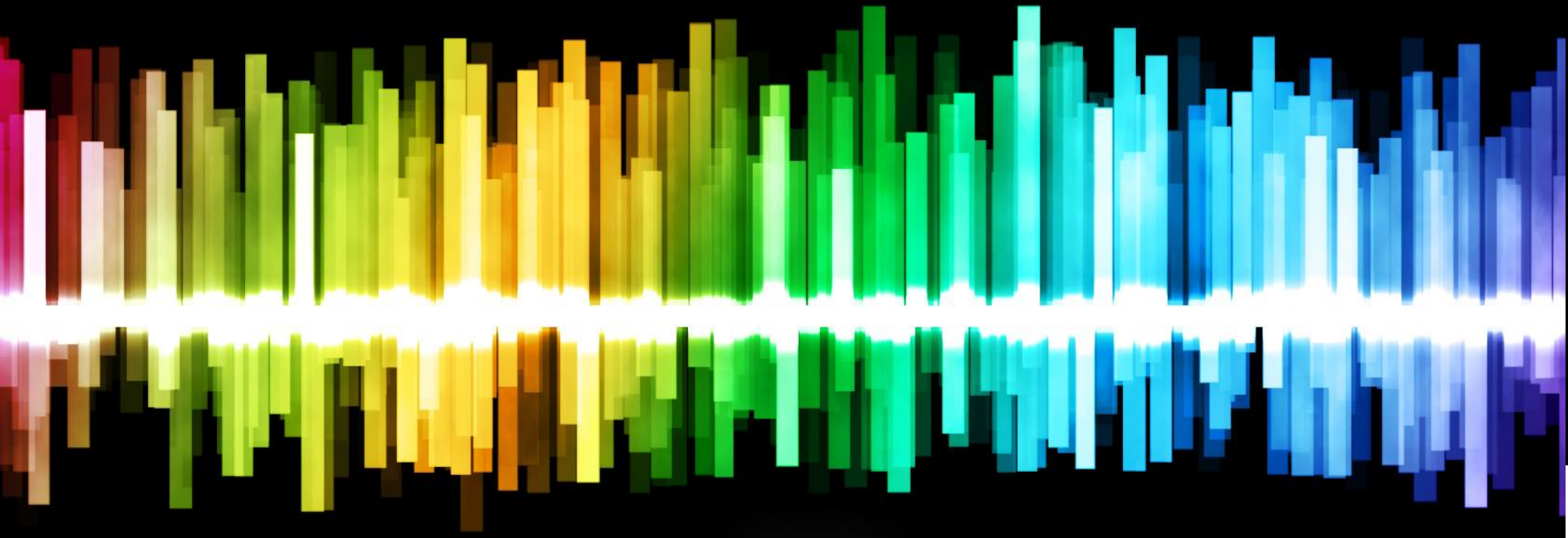




Tumors of the lung

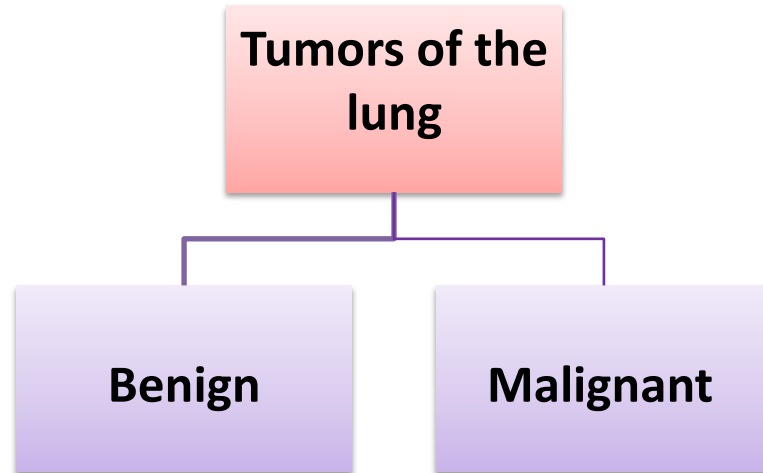


Objectives

At the end of this lecture, the student should be able to:

- 1) Understand the incidence, age group of affected patients and predisposing factors of bronchogenic carcinoma.
- 2) Is aware of the classification of bronchogenic carcinoma which include: squamous carcinoma, adenocarcinoma, small cell and large cell (aplastic) carcinomas.
- 3) Understands the clinical features and gross pathology of bronchogenic carcinoma.
- 4) Have a basic knowledge about neuroendocrine tumors with special emphasis on small cell carcinoma and bronchial carcinoid .
- 5) is aware the lung is a frequent site for metastatic neoplasms.

Tumors Of The Lung



- 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.
- Lungs are frequently the site of metastases **because** the lung is a very vascular organ, lymphatic vessels and lymph nodes

Benign tumors of the lung

Hamartoma	Teratoma
<p>The presence of abnormal accumulation of benign tissues in an organ and the <u>tissues are</u> *indigenous <u>To this organ</u></p>	<p>The presence of abnormal tissues arising <u>from different embryonic layers</u> (ectoderm , endoderm and mesoderm)</p>
<p>Example : abnormal accumulation of cartilage ,epithelial cells and adipose tissues in the upper lobe of the lung <i>Note that ,all these types of tissues are found normally in the lung .</i></p>	<p>Example : Mass of tissues in the ovary containing (hair and teeth)</p>

- ***Indigenous:** Means that the tissue can normally be found in this organ

Chondromatous hamartoma (Adenochondroma)

It's formed by respiratory & columnar epithelium, it may also be present with cartilage, epithelial cells and adipose tissue in abnormal amounts.

Present as :

- localize tumor.
- Rounded (coin) lesion

Is usually found incidentally in routine chest examination without any previous complains from the patient.

How is the patient who has a lung tumor present to you ?

General symptoms	Specific symptoms
<i>Apply to any type of tumor</i>	<i>Specific to an organ (lung)</i>
<ul style="list-style-type: none">□ Wight loos <p>“especially if the tumor is rapid within short period of time “</p> <ul style="list-style-type: none">□ Generalized weakens□ anemia□ Unexplained fever□ Easy fatigability□ (cachexia)* <p>“الهزال الشديد الذي يحصل نتيجة انتشار الورم“</p>	<ul style="list-style-type: none">□ Dyspnea□ Chest pain□ Persistent cough□ Hemoptysis “ نفث الدم “□ Metastasis* <p>“ If the patient had a pathological fracture in the head of femur then we took a biopsy and found a metastasis renal carcinoma “</p> <ul style="list-style-type: none">□ Bronchial obstruction* <p>“ due to emphysema or bronchitis“</p>

Lung Tumors

Malignant epithelial tumors/
bronchogenic carcinoma

Malignant
mesothelial tumors

Miscellaneous
malignant tumor

Non-Small
Cell Lung
Carcinoma
(NSCLC)

Small cell
lung
carcinoma
(SCLC)

Combine
patterns

Carcinoid
tumors

- Epithelial
- Fibrous
(spindle
cell)
- Biphasic

Carcinosarcoma
Pulmonary
Blastoma
Melanoma
Lymphoma
Others

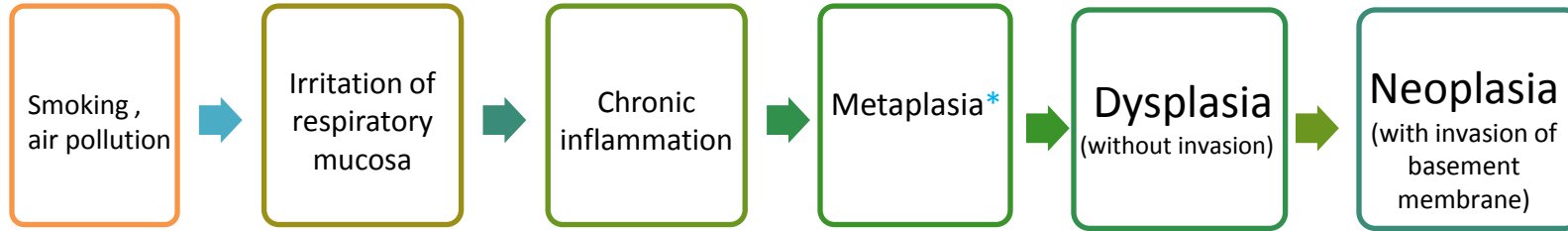
Squamous cell
carcinoma

Adenocarcinoma

Large cell
carcinoma

Malignant tumors of the lung

pathogenesis:



Malignant tumors of the lung are mainly caused by:

- ✓ Irritation, and air pollution
- ✓ **Smoking** “ main cause “
- ✓ contact with nickel and chromate
- ✓ Radiation : mainly Radium and Uranium
- ✓ contact with **asbestos**

Complications:

- Secondary bronchiectasis
- Metastasis
- Finger clubbing*
- Endocrine related problems

***Clubbing of fingers** : fingers become enlarged near to the tip.

* (pseudostratified changed to squamous stratified)

Tumor

1- Squamous cell carcinoma (Bronchogenic)

Causes

strong association with smoking “ most common cause “

Location

Always present as a central (hilar) mass (near to the **hilum***) where the **blood vessels and the main bronchus enter the lung**

Pathogenesis

**Smoking > chronic irritation > inflammation > Metaplasia
Dysplasia > neoplasia > invading tumor** (rupture of basement membrane)

Manifestations

This tumor produce protein like – resembling parathyroid hormone which will lead to Paraneoplastic syndrome (Hypercalcemia)

Under the microscope we see cells producing keratin and it's a sign of well differentiation

Tumor

2- Adenocarcinoma(glandular cell) or scar carcinoma

Causes

- ✓ Usually occur in non smoker “ not linked to smoking ! “
- ✓ More common in women “ because usually they don’t smoke”
- ✓ 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** , if we detected this gene we can give the patient a treatment (antiEGFR).

Location

It’s not a hilar mass , **always peripheral.**

Characteristic

- ✓ Contain malignant glands secreting mucin.
- ✓ Related to an area of a scar (site of prior pulmonary inflammation or injury), referred to as (**scar carcinoma**)

Types

1-Bronchoalveolar carcinoma **2**-Bronchial – derived carcinoma

Tumor

A-Bronchoalveolar carcinoma

*Peripheral, infiltrating along the alveolar basement membrane
"lepidic* pattern of growth"*

Location

**Lepidic: means along the basement membrane*

characteristic

- ✓ *It' a special type of adenocarcinoma*
 - ✓ *It is called in situ adenocarcinoma or severe dysplasia "because*
 - ✓ *it doesn't invade the basement membrane"*
 - ✓ *In-situ (no invasion "severe dysplasia") it is irreversible.*
 - ✓ *So , it has **dysplasia** (severe)*
 - ✓ *There is thickens of the epithelium full of dysplastic glands **but they don't rupture the basement membrane***
- EGFR gene is mutated in about 25% of these malignant tumors*

3- Neuroendocrinecarcinoma of the lung

There are three type:

1-Carcinoid tumor	2-Atypical carcinoid tumor	3-Small cell carcinoma (Oat cell carcinoma)
<ul style="list-style-type: none"> ✓ Well differentiated ✓ Good prognosis ✓ Location: in major bronchi ✓ We can excised it “ remove it “ ✓ It can cause Carcinoid syndrome, because it’s secret (vasoactive amines) which will go to the blood causing these symptoms ! ✓ Symptoms of Carcinoid syndrome: <ul style="list-style-type: none"> ✓ Bronchospasm ✓ Intestinal colic ✓ Diarrhea ✓ Changes in the right side of the heart especially tricuspid valve (tricuspid valve incompetence) 	<p>Moderately differentiated</p>	<ul style="list-style-type: none"> ✓ Poorly differentiated ✓ Location: central ✓ poor prognosis (metastatic) ✓ Highly malignant “ the cells are totally small and they go everywhere” ✓ It can't be treated surgically, because it is a very aggressive tumor. ✓ The only treatment is the “chemotherapy (cytotoxic drugs)” ✓ Paraneoplastic syndromes which happen in it are caused by abnormal secretion of two hormones: <ul style="list-style-type: none"> ✓ ACTH (Adrenocorticotropic hormone): acts on adrenal gland to give corticosteroid ✓ ADH (antidiuretic hormone): that acts on renal tubes to reabsorb electrolytes. ✓ Cause Cushing’s syndrome “ High corticosteroid “ ✓ Symptoms of Cushing’s syndrome: <ul style="list-style-type: none"> ✓ Moon face “ وجه مدور كاليدر “ ✓ Hirsutism (facial hair) ✓ Obesity (weight gain) ✓ Pink or purple stretch marks (striae) on the skin of the abdomen, thighs, breasts and arms “ خطوط في الجسم “

Large cell carcinoma (Anaplastic carcinoma)

- ✓ **We can't** tell if it's squamous cell carcinoma or adenocarcinoma.
- ✓ Only if we do electron microscopy we can know (not always).
- ✓ **very poorly differentiated**
- ✓ *Location: peripheral*

Mesothelioma

- ✓ It's a highly malignant tumor that **affect the pleura.**
- ✓ Usually due to **exposure to asbestos.**
- ✓ It's arise from **abnormal proliferation of mesothelial cells.**
- ✓ It **incases*** the lung “ * مغلقة الرئة “
“ enclose it “
- ✓ **Very poor prognosis**

- Notes:

- ✓ Malignant tumours spread into lymphatics.
- ✓ Most lung tumours are malignant.
- ✓ All kinds of smoking are cancerogenic
“because they contain hydrocarbons”

Asbestos can cause the following:

- ✓ Restrictive lung disease “ interstitial fibrosis with inflammation”
- ✓ Fibrosis of the pleura
- ✓ Mesothelioma “ malignant tumor “

Clinical features

Superior vena cava syndrome

Compression or invasion of the superior vena cava leads to obstruction of venous drainage which leads to dilation of veins in the upper part of the chest and neck resulting in swelling and cyanosis of the face, neck, and upper extremities including the breasts; edema of the conjunctiva etc.

Pancoast tumor (superior sulcus tumor)

Involvement of the lung often with **Horner syndrome** (ptosis, meiosis & anhidrosis)
Due to involvement of the cervical sympathetic plexus

Hoarseness

Recurrent laryngeal nerve paralysis

Pleural effusion

Often bloody

Paraneoplastic syndrome

ACTH like activity with small cell carcinoma

Spread of bronchogenic carcinoma

1- Lymphatic spread.

- * successive chains of nodes (scalene nodes).

- * involvement of the supraclavicular node (Virchow's node).

2- Extend into the pericardial or pleural spaces. Infiltrate the superior vena cava.

3- A tumor may extend directly into the esophagus, producing obstruction, sometimes complicated by a fistula.

4- Phrenic nerve invasion usually causes diaphragmatic paralysis

5- May invade the brachial or cervical sympathetic plexus (Horner's Syndrome).

6- Distant metastasis to liver (30-50%), adrenals (>50%), brain (20%) and bone (20%).

MCQS

Q1: Which of the following is the most aggressive bronchogenic carcinoma ?

- A- Small cell carcinoma
- B- Adenocarcinoma
- C- Squamous cell carcinoma

Q2: Which of the following is develop in the site of pulmonary inflammation ?

- A- Small cell carcinoma
- B- Adenocarcinoma (scar carcinoma)
- C- Bronchoalveolar adenocarcinoma

Q3: Which of the following is primary neoplastic lesion of pleura? ?

- A- Adenocarcinoma
- B- Squamous cell carcinoma
- C- Mesothelioma

Q4: Which of the following is more common in women and nonsmokers?

- A- Squamous cell carcinoma
- B- Carcinoid
- C- Adenocarcinoma

Q5: Which of the following is clearly linked to smoking?

- A- Adenocarcinoma
- B- Squamous cell carcinoma
- C- Large cell carcinoma

MCQS

Q6: A patient has adenocarcinoma. Which of the following is the best to do for the patient?

- A- Surgery
- B- Chemotherapy
- C- Medication
- D- Consultation

Q7: Which of the following is less clearly linked to smoking?

- A- Large cell carcinoma
- B- Scar carcinoma
- C- Oat cell carcinoma

Q8: Which tumor is characterized by the presence of keratin pearls?

- A- Bronchialveola carcinoma.
- B- Squamous cell carcinoma
- C- Large cell carcinoma.

Q9: What kind of tumors causes Horner's syndrome?

- A- Pancoast tumor
- B- Mesothelioma
- C- Oat cell carcinoma.

Q10: What region of the lung the squamous cell carcinoma is present?

- A- Apex.
- B- Base.
- C- Hilum

Q1:A, Q2: B, Q3: C, Q4: C, Q5: B, Q6: A, Q7: B, Q8: B, Q9: A, Q10: C

Questions

Q1: What is the histological changes in the cancer of the lungs?

- 1- Squamous metaplasia of the respiratory epithelium in the broncogenic carcinoma.
- 2- Change the range from dysplasia to carcinoma in situ.

Q2: What is horner syndrome ?

It is pancoast tumor (superior sulcus tumor)

With (ptosis, miosis, anhidrosis).

Q3: What are the characteristic of small cell carcinoma ?

- 1- Undifferentiated tumor
- 2- Most aggressive bronhogenic carcinoma
- 3- Cause metastases at the time of diagnose
- 4- Associated with production of (ACTH) or (ADH)
- 5- Increased in smokers
- 6- Can not treated by surgery

Q4: What is the diagnose of pleural disease?

- 1- Radiological investigation .
- 2- Cytological examination .
- 3- Bacteriological assessment and culture

Q5: An adult-26-years did an X-Ray Screening (Pre-employment).he had no complains .there was a coin lesion in the middle of the right lung (sharp edges). In the histology there were a cartilage "bronchi", adipose tissue and epithelial cells (hamartoma)

this is an adenocondroma

Note: screening: looking for a disease in a healthy person.

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