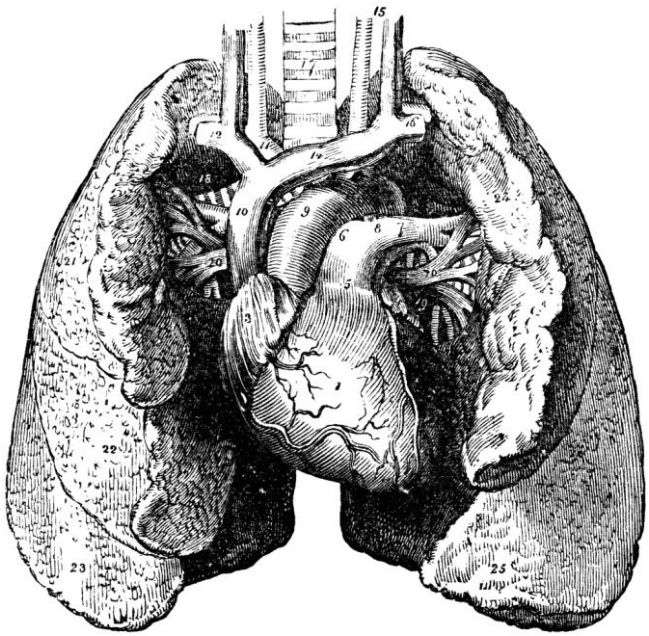


Pathology teamwork

Lecture (2): Pathology of Chronic Obstructive Airway Disease

Color Index :-

- **VERY IMPORTANT**
- Extra explanation
- **Examples**
- **Diseases names: Underlined**
- **Definitions**

*وإنّ الطِّبَّ مهنةُ كُلِّ حُرٍّ، رأى أن يُبذلَ الجهدَ اجتهادا

Objectives :

A) Understand that this group of disorders is characterized by increase to airflow, owing to partial or complete obstruction at any level of the bronchial./bronchiolar.

B) Know that the major obstructive disorders are chronic bronchitis, emphysema, asthma and bronchiectasis.

C) Is aware that the symptom common to all these disorders is “dyspnea” (difficulty in breathing) but each have their own clinical and anatomical characteristic.

D) Chronic bronchitis and emphysema almost always coexist.

COPD INTRODUCTION

- Diffuse pulmonary diseases can be classified into two categories:

  (1) **obstructive** (airway) disease, characterized by limitation of airflow, usually resulting from an increase in resistance caused by partial or complete obstruction at any level.

  (2) **restrictive** disease, characterized by reduced expansion of lung accompanied by decreased total lung capacity.

- The major diffuse obstructive disorders are

Emphysema	Chronic bronchitis	Bronchiectasis	Asthma

  - In These diseases:

FVC = N or slightly ↓
FEV1 = slightly ↓
FEV/FVC = ↓

An FEV_1/FVC ratio of less than 0.7 generally indicates airway obstruction

  - forced vital capacity (FVC) is either normal or slightly decreased,
  - The expiratory flow rate, usually measured as the Forced Expiratory Volume At 1 Second (FEV1), is significantly decreased.
  - Thus, the ratio of FEV to FVC is characteristically decreased.
    - By contrast, in Restrictive diseases:
      - FVC is reduced
      - The Expiratory Flow Rate is normal or reduced proportionately.
      - The ratio of FEV to FVC is near normal.

- Expiratory obstruction may result either from -Anatomic airway narrowing (in asthma) or from -Loss of Elastic Recoil (in emphysema).

*Overlaps between Emphysema, Bronchitis, and Asthma are common.

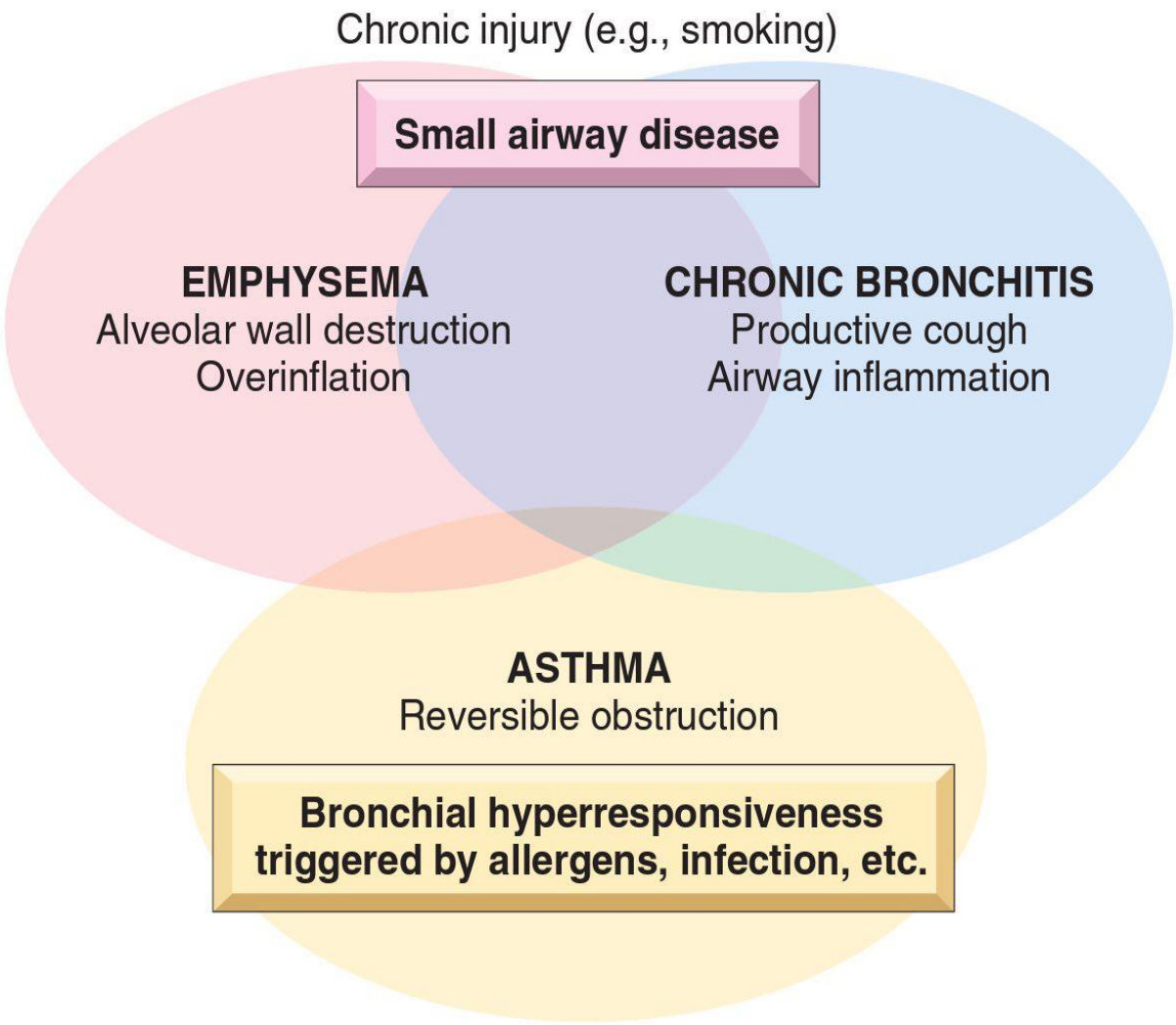


Figure 12–5 Schematic representation of overlap between chronic obstructive lung diseases.

COPD INTRODUCTION

Diffuse pulmonary diseases

Restrictive

characterized by reduced expansion of lung parenchyma with decreased total lung capacity while the expiratory flow rate is near normal. Occur in:
1. Chest wall disorder.
2. Acute or chronic, interstitial and infiltrative diseases, e.g. ARDS and pneumoconiosis.

Obstructive

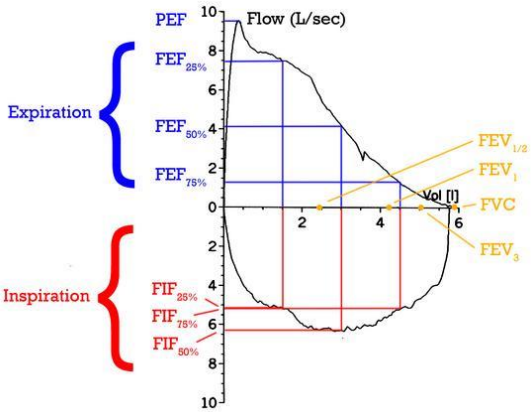
characterized by limitation of airflowing to partial or complete obstruction at any level from trachea to respiratory bronchioles.

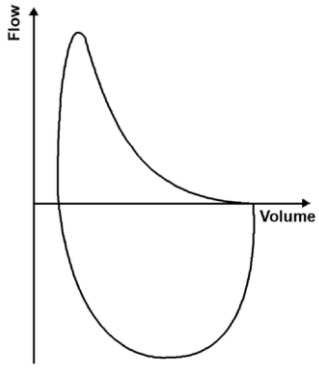
- Bronchiectasis
- Athsma
- Chronic obstructive pulmonary/airway/lung disease(COPD/COAD/COLD).

Irreversible obstruction to airflow out of the lungs Cigarette smoking is the principal cause of COPD Greater than 10% of the population >45 years old has airflow obstruction. Majority of patients with COPD have both emphysema (air space destruction) and chronic bronchitis

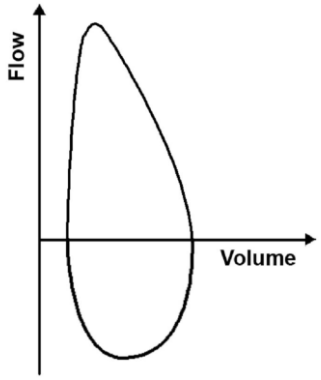
- Emphysema
- Chronic Bronchitis

An FEV_1/FVC ratio of less than 0.7 generally indicates airway obstruction





Obstructive



Restrictive

CHRONIC BRONCHITIS

Definition : Persistent productive cough (with sputum) for at least 3 consecutive months in at least 2 consecutive years.

It is a chronic obstructive airway disease characterized by presents of chronic productive cough. Productive cough means that it will produces mucus and sputum and it will be present in patients during at 2 least 3 consecutive months over at least 2 consecutive years.

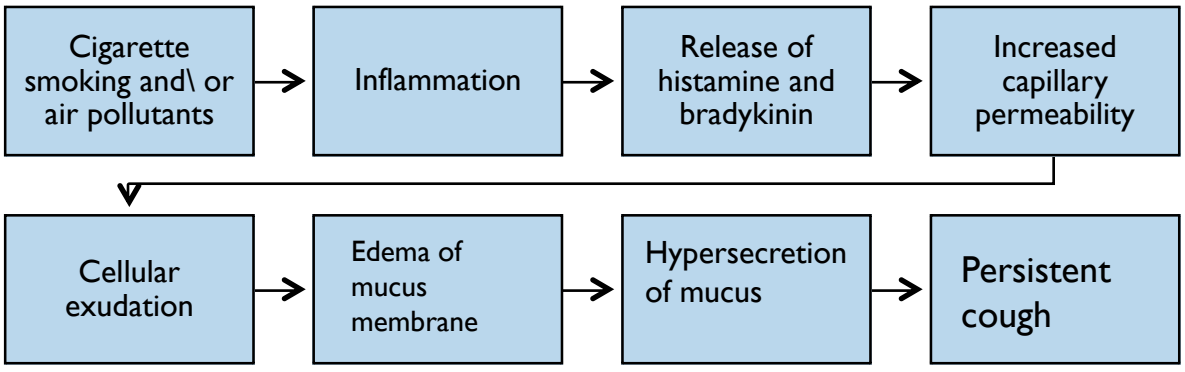
Causative factors :

- Cigarette smoking and pollutants (sulfur dioxide, nitrogen dioxide). Most patients are smokers
- Infection (due to mucus and sputum excessive production)
- Genetic factors e.g. cystic fibrosis
- Age: 40 to 65

Pathogenesis :

Chronic irritation of inhaled substances or microbial infection leads to:

- Hypersecretion of mucus that starts in the large airways with associated hypertrophy of the sub-mucosal glands and inflammation.
- Infection does not initiate chronic bronchitis, but is probably significant in maintaining it and may be critical in producing acute exacerbations.
- As chronic bronchitis persists the small bronchi and bronchioles also get affected leading to irreversible bronchiolar wall fibrosis.



- C

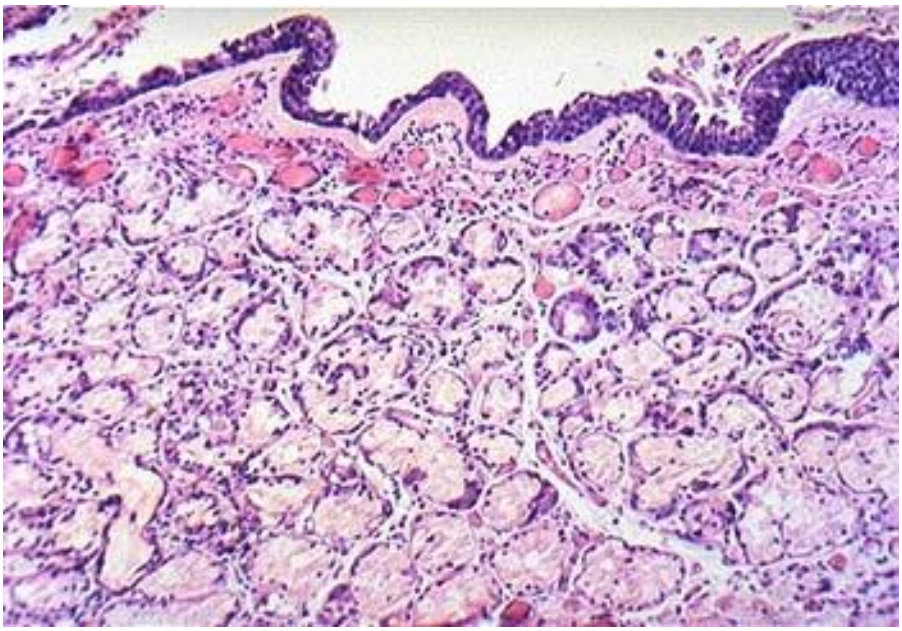
Pathologic findings :

- Chronic bronchitis does not have characteristic pathologic findings.
- In bronchitis the airway mucosa is red and edematous.
- Patients suffering of this disease may be called Blue Bloaters. Blue is because of cyanosis is one of the presenting symptoms and Bloater because The patient has difficulties expiring air out of lungs causing excessive air in lungs (fish mouth breathing).
- Alteration in the **read index** (compares thickness of mucous bronchial glands to entire thickness of bronchial wall). Usually 0.4 but in patients with Chronic bronchitis it is increased due to the alteration in thickness of mucous glands.

Morphology :

1) Inflammation of airways, fibrosis and narrowing of bronchioles.
2) Hypertrophy and hyperplasia of mucus producing cells (increased number of goblet cells).
3) Squamous metaplasia which can progress to dysplasia and even invasive carcinoma.
4) Injury to cilia with loss of ciliated epithelial cells .
5) Coexistent emphysema.

than those with emphysema alone



Clinical Course :

- Prominent cough and the production of sputum.
- Hypercapnia, hypoxemia and cyanosis.
- Patients with severe chronic bronchitis are termed blue bloaters.
- Patient leaning forward (trying to use accessory muscles)
- **Patients may also have:**

➢increased sleepiness due to CO_2 narcosis.
➢cyanosis due to very poor oxygenation.
➢elevated red cell counts (secondary polycythemia) as a result of chronic hypoxemia.
➢Cardiac failure (Cor pulmonale/right heart failure): diseases of the lung or pulmonary vasoconstriction leads to pulmonary hypertension which leads to right ventricular dilation and hypertrophy (right heart failure)*.

*Why is it on the right side only ? Because of venous return coming from pulmonary artery (pulmonary artery carries venous blood). The pressure inside the pulmonary artery will increase which leads to pulmonary hypertension and that will put the right ventricle under a lot stress so it will become hypertrophied .

Patients with chronic bronchitis and emphysema have frequent exacerbations, more rapid disease progression, and poorer outcomes

EMPHYSEMA

Definition: is an abnormal permanent enlargement of the airspaces distal to the terminal bronchioles accompanied by destruction of their walls, without obvious fibrosis.

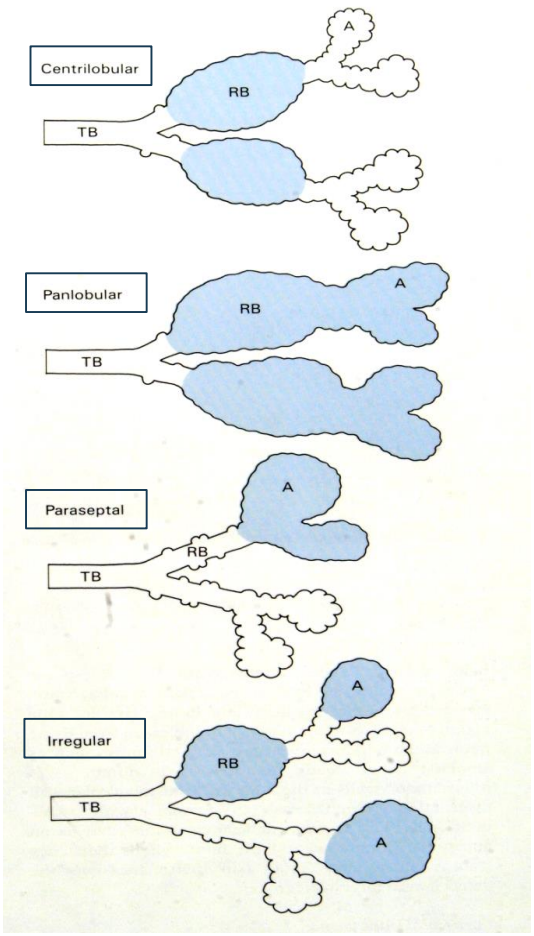
Characteristics/features:

- Element of chronic bronchitis coexist
- "Dilatation" is due to destruction and loss of alveolar walls (tissue destruction)
- Appear as "holes" in the lung tissue
- Impairment of Respiratory Function:
  - Diminished alveolar surface area for gas exchange (decreased Tco)
  - Loss of elastic recoil and support of small airways leading to tendency to collapse with obstruction

Types of emphysema: Emphysema is classified according to its anatomic distribution within the lobule* into four major types:

*acinus is the structure distal to the terminal bronchioles, and a cluster of three to five acini is called a **lobule**

1) Centriacinar (centrilobular)
2) Panacinar (Panlobular)
3) Distal acinar/ paraseptal
4) Irregular



Dr.Rikabi Notes:

- Emphysema leads to inflated lung. Patients are known as Pink puffer, he is trying to get rid of excess air in lungs. He doesn't have cyanosis.
- The fifth type of emphysema is **interstitial emphysema**

DR. RIKABI NOTES

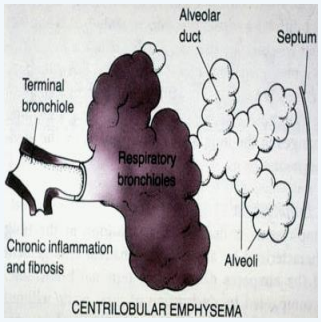
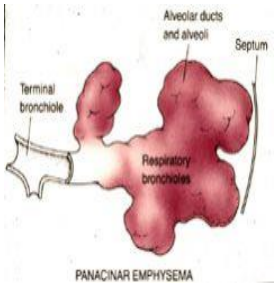
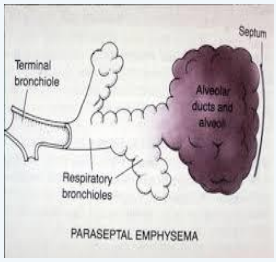
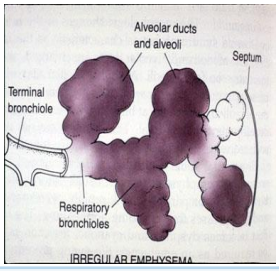
- **Definition:** It is a COPD characterized by expansion/dilatation of the airways which are distal to the terminal bronchiole, it could also cause destruction of the alveolar wall.

- It causes **bullae** which is a bubble of air, (**present in advanced emphysema**) the bubble of air can rupture, and this causes the air to go to the pleura. Leading to a condition known as **pneumothorax.**

- **Pnuemothorax** is common in patients ephymesamatous patients with bullae and is considered a sever acute medical emergency in which the patient presents with sever dyspnea

- Treatment of pneumothorax: thoracostomy: inserting a chest tube To the chest cavity and drain the air, fluid ,etc

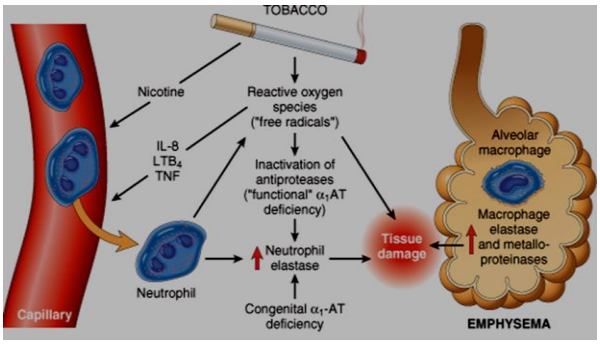
TYPES OF EMPHYSEMA

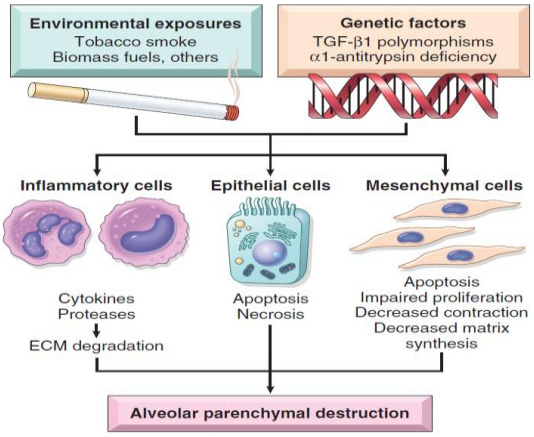
Type	Location	Cause	Features	
Centriacinar (centrilobular)	(Respiratory bronchioles) The central or proximal parts of the acini	Smoking (in association with crhonic bronchitis)	- More common and severe in upper lobes (apical segments) - The walls of the emphysematous space contain black pigment - Inflammation around bronchi & bronchioles. - Occur in heavy smoker in association with chronic bronchitis	 CENTRILOBULAR EMPHYSEMA
Panacinar (panlobular)	Uniform injury: Acini are uniformly enlarged from the level of the respiratory bronchiole to the terminal blind alveoli.	α_1 anti-trypsin deficiency	- More commonly in the lower lung zones.	 PANACINAR EMPHYSEMA
Distal acinar (paraseptal)	The distal part of the acinus	Unknown (seen most often in cases of spontaneous pneumothorax in young adults)	- Occurs adjacent to areas of fibrosis (adjacent to the pleura), scarring or atelectasis. - More severe in the upper half of the lungs. - Sometimes forms multiple cyst-like structures (bullae) with spontaneous pneumothorax	 PARASEPTAL EMPHYSEMA
Irregular	Can affect any part of the respiratory tract , Irregular involvement associated with scarring	Invariably associated with scarring such as that resulting from healed inflammatory diseases	- Most common form found in autopsy. - Asymptomatic. - Usually as a complication (common in chronic inflammatory conditions such as TB and pneumonias)	 IRREGULAR EMPHYSEMA
Interstitial	Mediastinum (air tracks from airways to mediastinum)	by very advanced chronic respiratory conditions and Road traffic accidents (due to fracture of ribs).	- it can be under skin in subcutaneous tissue leading to edema in head and neck. - Pressing feels like pressing on a nylon bag or bubble wrap. - It shows in x-rays as black (air is black)	

Pathogenesis

* Is not completely understood
* Elastic tissue of the alveolar wall is broken down by action of proteolytic enzymes like **protease (e.g.elastase)**.
* **Protease** is produced by neutrophils and macrophages.
* ***Alpha 1 antitrypsin*** **is an anti-protease** (anti-elastase) and it counter acts the protease. It is a major inhibitor of proteases secreted by neutrophils during inflammation. α_1-antitrypsin is normally present in the serum, in tissue fluids and in macrophages.
* Normally there is a balance between protease and anti protease activity.

- Smokers have increases number of neutrophils and macrophages in their alveoli
- Smoking stimulates release of elastase and enhances elastase activity in macrophages.
- Smoking Inhibits alpha 1 antitrypsin.
- Tobacco smoke contains reactive oxygen species with inactivation of anti-proteases.
- The protease-antiprotease hypothesis explains the effect of cigarette smoking in the production of centriacinar emphysema

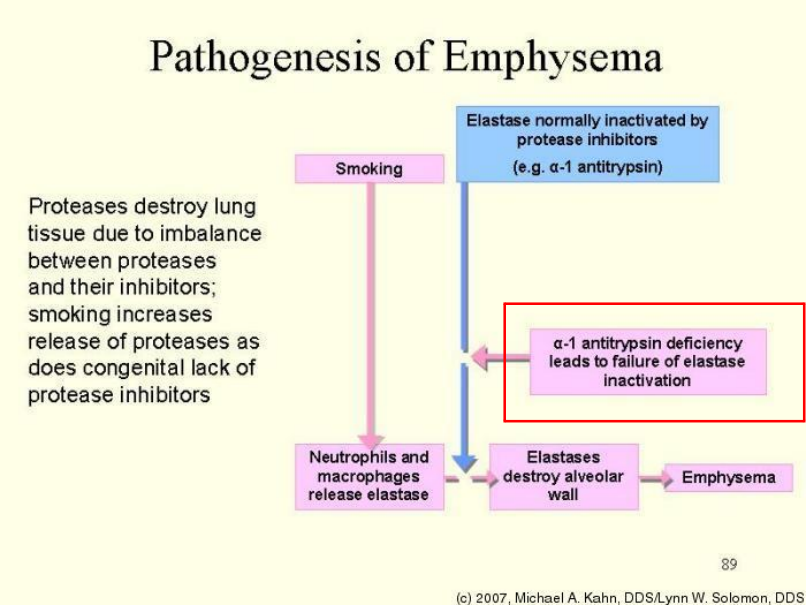




Dr. Rikabi Notes:

Pathogenesis:

- Usually affects smokers or people living in polluted areas (e.g. beijing), but can be congenital (alpha-1 trypsin deficiency)



Alpha-1 antitrypsin deficiency is rare in the Arab world but common in the west. It leads to hepatic failure and emphysema.

Alpha-1 antitrypsin deficiency leads to less elastase inactivation. (Excess work of elastase)

Neutrophils and macrophages release elastase and protease which destroy the alveolar wall leading to inflammation and dilatation causing emphysema

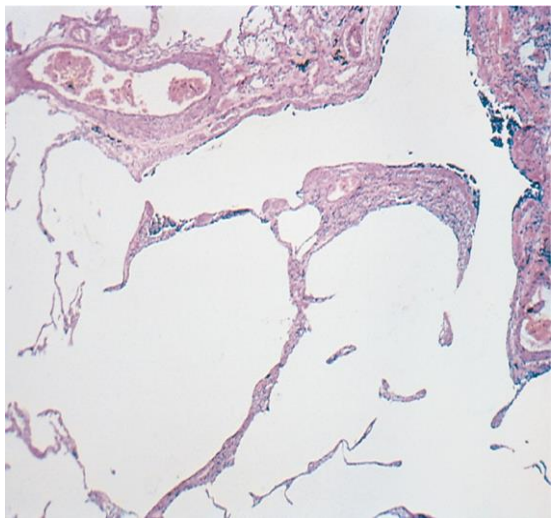
Why is emphysema considered to be an obstructive airway disease? Is there any mechanical obstruction?

- Because emphysema affects the peripheral airways, it is not, anatomically speaking, an obstructive disease, and there is no mechanical obstruction.

- However, it is functionally an obstructive disease, because destruction of the wall of the air spaces prevents the elastic recoil that is necessary to push air out of the lungs. Thus, in effect, there is limitation of airflow, just as there would be if there were mechanical obstruction.

Morphology of Emphysema

- The lungs are pale, voluminous
- The lung tends to collapse during expiration—an important cause of chronic airflow obstruction in severe emphysema.
- Bronchiolar inflammation and submucosal fibrosis are consistently present in advanced disease.
- **Histologically:**
  - Loss of elastic tissue
  - Reduced radial traction on the small airways
  - Alveolar capillaries are diminished
  - Accompanying bronchitis and bronchiolitis



Clinical Features

- ***Dyspnea*** usually is the first symptom; it begins insidiously but is steadily progressive. In patients with underlying chronic bronchitis or chronic asthmatic bronchitis, cough and wheezing may be the initial complaints.
- Reduced FEV1 with normal or near-normal FVC. *Hence, the ratio of FEV1 to FVC is reduced.*
- Because of prominent dyspnea and adequate oxygenation of hemoglobin, these patients sometimes are called **"pink puffers."**

Dr. Rikabi Notes:

Patient Presentation:

- Patient presents with Sever Dyspnea

- Barrel shaped chest (increase in antero-posterior diameter of thoracic cage) hyperinflated lung full of bullae. Pink puffer. The patient also usually has chronic bronchitis.

- **Histology:** normal alveolar wall, it isnt affected. Expansion of air spaces with dilated alveoli. Some alveoalr walls are missing.

- **Grossly:** bullous(cyst) in the sub plural if it's rapture it will lead to pneumothorax: accumulation of air in the plural cavity

Clinical Course

- Cough and wheezing
- Dyspnea
- Weight loss
- Barrell chest (increased anteroposterior diameter of chest)
- Pulmonary function tests reveal reduced FEV1
- Advanced: hypoxia, cyanosis, respiratory acidosis
- Patients are known as pink puffers

Complications

- Coexistent chronic bronchitis
- Interstitial emphysema in which air escapes into the interstitial tissues of the chest from a tear in the airways.
- May also be complicated by rupture of a surface bleb with resultant **Pneumothorax**
- Death from emphysema is related to:
  - **Pulmonary failure** with respiratory acidosis, hypoxia and coma.
  - **Cor pulmonale** : (Right-sided heart failure induced by pulmonary disease)

Summary

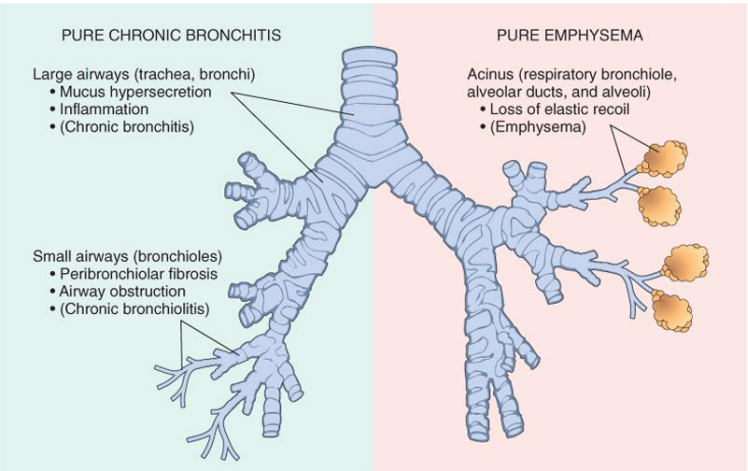
Emphysema: Dilated air spaces beyond respiratory arterioles

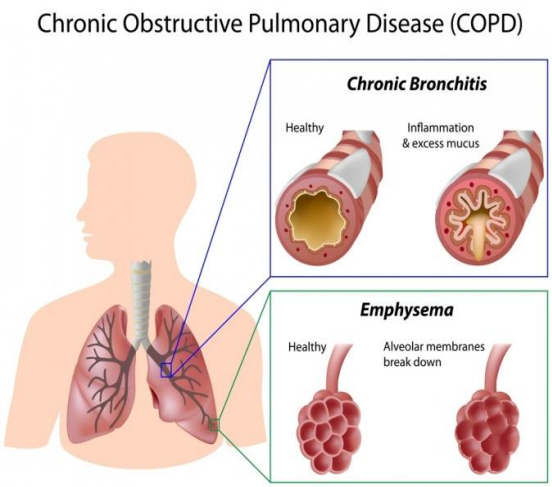
Types	• Centriacinar: Smoking • Panacinar: deficiency of α1 AT • Paraseptal • Irregular: scar
Clinical features	• Dyspnea • Cough and wheezing. Respiratory acidosis • Weight loss • Pulmonary function tests reveal low FEV1

Complications	• Pneumothorax
	• Death from emphysema is related to:
	  • Pulmonary failure with respiratory acidosis, hypoxia and coma.
	  • Right-sided heart failure (Cor pulmnale)

Chronic bronchitis vs Emphysema

	Predominant Bronchitis	Predominant Emphysema
Appearance	"Blue bloaters"	"Pink Puffers"
Age	40-45	50-75
Dyspnea	Mild, late	Severe, early
Cough	Early, copious sputum	Late, scanty sputum
Infection	Common	Occasional
Cor pulmonale	Common	Rare, terminal
Airway resistance	Increased	Normal or slightly increased
Elastic recoil	Normal	Low
Chest radiography	Prominent vessels, large heart	Hyperinflation, small heart
$PaCO_2$	Increased	Normal to decreased
Cyanosis	Present	Absent





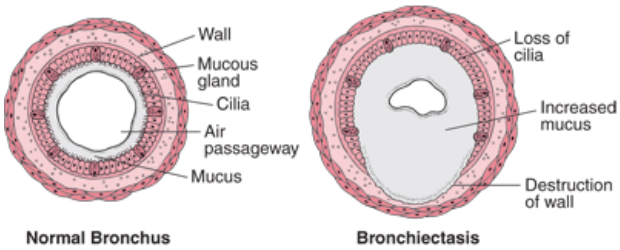
BRONCHIECTASIS

The suffix "Ectasis" means dilatation and stagnation of secretion

- It is the chronic necrotizing infection and inflammation of the bronchi and bronchioles leading to abnormal permanent dilation of these airways in association with ulceration. It represents the end stage of a variety of pathologic processes that cause destruction of the bronchial wall.
- most often involves the basal segment of the lower lobes in both lungs. (prefers left lung)
- is characterized by fever and cough with production of copious purulent foul smelling sputum due to stasis of secretions which is associated with anaerobic bacteria proliferation, and recurrent pulmonary infection that may lead to lung abscess.

There is dense bronchi due to fibrosis and secretions.

Treatment in advanced cases is excision of entire lobe



Bronchiectasis is a result of chronic inflammation associated with an inability to clear mucoid secretions. Conditions commonly associated with Bronchiectasis are as follows:

A) Bronchial obstruction

Localized:

- _tumor, foreign bodies or mucous impaction

Generalized:

- bronchial asthma
- chronic bronchitis

B) Congenital or hereditary conditions:

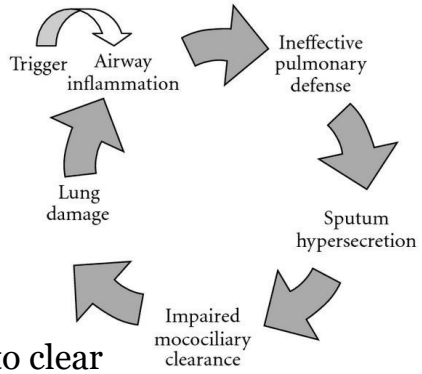
1- Congenital bronchiectasis
2- Cystic fibrosis.
3- Intralobar sequestration of the lung.
4- Immunodeficiency status. (Decreased production of immunoglobulins).
5- Immotile cilia and kartagner syndrome

C) Chronic or severe infection / necrotizing pneumonia:

Caused by TB, staphylococci or mixed infection.

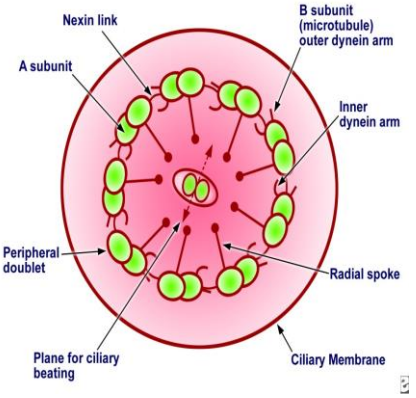
Pathogenesis:

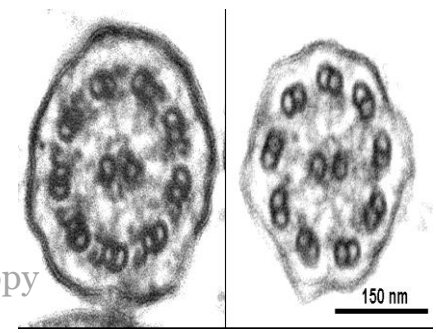
- ❖ Any of the previously mentioned conditions can cause damage to the airways resulting in impaired mucociliary clearance, mucus stasis and accumulation
- ❖ The airways become susceptible to microbial colonization lead to a "vicious circle" of inflammation and tissue damage.
- ❖ Inflammation results in progressive destruction of the normal lung architecture, in particular the elastic fibres of bronchi.
- ❖ Neutrophils are thought to play a central role in the pathogenesis of tissue damage that occurs in bronchiectasis.



Kartagener Syndrome/ immotile cilia syndrome:

- ❖ It is a genetic condition resulting in the failure to clear sputum (Primary ciliary dyskinesia) caused by a defect in the motility of respiratory, auditory, and sperm cilia.
- ❖ Inherited as autosomal recessive trait.
- ❖ Patient develop bronchiectasis, sinusitis and situs invertus sometimes with hearing loss and male sterility. In addition to growth retardation, and recurrent respiratory infections.
- ❖ Lack of ciliary activity interferers with bronchial clearance of mucus.
- ❖ absence of outer and inner dynein arms in a patient with primary ciliary dyskinesia.
- ❖ Dynein, a type of ATPase, provides energy for microtubule sliding and the longitudinal displacement of adjacent microtubular doublets, resulting in ciliary bending.





Diagnosed through genetic studies or electron microscopy of cilia. Take biopsy from respiratory Cilia is made of microtubules 9 doublets and a central one (the patient might have a slight deficiency of doublets but that has no effect on movement.

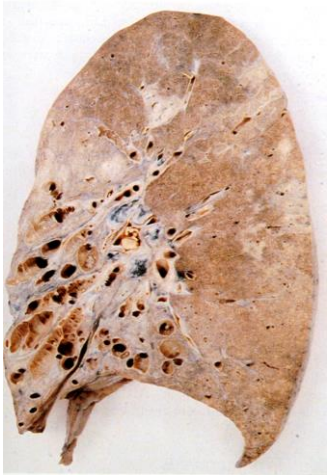
Cystic fibrosis: (Mucovesidosis)

- Cystic fibrosis is an inherited disease that causes thick, sticky viscus mucus to build up in the lungs and digestive tract. It is one of the most common chronic lung diseases in children and young adults, and may result in early death.

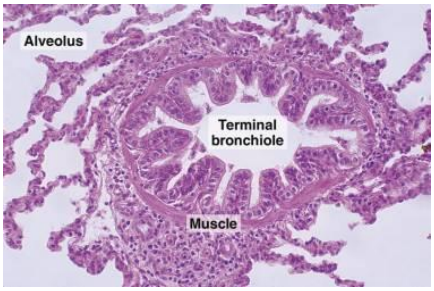
- It may lead to bronchiectasis, pancreatitis, and recurrent Respiratory infections

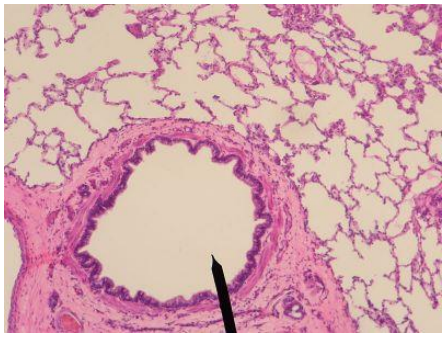
Morphology of Bronchiectasis:

- Usually affects lower lobes bilaterally (vertical airways).
- Dilated airways up to four times of normal, reaching the pleura.
- Acute and chronic inflammation (neutrophils, lymphocytes, histiocytes and plasma cells)
- Necrosis and ulceration in the wall of the bronchi and bronchioles with loss of cilia, squamous metaplasia and fibrosis.
- Abscess
- Gross appearance shows dilated bronchi. Blackness is carbon (anthracnosis) due to pollution/smoking. Black lymph nodes due to pollution Secondary to bronchitis or asthma Treatment in advanced cases is excision of entire lobe
- Can present with lung abscess leading to empyema. Empyema is the presence of purulent material in the pleural cavity.

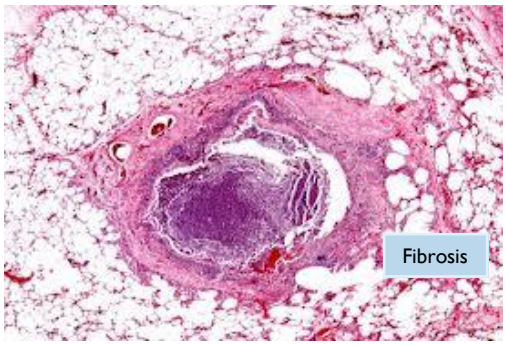


Normal





bronchiectasis



Clinical course:

- Sever persistent cough with sputum (mucopurulent, fetid sputum) sometime with blood.
- Clubbing of fingers.

Complication:

- If sever, obstructive pulmonary function develop.
- Other complications: metastatic brain abscess and amyloidosis

SUMMARY:

Bronchiectasis: Dilatation of bronchi and bronchioles secondary to chronic inflammation and obstruction	
cause	❖ Infection/ Necrotizing pneumonia ❖ Obstruction ❖ Congenital (Cystic fibrosis, Kartagener's Syndrome)
Clinical features	❖ Sever persistent cough with sputum (mucopurulent sputum) sometime with blood. ❖ Clubbing of fingers.
complications	❖ If sever, obstructive pulmonary function develop. ❖ Lung Abscess, migrating abscess ❖ Rare complications: metastatic brain abscess, amyloidosis AA, and osteomyelitis .

SUMMARY

the main differences between various types of COPD

	Chronic Bronchitis	Bronchiectasis	Asthma	Emphysema	Bronchiolitis
Anatomic site	Bronchus	Bronchus	Bronchus	Acinus	Bronchiole
Pathology	Mucous gland hyperplasia, hypersecretion	Airway dilatation, scarring	Smooth muscle hyperplasia, excess mucus, inflammation	Airspace enlargement, wall destruction	Inflammatory scarring, obliteration
Etiology	Tobacco smoke, air pollutants	Persistent or severe infections	Immunologic or undefined causes	Tobacco smoke	Tobacco smoke, air pollutants, miscellaneous
Main symptoms	Cough, sputum production	Cough, purulent sputum, fever	Episodic wheezing, cough, dyspnea	Dyspnea	Cough, dyspnea

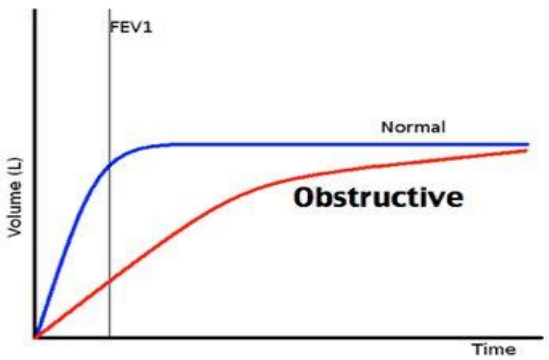
Blue bloaters Vs Pink Puffers

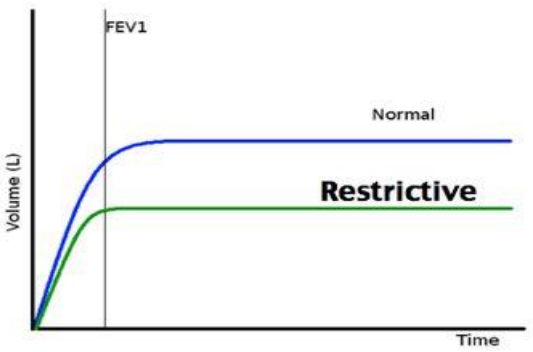
	Symptoms	Signs	Complications
Bronchitis *Blue bloaters*	• Chronic productive cough • Purulent sputum • Hemoptysis • Mild dyspnea initially	• Cyanotic (secondary to hypoxaemia and hypercapnia) • Peripheral edema (from RHF: corpulmonale) • Crackles, wheezes • Frequently obese	• Secondary polycythemia due to hypoxaemia • Pul HTN due to reactive vasoconstriction due to hypoxia • Cor pulmonale from chronic pul HTN
Emphysema *Pink Puffers*	• Dyspnea • Minimal cough • Tachypnea	• Pink skin • Purse lip breathing • Accessory muscles use • Cachexic due to Anorexia+ increase work of breathing • Hyperinflation/barrel cheast • Hyrerresonant percussion • Decrease breath sounds • Diaphragmatic excursions	• Pneumothorax due to formation of bullae • Weight loss due to increased work of breathing

emphysema	Chronic bronchitis	Bronchiectasis
-Abnormal permanent enlargement (dilatation) of distal terminal bronchioles -Walls destruction -pink puffers -Bullae -Complication: secondary spontaneous pneumothorax -barrel-chested -A anti tyrosin -Centriacinar (centrilobular) -Panacinar (panlobular) -Paraseptal (distal acinar) -Irregular	-Blue bloaters -Complication : cor pulmonale and secondary polycythemia -3 months of the year, in at least 2 consecutive years. -Productive cough -Fibrosis -Hypertrophy and hyperplasia of mucosal and submucosal glands -Increase reid index	-Abnormal permanent and irreversible dilation of bronchial walls -Severe persistent cough with sputum (bad smell) -Clubbing of fingers -Congenital bronchiectasis. -Kartagener's syndrome -cystic fibrosis.(Dynein Arms) -Immunodeficiency status. -Intralobar sequestration of lung Complications : ~lung abscess ~Metastatic brain abscess ~amyloidosis (AA)

Obstructive vs. Restrictive Lung Disease

	Obstructive	Restrictive
Characteristics	Limitation of airflow due to partial or complete obstruction	Reduced expansion of lung parenchyma accompanied by decreased total lung capacity
Examples	• Emphysema • Chronic bronchitis • Bronchiectasis • Asthma	• Interstitial lung disease • Idiopathic pulmonary fibrosis • Pneumoconiosis • Sarcoidosis • Chest wall neuromuscular diseases
Total lung capacity	Normal	Decreased
Forced vital capacity (FVC)	Normal	Reduced
Forced Expiratory Volume at 1 sec (FEV_1)	Decreased	Normal or reduced
FEV_1 / FVC ratio	< 0.8	Normal





MCQS

- **1-Which of these symptoms is common is all COPDs ?**
- A. Dyspnea
- B. Dry cough
- C. Loss of elastic recoil
- D. Coexistent Emphysema

- **2-Abnormal dilatation of air spaces which are distal to the terminal bronchioles is a definition of which disease?**
- A. Asthma
- B. Emphysema
- C. Chronic bronchitis
- D. Bronchiectasis

- **3-which one of the following is not type of emphysema?**
- A. Centriacinar
- B. Regular
- C. Panacinar
- D. Paraseptal

- **4-The most important risk factor for chronic bronchitis?**
- A. Mycobacterium tuberculosis
- B. Smoking
- C. Autoimmune diseases
- D. High Altitudes

- **5-A man has died after suffering with chronic pulmonary tuberculosis, his autopsy showed some scars in his lungs with weird looking acinus.. The doctors included that he had a type of emphysema, which is?**
- A. Panacinar emphysema
- B. Irregular emphysema
- C. Centrilobular emphysema
- D. Paraseptal emphysema

- **6-Asthma is mediated by what type of antigen?**

Review the first lecture if you have answer it wrong

- A. IgA
- B. IgG
- C. IgE
- D. IgM

- **7-'Barrel Chest' is a characteristic of which disease?**
- A. Emphysema
- B. Asthma
- C. Chronic bronchitis
- D. Bronchiectasis

- **8-what is cor pulmonale ?**
- A-right ventricular faliure
- B-left ventricular faliure
- C-right atrium faliure
- D-left atrium faliure

1-A 2-B 3-B 4-B 5-B 6-C 7-A 8-A

MCQS

- **9-Which of the following bronchial asthma characteristics is NOT true ?**
- A. Chronic
- B. Inflammatory
- C. Not reversible
- D. Hyperreactive
- Airway

- **10-Blue Bloaters ?**
- A. A Man with Chronic Bronchitis
- B. A lady with Emphysema
- C. A Child with asthma
- D. An Elder with Bronchiectasis

- **11- PINK Puffers ?**
- A. A Man with Chronic Bronchitis
- B. A lady with Emphysema
- C. A Child with asthma
- D. An Elder with Bronchiectasis

- **11- A 43 year old male patient present to the physician with dyspnea excessive sputum and blue lips and extremities chest. Radiography showed large heart and prominent blood vessels, which of the following is most likely the diagnosis?**
- A. Emphysema
- B. Bronchitis
- C. Bronchiectasis
- D. Intrinsic asthma

- **12- A 15 year old female patient present to the physician with breathlessness cough and sputum production the patient**
- **diagnosed with bronchial asthma which of the following would be found if we do sputum analysis?**
- A. Curschmann spirals
- B. Asbestos bodies
- C. Carbon dust
- D. Black coal laden macrophages

- 13- **Which one of the following conditions is characterized by sinusitis, bronchiectasis, situs inversus and male infertility?**
- A. Goodpasture syndrome
  B. Histiocytosis X
  C. Karagener's syndrome
  D. Wegener's granulomatosis

- 14-**Which one of the following types of emphysema is associated with α-1 antitrypsin deficiency**?
  A. Panacinar emphysema
- B. Irregular emphysema
- C. Centrilobular emphysema
- D. Paraseptal emphysema

- 15- **which of the following is charectrised by dialation of air spaces with distruction to alveolar walls?**
  A. Asthma
- B. Emphysema
- C. Chronic bronchitis
- D. Bronchiectasis

- **16-amyloidosis IS a Complication of which of the following ?**
- A. Asthma
- B. Emphysema
- C. Chronic bronchitis
- D. Bronchiectasis

- **17-It is an inherited disease causes thick, sticky viscous mucus to build up in lungs and digestive tract. thick mucosal secretion causing bronchiectasis.**
- A. Cystic Fibrosis
- B. Histiocytosis X
  C. Karagener's syndrome
  D. Wegener's granulomatosis

9-C 10-A 11-B 12-B 13-c 14-A 15-B 16-D 17-A

SAQ

- 1-What is Chronic Bronchitis ?
- It is a chronic obstructive airway disease characterized by presents of chronic productive cough

- 2-What cause it?
- cigarette smoking, air pollution , infections , genetic factors

- 3-Chronic Bronchitis present with? (enumerate 3)
- Inflammation, Dyspnea, hypercapnia and hypoxemia, Cyanosis in severe cases.

- 4-Why paint suffering from Chronic Bronchitis Called Blue Bloaters?
- 1- Blue is because of cyanosis
- 2-Bloater due expiring of air difficulties

- 5-Enumerate Types of emphysema?
- Centriacinar, ,Panacinar (Panlobular), ,Distal Acinar (Paraseptal) ,Distal Acinar (Paraseptal)

- 6-Where is the site of dilation in Emphysema?
- Distal to terminal bronchiole. (include: respiratory bronchiole, alveolar duct ,"alveolar sac and alveoli" acinus)

- 7-What is alpha-1 antitrypsin
- autosomal recessive Enzyme, it Deficiency causes congenital emphysema

SAQ

DR.Rk said you should always know the definition because it's present you the most important features of the diseases

8-Bronchiectasis is:

chronic necrotizing infection and inflammation of bronchi and bronchioles leading to abnormal Permanent and irreversible dilation of bronchial walls

9-Describe the clinical feature of Bronchiectasis:

persistent cough with sputum, Fever, hypoxemia and hypercapnia, clubbing of fingers

10-What are the possible complications of Bronchiectasis?

Lung Abscess

Rare complications: metastatic brain abscess and amyloidosis

11- 45-year-old man has smoked two packs of cigarettes per day for 20 years. For the past 2 years,. Got infected with the common cold what will happen to progression and outcome of the disease?

- .
- The chronic bronchitis will get exacerbated (more rapid disease progression, and poorer outcomes)

CASE:

A) A 28 year old woman with cystic fibrosis presents with increasing shortness of breath and production of abundant foul smelling sputum ,also the physician found that the patient has a clubbed fingers

- 1) What the patient is most likely have ?
- Bronchiectasis
- 2) Describe the role of neutrophils in this disease
- play a central role in the pathogenesis of tissue damage
- 3)What type of respiratory diseases this disease refer to ?and why ?
- obstructive, due Loss of the elasticity of the alveolar wall cause resident to air flow. lung disease
- 4)The paint have Cystic Fibrosis. describe it
- It is an inherited disease causes thick, sticky viscous mucus to build up in lungs and digestive tract thick mucosal secretion causing bronchiectasis.

CASE:

- B)A 45-year-old man has smoked two packs of cigarettes per day for 20 years. For the past 2 years, he complains of coughs with a large amount mucous and you notice that he shows signs of Cyanosis, and blue bloaters and and Auscultation of the chest reveals crepitations. Pulmonary function tests show that the FEV1 is markedly decreased, but the FVC is normal, and FEV1/FVC ratio is decreased but the TLC is increased

- 1)is the disease obstructive or restrictive ?
- (the FEV1 is markedly decreased, but the FVC is normal, and FEV1/FVC ratio is decreased but the TLC is increased till is that the disease is obstructive)
- 2)what is the disease that the patient most likely suffering from?
- Chronic bronchitis (because of the facts that he is a smoker and the productive cough and Cyanosis, and blue bloaters and crepitations)
- 3)what is the cause of Cyanosis, and blue bloaters?
- mucus plugs trap carbon dioxide; increase in Paco2, and decrease in pao2
- 4)What are the complications in Chronic Bronchitis?
- ● Pulmonary failure respiratory acidosis, hypoxia and coma.
- ● Cor-pulmonale with

- C) A 64 year old man who is a chronic smoker presents with increasing shortness of breath. He denies having a productive cough or any recent infections. Physical examination reveals a thin man who while sitting leans forward and breaths quickly through pursed lips. His doctor also noticed an increase in the anteroposterior diameter of his chest. Pulmonary function tests show that the FEV1 is markedly decreased, but the FVC is normal, and FEV1/FVC ratio is decreased but the TLC is increased

- 1)what is the disease that the patient most likely suffering from?
- Emphysema
- 2)what is the TYPE of disease that the patient most likely suffering from?
- Centriacinar (Centrilobular)
- 3)what is the Location of the disease?
- The central or proximal parts of the acini
- 4)What are the complications of the disease?
- Cor pulmonale. , Respiratory acidosis , Chronic Bronchitis.

Males:

-leader : محمد باحاذق

عبدالجبار اليماني

أحمد الراشد

عبدالله بالعبيد

عبدالله السرجاني

أحمد الحربي

أنس السيف

داود إسماعيل

فهد الفايز

محمد بن معيوف

فهد النحابي

سعد الفوزان

سيف المشاري

تميم الوهيبي

خالد العقيلي

محمد الصويغ

محمد الأصقه

السبيعي نواف

عبدالعزيز المحنا

عبدالله المعيذر

فايز الدرسوني

رشيد البلاع

عبدالإله الحسين

Fenales:

-leader : بثينة آل ماجد

-فاطمة بالشرف

-رهف الشمري

-رناد الفرم

-هديل عورتاني

-منيرة المسعد

-الجوهرة الشنيفي

-رزان الزهراني

-روان مشعل

-نوف العتيبي

-ابتسام المطيري

-غرام جليدان

-بلقيس الراجحي

-نورة القاضي

-آلاء الصويغ

-ريم القحطاني

-شوق

PATHOLOGY
TEAM 437

Kindly contact us if you have any questions/comments and suggestions:

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GOOD LUCK! ☺

*references:

-Robbins Basic Pathology
- doctor's slides

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