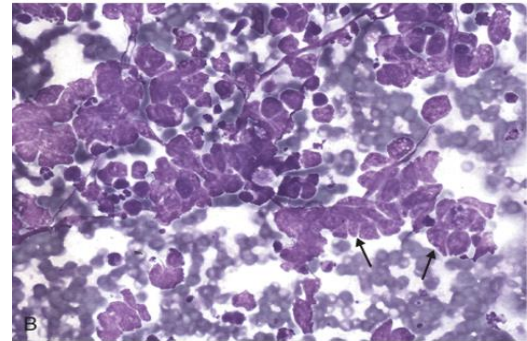
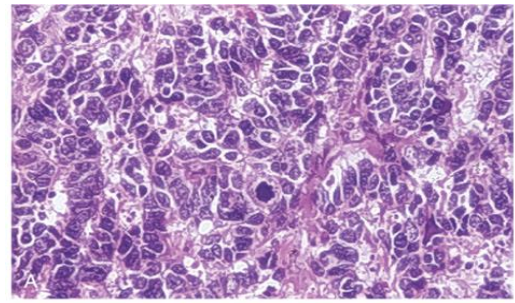
3- Small cell carcinoma (Oat cell carcinoma):

- This tumor arises from **neuroendocrine** cells
- Neuroendocrine cells are present between the epithelial cells and the glands.
- It **can't** be treated surgically, because it is a very **aggressive** tumor.
- **When the neuroendocrine cells are:**
 - 1- **Well** differentiated → **Carcinoid tumor** → Good prognosis
 - 2- **Moderately** differentiated → **atypical carcinoid tumor**.
 - 3- **Poorly** differentiated → **Small cell carcinoma** (Oat cell carcinoma) → poor prognosis (metastatic)
- These tumors are accompanied by paraneoplastic syndromes:
 - Cushing's syndrome
 - Moon face
 - Weight gain
 - Hirsutism (facial hair)
 - Urinary retention
- Paraneoplastic syndromes which happen in oat cell carcinoma are caused by abnormal secretion of two hormones:
 - 1- **ACTH** (Adrenocorticotrophic hormone) resulting in.
 - 2- **ADH** (antidiuretic hormone)
- **Carcinoid tumor can sometimes causes carcinoid syndrome.**
- **Manifestations of carcinoid syndrome are:**
 - 1- **Flushing** of the patient face.
 - 2- **Diarrhea**.
 - 3- **Changes** in the right side of the heart especially **tricuspid valve (tricuspid valve incompetence)**.

Small-cell lung carcinoma.

A, Nests and cords of round to polygonal cells with scant cytoplasm, granular chromatin, and inconspicuous nucleoli. Note mitotic figure in center.

B, Cytologic preparation from a case of small-cell carcinoma demonstrating "nuclear molding" of adjacent cells (*arrows*). This is a useful feature in bronchioloalveolar lavage samples or fine-needle aspiration specimens for diagnosing small-cell carcinoma.



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4- Large cell carcinoma (Anaplastic carcinoma):

- It is very poorly differentiated tumor.
- It is between squamous cell carcinoma and adenocarcinoma.

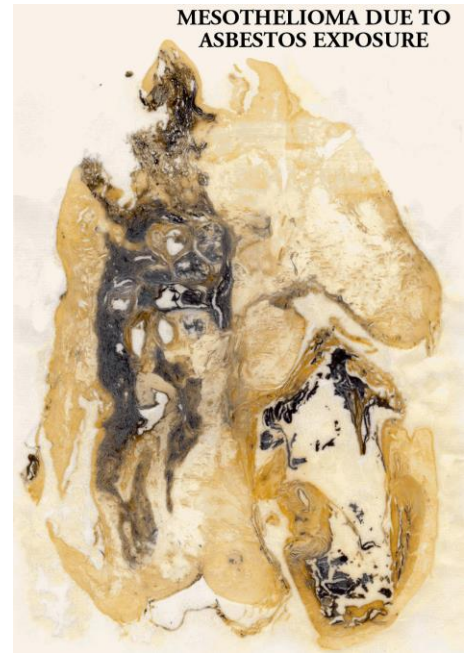
5- Pancoast Tumor:

- When a bronchogenic carcinoma (sometimes adenocarcinoma) affects the **upper lobe** of the lung it will cause **pancoast tumor**.
- **Pancoast tumor** → it is a tumor affecting the **apical segment** of the **upper lobe**.
- The patient is usually present with **Horner syndrome's** symptoms:
 - 1- **Ptosis**.
 - 2- Asymmetrical **Constriction of the pupil** of the eye (**meiosis**).
 - 3- **Anhidrosis**.
- The cause of symptoms **is infiltration of nerves of the sympathetic plexus (neuroplexus in the axilla)**.

6- Mesothelioma:

- It's a malignant tumor that affect the pleura.
- Usually due to asbestos inhalation.
- It **incases the lung**
- It is caused by abnormal proliferation of mesothelial cells
- Very poor prognosis

REMEMBER: malignant tumors spread via lymphatics.



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Good Luck ^_^