WELCOME

TO

PATHOPHYSIOLOGY

UNIT 2

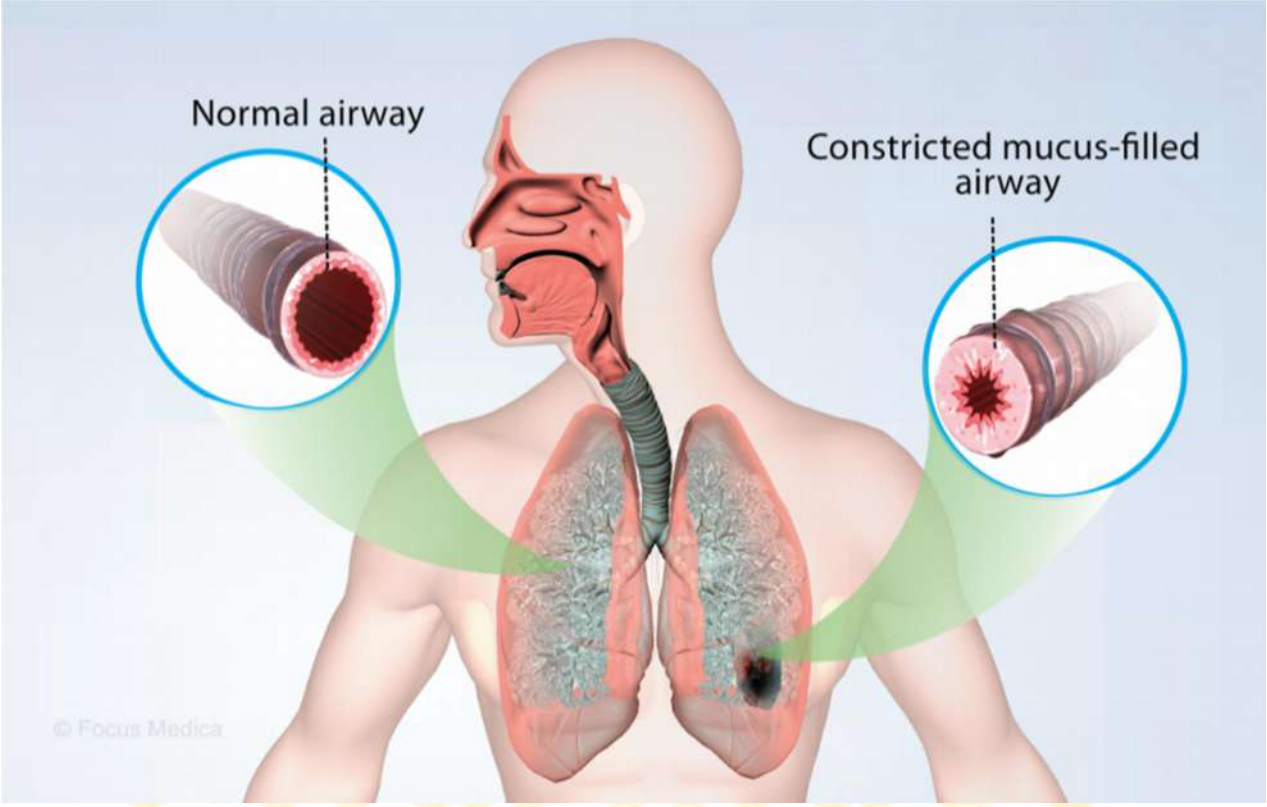
TOPIC :

- **Respiratory system :** Asthma, Chronic obstructive airways diseases.

Respiratory system

Asthma

→ Asthma is a chronic, inflammatory disorder in which the bronchial Airways become swollen in narrowed and cause difficulty in airflow or Obstruction in airflow .



Types of Asthma

- **Atopic / Extrinsic Asthma :** This type of asthma occurs due to Allergens like dust , feathers , food , Pollen or infections etc. this is occur due to immune mechanism . (Hyper Responsiveness).
- **Non Atopic or Intrinsic Asthma :** This type of asthma occurs due to a irritant like air pollution , cold heat, smoke , room deodorant , stress , anger etc.
- **Drug Induced Asthma :** This type of asthma occurs due to drug like Aspirin .

- **Occupational Asthma :** This type of asthma is caused by fumes (epoxy resins and plastics), organic and chemical dusts (wood, cotton, and platinum), gases (toluene), and other chemicals.

Etiology

- Indoor allergens (house dust, carpets and stuffed furniture pollution,)
- Outdoor allergens (Pollens and moulds),
- Tobacco smoke,
- Chemical irritants in the workplace, and
- Air pollution.

Pathogenesis

Exposure to Allergens (entry of allergens in bronchi)

↓

Recognised by Immune System (produce T Helper cell , then Produce Plasma cell)

↓

plasma cell makes Antibodies (IGE and loaded with Mast cells and present in bronchial muscles) .

↓

When next time any the antigen come into , and in contact of antibodies , they activate the mast cells and mast cells produce Histamine , Prostaglandin , Leukotrienes .

↓

Now Prostaglandin Causes Blood vessels dilation , inflammation , (due to it fluid increased in that area)

↓

Leukotrienes, Histamine cause excess production of mucus and constriction of smooth muscles .

↓

Obstruction In Airflow

Clinical Manifestations

- Coughing (severe at night)
- Difficulty in breathing
- Tightness, and pain in chest
- Wheezing
- Shortness of breath

Non Pharmacological management

- ❖ The patient should avoid smoking
- ❖ He should avoid allergens
- ❖ He should irritants
- ❖ He should avoid ß blocker , and NSAIDs .

Pharmacological management

◈ **Long Term Asthma Medications**

- **Inhaled Corticosteroids :** Fluticasone , Budesonide , ciclesonide.
- **leukotriene Modifiers :** Montelukast , Zafirlukast.
- **Long Actingß Agonist :** Salmeterol , Formoterol.
- **Theophyllin :** It is used daily for bronchodilation.

◈ **Quick - Relief Asthma Medications**

- Inhaled short acting ß Agonist : Albuterol
- Ipratopium

◈ **Allergy medication**

- **Omalizumab Injection :** It is used in severe asthma . It alters the immune system .

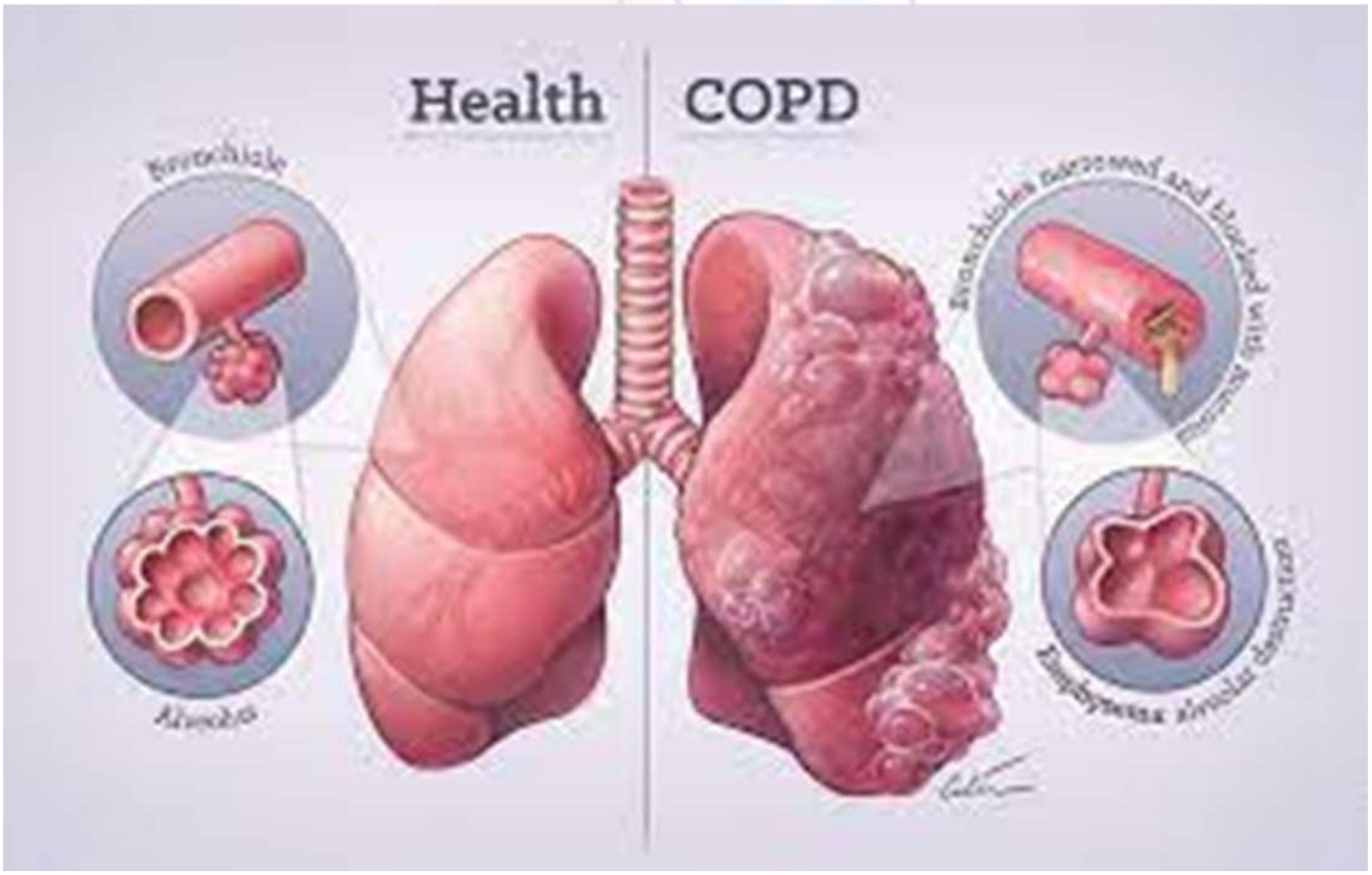
Chronic Obstructive Pulmonary Disorder (COPD)

→ Chronic Obstructive Pulmonary Disease (COPD) is also known as
- Chronic Obstructive Lung Disease (COLD).
- Chronic Obstructive Airway Disease (COAD)
- Chronic Airflow Limitation (CAL),
- Chronic Obstructive Respiratory Disease (CORD).

→ It is characterised by inflamed lungs and obstruction in airflow.

→ Thus, a patient affected with this disease faces difficulty in breathing (shortness of breath) due to constriction (narrowing) of the airway.

→ According to WHO COPD is a lungs disease and defined as chronic obstruction of lung
Airflows that interfere with normal breathing and it is not fully reversible .



Types of COPD

- Chronic Bronchitis
- Emphysema

1) **Chronic Bronchitis :** It refers to inflammation of respiratory tract and formation of thick mucus, and with the passes of time this mucus blocks the respiratory tract and cause difficulty in breathing .

Etiology

- Air pollution
- Smoking
- Aging
- Repeated exposure to infection
- Other respiratory diseases
- Genetic factor

Pathogenesis

Air pollution (and other causes)

↓

Inflammation of Smooth muscle

↓

Excess production of Mucus By goblet cell and mucus gland

↓

Obstruction In airflow

↓

Bronchitis

2) **Emphysema :** It refers to damage of alveoli (air sacs) in which elasticity of alveoli destroyed , and it enlarged and some time burst , air is trapped in it . which increases the concentration of carbon dioxide and causes difficulty in breathing .

Etiology

- Air pollution
- Genetic factor (α 1 Antitrypsin deficiency (AAT))
- Smoking
- Earlier Infection (like TB , Pneumonia and other respiratory diseases)
- Age

Clinical Manifestation

- Chronic Cough (severe at night)
- Difficulty in breathing
- Tightness, and pain in chest
- Wheezing
- Shortness of breath
- lack of energy

Non Pharmacological managements

- The patient should avoid smoking
- He should avoid ß blocker , and NSAIDs .
- He should avoid air pollution
- Oxygen Therapy (in case of concentration of oxygen decrease in blood)

Pharmacological managements

- **Inhaled Corticosteroids :** Fluticasone , Budesonide , ciclesonide .
- **Long Actingß Agonist :** Salmeterol , Formoterol .
- **Theophyllin :** It is most popular and cheap drug used for bronchodilation .

Antibiotics : In case of infection