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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 1 : Pharmacotherapeutics

Chapter 1
PHARMACOTHERAPEUTICS

- → It is a branch of science in which we study about diseases their causes , process of causes development , symptoms and treatment with the help of drugs and changes in lifestyle.
- → Pharmacotherapeutic is formed two words pharmacon means drug and therapy means system to apply.
- → Pharmacotherapeutics is the application of pharmacological informationm, along with the disease knowledge for its prevention, mitigation, or cure.

It includes rational and empirical pharmacotherapeutics:

- ❖ **Rational Pharmacotherapeutics :** It refers to the rational use of drug and its mechanism of action ; for example, adrenaline is used in bronchial asthma and its mechanism of action is well-known.
- ❖ **Empirical Pharmacotherapeutics :** It refers to the use of drug in a particular disease, but its mechanism of action is not known ; for example, colchicines was used in gout, but its action was not known.

Scope of Pharmacotherapeutics

- A person has knowledge about pharmacotheraphetic Can work in the field of treatment.
- A person has knowledge about pharmacotherapeutics can work in the field of diagnostic laboratory.
- Pharmacotheraphetic knowledge provide a foundation level for advance study in the field of disease and their causes.
- A person has knowledge of pharmacotherapeutics can prevent himself in other from being sick by getting changes in lifestyle and diet.
- The person has knowledge of pharmacotherapeutics can make a community healthy.
- The person has knowledge of pharmacotherapeutics can work in the field of epidemiology.
- The person has knowledge of pharmacotherapeutics can work in the field of research and development of drug.

Objectives

- ❖ To ensure proper and rational use of drugs.
- ❖ To avoid and reduce adverse drug reactions and toxicity.
- ❖ To provide quality and effective drugs at an optimum cost.
- ❖ To ensure patient compliance.
- ❖ To use the advances in knowledge made by researchers and scientists.

RATIONAL USE OF MEDICINES (RUM)

- → Rational use of medicines refers to prescribing the right drug, in adequate dose for sufficient duration, and suitable to the clinical requirements of the patient at minimum cost.
- → Rational use of medicines include that patients receive medications as per their clinical needs, in doses that meet their individual requirements, for an adequate time period, and at the lowest cost to them and their community.

Reasons for Irrational Use of Drugs

- Lack of adequate information.
- Defective, insufficient training, and education of healthcare providers.
- Not having diagnostic services.
- Sub-standard drug supply system and bad drug regulation.

To Promote Rational use of medicines

- Establishing a multidisciplinary national body to coordinate policies on medicine use.
- Using clinical guidelines.
- Developing and using national essential medicines list.
- Establishing drug and therapeutics committees in districts and hospitals.
- Using independent information on medicines
- Providing public education about medicines.

EVIDENCE-BASED MEDICINE (EBM)

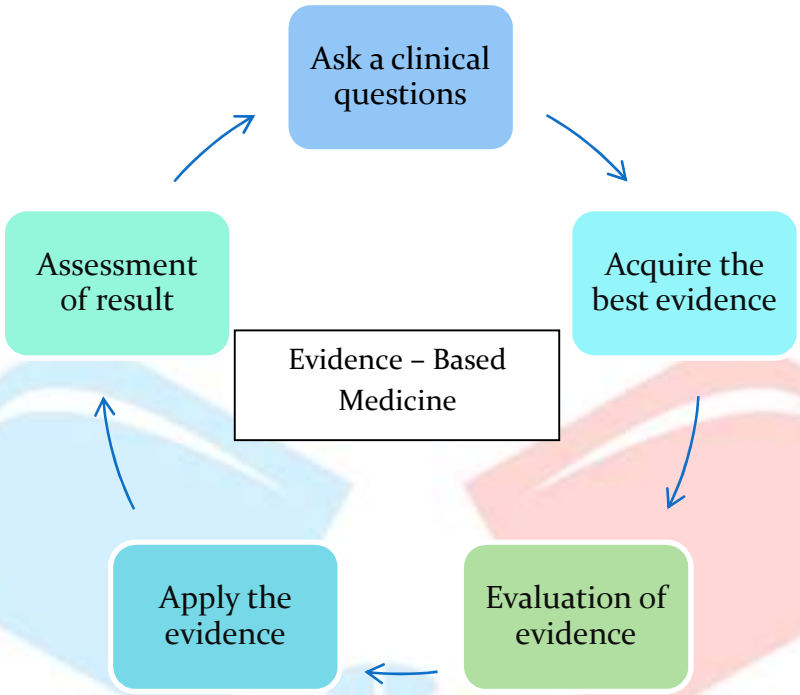
- → Evidence-based medicine refers to an interdisciplinary approach that uses science, engineering biostatistics and epidemiology techniques, like meta analysis, decisim analysis, risk-benefit analysis, and randomised controlled trials to deliver **the right care at the right time to the right patient**

Or

- → It means to use the best available (science based) research for treatment , with the help of epidemiology , engineering technique and risk-benefit analyses .

Five Step Model of EBM

1. To ask clinical questions.
2. To find best evidence.
3. Evaluation of evidence, if it is valid and useful or not ?
4. Application of evidence.
5. Assessment (evaluation) of result.



Importance

- ⇨ EBM helps the clinicians to remain updated on the standardised, evidence-based protocols.
- ⇨ EBM to provide better patient care based on near real-time data.
- ⇨ EBM improves transparency, accountability, and value.
- ⇨ EBM improves quality of care because clinicians have access to previously untapped data and best practices agreed upon by peers.

ESSENTIAL MEDICINES LIST

- → It is a list of essential medicines that satisfy (complete) the basic healthcare needs of the population .

Or

- → According to WHO, essential drugs (medicines) are "drugs that satisfy the priority healthcare needs of the population"
- → The WHO brought out its first Model List of Essential Drugs along with their dosage forms and strengths in 1977, for the guidance of member countries.
- → This model list can be accepted after appropriate modifications according to needs of the people in a location.
- → The WHO Model Lists of Essential Medicines are updated every two years by the Expert Committee on Selection and Use of Essential Medicines.

Selection of essential medicines

- The satisfactory information about the effectiveness and safety of drug , should be available on the drug.
- The drug should be stable in store for long periods.
- The drug should be available in sufficient quantity.
- It should be best amongst two or more similar drugs in comparison of safety , quality , cost and effectiveness.
- They should be single compound.

Current Essential Medicine List

- The Indian Government has released the National List of Essential Medicines (NLEM) 2021, in which 39 drugs, including anti-cancer, anti-diabetes and ant retrovirals have been added to the list.
- The Union Minister of Health and Family Welfare, Mansukhani Mandaviya released the NLEM 2021 during a visit to the Indian Council of Medical Research (ICMR).

39 Current Essential Medicine List of India 2021

They are called NLEM (National List of essential medicines)

1) Amikacin Bedaquiline (anti-TB),
2) Bendamustine Hydrochloride (anti- cancer),
3) Buprenorphine (opioid to treat opioid use disorder),
4) Buprenorphine (A)+ Naloxone (B) (to treat opioid addiction),
5) Cefuroxime (antibiotic),
6) Dabigatran (anticoagulant),
7) Daclatasvir (hepatitis C drug),
8) Darunavir (A) + Ritonavir (B) (antiretroviral),
9) Delamanid (anti-TB),
10) Dolutegravir (antiretroviral),
11) Fludarabine (anti-cancer),
12) Fludrocortisone (corticosteroid),
13) Fomepizole (antidote to certain poisoning),
14) Fulvestrant (anti-cancer),
15) Insulin Glargine (long-acting insulin),
16) Irinotecan HCI Trihydrate (anti-cancer),
17) Itraconazole (antifungal),
18) Ivermectin (anti- parasitic),
19) Lamivudine (antiretroviral),
20) Latanoprost(ophthalmic),
21) Lenalidomide (anti-cancer).

22) Leuprolide acetate (anti-cancer),
23) monelukast (anti-asthmatic),
24) Mupirocin (antibiotic),
25) nicotine replacement therapy (to treat tobacco use disorder),
26) Nitazoxanide (anti-parasitic and antiviral),
27) Ormeloxifene [Centchroman] (non-steroidal oral contraceptive),
28) Phenoxymethyl Penicillin (antibiotic),
29) Procaine Benzyl Penicillin (antibiotic),
30) Rotavirus vaccine,
31) Secnidazole (anti-infective),
32) Tenecteplase (thrombolytic drug).
33) Teneligliptin (anti-diabetic),
34) Tenofovir Alafenamide Fumarate [TAF) (Hepatitis B drug),
35) Terbinafine (antifungal),
36) Valganciclovir (antiviral)
37) 38), 39) Tenofovir + Lamivudine + Dolutegravir (antiretroviral).

Advantages of Essential Medicines

- ✓ The concept of essential medicines has several logical and prescribing advantages.
- ✓ For example, better management of medicines, like easier procurement, storage, distribution, more manageable stock, better quality assurance, easier dispensing, less fragmentation of budget, and enhanced drug availability.
- ✓ Prescribing also improves. due to focused training and drug information, better recognition of adverse drug reactions, drug interactions, and focused education efforts.
- ✓ The list of essential medicines relates to treatment guidelines for clinical diseases and is used for public procurement and supply of medicines, schemes for reimburse of medicines costs, and local medicine production.

STANDARD TREATMENT GUIDELINES (STGS)

- → Standard treatment guidelines (or treatment protocols or prescribing policies) are systematically developed statements designed to assist prescribers in making decisions about appropriate treatment and health care for specific clinical problem.
- → STGs is a tool that helps and guides prescribers (doctors , Pharmacists , dispensers) and other health care staff , who provide primary health care services , to provide evidence -based medicine and quality of care, at good cost .
- → Standard treatment guidelines (or clinical guidelines or clinical protocols) are component of health services that ensure evidence-based medicine and quality of care.
- → It helps in planning and costing of services at the health system level.
- → STGs are also a critical tool for monitoring and authorising procedure in a public funded health insurance schemes.

Key Features of a Successful STG Manual

1) **Simplicity :-** The number of commonly observed diseases are limited , so each disease should be written with a few salient features , with clear information on pharmacological and non pharmacological treatment.
2) **Credibility :-** The STGs guidelines should be developed by most junior and experienced clinicians in the country.
3) **Same standard for all levels : -** the first choice of drugs for treatment of a patient , depends on the patient 's diagnosis and conditions , If a patient attends a primary level or secondary or tertiary level h ospital with same common conditions the treatment may be same.
4) Medicine supply should be based on standards.
5) **Regular updating :-** If any changes occurs in therapeutic option , it should be included in the revised version.
6) **User friendly : -** STGs should be published as small or pocket size , that can be easily carry and used.

Advantages

1) **Patients :**
   - It provides a cost-effective optimal therapy.
   - It improves the availability of drugs.
   - It provides overall better quality of care.
2) **Healthcare Providers :**
   - It provides standardised guidance to practitioners.
   - It provides standard quality of care based on expert consent and basis for monitoring.
3) **Health Care Policy Makers :**
   - It provides focus therapeutic integration of special programs (dianhoes disease control, acute respiratory infection).
   - It provides a system for efficient controlling of cost by using funds.

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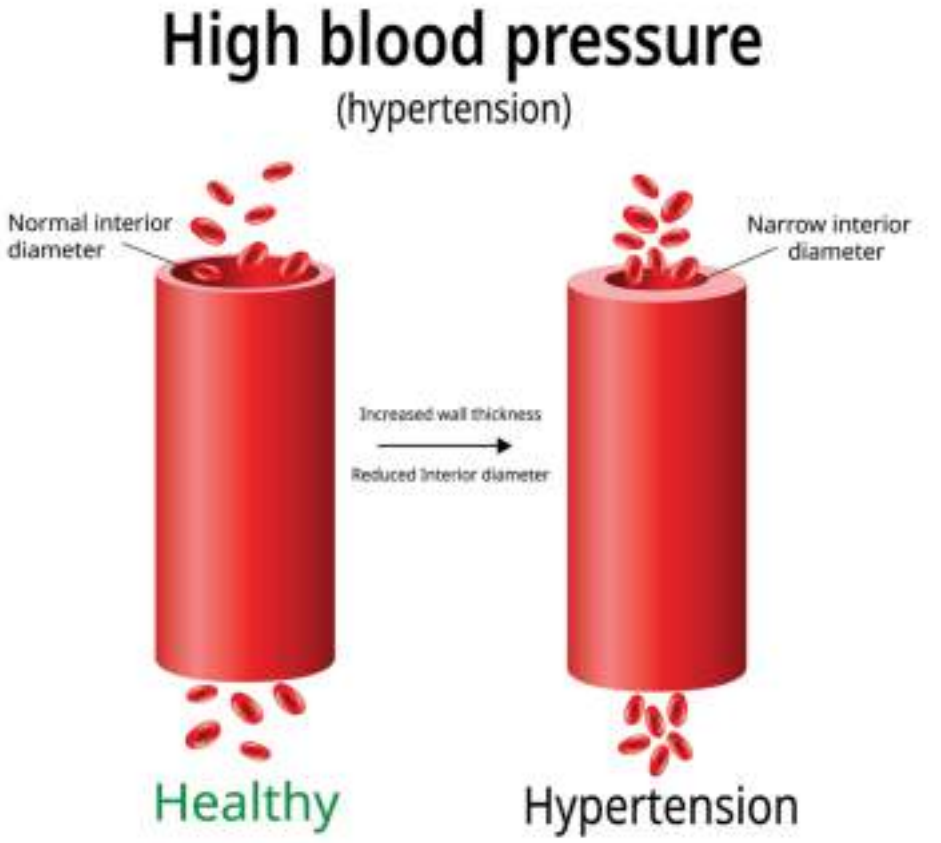
Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (a) : CARDIOVASCULAR SYSTEM DISORDERS

Chapter 2 (a)

CARDIOVASCULAR SYSTEM DISORDERS

Hypertension

- Hypertension (or high Blood Pressure, BP) is a common condition in which the long-term force of the blood against artery walls is high enough that it may eventually cause severe health complications mainly related to heart disease.
- A condition in which the blood pressure of the systemic artery increases beyond the normal pressure is known as hypertension.
- Therefore, to deliver blood to tissues, the heart works harder to overcome the increased systemic pressure. This increased systemic arterial pressure puts strain on the heart and other anteries that result in high blood pressure.



Classification of Blood Pressure for Adults

Blood Pressure Classification	Systolic BP	Diastolic BP
Normal	Less than 120	Less than 80
Prehypertension/Elevated	120 - 129	Less than 80
Stage 1 Hypertension	130 – 139	80 – 89
Stage 2 Hypertension	140 or higher	90 or Higher
Hypertensive Crisis	Higher than 180	Higher than 120

Types of hypertension on the basis of causes

- ⇨ Primary (Essential) Hypertension
- ⇨ Secondary Hypertension
- ⇨ Hypertension Crisis

Primary or essential Hypertension : This is the most common type of hypertension , (about 90-95 %). The exact cause of high blood pressure is not identified .

Etiology of Primary Hypertension

The exact reason of this type of hypertension is not clearly identified ,any of the following factors may be consider a cause :

- Hyperactivity of sympathetic nerve stimulation (because it increases heart rate , and constrict some blood vessels)
- Vasoconstriction due to release of vasoactive substances from endothelial cells .e.g. nitric acid , endothelin etc.
- Increase in cardiac output .
- Too much sodium (salt) in diet .
- Family history of Hypertension .

Secondary Hypertension : This is less common type of hypertension (about 5-10%) . this type of hypertension occurs due to other diseases like tumour , kidney disease , endocrine and cardiac disorder .

Etiology of Secondary Hypertension

This type of hypertension occurs due to other diseases like :

- Genetic problems
- Kidney diseases
- Hyperthyrodism (over production of thyroid gland hormone it increases heart rate) .
- Hypothyrodism (it increases cholesterol level) .
- Sleep apnea (sudden fall in sleep , change in heart rate)
- NSAIDs , estrogen , sympatomimetics , steroids , etc.

Hypertension Crisis :

- → It is a severe condition in which increased blood pressure may lead to heart stroke.
- → In this condition, blood vessels get damaged due to increased systolic blood pressure (180mmHg or higher) and increased diastolic pressure (120mmHg or higher).
- → Thus, the heart fails to pump blood effectively to the body.

Pathogenesis of Hypertension

Pathogenesis The blood pressure is regulated by following theories :

1. Sympathetic nervous system activities.
2. Activity of Vascular endothelium
3. Activity of renal system (Fluid Volume Regulation)

1) Sympathetic nervous system activities

- ➢ Over activation of SNS increase adrenaline sec retion then heart rate then cardiac output increased which leads to hypertension.

2) Activity of Vascular endothelium

- ➢ Endothelium dysfunction increase vasoactive substances (nitric acid) secretion which causes vasoconstriction and then hypertension . or decrease vasodilator nitric oxide it also case BP.

3) Activity of renal system

- ➢ The kidney release renin which help Anginotensinogen to convert into angenotensin and then it convert into anginotensin I and then anginotensin II and constrict blood vessels . anginotensin II also help to make aldosterone which increases blood volume by retaining sodium and water that increase blood preassure.

Clinical Manifestation of Hypertension

- Severe headache
- Chest pain
- Bleeding from nose
- Blurred Vision
- Difficulty In Breathing
- Irregular heart beat
- Confusion
- Nausea and vomiting
- Dizziness
- Pain in neck and back 11) Seizure

Non Pharmacological Management of Hypertension

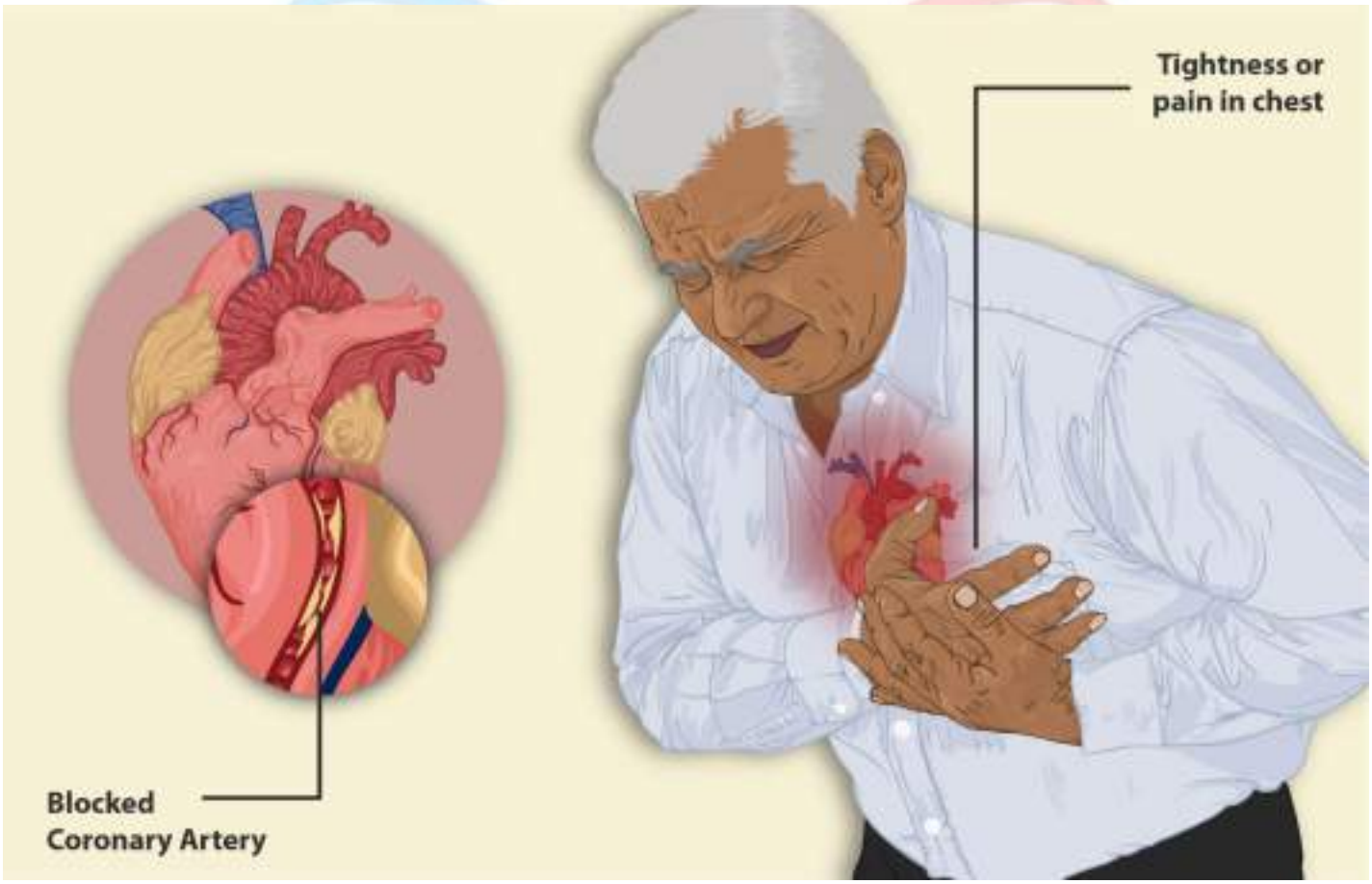
- **Dietary Changes :** A prehypertension (elevated) can be control with healthy diet , taking a diet low in sodium and high in potassium . It is called DASH (Dietary Approaches to Stop Hypertension)
- **Exercise :** Physical activity is can lower blower BP by decreasing bad cholesterol , obesity and overweight.
- **Stress Management :** Eliminating Stress is also an important way to manage BP , because in stress condition in which adrenal gland produces Cortisol hormone , and it increases blood sugar level to manage stress , that causes Hypertension . Stress Can be manage by Exercise and meditation .
- **Stopping Smoking :** Smoking Increases Sympathetic nerve activity , which increases heart rate and causes High BP.
- **Stopping Alcohol :** Drinking a lot of alcohol constrict blood vessels and increases blood pressure.

Pharmacological Management of Hypertension

- **Diuretics :** chlorothiazide , Furesimide , Spironolactone .
- **α Blocker :** Prazosin , Phenoxibenzamine
- **ß Blocker :** Atenolol , Propranolol .
- **α +ß Blocker :** labetlol , carvedilol .
- **Calcium channel Blocker :** Amlodipine , Nifedipine , Verapamil .
- **Angiotensin - converting enzyme (ACE) Inhibitors :** Captopril , Ramipril .
- **Angiotensin Receptor Blocker :** Losartan , valsartan .
- **Vasodilators :** Hydralazine , minoxidil

Angina Pectoris

- → Angina is a term used for chest pain caused by reduced blood flow to the heart muscles.
- → It is a symptom of coronary artery disease, and is typically described as squeezing, pressure, heaviness, tightness, or pain in chest.
- → Angina is experienced during physical stress and relieved after rest, but in severe conditions, it may be observed on minimum physical work or at rest.
- → Generally it is indication of coronary artery disease.
- → It is a very strong sign that someone at high risk of cardiac arrest, heart attack, and sudden cardiac death.



Types of Angina Pectoris

1. Stable / Chronic
2. Unstable Angina
3. Microvascular angina
4. Variant Angina

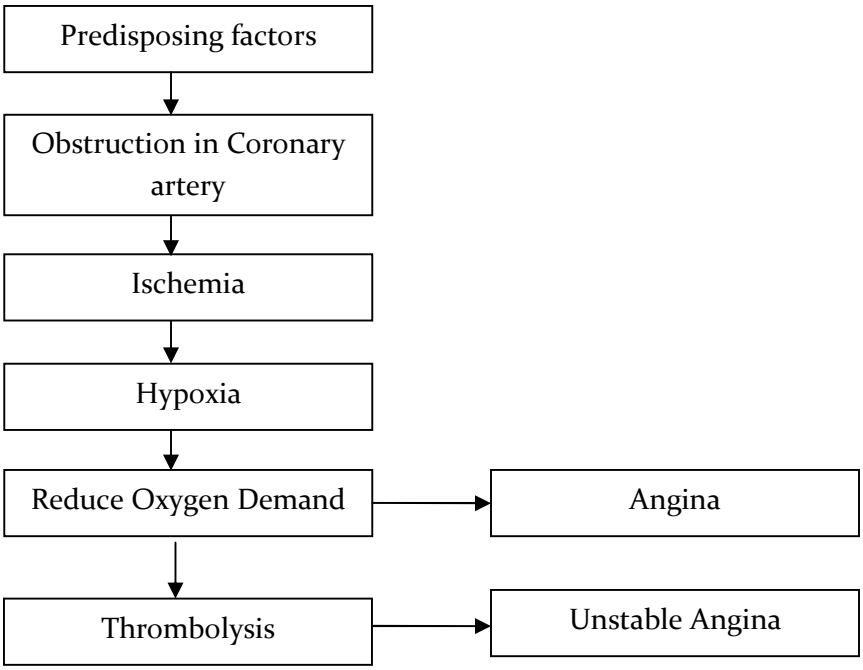
1. **Stable / Chronic :** This type of angina follow a regular pattern due to stable plaque in coronary arteries and occurs when work load of heart increased due to any reason like exercise ,playing foot ball . It is less dangerous than unstable Angina . This is relieved by rest and medication.
2. **Unstable Angina :** This type of angina does not follow a regular pattern due to unstable (dynamic) plaque in coronary arteries and occurs even at resting condition , rest and medication is not enough for its relief.
3. **Microvascular Angina :** This type of angina occurs when any one more smallest coronary arteries are blocked , and it commonly occurs due to thrombosis part of unstable angina.
4. **Variant Angina :** This type of angina occurs due to coronary spasm , and it follows a pattern , and spasm occurs due to external reasons like smoking , Cold weather , certain medicines , and stress . It is commonly occurs in younger people.

Etiology of angina Pectoris

The main causes of angina pectoris are

- Coronary Artery diseases
- Plaque In Coronary arteries : (It is also called Athreosclerosis) More than 60 % of blocking of coronary arteries become unable to fulfill the demand of increased blood oxygen by the heart muscles.
- Narrowing of Coronary arteries.
- Spasm In coronary arteries.

Pathogenesis



Clinical Manifestations Angina pectoris

- Pain in Chest
- Weakness
- Heartburn
- Cramping.
- Sweating
- Indigestion,
- Nausea,
- Shortness of breath

Non Pharmacological Management of angina Pectoris

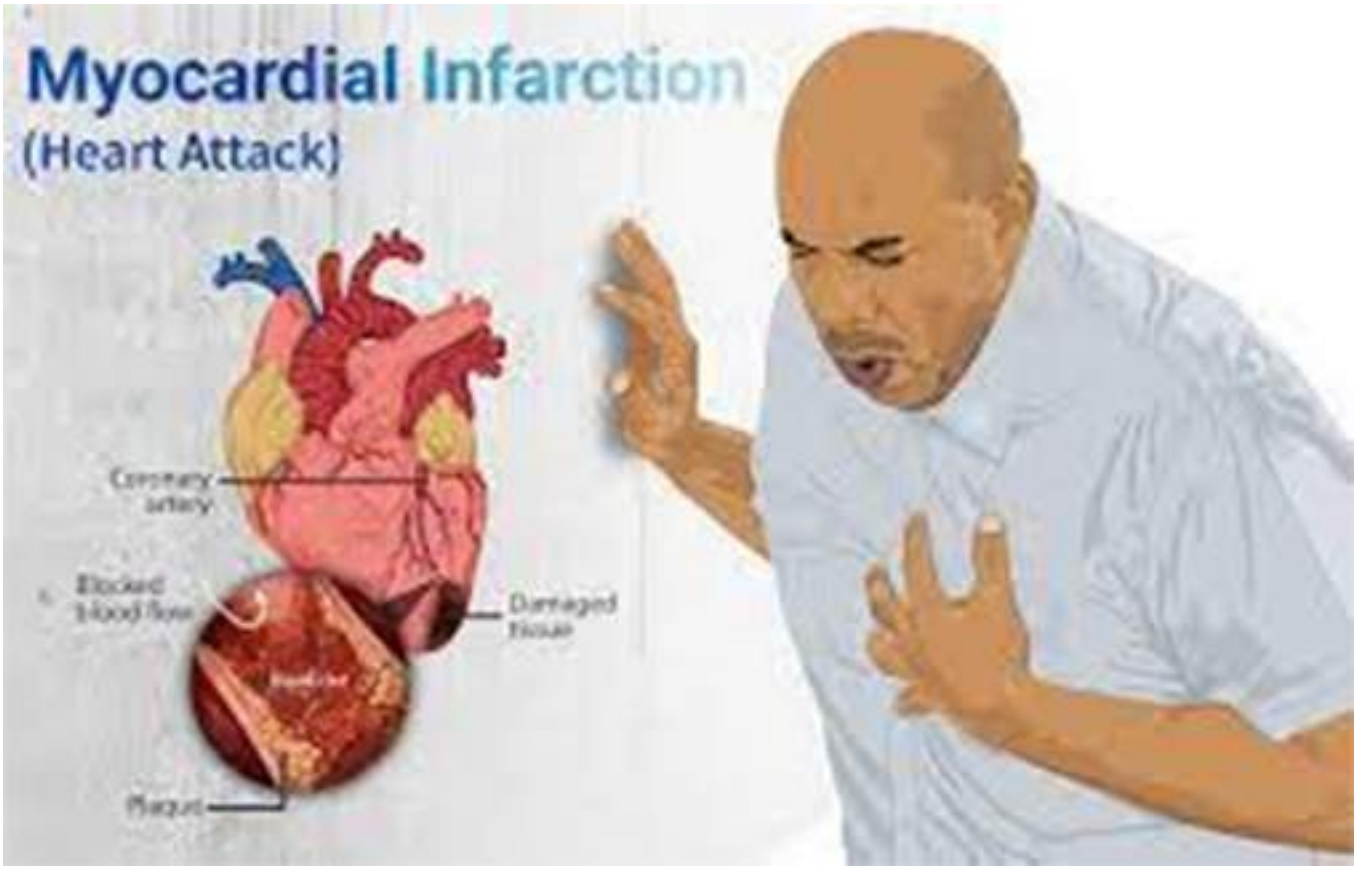
- To stop smoking
- Controlling Weight
- Avoiding heavy work in case of blockage .
- Controlling Hypertension
- Avoiding Heavy meals
- Avoiding Stress
- Avoiding alcohol
- Adding fruits , vegetable , high density lipoproteins , in diet

Pharmacological management of angina Pectoris

- **Nitrates :** Nitroglycerine , Isosorbide Dinitrate , they open the coronary arteries , and are given by sublingual route to obtain one set of action .
- **ß Blockers :** Atenolol , propranolol , they decrease BP and slow down the heart rate.
- **Calcium Channel Blocker :** Amlodipine , Nifedipine , Verapamil . they also act like ß blockers.
- **Thrombolytic Drugs (Antiplatelet drugs) :** Steptokinase , Urokinase , prourokinase , they prevent blood clotting.

Myocardial Infarction (MI, Heart Attack)

- → Myocardial Infarction (MI) or Acute Myocardial Infarction (AMI) or heart attack is a condition characterised by death of cardiac tissue due to disturbed obstructed blood supply.
- → It can also be described as irreversible death of hear cells due so ischemia.
- → Myocardial infarction or a heart attack is a condition in which the blood flow to a part of heart stops or is highly inadequate, causing that part of heart muscle to die and fail to pump blood.



Types

- Transmural Myocardial Infarction
- Non-Transmural Myocardial Infarction

Transmural MI : In this type of MI all the Three layer of heart muscles are affected by Ischemic Necrosis.

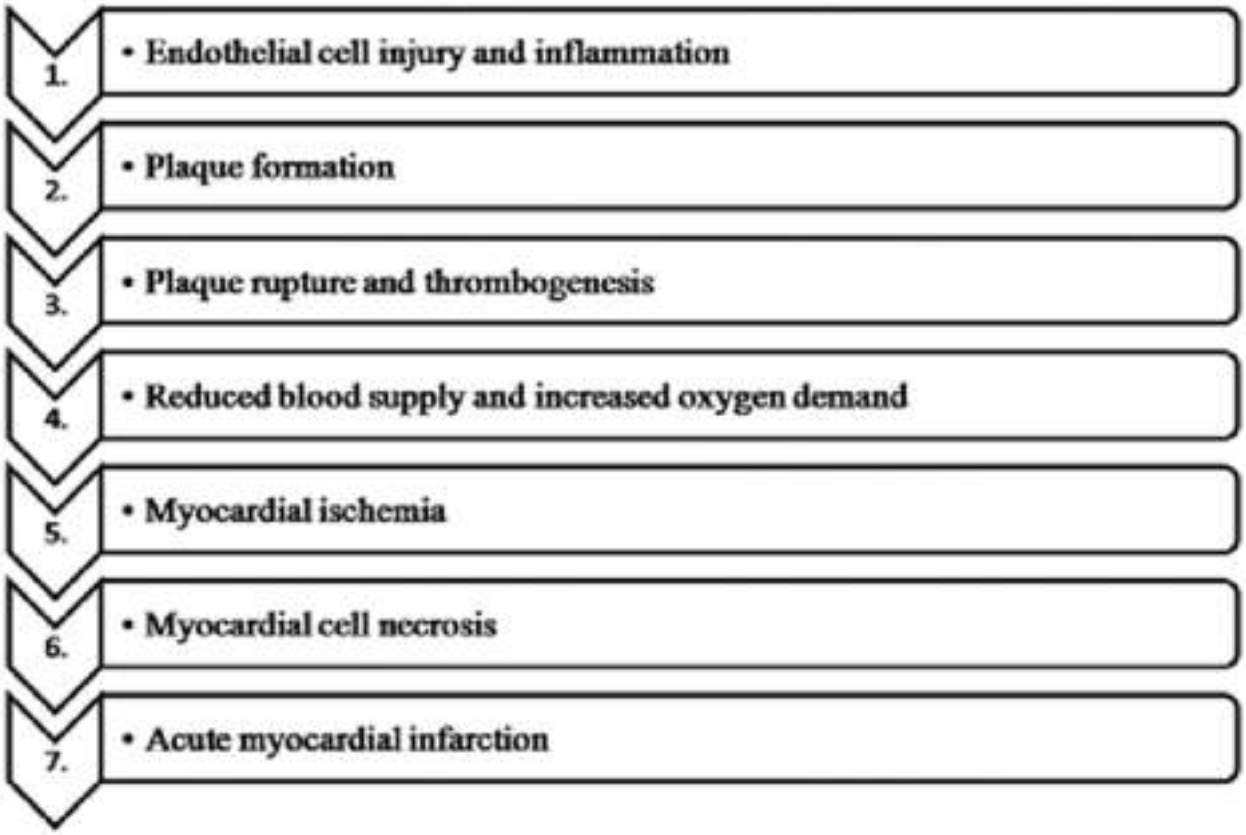
- Endocardium (inner Layer)
- Myocardium (middle layer)
- Epicardium (outer layer)

Non-Transmural MI : In this type of MI the Ischemic Necrosis affected ares is limited to endocardium or to myocardium

Etiology of Myocardial Infarction

- Coronary Artery diseases
- Plaque In coronary arteries
- Narrowing of Coronary arteries
- Spasm In coronary arteries
- Ischemia
- Hypoxia (due to carbon monoxide or pulmonary disorder)
- Increase After load and decrease blood supply

Pathogenesis



Clinical Manifestations

- Sudden chest pain,
- Shortness of breath,
- Anxiety,
- Sweating.
- Nausea and vomiting.

Non Pharmacological Management of Myocardial Infarction

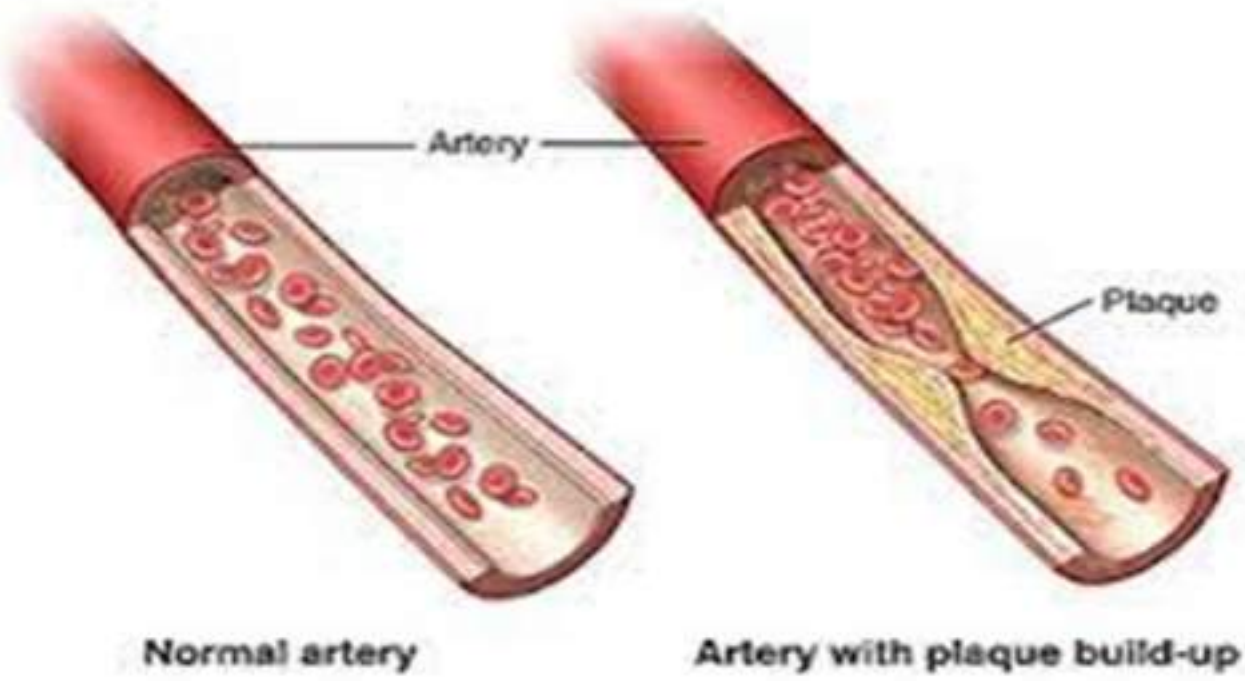
- To stop smoking.
- Diet : avoiding meat and dairy products , and increasing unsaturated fats Like olive oil , canola oil , Almonds , fish.
- To control Body weight and obesity.
- Physical activity.

Pharmacological Management of Myocardial Infarction

- The blocked artery of heart is treated by a surgical procedure called Angioplsty , in which a catheter is inserted with a balloon into the artery an d balloon is inflated at location of blockage to expand the artery . Then a ring called stent placed there which holds the open the artery . After angioplasty a heart patient requires following medicines :
  - **Blood thinners :** Aspirin , pradaxa
  - **Thrombolytic :** streptokinase , urokinase (these dissolve clots)
  - **Antiplatelet drugs :** clopidogrel (they prevents the formation of new clots)
  - **Nitrates :** Isosorbide dinitrate , Notroglycerine
  - **ß blockers :** propranolol
  - **ACE Inhibitors :** ramipril , captopril , Losartan , valsartan

Hyperlipidaemia

- → Hyperlipidemia is a condition in which the levels of fats (lipids) in blood, including cholesterol and triglycerides, increases abnormally
- → It is most commonly caused by lifestyle factors (poor diet and insufficient physical activity)



Etiology of Hyperlipidamia

- Too much alcohol consumption .
- Taking foods , high in saturated fat
- No physical activity , spending most time sitting .
- Genetic problem

Some drugs that can increase cholesterol levels

- ß blockers
- Diuretics
- Hormonal birth control pills
- Steroids

Some diseases can increase cholesterol levels

- Hypothyrodism
- chronic kidney disease
- diabetes
- HIV

Pathogenesis

- Liver produces homones as well as cholesterol to help in digestion.
- However cholesterol can also be obtained from meat and dairy products.
- The cholesterol included in foods is unnecessary because liver can manufacture all of the cholesterol required in the body
- Excessive cholesterol is harmful because it can block the arteries transporting blood throughout the body, and result in organ damage.
- The most hazardous type of cholesterol is bad cholesterol, which causes hardened cholesterol deposits (plaque) to form inside the blood vessels.
- This makes it more difficult for the blood to flow, thus increasing the risk for a stroke or heart attack

Types of Cholesterol	Normal Range
Total Cholesterol	< 200 mg/dl
Bad (LDL) Cholesterol	< 100 mg/dl
Good (HDL) Cholesterol	At least 60mg/dl
Triglycerides	< 150 mg/dl

Clinical Mainifestions

Hyperlipidamia does not show any symptoms , although at high level .but may lead to other condition like :

- High blood pressure
- Heart attack
- Stroke (reduce blood supply to brain)
- Weight gain
- Depression, etc.

Non-Pharmacological Management

- Exercising
- Quitting smoking.
- Limiting alcohol consumption
- Getting at least 7 hours of sleep every night.
- Keeping stress under control.
- Consuming nutritious foods.
- Losing a few pounds to achieve a healthy weight

Pharmacological Management

- **Statins :** These drugs prevent liver from producing cholesterol e.g. atorvastatin , Fluvastatin
- **Cholesterol Absorption Inhibitors :** These drugs prevent cholesterol absorption from intestine. These drugs work in combination with statins .e.g. Ezetimibe , simvastatin .
- **Nicotinic Acids :** It reduce LDL and triglyceride , and increases HDL . e.g. Niacin .
- **Fibrates :** Clofibrates , Fenofibrates .
- **Resins :** Colestipol , Colesevelam

Congestive Heart Failure (CHF)

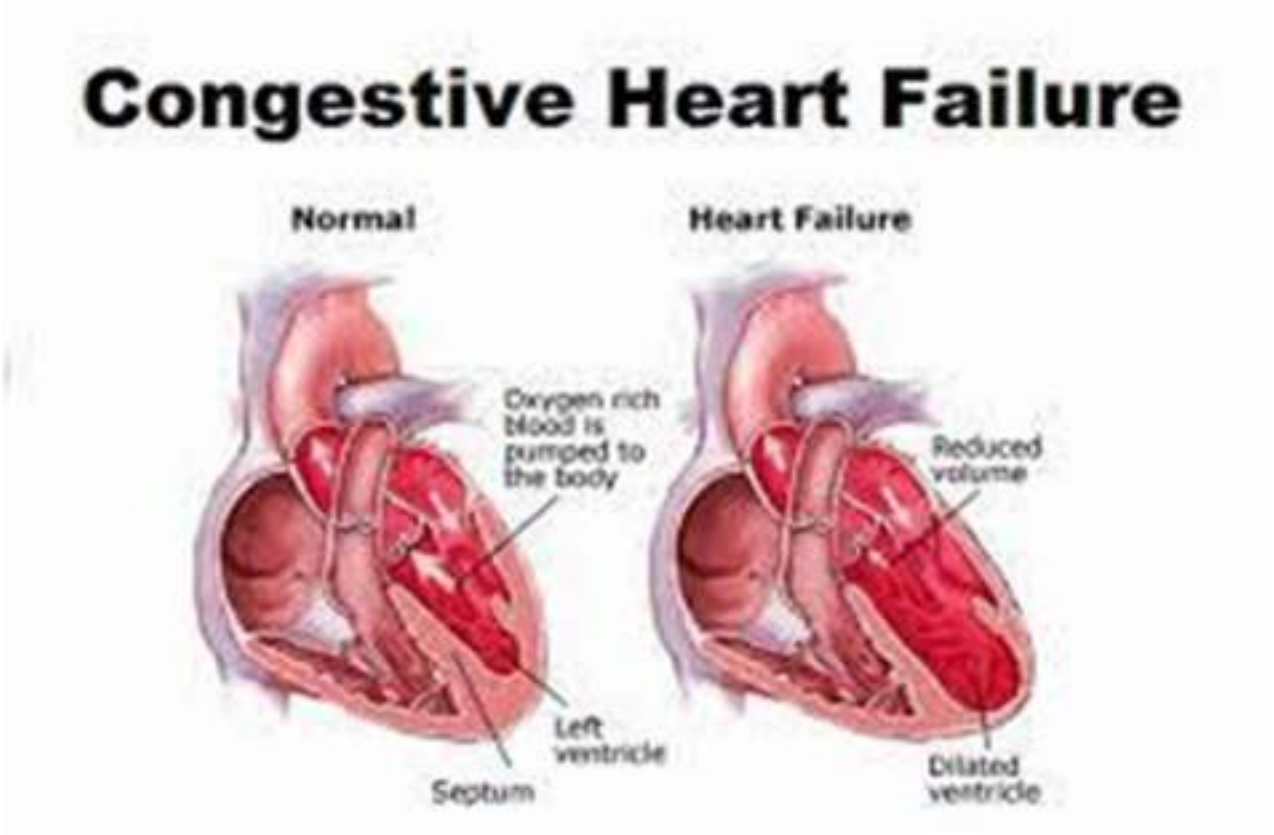
→ Congestive Heart Failure is a condition in which a heart fails to pump blood in a quantity sufficient to fulfil the body requirements.

Or

→ It is a Condition in which heart is unable to generate enough cardic output to fulfill minimum requirement of the body.

→ Narrowed heart arteries (coronary artery disease) or high blood pressure, makes the heart too weak or stiff to fill and pump efficiently.

→ Thus, these conditions give rise to CHE.



Types

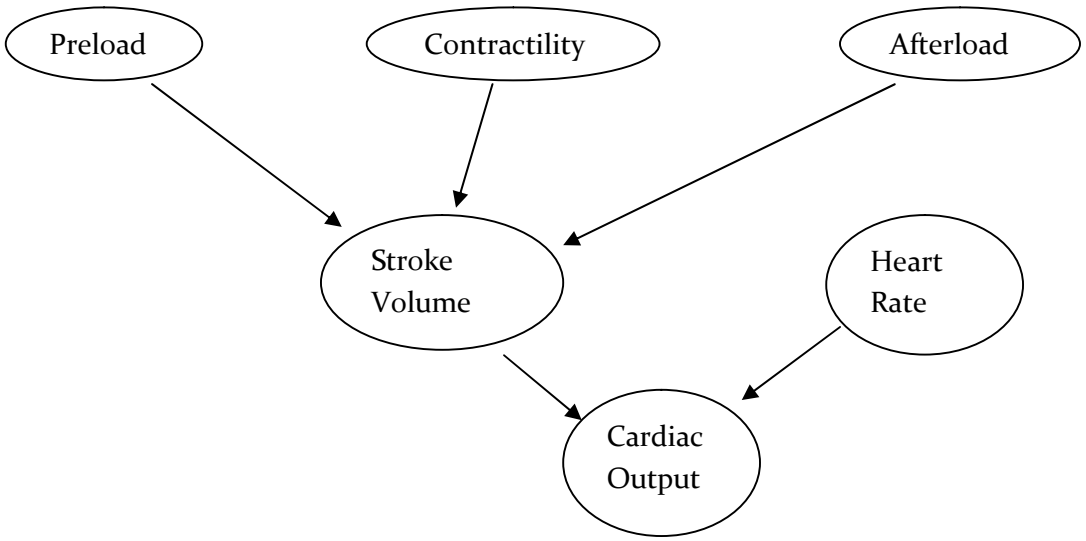
1. **Left-Sided Heart Failure :** Fluid back-up in the lungs, causing shortness of breath.
2. **Right-Sided Heart Failure :** Fluid back-up in e abdomen, legs, and feet causing swelling.
3. **Systolic Heart Failure :** The left ventricle fails to contact vigorously, indicating a pumping problem.
4. **Diastolic Heart Failure :** Also known as heart failure with preserved ejection fraction. The left ventricle fails to relax or fill completely, indicating a filling problem.

Etiology

- Too much preload
- Too low preload
- Too much afterload
- Slow or high heart rate
- Valve dysfunction
- Contractility disorder (intrinsic health of heart muscle)
- Cardiomyopathy (Diseases of the heart muscles)
- Any heart valve disease (due to high BP or Fever)
- Any congenital heart defect

Pathogenesis

- When preload or contractility or afterload or heart rate affected badly due to any reason then heart become unable to generate enough cardiac output to fulfill minimum requirements of the body and occurs Congestive Heart Failure.



Clinical Manifestations

- Breathing problems.
- When active, the patient may feel tried and weaknes in legs.
- Swollen ankle, leg, and abdomen.
- Weight gain.
- Urge to urinate at night.
- Palpitations (rapid or irregular heartbeats).
- A dry, hacking cough.
- A bloated or hard stomach, appetite loss, or nausea.

Non-Pharmacological Management

- **Diet :** He should take healthy diet , and avoid too much salt .
- **Fluid :** He should take limited fluid substance.
- **Alcohol :** he should avoid alcohol .
- **Smoking :** He should avoid smoking
- **Heavy work :** He should avoid heavy work

Pharmacological Management

- **ACE inhibitor :** Losartan , valsartan captopril , ramipril . (they make easy the blood flow.
- **ß Blockers :** Propranolol .
- **Diuretics :** Chlorthiazide , acetazolamide , spironolactone

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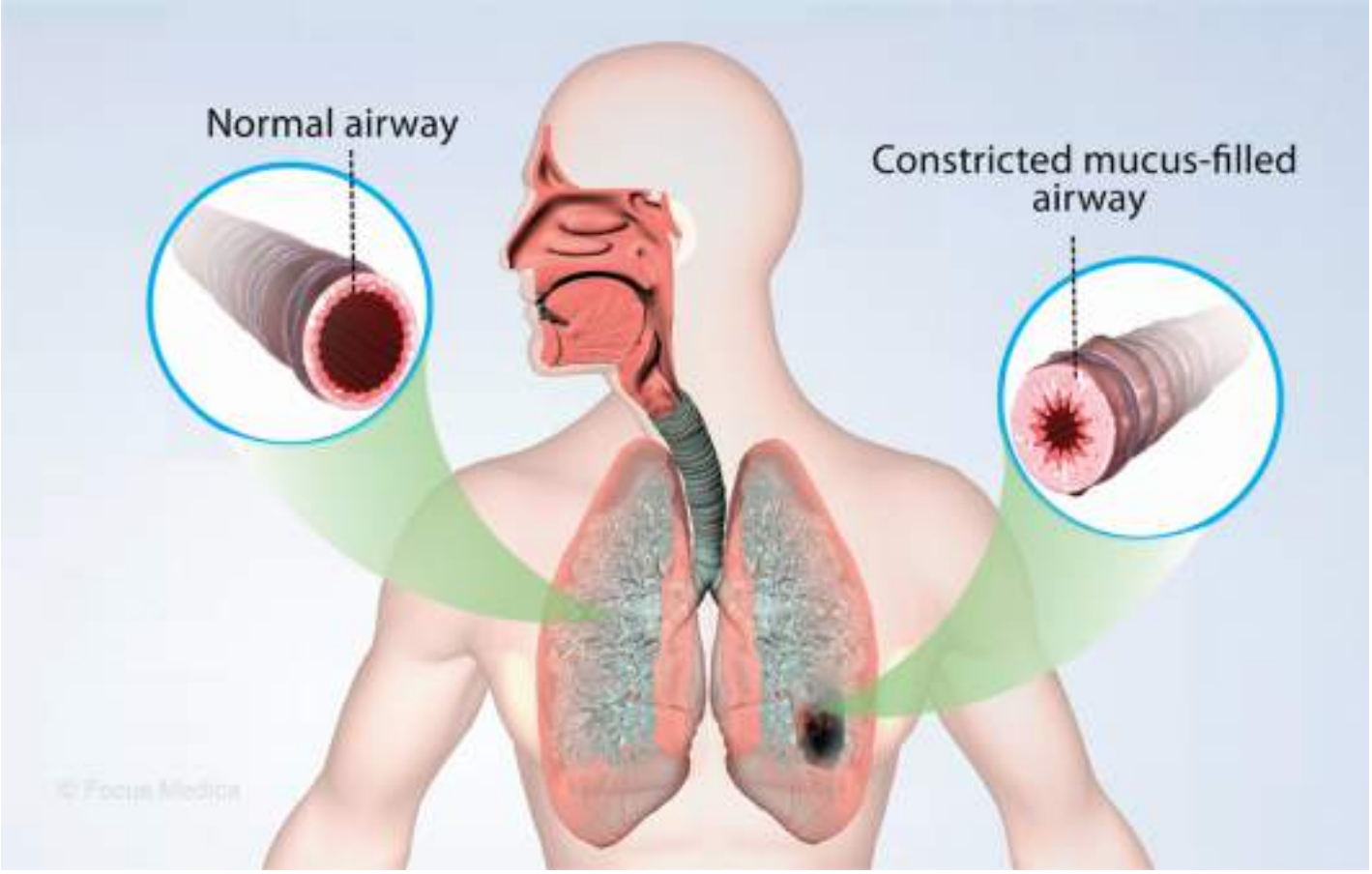
Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (b) : RESPIRATORY SYSTEM DISORDERS

Chapter 2 (b)

RESPIRATORY SYSTEM DISORDERS

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

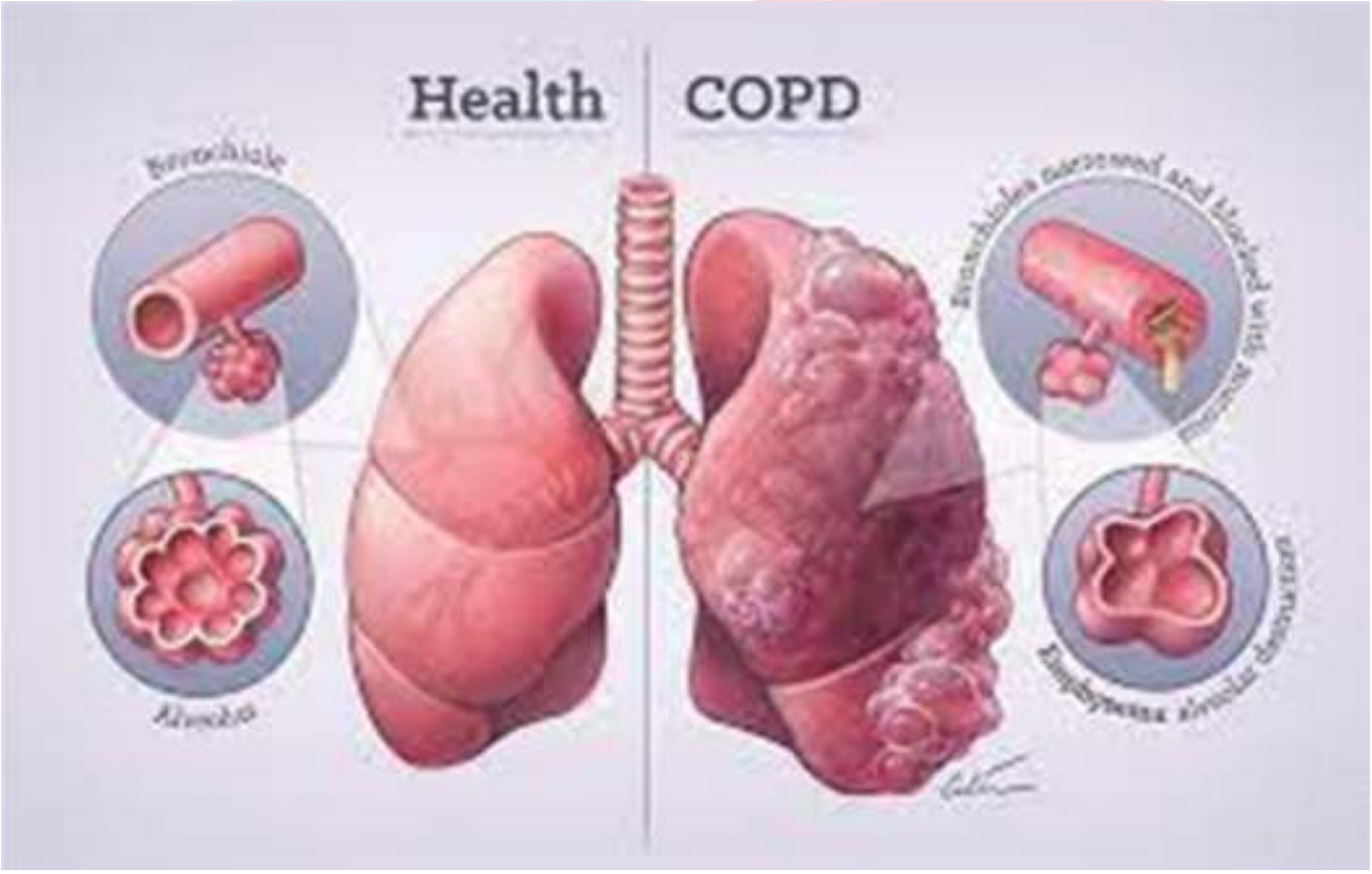
- Inhaled short acting ß Agonist : Albuterol
- Ipratopium

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

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (c) : Endocrine System Disorders

Chapter 2 (c)

Endocrine System Disorders

- → Endocrine system is defined as the complex glandular structure (cell modification or aggregation) which secrete the hormones and neurotransmitter in the body and regulate the body physiology and major participate in the defensive mechanism of the body.
- → Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts. Most hormones enter interstitial fluid and then the bloodstream. In endocrine system we have discussed about two types of glands.
    1. Exocrine glands—Exocrine glands secrete their products (enzymes) into ducts, that carry the secretions into body cavities, into the lumen of an organ, or to the outer surface of the body. Exocrine glands include sudoriferous (sweat), sebaceous (oil), mucous, and digestive glands
    2. Endocrine gland—Endocrine glands secrete their products (Hormone) into the interstitial fluid surrounding the secretory cells rather than into ducts. From the interstitial fluid, hormones diffuse into blood capillaries and blood carries them to target cells throughout the body. It is depending upon the heart for distribution of products.

Clinical consideration

- ➢ When the hormonal secretion impaired due to any reason include external as well as internal reason leads to disease like-
    - ◈ Diabetes mellitus.
    - ◈ Hashimoto thyroiditis.
    - ◈ Grave‟s disease
    - ◈ Polycystic ovarian.
    - ◈ Hypothyroidism.
    - ◈ Hyperthyroidism

Diabetes

- Diabetes Mellitus is a inherited or acquired disease occurs due to defect in insulin secretion or insulin action or both , in which blood sugar level is high for long time.
- It is also called Hyperglycemia.
- Diabetes means pass through , and mellitus means sweet,
- So we can say abnormal passing of sugar through blood or urine is called Diabetes mellitus.

Normal range of blood sugar level

	normal people	diabetes patients target
Before meals	72-99 mg/dl	80-130mg /dl
2 hours after meals	less than 140/ mg/dl	less than 180mg/dl

Types of Diabetes

- **Type 1 Diabetes :** This type of diabetes occurs due to severe reduction in production of Insulin because of autoimmune destruction of beta cells of Pancreas . This occurs in younger age usually . (before 35-40 years)
- **Type 2 diabetes :** This type of diabetes occurs due to the resistances to the action of Insulin . Or cells do not respond to insulin . This occurs in older age usually .
- **Gestational Diabetes :** During pregnancy , placenta generate hormones that alter the function of insulin.

Etiology

1) Type 1 Diabetes :

- Autoimmune destruction of beta cells of pancreas.
- Any disease in pancreas
- Age
- Genetic factors
- Beta blockers and Thiazide drugs if used for long term

2) Type 2 Diabetes

- Insulin does not function properly.
- Resistances to insulin function
- Obesity.
- lack of physical activity
- Genetic factors

Pathogenesis

Type 1 diabetes	Type 2 Diabetes
Immune attack on beta cells ↓	Poor response of cells to insulin ↓
Severe decrease in insulin production ↓	Decrease function of Insulin ↓
Increase blood sugar level ↓	Increase blood sugar level ↓
Type 1 Diabetes Mellitus	Type 2 Diabetes Mellitus

Clinical Manifestations

- Presence of sugar in urine
- Increase thirst
- Increase frequency of urination
- Extreme hunger
- Fatigue
- Blurred vision
- Headache
- Frequent infection
- Delay in healing of cuts and wounds
- Itchy skins

Non Pharmacological managements

- Physical Activity
- Diet (should avoid carbohydrates , salt in excess amount)
- Should avoid Sweats

Pharmacological managements

- **Type 1 diabetes :** It is insulin dependent , insulin is administered to treat this type of diabetes .
- **Type 2 diabetes**
  - **Hypoglycemic agents**
    - Sulfonylurea : they stimulate the release of insulin from pancreas , : Tolbutamide ,chlorpropamide , glibenclamide
    - Biguanides : prevent liver from production of glucose , : metformin , phenformin
    - α Glucosidaese Inhibitors : it prevent the absorption of carbohydrates form intestine : Acarbos , miglitol

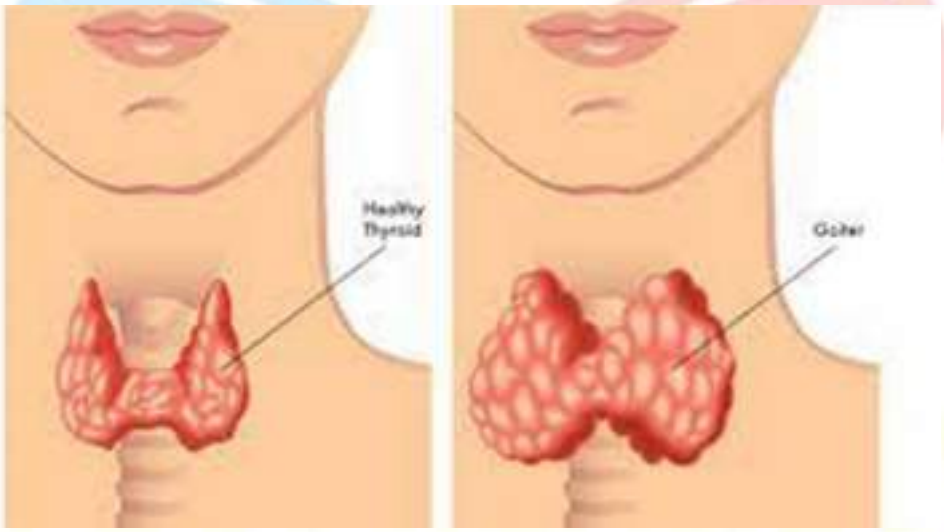
Thyroid Disorder (Hypo and hyperthyroidism)

→ The thyroid gland, usually located below and anterior to the larynx, consists of two bulky lateral lobes connected by a relatively thin isthmus.

→ The thyroid is divided by thin fibrous septae into lobules composed of about 20 to 40 evenly dispersed follicles, lined by a cuboidal to low columnar epithelium.

Hypothyroidism

→ Lake of Thyroid Hormones (TH) in blood circulation about 20% to 40 % which slow down the metabolism is called Hypothyroidism.



Etiology :

➢ There are two types of etiology of Hypothyroidism , primary (Problem in thyroid gland) , secondary (problem in Pituitary gland)

Primary :

- Autoimmune disorder
- Dietary iodide deficiency.
- Anti-thyroid drugs
- Lithium therapy
- Radioactive iodine (RAI) uses.

Secondary :

- low secretion of TSH.
- Damage of pituitary gland.

Pathogenesis of Hypothyroidism

Primary or secondary causes
Autoimmune disorder ↓
decreased production of TH ↓
lake of TH in blood ↓
Hypothyroidism ↓

Clinical manifestation

- Constipation
- Depression
- Feeling tiredness
- high blood cholesterol level
- Dry skin
- Excessive forgetfulness
- Heavy and frequent menstrual cycle
- Tingling in hands
- Loss of sexual desire
- Gaining weight

Non Pharmacological Management

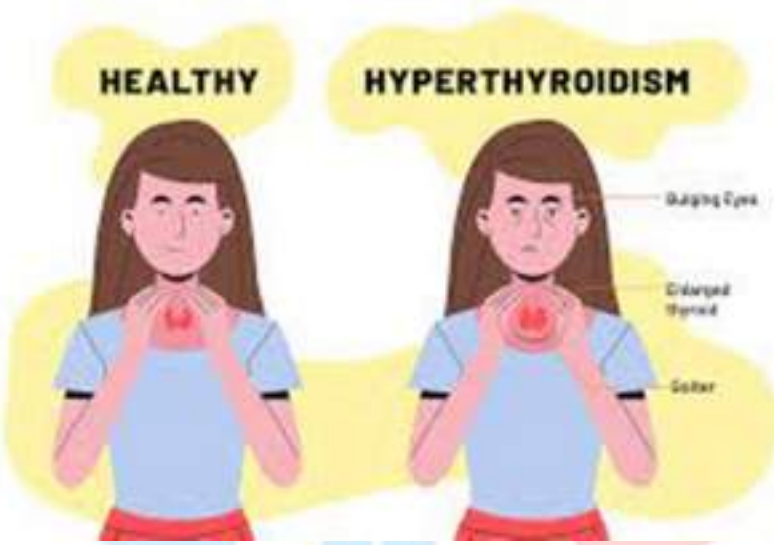
- Exercise
- Stress management
- Diet (Increase intake of foods , fruits , vegetables are rich in iodine , zinc , iron copper selenium , Vitamin A , D.

Pharmacological Management

- Levothyroxine (T_4)
- Liothyronine (T_3)
- Combination Of T_4 and T_3

Hyperthyroidism

→ A condition in which thyroid gland produces more Thyroid Hormones (TH) than requirement of the body is called Hyperthyroidism.



Etiology

- Graves 's Disease : It is an immune system disorder in which thyroid produce excess amount of Thyroid hormones.
- Infection of Thyroid gland.
- Excess consumption of Iodine
- Pituitary gland disorder

Pathogenesis of Hyperthyroidism

Thyroid gland disorder ↓
Increases production of TH ↓
High level of TH in Blood ↓
Hyperthyroidism ↓

Clinical Manifestation

- Weight Loss
- Increased appetite
- Changes in menstrual
- Restless
- Diarrhoea
- Excess sweating
- Sleep problems
- Swollen in thyroid gland etc.

Non Pharmacological Management

- Exercise
- Stress management
- Diet (decrease intake of foods , fruits , vegetables are rich in iodine , zinc , iron copper selenium , Vitamin A , D.

Pharmacological Management

- **Hormone Inhibitors :** Methimazole , Propylthiouracil .
- **Beta Blockers :** Propranolol (these drugs provide relief from hyperthyroid symptoms till the anti-thyroid drugs become effective .
- **Glucocorticoids :** They inhibit the conversion of T_4 to T_3 (T_3 is more power full Hormone)
- **Radioactive Iodine :** These drugs destroy thyroid cells and control thyroid hormones . the dosage of RAI should be given carefully , otherwise cause hypothyroid .

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (d) : Central Nervous System

Chapter 2 (d)

Central Nervous System

- → The principal functional unit of the central nervous system (CNS) is the neuron.
- → Neuron is the structural and functional unit of the nervous system; it has the unique ability to receive and transmit information.
- → Neurons of different types and in different locations have distinct properties, including functional roles, distribution of their connections, neurotransmitters used, metabolic requirements, and levels of electrical activity at a given moment.
- → In addition to neurons the CNS contains other cells, such as astrocytes and oligodendrocytes, which make up the neuroglia. During any injury or abnormality these cells undergo a range of functional and morphological changes and leads to many of neurological disorders.

Clinical consideration

- Epilepsy.
- Parkinson's disease.
- Alzheimer's disease.
- Stroke.
- Migraine.
- Encephalopathy
- Seizure.

Epilepsy

- Epilepsy is a nervous system disorder due to abnormal electrical activity in brain cells, it is also called seizure and convulsant.
- This disorder results contraction , involuntary movement , shaking of the body etc.

Classification of seizures

- Seizure is classified on the basis of behavioural and electrophysiologic pattern of activity as

1. Partial (Focal seizures)

- It mainly appears in only one hemisphere.
- That means symptoms only happen in a specific part or on one side of your body. But focal seizures can sometimes spread and become generalized seizures.
    a) Simple partial seizures with motor, sensory, or autonomic symptoms.
    b) Complex partial seizures.
    c) Partial seizures with secondary generalization.

2. Generalized seizures

- These are seizures that happen in both hemispheres of your brain side. These seizures tend to cause more severe effects and symptoms.
    a. Absence seizures.
    b. Tonic- clonic seizures.
    c. Other (Myoclonic, tonic, clonic, atonic)

Etiology

- Brain injury
- High fever
- lake of oxygen to brain
- Brain tumor
- Genetic brand disorder
- Stroke (reduce blood supply to brain)

Pathogenesis

Due to etiological factors ↓
Neuronal cell membrane altered ↓
Repeated Action potential ↓
Rapid generation of electrical Impulses ↓
spread to other cell of brain ↓
The abnormal electrical impulses reach to skeletal muscles ↓
Epilepsy

Clinical Manifestation

- Recurrent of seizure
- Sudden stiffness due to unknown reason
- Sudden falling due to unknown reason
- Sudden bouts of chewing due to unspecific reason
- Rpetitive involuntary movement
- Changes in sense of smell touch and sound

Non Pharmacological Management

- Ketogenic diet is useful in children are suffering from seizure . ketogenic diet is a high -fat adequate protein , and low carbohydrates diet for example fish , meat , eggs , seafood etc

Pharmacological managements

- Benzodiazepines— ex- clonazepam, lorazepam, diazepam.
- Barbiturates— ex- phenobarbital, desoxyphenobarbital.
- Deoxy barbiturates— ex- primidone.
- Hydantoin— ex-phenytoin, ethotoin.
- Aliphatic carboxylic Acid— ex- valproic acid, magnesium valproate.
- Oxazolidine derivatives— ex- trimethadione, paramethadione.
- Cyclic GABA Analogues— ex- gabapentin, pregabalin.
- Iminostilbene— carbamazepine, oxcarbazepine.
- Other drugs— ex- levetiracetam, parampanel, brivaracetam, lacosamide

Parkinson's Disease

→ It is a chronic, progressive , neurodegeneration disorder. in which slows down the voluntary movement of body parts (bradykinesia) , muscles tone changed (rigidity) and tremor at rest.

Etiology

- Genetic factors
- Advancing age : above 60 year mostly scene
- Head injury
- Drugs : like neuroleptics ,antiemetics etc.
- Exposure to toxin.
- Low production of Dopamine

Pathogenesis of Parkinson 's Disease

Degeneration of Dopamine production

↓

Deficiency Of Dopamine

↓

The normal balance between Dopamine and acetylcholine disturbed

↓

Motor control affected

↓

tremor , Rigidity , bradykinesia

↓

Parkinson's Disease

Clinical Manifestation

- Slow moment
- Tremor / trembling
- Low volume of speech
- Dropping of saliva
- Constipation
- Tendency to fall backwards
- Depression

Non Pharmacological Management

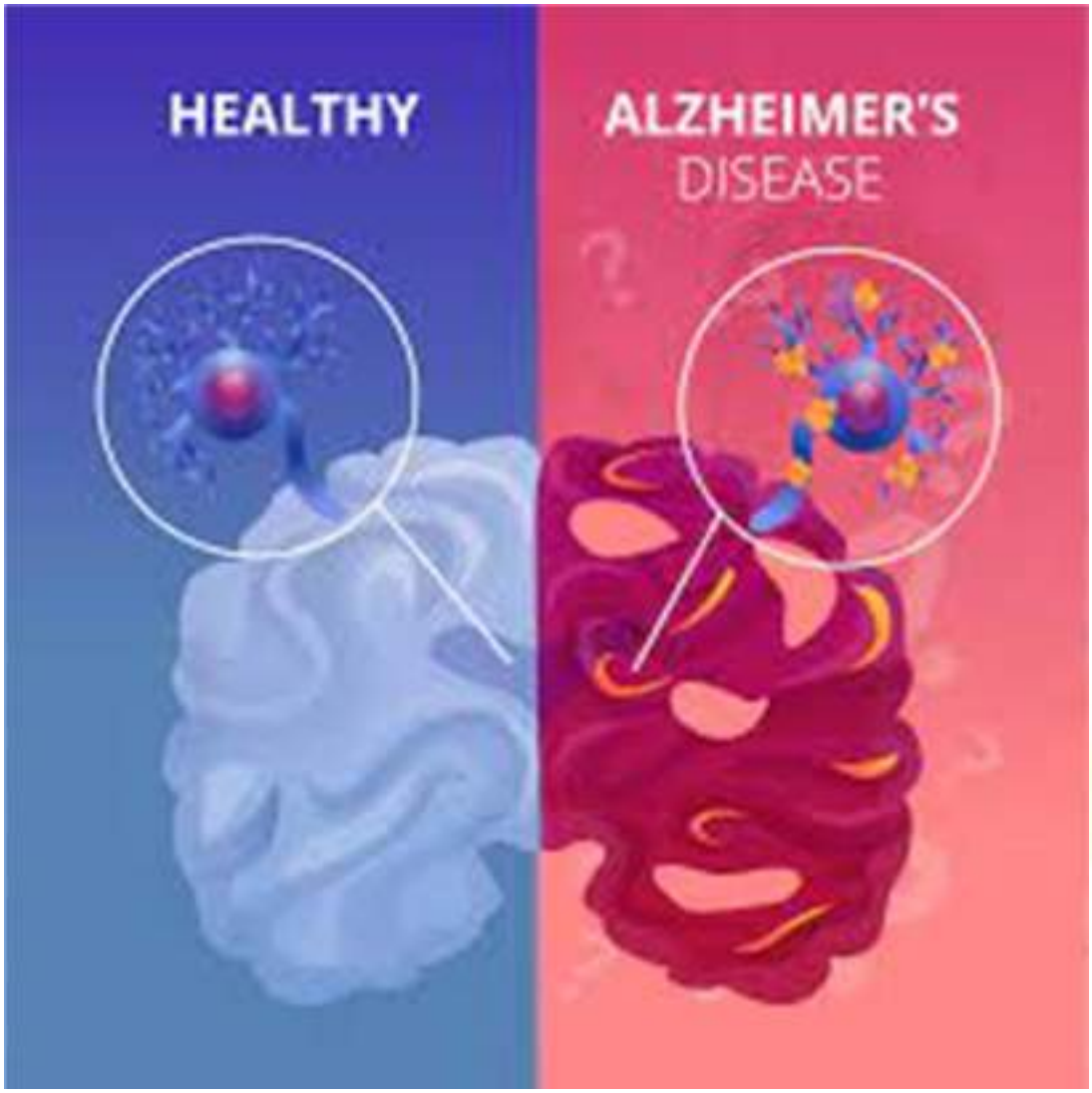
- Avoid and discard the all activities which cause/induce the depression, stress, sleep disorders etc.
- Follow and change the diet plans according to own demand or prescription by any RMP
- Practice the yoga, meditation, physical exercise regularly. Ventilation is one of the reasons which leads to brain disorders and cardiac disorders also
- Practice of herbal/natural medicine other than allopathic.
- Do such all activities which makes you happy and cheerful.

Pharmacological Management

- **Levodopa :** It converts into dopamine when reach to the brain . It is the most effective drug For PD.
- **Dopamine agonist :** Bromocriptine , ropinirole : They work like dopamine on dopaminergic receptors.
- **MAOI :** Selegiline , Rasagline.
- **Anti-cholinergic drugs :** Benztropine , Procyclidine.

Alzheimer 's Disease

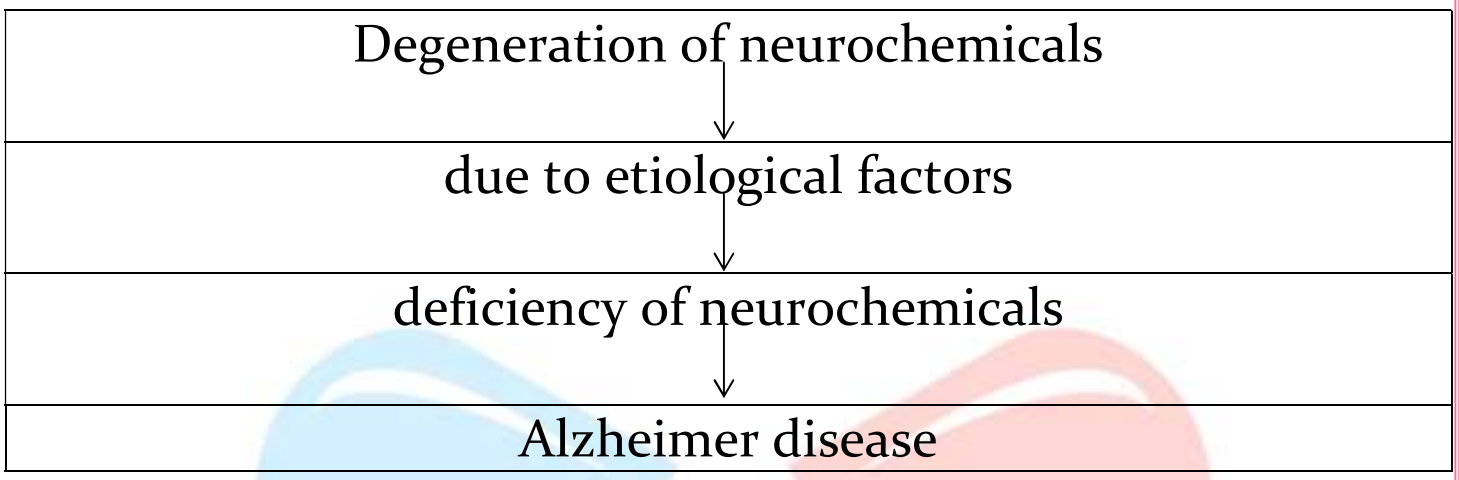
→ Alzheimer's disease is a chronic irreversible neurodegeneration disease which gradually destroy the ability to think, remember, and learn ,and involves memory loss.



Etiology

- Neurochemical factor
- Genetic factors
- Environmental factors
- Head injury
- Smoking
- Advancing age (above 65 years).

Pathogenesis



Clinical Manifestation

- Loss of memory
- Placing object at unusual place
- Confusion about events, time and place
- Asking the same question repeatedly
- Problem to perform familiar work
- Getting lost of or wandering
- Problem in sleeping
- Behaviour changes like agitation , anxiety
- Poor thinking or understanding
- Difficulty in recognising family members or friends
- Difficulty in speaking during choosing the right words.

Non Pharmacological Management

- Avoid and discard the all activities which cause/induce the depression, stress, sleep disorders etc.
- Follow and change the diet plans according to own demand or prescription by any RMP
- Practice the yoga, meditation, physical exercise regularly. Ventilation is one of the reasons which leads to brain disorders and cardiac disorders also
- Practice of herbal/natural medicine other than allopathic.
- Do such all activities which makes you happy and cheerful.

Pharmacological Management

- **Chonilesterase Inhibitors :** Donepezil , galantamine.
- **Glutametergic Drugs :** Gabapentin , Lamotrigine

Stroke

- → Stroke is a condition in which blood supply to the brain reduced or stops due to blockage or hemorrhage.
- → In stroke condition brain function is stopped due to the death of brain cell.
- → Stroke is also called brain attack and cerebrovascular accident (CVA).

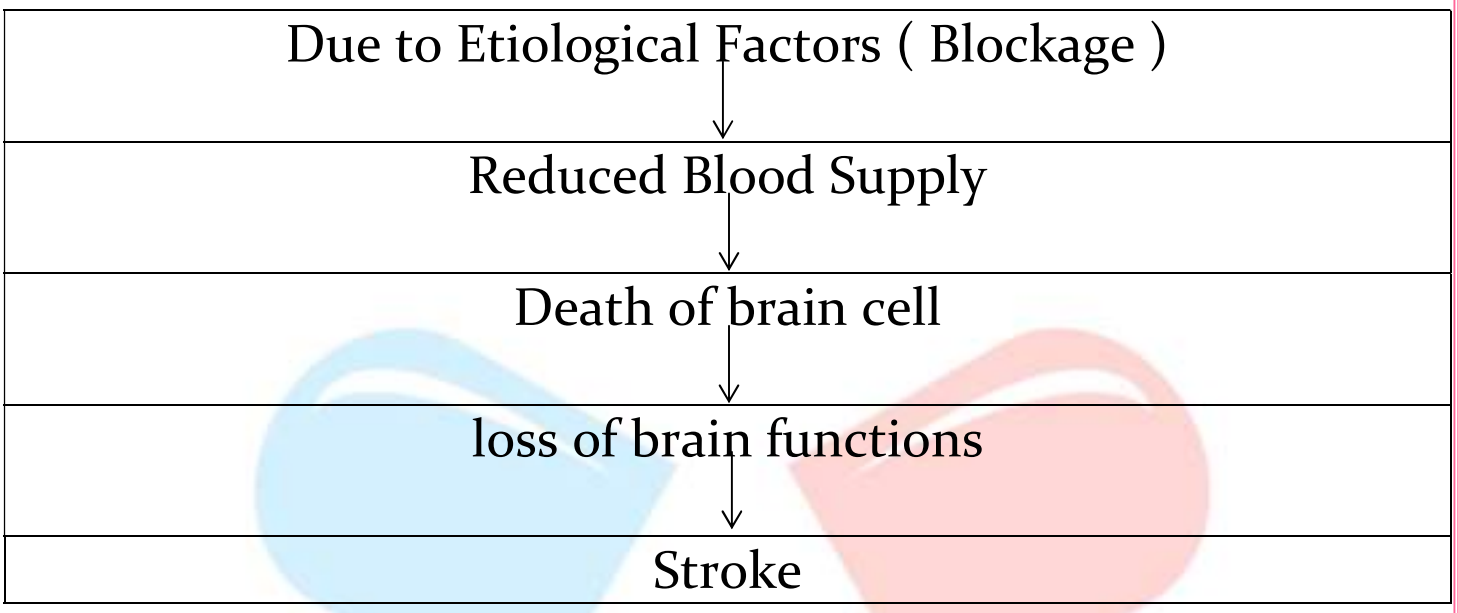
Types

- **Islamic stroke :** Blood flow to the brain reduced due to narrowed or blocked arteries of brain by Thrombus(lipid deposition) or embolus (blood clot).
- **Haemorrhagic stroke :** Blood flow is disturbed due to leakage of blood vessels of brain.

Etiology

- Blockage in brain arteries
- Leakage in blood vessels
- Diabetes mellitus
- Smoking
- Inactivity
- Obesity
- Alcoholism
- Estrogen use
- Advancing age
- Family history

Pathogenesis



Clinical Manifestations

- Dizziness
- Loss of control and coordination
- Difficulty in speaking and understanding
- Paralysis in face, leg, arms , mostly on one side of the body
- Blurred vision
- Severe headache

Non Pharmacological Management

- Early Contact to doctor
- Early Diagnosis

Pharmacological Management

- Emergency treatment with medications
- Alteplase Injection : it is given by vein in arm , it dissolves the blood clot and restore the blood flow
- Anticoagulant drugs : these drugs prevent further blood clot .Heparin , warfarin.

Emergency Procedure for removal of clot

1) Surgical Procedure
2) **Mechanical clot removal :** Using a catheter a small device is move into the brain , which removes the clot either by grabbing it or by breaking it .

Migraine

- Migraine is a recurrent attacks of headache that affects one side of head.
- Migraine may last 4-48 hours.
- A migraine is a headache that can cause severe throbbing pain or a pulsing sensation, usually on one side of the head and also involving altered regulation and control of afferents, with a particular focus on the cranium. It's often accompanied by nausea, vomiting, and extreme sensitivity to light and sound.

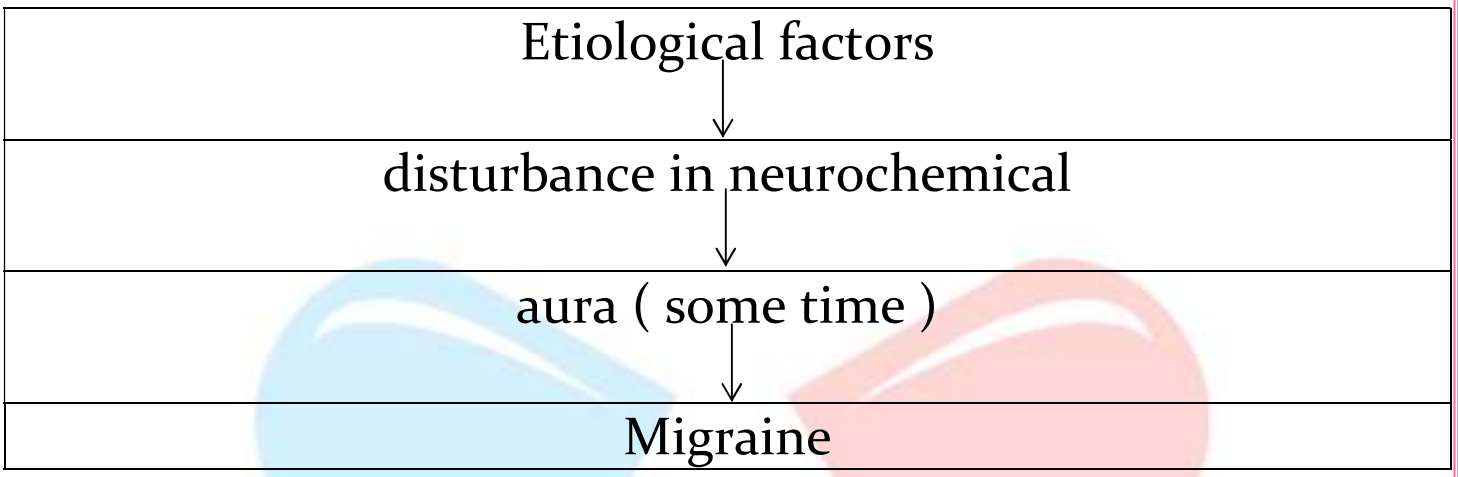
Types

- **Migraine with Aura :** It is a type of migraine in which a person has warning sign (aura) that a migraine attacks is going happen
    - Examples of aura : constipation , mood changes , neck stiffness , increasing urination
- **Migraine without aura :** This is the most common type of migraine.

Etiology

- Abnormal metabolism of serotonin in brain.
- Family History
- Age (above 30)
- Hormonal changes
- Pregnancy
- Oral contraceptives

Pathogenesis



Clinical Manifestation

- One side headache
- Nausea and Vomiting
- Blure vision
- Sensitivity to light noise or odours
- Feeling tired
- Stiff neck

Non Pharmacological Management

- Should avoid triggers of headache like intense light and sound , and stress etc.
- Should rest in a dark place

Pharmacological Management

- **NSAIDs :** Should use in mild to moderate headache. Paracetamol , Ibuprofen , aspirin
- **Calcium channel blocker :** Amlodipine , Verapamil.
- **ß Blockers :** Atenolol , propranolol.
- **Antidepressant :** Amitriptyline , Venlafaxine.
- **Anti- epileptic drugs :** Valproate , carbamazepine.
- **Vitamins :** Riboflavin (B2)

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (e) : Gastro Intestinal System Disorders

Chapter 2 (e)

Gastro Intestinal System Disorders

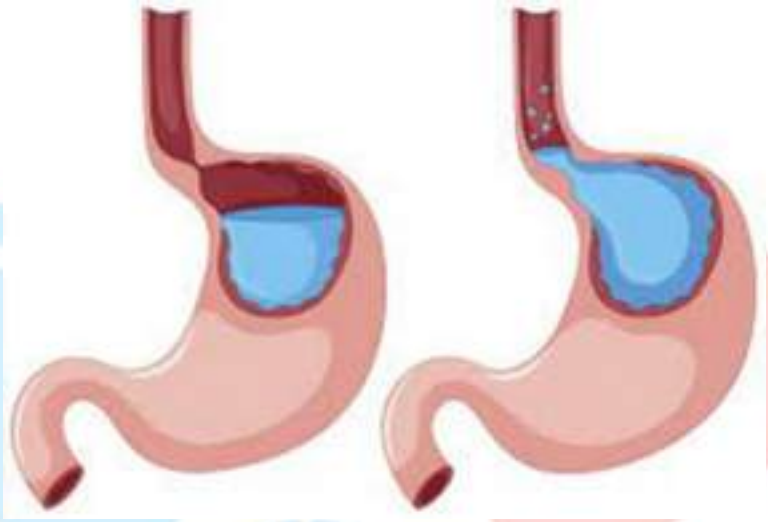
→ The gastrointestinal (GI) tract is a hollow tube extending from the oral cavity to the anus that consists of anatomically distinct segments, including the oesophagus, stomach, small intestine, colon, rectum, and anus. Each of these segments has unique, complementary, and highly integrated functions, which together serve to regulate the intake, processing, and absorption of ingested nutrients and the disposal of waste products

Clinical Consideration

- Irritable bowel syndrome.
- Hypertrophic pyloric stenosis.
- Oesophageal achalasia.
- Gastro oesophageal reflux disease (GERD).
- Peptic ulcer/gastric ulcer/duodenal ulcer.
- Inflammatory bowel diseases (IBDs).
- Alcoholic liver disease etc.

Gastro Oesophageal Reflux Disease (GERD)

→ GERD is a disease in which gastric acid (stomach acid) moves up into the oesophagus and irritates the oesophageal lining.



Etiology

- Weakness of LES(lower oesophageal sphincter)
- Excessive abdominal pressure (pregnancy)
- Some foods (like spicy, dairy , fried foods)
- Some drugs like anti-asthmatic ,anti hypertensive , anti allergy , anti depressant and pain killers etc.
- Hiatal Hernia.
- Obesity

Pathogenesis

Oesophageal Hypersensitivity or other reason ↓
Inflammation (due to cytokine) ↓
Change in Oesophageal Sensitivity ↓
weakness / relaxed LES ↓
GERD

Clinical Manifestations

- Heartburn
- Chest Pain
- Difficulty in Swallowing
- Sensation of Lump in the Throat
- Bad breath

Non Pharmacological Management

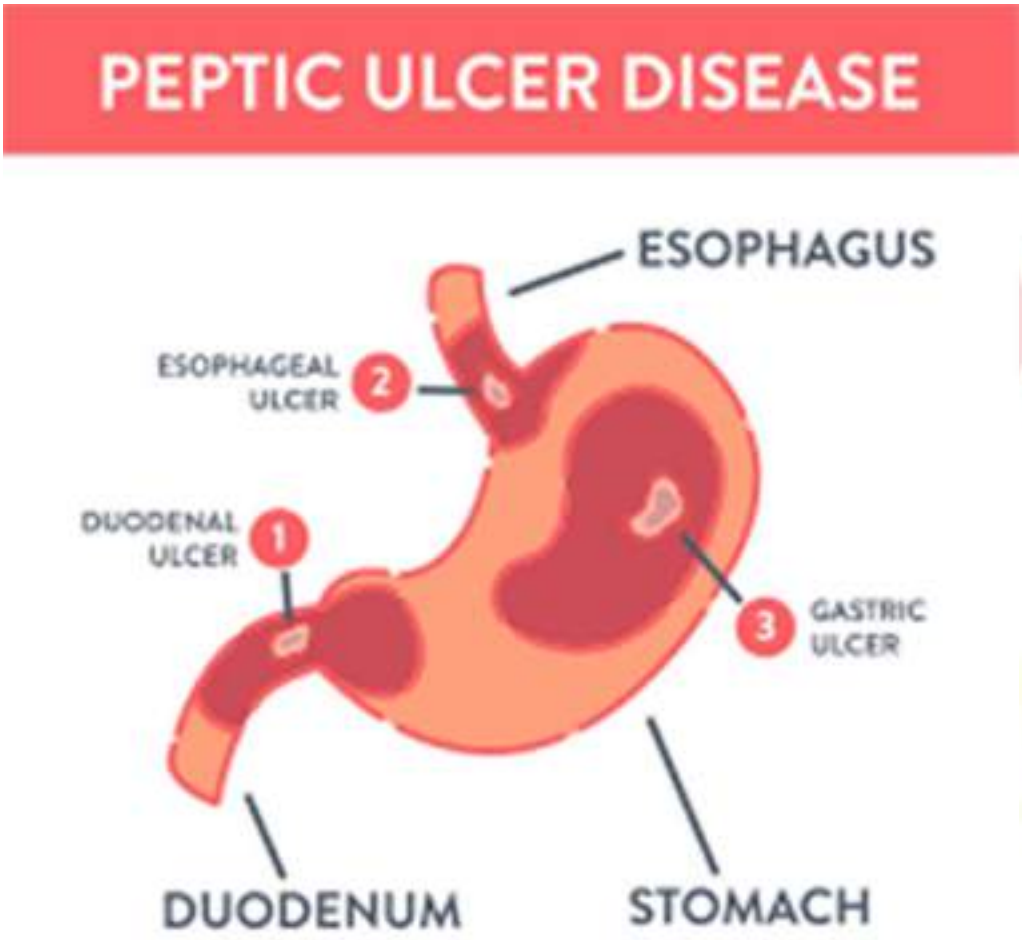
- To avoid Foods increase Gastric acidity . and foods or beverages can relax the LES (Chocolate , peppermint , Caffeine , alcohol etc.)
- Avoiding meals that slow down Peristaltic movement.
- Limiting the foods that take a long time in digestion.
- Avoiding heavy meals.
- leaving smoking
- Not laying down after eating.
- Losing weight (overweight).

Pharmacological Management

- **Antacids :** Aluminium hydroxide. magnesium carbonate. ,magnesium trisilicate. magnesium hydroxide. calcium carbonate. sodium bicarbonate.
- **H2 Blocker :** Cimetidine (Tagamet) , ranitidine (Zantac)** nizatidine (Axid) famotidine (Pepsid).
- **PPI :** Omeprazole ,Esomeprazole ,Lansoprazole , Rabeprazole Pantoprazole.
- **Baclofen :** It reduces the relaxation of LES

Peptic Ulcer Disease

→ Peptic Ulcer is a condition in which a wound / Sore developed on the lining of the Oesophagus , stomach , or small intestine (beginning part of intestine).



Etiology

- Helicobacter Pylori (it infects and causes inflammation).
- NSAIDs . (Inhibit COX 1)
- Smoking
- Alcoholism
- Radiotherapy

Pathogenesis

Helicobacter pylori release toxin ↓	NSAIDs ↓
Cause Inflammation ↓	Inhibits COX 1 ↓
Damage the defense mechanism ↓	Reduce PG Secretion ↓
ulcer Developed	Decrease Defense Mechanism ↓
	Ulceration Developed

Clinical Manifestations

- Pain in stomach
- Gastrointestinal Disorders
- Heartburn
- Appetite change
- Nausea , vomiting
- Dark or black stool due to bleeding
- Severe pain

Non Pharmacological Management

- Diet :
  - Avoiding the foods that take a long time in digestion.
  - If blood or water loss occurred due to Diarrhoea or vomiting , they should be recovered
- Cessation of NSAIDs.
- Quitting smoking.

Pharmacological Management

- **Antacids :** Aluminium hydroxide. magnesium carbonate. ,magnesium trisilicate. magnesium hydroxide. calcium carbonate. sodium bicarbonate.
- **H2 Blocker :** cimetidine (Tagamet) , ranitidine (Zantac)** nizatidine (Axid) famotidine (Pepsid)
- **PPI :** Omeprazole ,Esomeprazole ,Lansoprazole , Rabeprazol e Pantoprazole.
- **Protective Drugs :** Carafate (Sucralfate) Pepto- Bismol (Bismuth Subsalicylate). It covers the wound and prevent further damage)
- **Antibiotics :** Imidazole , azithromycine , amoxicillin etc.

Alcoholic Liver Disease (ALD)

- → The Structural and functional changes (damage) of liver due to overconsumption of alcohol is called ALD.
- → Consumption of 60-80 g/ day (about 75-100 ml/day) for 10 to 20 years for men.
- → 20 g /day (about 25 ml /day) for women . Women are at the double risk of getting ALD

Etiology

- Overconsumption of alcohol

Pathogenesis

Overconsumption of Alcohol ↓
Acetaldehyde (toxic) it causes auto immune disorder , due to its toxic effect liver cells also damage ↓
NAD reduced to NADH ↓
Inhibits Gluconeogenesis , decrease fatty acid oxidation in liver , increase storage of extra fat in liver ↓
Fatty liver (this is first stage of alcoholic Liver disease)

Clinical Manifestations

- Abdominal swelling.
- Jaundice
- Haematological disorders
- Indigestion and constipation
- Fainting and mental disturbance
- Renal disorders.

Non-Pharmacological Management

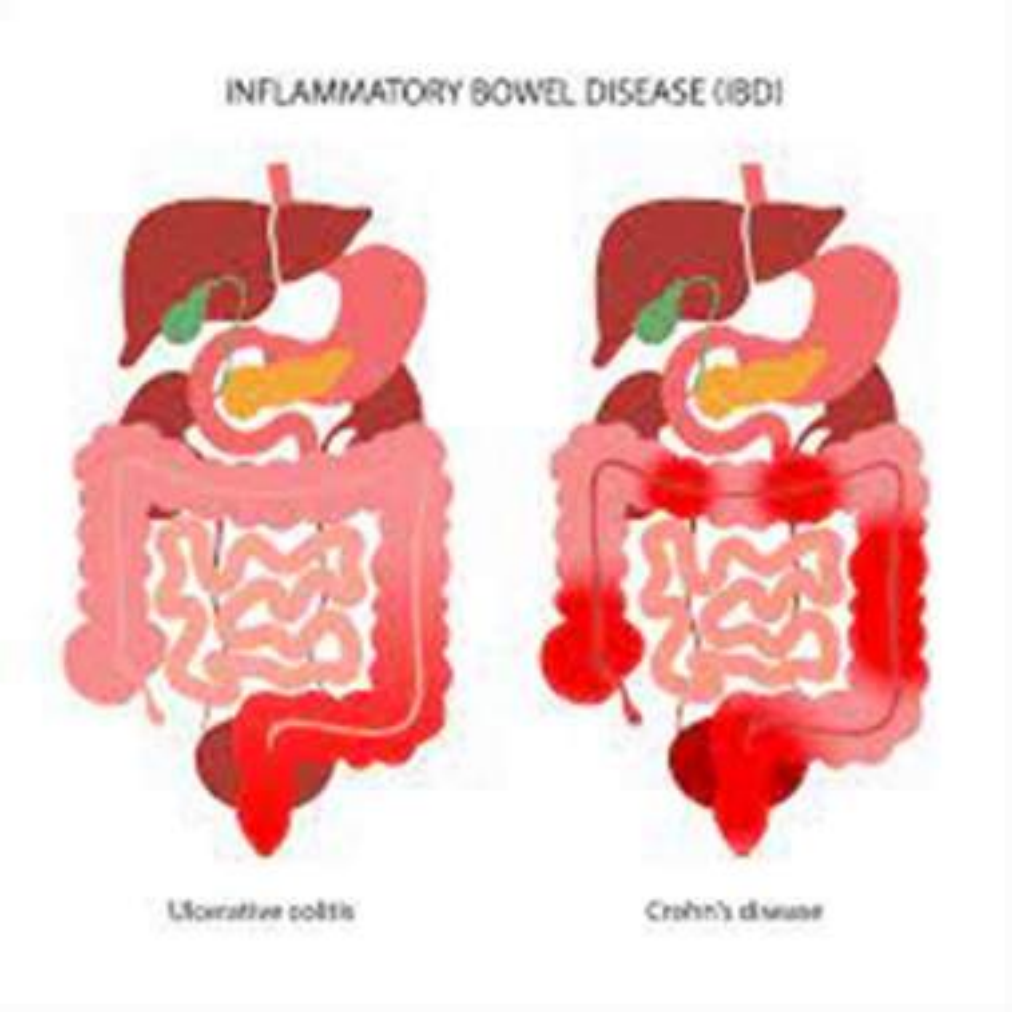
- Cessation of alcohol
- Taking healthy diet
- Low intake of salt

Pharmacological Management

- **In fatty liver :** It can be recover with stopping alcohol
- **In hepatitis :** Anti inflammatory drugs are used like steroids (prednisolone , pentoxifyline). Cholesterol medication.
- **In liver cirrhosis :** Diuretics , ammonia reducer , Beta blockers , antibiotics,
- Anti viral drugs and at last liver transplant.
- Vitamin k used according to needs

Inflammatory Bowel Disease

→ The prolonged Inflammation of GIT (specially in intestine) is called IBD.



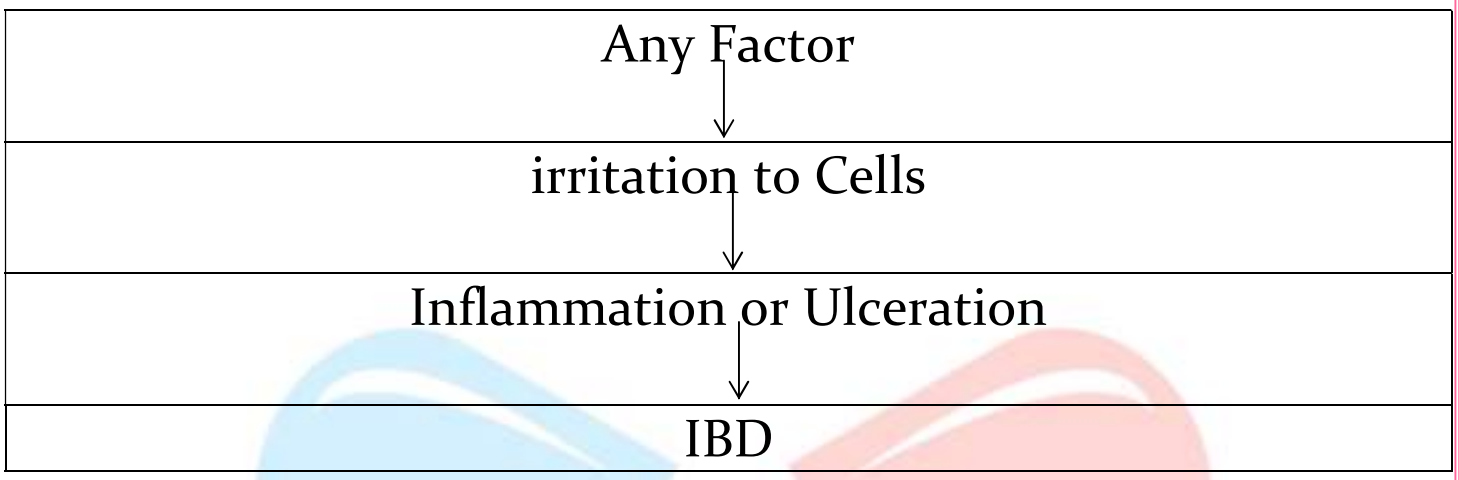
Types

- **Crohn's Disease :** If there is inflammation in intestine it is called Crohn's disease.
- **Ulcerative Colitis :** If there are inflammation and ulceration in large intestine it is called Ulcerative Colitis.

Etiology

- Autoimmune disorder
- Genetics
- Bacteria and viruses
- Environmental factors (Smoking , alcohol , Diet , oral contraceptives etc.).

Pathogenesis



Clinical Manifestations

- Loss in Weight
- Fever
- Pain & tenderness in abdomen
- Rectal Bleeding etc,

Non Pharmacological Management

- Avoiding smoking
- Cessation of alcohol
- Avoiding NSAIDs
- Increasing fiber rich diet.
- Increasing the intake of Omega 3 fatty acids in diet . It reduce inflammation.
- Avoiding Spicy and fried foods.

Pharmacological Management

- Antibiotics
- Anti-inflammatory drugs
- Immune suppressive drugs
- Steroids
- Analgesic
- Janus kinase (JAK) Inhibitors : Tofacitinib . It blocks the enzyme causes inflammation .
- Anti-diarrheals : Loperamide

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (f) : Haematological Disorders

Chapter 2 (f)

Haematological Disorders

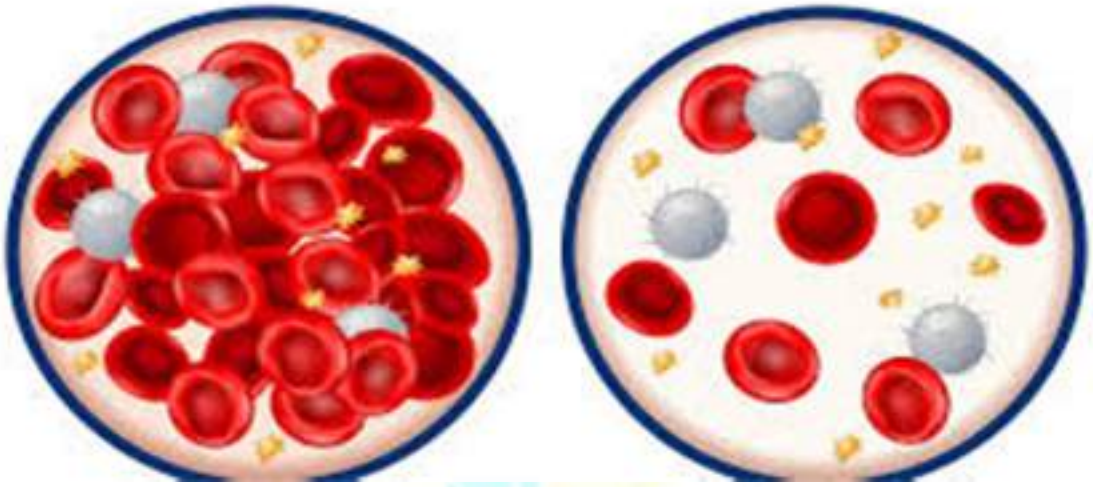
- → Blood is an extremely complex fluid, composed of both formed elements (red cells, white cells, platelets) and plasma. RBCs (erythrocytes) are the most common formed elements, carrying Oxygen and haemoglobin.
- → White blood cells are function as mediators of immune responses to infection or other stimuli of inflammation.
- → Platelets are the formed elements that participate in coagulation. Plasma is largely water, electrolytes, and plasma proteins. The plasma proteins most important in blood clotting are the coagulation factors.
- → A group of haematological disorders characterized by the any disturbance in the physiological and morphological changes in the blood cell is called haematological disorder.

Clinical consideration

- Most common haematological disorder is Anaemia.

Iron Deficiency Anaemia (Microcytic Anaemia) M.A

→ A condition in which blood doesn't have enough healthy RBCs is called Anaemia , and if it is due to lack of iron it is called Iron deficiency Anaemia or M.A



Etiology

- Lack of Iron
- lack of iron in diet
- Inability to absorb iron
- Pregnancy (in this condition iron demand increased)
- Genetics
- Heavy blood loss due to any reason

Pathogenesis

lack of Iron in body (due to any reason)

↓

Affected haemoglobine production

↓

Unhealthy RBCs

↓

Iron deficiency Anaemia

Clinical Manifestations

- Weakness
- Extreme Fatigue
- Pale Skin
- Chest pain
- Shortness of Breath
- Increased heart rate
- Headache
- Dizziness
- Brittle nails
- Inflammation in tongue

Non Pharmacological Management

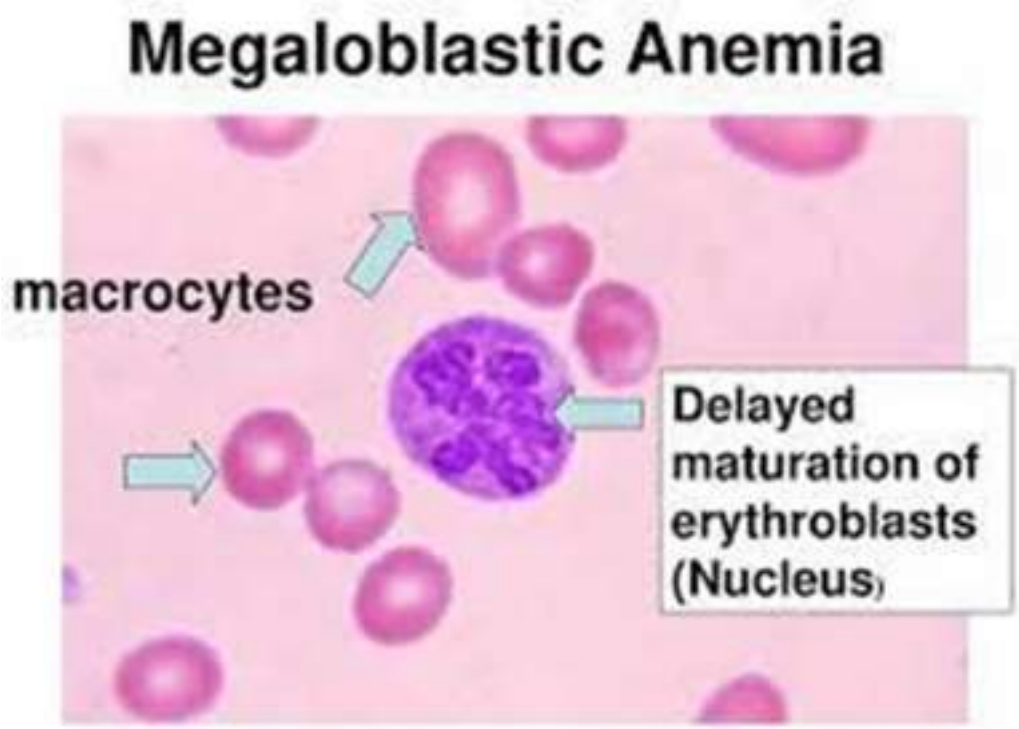
- Increase in diet :
  - Vitamin C
  - Red meat
  - Dark Green leafy vegetables
  - Nuts
  - Dry Fruits
  - Iron fortified Cereals.

Pharmacological Managements

- **Oral iron :** Ferrous sulphate, ferrous aminoate, ferrous gluconate, ferrous succinate, carbonyl iron, iron calcium complex.
- **Parenteral iron :** Iron sucrose, iron dextran, iron isomaltoside, ferric carboxy maltose, ferric pyrophosphate citrate.

Megaloblastic Anaemia

→ Megaloblastic Anaemia is a condition in which Bone marrow makes large structurally abnormal and immature RBCs , Due to lack of Vitamin B 1 2 and B9.



Etiology

- Lake of Folic Acid
- Lack of Cobalamin

Pathogenesis

Blood Formation ↓
lack of Vitamin B12 and B9 ↓
Abnormal Formation of RBCs ↓
Magaloblastic Anaemia

Clinical Manifestations

- Weakness
- Extreme Fatigue
- Pale Skin
- Chest pain
- Shortness of Breath
- Increased heart rate
- headache
- Dizziness
- Diarrhoea
- Loss of appetite

Non Pharmacological Management

- For Vitamin B12 Eggs , red meat , bran , Milk , liver . for Vitamin B 9 liver , kidney , eggs , Dark green Veg.

Pharmacological Management

- **Oral iron :** Ferrous sulphate, ferrous aminoate, ferrous gluconate, ferrous succinate, carbonyl iron, iron calcium complex.
- **Parenteral iron :** Iron sucrose, iron dextran, iron isomaltoside, ferric carboxy maltose, ferric pyrophosphate citrate.
- **Maturation factors :** Hydroxocobalamin, methyl cobalamin, cyanocobalamin, folinic acid/leucovorin.

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (g) : Infectious Diseases

Chapter 2 (g)

Infectious Diseases

→ The diseases caused by Microorganisms such as virus , Bacteria , fungi , protozoa and other parasites . These are diseases which can be transmitted by animals , humans , insects or other agents.

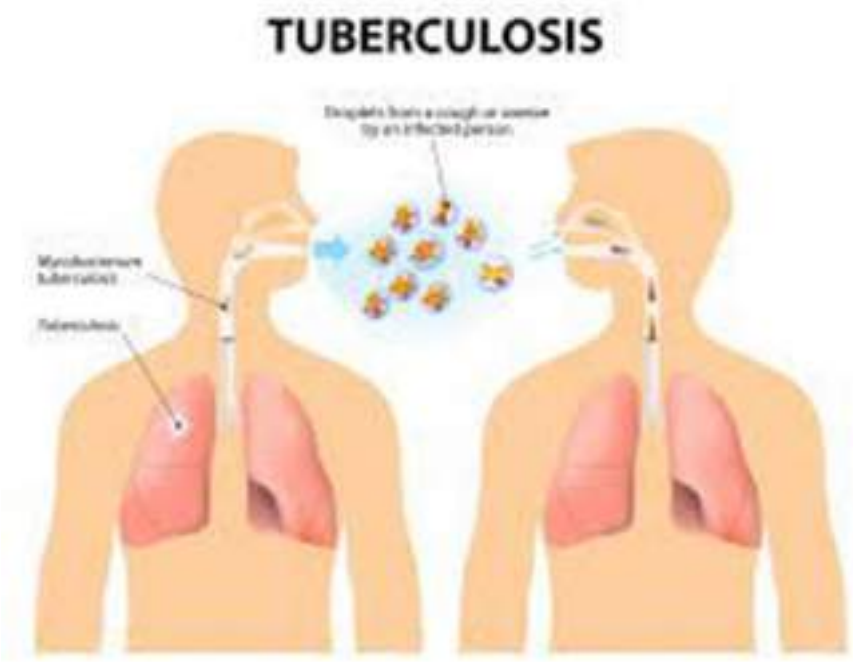
Infectious diseases

- Tuberculosis
- Pneumonia
- Urinary tract infections
- Hepatitis
- Gonorrhoea and Syphilis
- Malaria
- HIV and Opportunistic infections
- Viral Infections (SARS, CoV2)

Tuberculosis

→ Tuberculosis is a chronic and progressive infectious disease and affect the lungs usually and its causative agent is mycobacterium tuberculosis or mycobacterium bovis.

→ It is an airborne disease.



Types of TB

- **Pulmonary TB (Primary) :** Tuberculosis in Lungs.
- **Extra Pulmonary TB :** Tuberculosis in other organs.

Etiology

- Droplet Infection
- Intake of Unpasteurised Cow Milk
- Re-infection
- Diseased Condition

Pathogenesis

Entry of Mycobacterium tuberculosis

↓

In body (and attack on Immune System

↓

Weal Immune System

↓

Bacilli increases their number

↓

Formation of Granuloma

↓

Formation of Cavity in lungs tissues

↓

Symptoms

Clinical manifestations

- Long term cough
- Blood in Cough
- Shortness of breath
- Fever
- Chest pain
- Weight loss

Non-Pharmacological Management

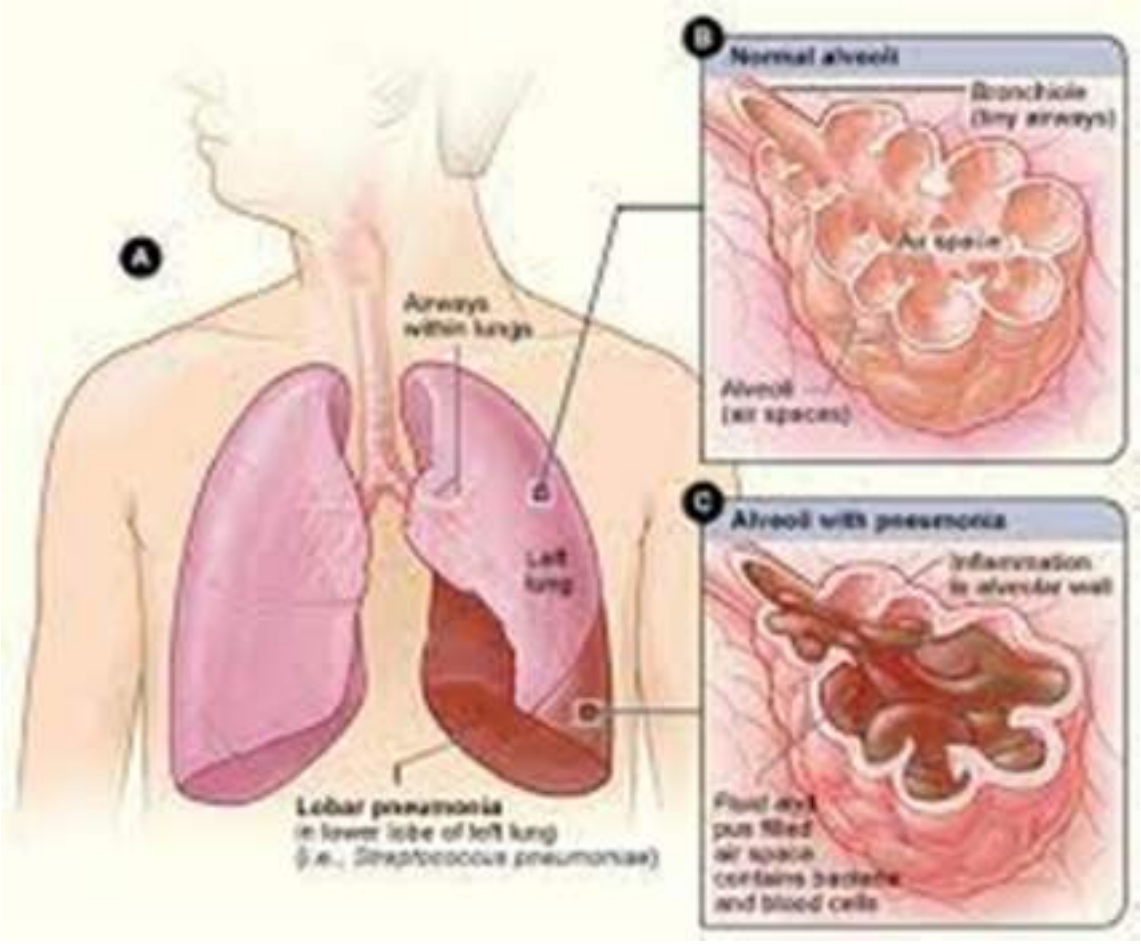
- TB patient should be Kept in separate room.
- He should wear mask
- He should keep towel / Handkerchief during coughing , Sneezing.
- He should take healthy nutrition .
- He should follow the directions of healthcare professionals

Pharmacological managements

- **First line of treatment :** Isoniazid, rifampin, ethambutol, pyrazinamide, streptomycin.
- **Second line of treatment :** Ofloxacin, amikacin, moxifloxacin, ethionamide.
- **Third line of treatment :** Linezolid, amoxicillin, azithromycin etc.

Pneumonia

→ Pneumonia is an infection caused by Microorganisms (Bacteria , viruses , fungus) in one or both the lungs and can inflammation of the airways and accumulation of mucus (sputum) and fluids enter in the alveoli.



Etiology

- **Bacteria :** Streptococcus Pneumoniae . or Mycoplasma Pneumonia or Chlamydia Pneumonia.
- **Viruses :** Pneumonia can be caused by any virus which causes respiratory infection.
- **Fungi :** Pneumonia rarely occurs due fungi.

Pathogenesis

Entry of Causative agent (bacteria ,viruses)

↓

Inflammation

↓

alveolar edema or exudate Formation

↓

alveoli and bronchioles fill with exudate (fluid)

↓

Pneumonia

Clinical Manifestations

- Shortness of breath.
- Chill and sweating
- Fever.
- Productive cough.
- Pleuritic chest pain.
- Hypoxemia.
- Fatigue.
- Tachypnoea.

Non Pharmacological Managements

- Oxygen therapy
- Ventilation
- He should keep towel / Handkerchief during coughing , Sneezing.
- He should take healthy nutrition.
- He should follow the directions of healthcare professionals.
- Oxygen Oximetry Test should be used to measure oxygen level . wh ich 95 % or high is good.
- Bed rest is required.

Pharmacological Management

- **Antibiotics :** Macrolides should be used in case of Streptococcus P. e.g. Erythromycin , Ezithromycin etc.
- **Antipyretics :** according to need to treat fever and headache e.g. Paracetamol , aspirin etc.
- Antitussive and expectorant.

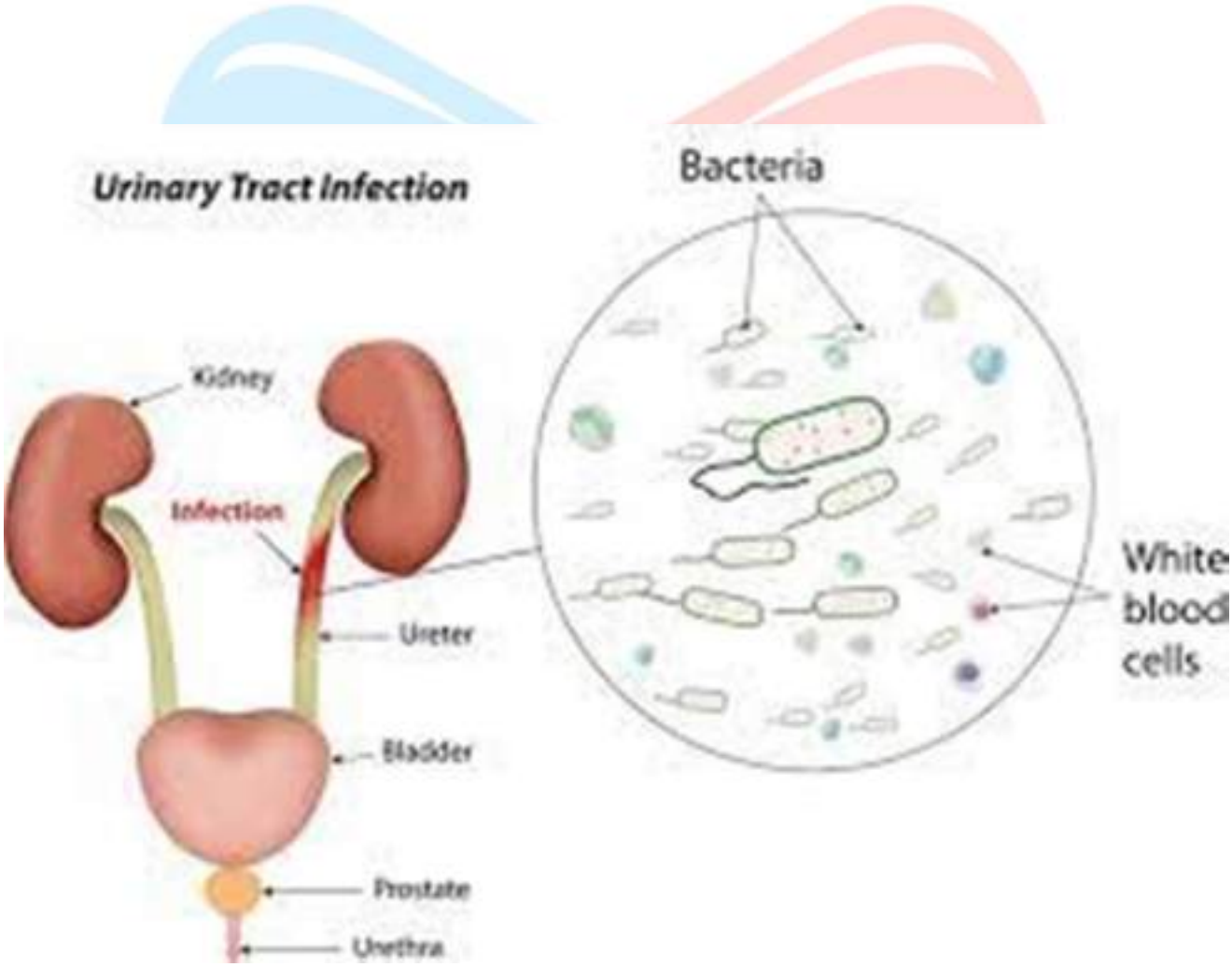
Urinary Tract Infection (UTI)

→ UTI is a Bacterial infection of the urinary Tract.

→ It includes

- Cystitis (infection of Bladder)
- Urethritis (Infection of Urethra)
- Prostatitis (Infection of Prostate gland) and
- Pyelonephritis (infection of Kidney)

→ Females are more prone to infection because of short size of Urethra , and closeness to anus.



Etiology

- **Bacteria :** Commonly UTI is occurs due to E. coli (Escherichia Coli)

Pathogenesis

Entry of Bacteria in preurethral area ,and Colonization (staying and increasing their number there)
↓
after Colonization go upwards to Urinary bladder
↓
Fimbria (hair like structure upon bacteria) help the bacteria in attachment with bladder , and bacterial toxin inhibits the bladder peristalsis and reduces the urine flow
↓
Bacteria penetrate the epithelial cells and go upwards to ureters and Kidney and infect them

Clinical Manifestations

- Pain in the side back , abdomen or in pelvic area .
- Frequency of urination
- Blood in urine
- Pain during urination
- Urination need at night
- Cloudy colour urine , strong bad smell .

Non Pharmacological Management

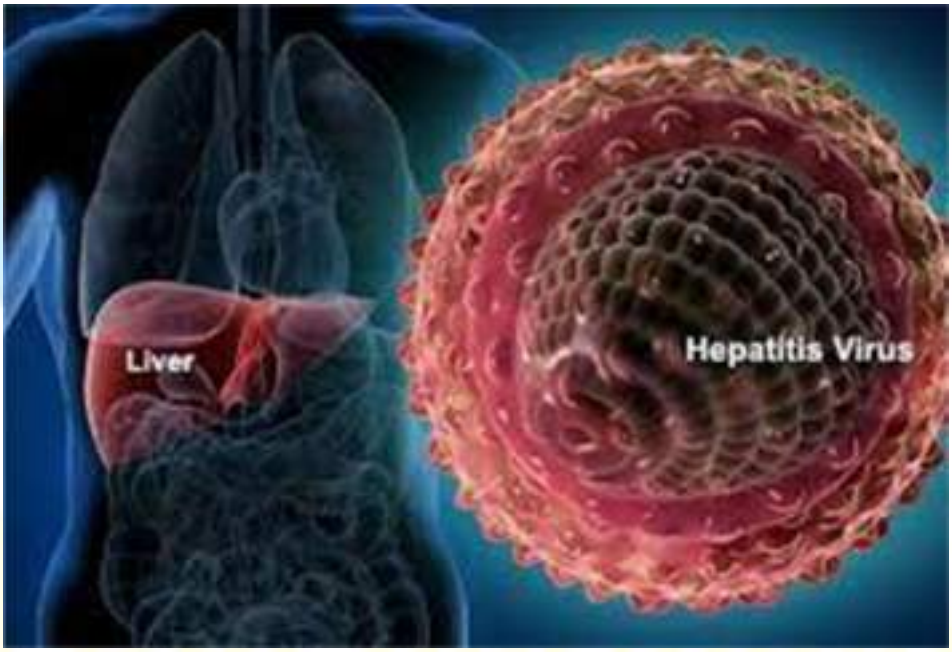
- Regular hygiene and cleaning are the most important measure to prevent the UTIs.
- Do the sexual activity by using of the proper protections.
- During the menstruation use the sanitizing sanitary pad.

Pharmacological Management

- Antibiotics are used to treat UTI Like amoxicillin , Ciprofloxacin ofloxacin, ciprofloxacin, norfloxacin, amoxycillin etc.

Hepatitis

- → The inflammation of liver is called hepatitis , this inflammation may be due to injury or infection
- → The most common cause of hepatitis is hepatitis viruses different type of viruses caused hepatitis like hepatitis A ,B,C,D,E,F
- → Hepatitis occurs due to other reasons also like alcohol, drugs , and disturbance in metabolism.



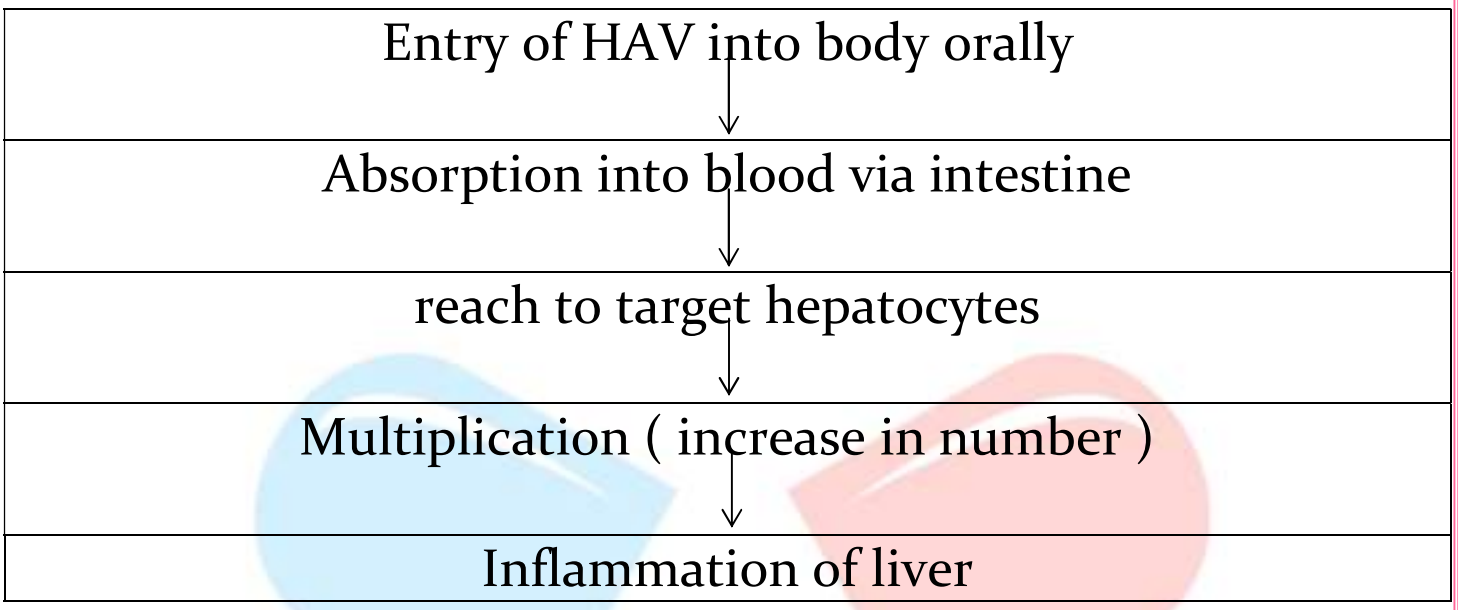
Types

- **Hepatitis A :** It is typically transmitted through contaminated food or water, and symptoms include fatigue, nausea, vomiting, and jaundice. Most people recover within a few weeks without specific treatment.
- **Hepatitis B and C :** These transmitted through blood and bodily fluids, and can lead to chronic infection, cirrhosis, and liver cancer. These types of hepatitis can be asymptomatic for years, and people may not realize they have the infection until liver damage has already occurred.
- **Hepatitis D :** It is a rare form of hepatitis that only occurs in people who are already infected with hepatitis B. It can lead to severe liver damage and cirrhosis.

Etiology

- Hepatitis A Virus
- Hepatitis B virus
- Hepatitis C Virus
- Hepatitis D Virus etc.

Pathogenesis



Clinical Manifestations

- Fatigue
- Nausea and vomiting
- Pain in upper side of abdomen
- Clay color stool
- Appetite loss
- Fever
- Dark color urine
- Jaundice
- Itching in intestine
- Pain in joints

Non Pharmacological Management

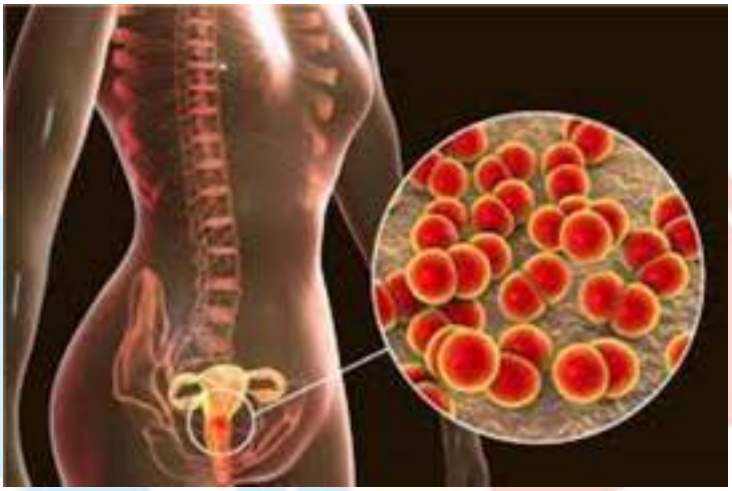
- Prevention of hepatitis involves good hygiene practices, such as handwashing and safe food preparation, vaccination (for hepatitis A and B), and avoiding high-risk behaviours such as unprotected sex and sharing needles.
- Early diagnosis and treatment of hepatitis is important to prevent longterm liver damage and complications.

Pharmacological managements.

- No treatment is available for Hepatitis A . If infection is detected in early stage the infection can be stopped by hepatitis A Vaccine or Hepatitis A Immunoglobulin.
- For hepatitis B- Interferon alpha, lamivudine, telbivudine, adenofovir, tenofovir, emtricitabine.
- For hepatitis C- Ribavirin, boceprevir, imeprevir, sofosbuvir

Gonorrhoea

- → Gonorrhoea is a sexually transmitted disease , caused by Neisseria Gonorrhoea (a bacteria) and most commonly affects the Genitourinary Tract .(all organs involved in formation and excretion of urine , and all the organs involved in reproduction).
- → It can penetrates mucosal Surface easily.



Etiology

- Neisseria Gonorrhoea bacteria

Mode of transmission

- Sexual contact with penis , vagina , mouth or anus of an infected partner.
- Mother to child

Pathogenesis

Entry through Sexual contact

↓

Penetrate mucosal surface

↓

Inflammation of epithelial tissues

↓

(especially urinary anus and reproductive system)

↓

Gonorrhoea

Clinical manifestation

- In females
  - Increased vaginal Discharge
  - Pain during Urination
  - Disturb MC
  - Vaginal Bleeding after sexual intercourse
  - Purulent (pus) discharge
- In Males
  - Pain during urination (Dysuria)
  - Pus discharge from penis
  - Itching of penis
  - Pain during sexual activity

Non-pharmacological managements

- Prevention of gonorrhoea involves practicing safe sex, including using condoms correctly and consistently, limiting the number of sexual partners, and getting regular STI testing.
- Early diagnosis and treatment of gonorrhoea are important for preventing complications and reducing the risk of transmission

Pharmacological management

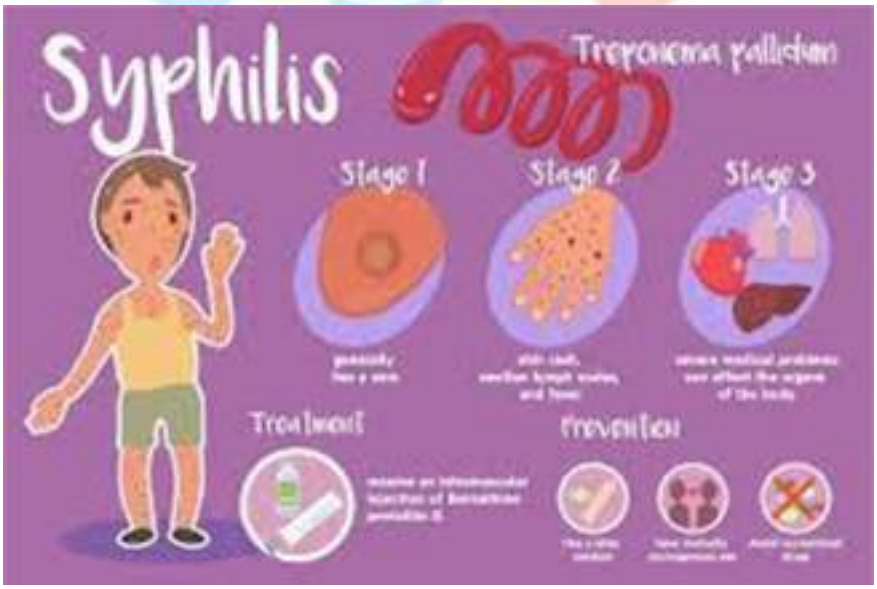
- Antibiotics are used to treat gonorrhoea C
- Eftriaxone + azithromycin or Cefixime + azithromycin
- And drugs can be used according to needs like pain killers

Syphilis

→ Syphilis is a sexually transmitted infection caused by the bacterium Treponema pallidum. It can affect both men and women and is spread through vaginal, anal, or oral sex with an infected person.

→ On the appearance of symptoms, it is categorized as

1. **Primary syphilis** : Appearance of a painless sore, known as a chancre, at the site of infection. The sore may be on the genitals, anus, or mouth and typically lasts 3-6 weeks before disappearing
2. **Secondary syphilis :** This characterized by a widespread rash that can appear all over the body, including the palms of the hands and soles of the feet. Other symptoms may include fever, swollen lymph nodes, sore throat, and fatigue.
3. **Latent syphilis :** This stage has no visible symptoms, but the infection persists and can be detected through blood tests.
4. **Tertiary syphilis :** This stage can occur years after the initial infection and can cause serious complications such as damage to the brain, nerves, eyes, heart, blood vessels, liver, and bones.



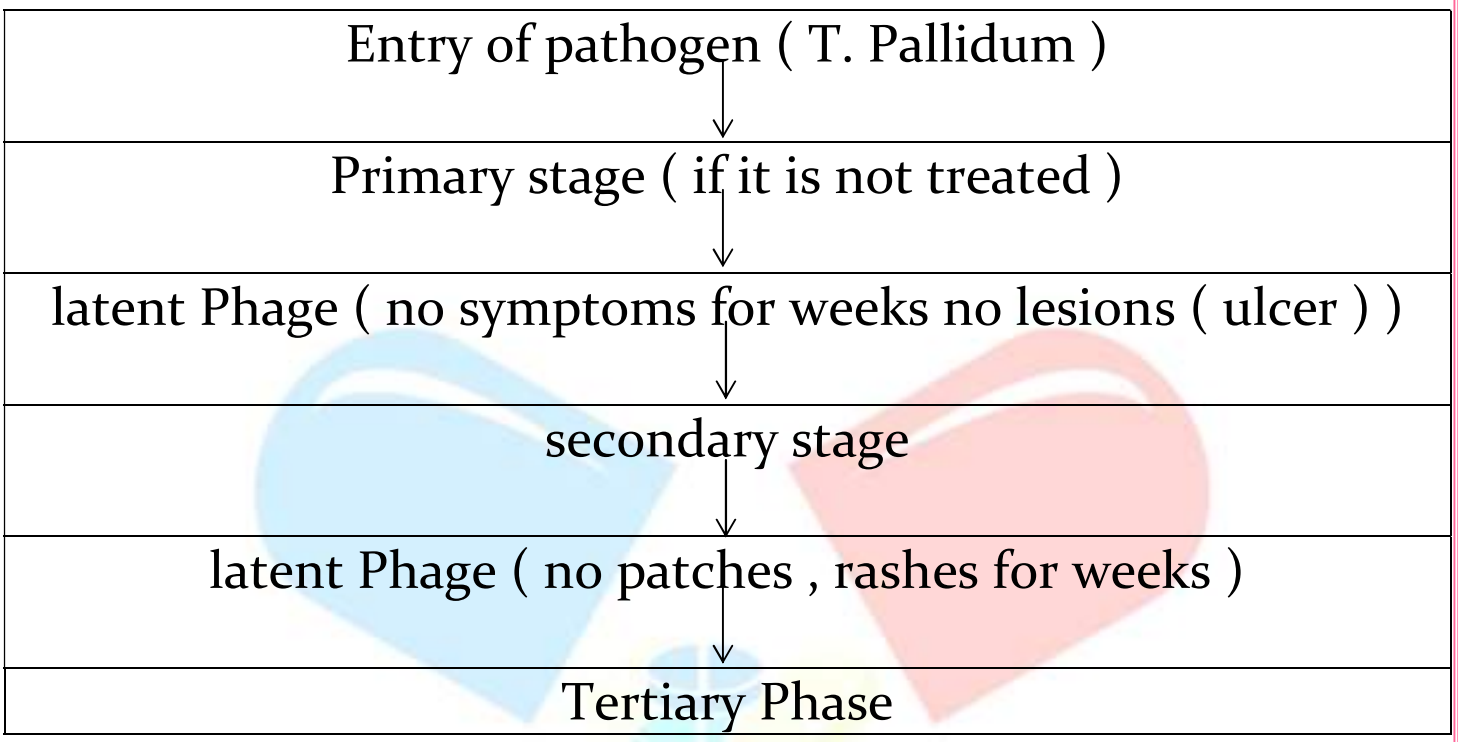
Etiology

- It is caused by Trepnuma Pallidum.

Mode of transmission

- Sexual intercourse
- Direct mucus membrane contact
- Mother to child
- Infected blood transfusion

Pathogenesis



Clinical manifestations

- **Primary stage :** First stage involves a painless ulcer on the sex organs , rectum or mouth
- **Second stage :** Patches and rashes on skin
- **Final stage :** It damage brain , heart , eyes, blood vessels , liver , bones and joints.

Non Pharmacological management

- Prevention of syphilis involves practicing safe sex, including using condoms correctly and consistently, limiting the number of sexual partners, and getting regular STI testing.
- Early diagnosis and treatment of syphilis are important for preventing complications and reducing the risk of transmission

Pharmacological managements

- Antibiotics are used to treat Syphilis , specially penicillin . Benzathine Benzylpenicillin , Procaine Benzylpenicillin , Doxycycline , teracycline and erythromycin can be used as alternative drugs.

Malaria

- → Plasmodium, a tiny protozoan is responsible for this disease. Different species of Plasmodium (P. vivax, P. malaria and P. falciparum) are responsible for different types of malaria. Of these, malignant malaria caused by Plasmodium falciparum is the most serious one and can even be fatal.
- → It is transmitted in humans through the bites of infected female Anopheles mosquitoes (vector/transmitting agent). It is interesting to note that the malarial parasite requires two hosts – human and mosquitoes.

Etiology

- The species of plasmodium responsible for malaria in human , but mainly caused by P. Falciparum and P.vivax . (80%) of recognised cases , an d 90% of deaths due to malaria are caused by them two.
- Other causative agents are : P.Ovale , P.malariae , P. semiovale . and female Anopheles mosquito is vector for malaria of human beings.

Pathogenesis

Infected Anopheles Bites (it has pathogen in saliva)

↓

Sporozoites in bloodstream

↓

they migrates to liver

↓

(asexual) multiplication in hepatocytes (Schizont)

↓

Rupture of hepatocytes and thousands of Merozoites escape into bloodstream (merozoites) . (this cycle places once)

↓

Infection of RBCs

↓

Erythrocyte schizont (multiplication)

↓

Rupture of erythrocytes

↓

released a large number of Gametocytes and infect other RBCs

↓

This cycle occurs multiple times

↓

malaria

Clinical Manifestations.

- Fever and headache.
- Fatigue and pain.
- Chill and sweating.
- Nausea and vomiting.
- Spleen enlargement.
- Kidney disfunction

Non Pharmacological Managements

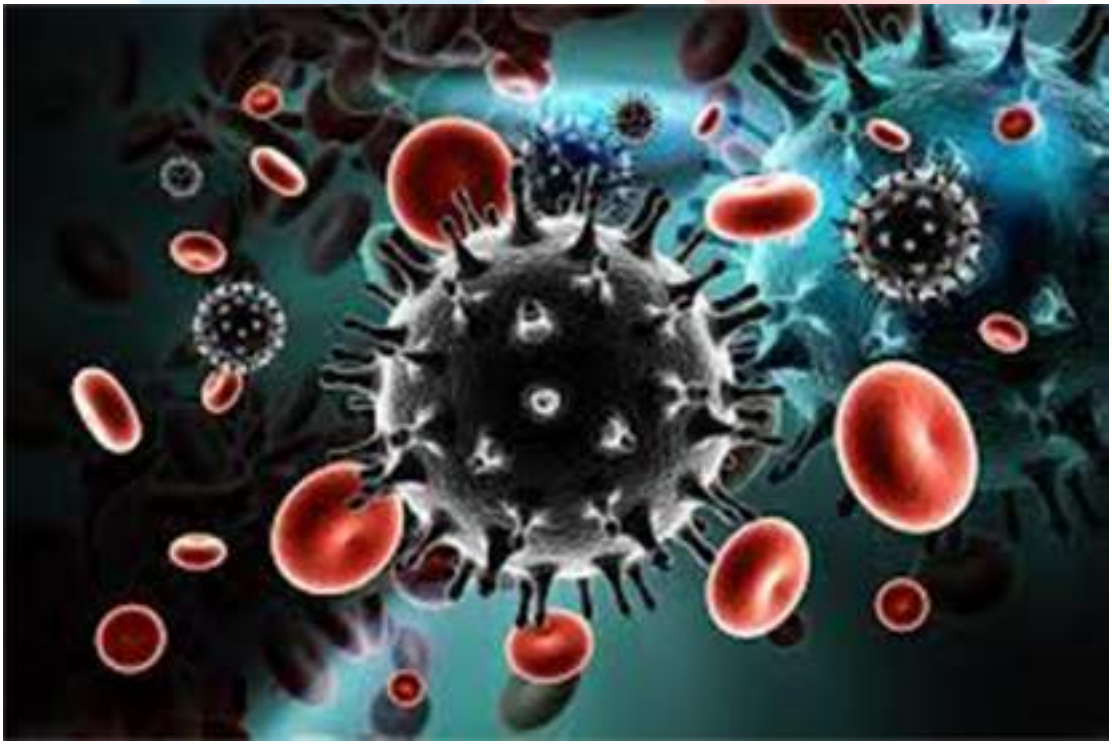
- Anopheles vectors are grown on the dirty place so, cleaning is very important.
- Follow the guidelines, release by the government.
- Take the balance diet and regular practice of yoga and exercise is very important.
- Use the mosquito net and mosquito repellent.

Pharmacological Management

- Anti malarial drugs are used to treat Malaria which are following
  - Chloroquine
  - Primaquine
  - Mefloquine
  - Doxycycline
  - Atovaquone

HIV / AIDS

- → HIV, or human immunodeficiency virus, is a virus that attacks the immune system and can lead to acquired immunodeficiency syndrome (AIDS). A widely used diagnostic test for AIDS is enzyme linked immuno-sorbent assay (ELISA).
- → AIDS was first reported in 1981 and in the last twenty-five years or so, it has spread all over the world killing more than 25 million persons.
- → AIDS is caused by the Human Immune deficiency Virus (HIV), a member of a group of viruses called retrovirus, which have an envelope enclosing the RNA genome.
- → Transmission of HIV-infection generally occurs by
    - Sexual contact with infected person.
    - By transfusion of contaminated blood and blood products.
    - By sharing infected needles as in the case of intravenous drug abusers.
    - From infected mother to her child through placenta.



Etiology

- Its causative agent is HIV (Human Immunodeficiency virus).
- HIV belongs to Retroviridae family so it is also called Retrovirus is causative agent of AIDs

Pathogenesis

Entry of HIV

↓

Distribution to different cells of the body

↓

Bind to receptor (T cells CD_4)

↓

the virus releases its RNA into the Host cell

↓

RNA converted into DNA by reverse Transcription

↓

suppress the function of host cell for years

↓

AIDs

Clinical Manifestations

- Fever and headache.
- Chills.
- Muscles aches and pains.
- Joint pain and fatigue.
- Swollen, lymph nodes mainly on the neck.
- Mouth ulcers and sore throat.
- Night sweat.
- Others infection also appears like skin disease etc

Non Pharmacological Managements

- AIDS has no cure; prevention is the best option.
- Follow the all precaution (wearing the mask, sterilize the hand etc.) prior to any activities.
- Take the nutritious diet and make diet chart as per the instruction by the physician

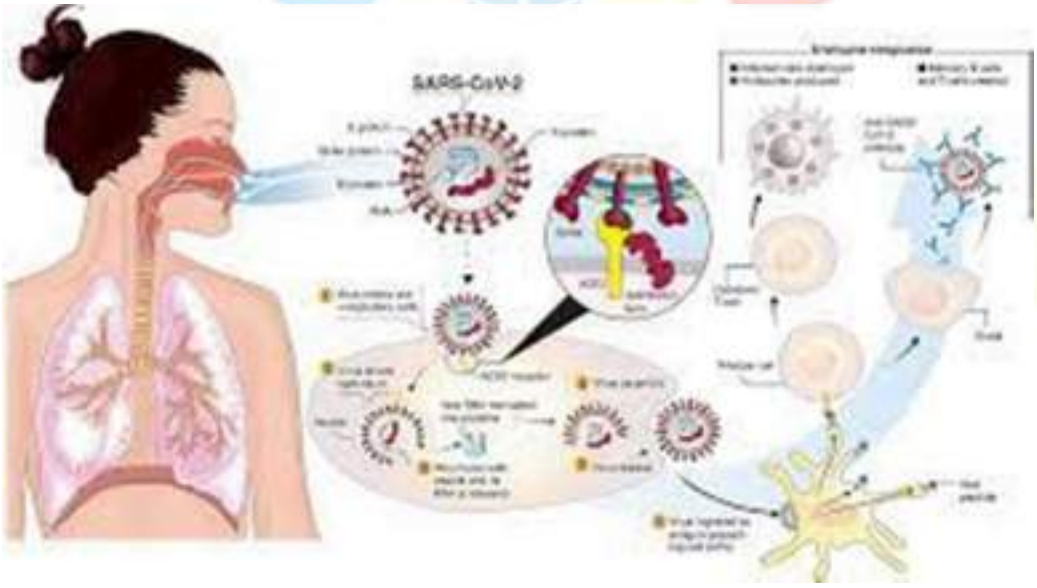
Pharmacological Management

- Treatment of Opportunistic infections according to need.
- **Prophylaxis against Opportunistic infections :** Cortimoxazole Prophylaxis is used in a dose of 960 mg orally /d. or three times per week. in case of intolerance, 100 mg of Dapsone is used per day.
- **Prophylaxis against TB :** Isoniazid is used
- **Anti- Retroviral drugs :** These drugs are used for prophylaxis of viral infections and to suppress HIV. these are used in combination : like Zidovudine + Lamivudine + Nevirapine.

Viral infection SARS-CoV-2

→ Coronavirus Disease is a Highly Contagious disease , which is caused by a novel Corona virus (a new strain that has not been identified previously).

→ This virus affects the respiratory tract badly and stops air flow , now COVID 19 is called SARS-CoV-2 (Severe Acute Respiratory Syndrome)



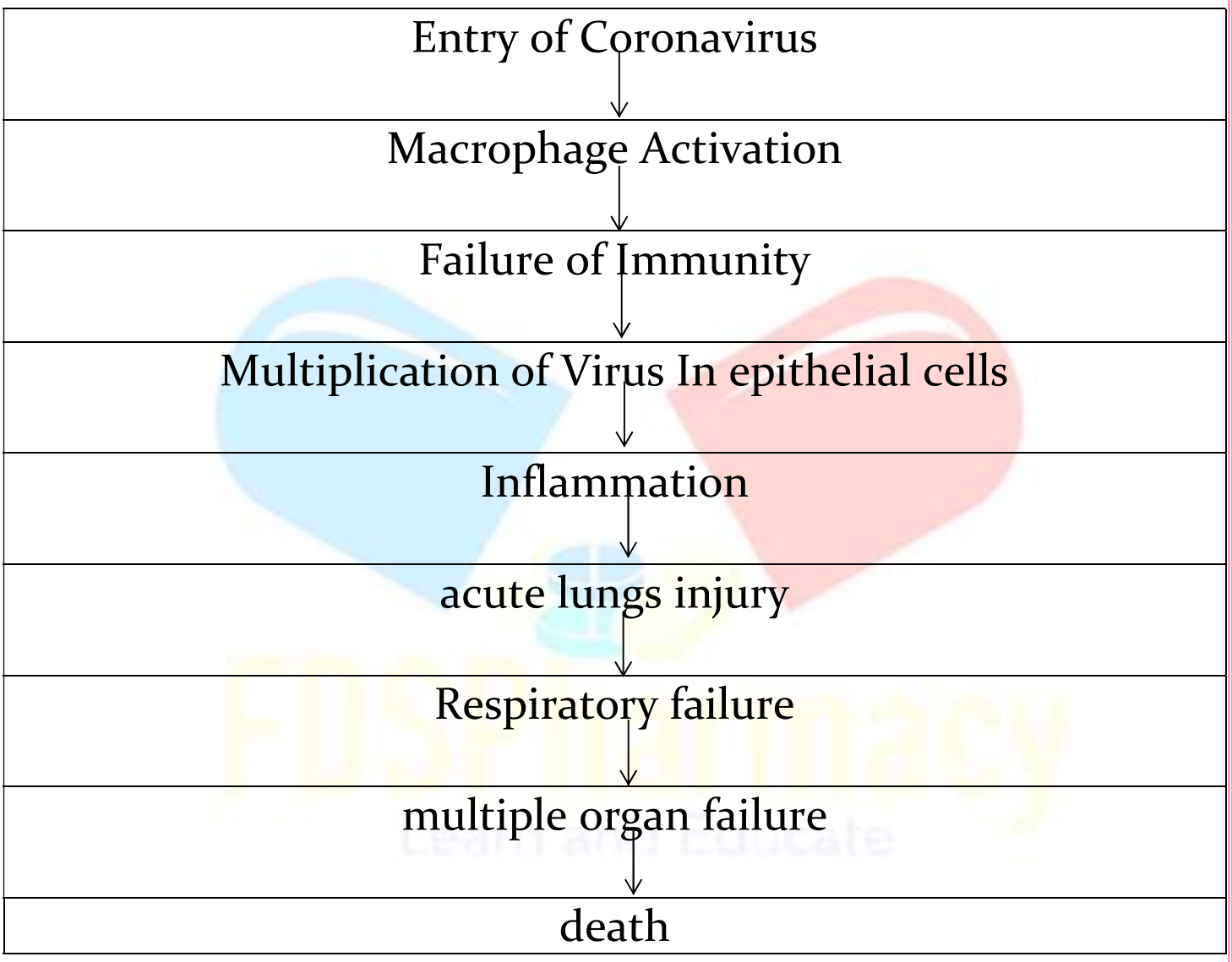
Etiology

- The causative agent of COVID 19 is SARS-COV-2

Mode of Transmission

- Droplets
- Physical Contact
- Contaminated things,

Pathogenesis



Clinical Manifestation

- Fever
- Dry cough
- Weakness
- Sore throat
- Conjuctivitis
- Difficulty in breathing
- Chest pain

Non Pharmacological Managements

- Public health measures such as vaccination, social distancing, and wearing masks, which remain the most effective means of preventing the spread of viral disease.
- Take the balance diet and regular practice of yoga and exercise is very important.

Pharmacological Management

- **Antiviral drugs :** Remdesivir , Ritronavir , Nirmatrelvir etc.
- **Monoclonal antibodies :** Bebtelovimab it is a monoclonal antibody , monoclonal is protein made in laboratory that can restore , increase , modify , or mimic the immune system.

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (h) : Musculoskeletal disorders

Chapter 2 (h)

Musculoskeletal disorders

- Musculoskeletal disorders comprise diverse conditions affecting bones, joints, muscles, and connective tissues.
- These disorders may result in pain and loss of function. It is happening due to the lack of knowledge and irregular/improper diet plan.
- Now a day, it is big challenges for the modern society and pharmaceutical science.

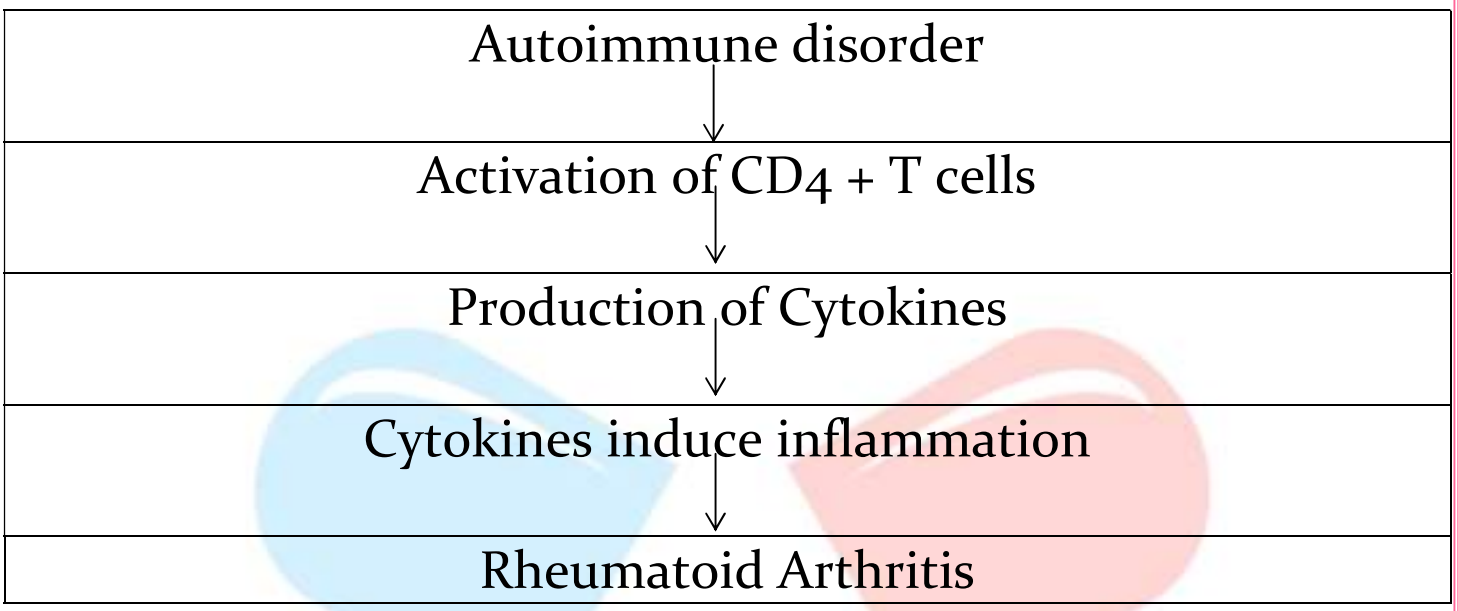
Rheumatoid Arthritis

- RA is a chronic , progressive ,inflammatory musculoskeletal disorder affecting many joints and patient suffers from swelling and pain of joints.

Etiology

- Genetic
- Autoimmune disorder
- Environmental factors
- Hormones

Pathogenesis



Clinical Manifestations

- Joint pain
- Swelling of joint
- Redness of joints
- Joint stiffness particularly in the morning or after sitting continuously

Non Pharmacological Management

- Make the diet charts and follow accordingly and avoid the fattier and lipids contents in the diet.
- Change the lifestyle and apply the home remedies means replace the allopathic medicine with ayurvedic medicine (because of less side effects)
- Regular practice of yoga exercise and other physical exercise
- During more pain condition rest is required and follow the heat and cold for managing pain (Both heat and cold can relieve pain in joint. Heat also relieves stiffness, and cold can relieve muscle spasms and pain).
- Avoid the smoking and alcoholism.

Pharmacological Management

- Rheumatoid arthritis has no known treatment. However clinical trials show that early therapy with Disease Modifying Anti-Rheumatoid Drugs (DMARDs) reduces the symptoms.
- Drug recommendation will be based on the severity of symptoms and the duration of rheumatoid arthritis.
    - **NSAIDs :** Pain and inflammation can treat with NSAIDs . paracetamol , ibuprofen , diclofenac , Meloxicam etc.
    - **Steroids :** Corticosteroids(prednisolone) reduces inflammation , pain and damage of joints.
    - **Conventional DMARDs :** These drugs can reduce the progression of RA , and prevent permanent damage to joints . **examples :** Methotrexate , leflunomide (immunosuppressive) Hydroxychloroquine (immunosuppressive) , Slfasalazine (reduces inflammation) .
    - **Biologic DMARDs :** These are commonly most effective when used with Conventional DMARDs example : Infiliximab.
    - **Targeted synthetic DMARDs :** These are used when Conventional and biologic DMARDs are failed . example : Baricitinib , tofacitinib.

Osteoarthritis

→ OA is a type of arthritis and it is most common progressive joint condition in which the protective tissues (cartilage , synovial fluid) at the end of bones wears down . and causes pain in joints.

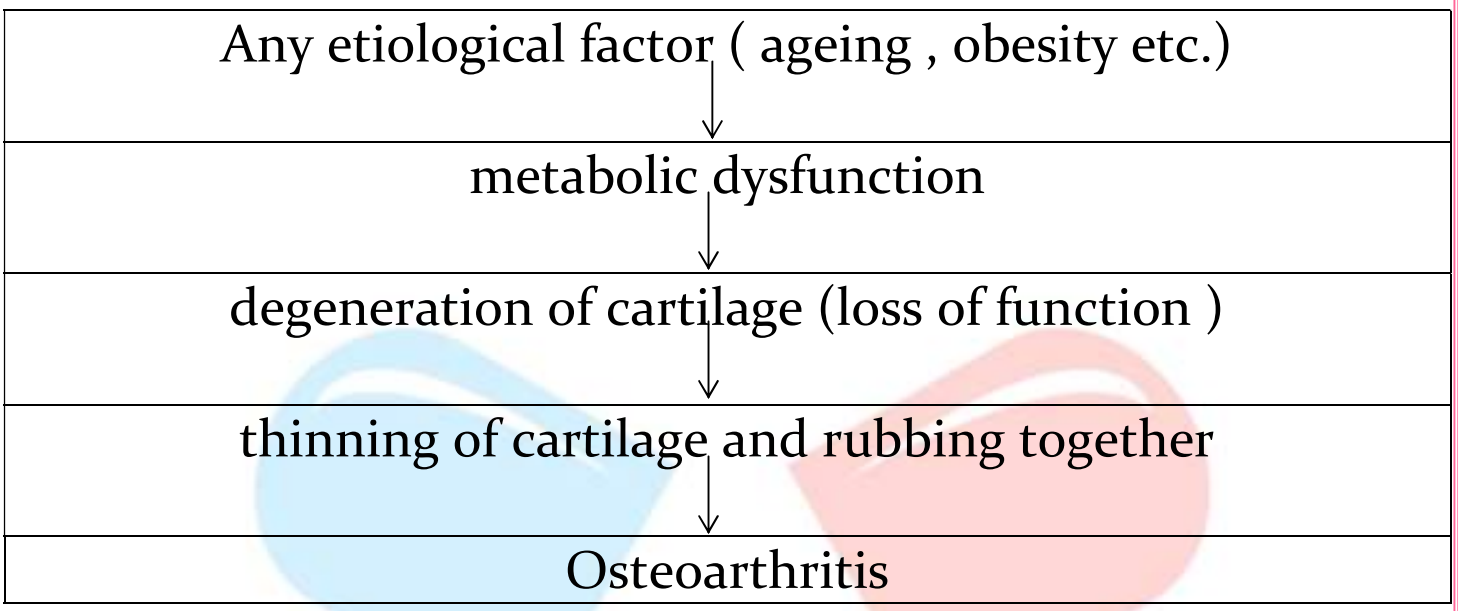
Etiology

- Past injury (torn cartilage , ligament injury , or dislocation of joints)
- Metabolic disorder (degeneration of cartilage or fluid of joints)
- Obesity
- Poor posture
- Genetic
- Diabetes
- Poor diet
- Ageing

Following are at more risk of OA

- Women
- Fat people
- Over 50 people
- Working job that requires kneeling , climbing , heavy lifting.
- Family history.

Pathogenesis



Clinical Manifestations

- Joints pain
- Stiffness in the joints
- Inflammation
- Reduce motion and flexibility range
- Sound of cracking , clicking or popping on moving the joints

Non Pharmacological Management

- Exercise
- Weight loss
- Avoiding wrong posture
- Taking healthy diet

Pharmacological Management

- **Oral Pain Relievers :** Paracetamol
- **Topical pain reliever :** Diclofenac Emulgel, ketoprofen gel, piroxicam gel, diclofenac Flector plaster, and diclofenac other plaster.
- **NSAIDs :** Ibuprofen , Naproxen etc , they reduce pain and swelling.
- **Corticosteroids :** They suppress immune system and reduce inflammation : Cortisone , triamcinolone.
- **Duloxetine :** It is an antidepressant and approved by FDA for treatment of Musculoskeletal problems.

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (i) : Dermatology

Chapter 2 (i)

Dermatology

→ Dermatology is the branch of medical science in which we study about the skin abnormality appears due to any infections or allergic conditions. In skin disease we discuss many conditions like

- Psoriasis
- Scabies
- Eczema

Psoriasis

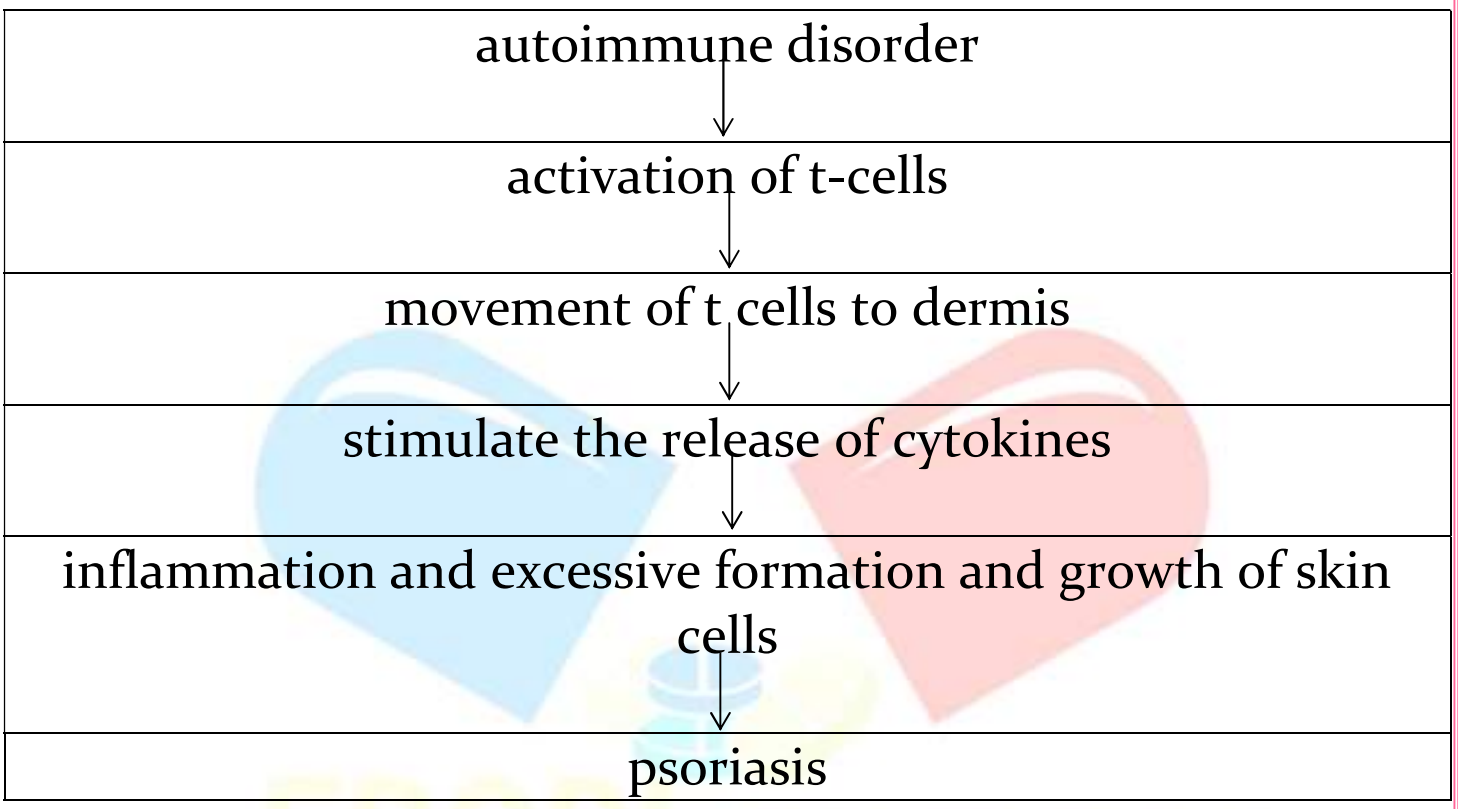
→ Psoriasis is a chronic autoimmune disorder in which the skin cells build up rapidly and form thick , pink or red coloured , itchy and dry patches , covered with white or silvery scales . It is called plaque .

→ These patches can develop anywhere on the body . it may be some patches or can cover a large area of skin.

Etiology

- Over activation of immune when it triggered causes inflammation and leads to rapid formation of new skin cells . triggers of psoriasis are following :
- Streptocoal or other infection.
- Certain drugs (like lithium , ß blocker etc.)
- Cold weather or less or more exposure to sunlight .
- Stress
- Skin injury

Pathogenesis



Clinical Manifestations

- Psoriatic arthritis.
- Patches covered with silver white flakes.
- Raised and thick skin.
- Dry, swallow and inflamed patches.
- Pain, itching, and burning sensation.
- Red spots on the body.

Non Pharmacological Managements

- Diet is an important factor in the skin disorder because some food causes the skin allergy and leads to severe conditions.
- Self-awareness is very important because we need to know which substance cause allergy (allergens like dust, smoke, pollen, food etc).
- Regular hygienic activity is very important factors to overcome the skin disorder conditions. (Like regular bathing, wearing dry and clean clothes etc).
- Regular yoga and physical activity also overcome the disease by maintain the immune system in proper condition

Pharmacological Management

- **Steroid creams :** To suppress the immune system
- **Anthralin cream :** It slows down the growth of skin cells.
- **Methotraxate :** It prescribed in severe cases.
- **Cyclosporine :** It is an oral corticosteroid , it is immunosuppressive.
- **Moisturisers :** They are used to reduce dryness of skin.

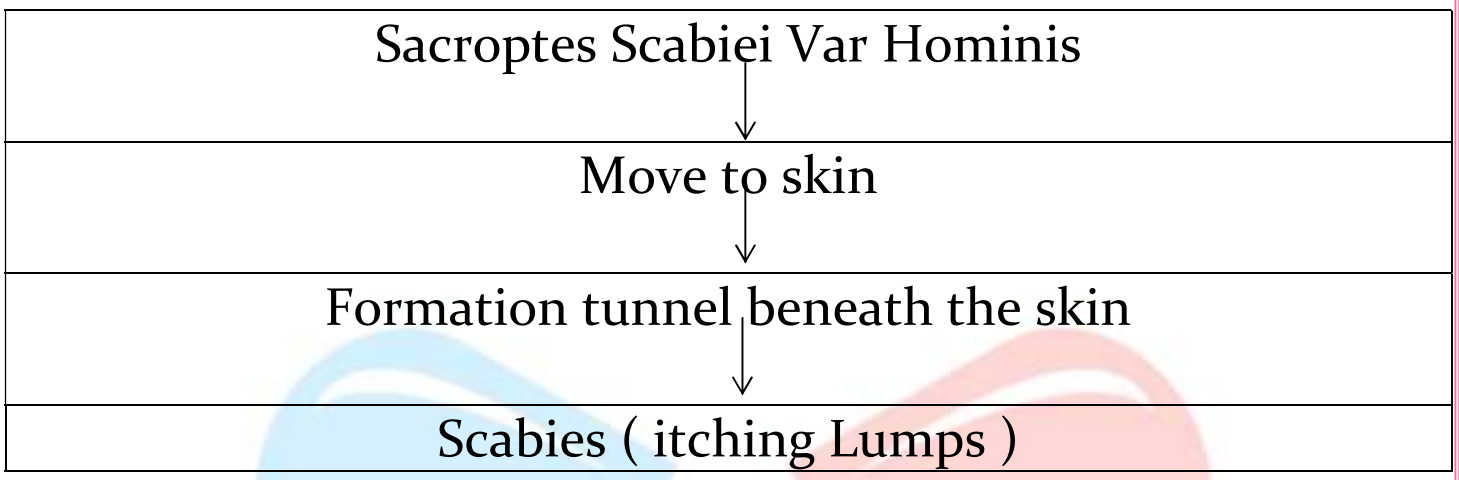
Scabies

- Scabies is an infectious disease of the skin by the human itch mite.
- The microscopic scabies mite burrows into the upper layer of the skin where it lives and lays its eggs.
- The most common symptoms of scabies are intense itching and a pimple-like skin rash.
- The scabies mite usually is spread by direct, prolonged, skin-to-skin contact with a person who has scabies.
- Scabies is one of the commonest dermatological conditions, accounting for a substantial proportion of skin disease in developing countries.
- Globally, it is estimated to affect more than 200 million people at any time, although further efforts are needed to assess this burden.

Etiology

- It is caused by Sacroptes Scabiei Var Hominis

Pathogenesis



Clinical Manifestations

- Formation of plaques.
- Thickening of skin.
- Puffy and red eye lids.
- Hyperpigmentation of skin.
- Oozing of lesions.
- Formations of cracks.
- Itching, and burning sensation.

Non Pharmacological Managements

- Proper Hygiene
- Other should avoid a close contact with affected person

Pharmacological Managements

- **Topical creams and lotions :** Permethrin Cream and lotion and Calamine lotion can be used.
- **Antibiotics :** Oral Ivermectin is used when topicals don't give good responses.
- **Antihistamines :** Ceterzine , Promethzine , diphenhydramine etc. these are used to relieve itching

Eczema

- → The term Eczema has been derived from the Greak word eckzin which means to boil over or break out.
- → Eczema is a group of medical conditions which causes inflammation and irritation to the skin . It is also called dermatitis , But all type of inflammations are not eczema.

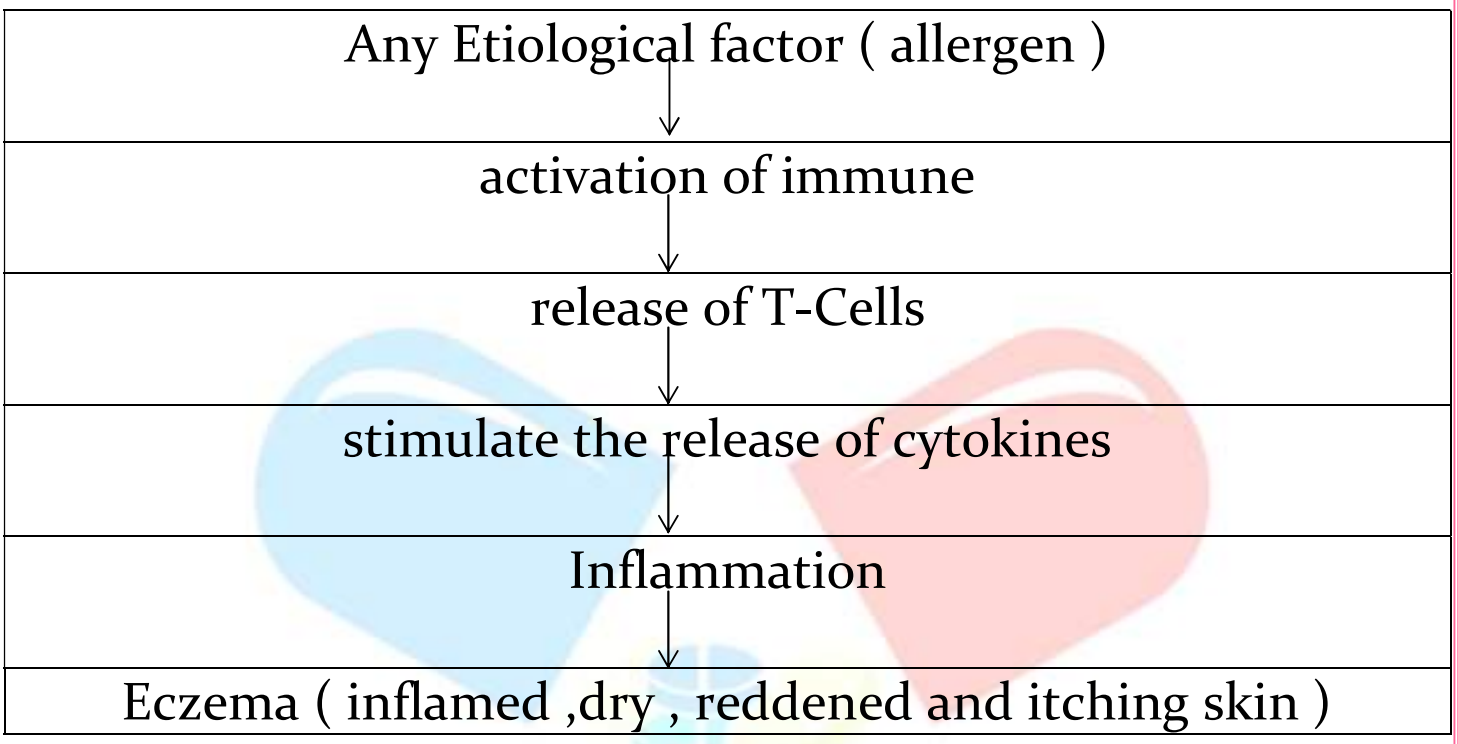
Types

- **Atopic Dermatitis :** It the most common form of eczema . inflamed , Dry and itchy skin, commonly affect the children , it can be occur at any age.
- **Contact Dermatitis :** It is also called allergic contact dermatitis , this is occurs due to environmental allergic reaction.
- **Dyshidrotic eczema :** It occurs more commonly in women , it causes the dryness of skin and a burning sensation and painful rashes and blisters on palms of hand and soles of feet.
- **Numular Dermatitis :** It causes small ,rounded lesions all over the body , but specially on arms and legs.
- **Stasis Dermatitis :** It occurs on the lower legs due to poor blood flow and causes discoloration of legs.

Etiology

- Irritants : like shampoo , shops , detergents etc.
- Cold or dry weather.
- Cigarette
- Stress
- Allergens (pollen , mold , dust , mites)
- Genetic factors
- Immunological disorder

Pathogenesis



Clinical Manifestations

- Itching, and burning sensation.
- Dryness of skin.
- Cutaneous reactivity.
- Chances of secondary or internal tissue infections.

Non Pharmacological Managements

- Proper hygiene
- Allergens should be avoided

Pharmacological Managements

- **Prescribed Topical steroids creams :** Clobetasole , mometasone , triamcinolone.
- **Moisturisers :** They are used to reduce dryness of skin.
- **Antihistamines :** Ceterzine , Promethzine , diphenhydramine etc. these are used to relieve itching

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Diploma in Pharmacy 2nd Year
Pharmacotherapeutics
Chapter 2 (j) : Psychiatric Disorders

Chapter 2 (j)
Psychiatric Disorders

- Psychiatric disorder also called mental health disorders, refers to a wide range of mental health conditions
- Disorders that affect your mood, thinking and behaviour.
- It includes as
    - Depression.
    - Anxiety disorders.
    - Psychosis

Depression

- According to WHO depression is a common mental disorder characterized by sadness , loss of interest or pleasure , feeling of guilt or Low self worth , disturbed sleep or appetite , feeling of tiredness and poor concentration

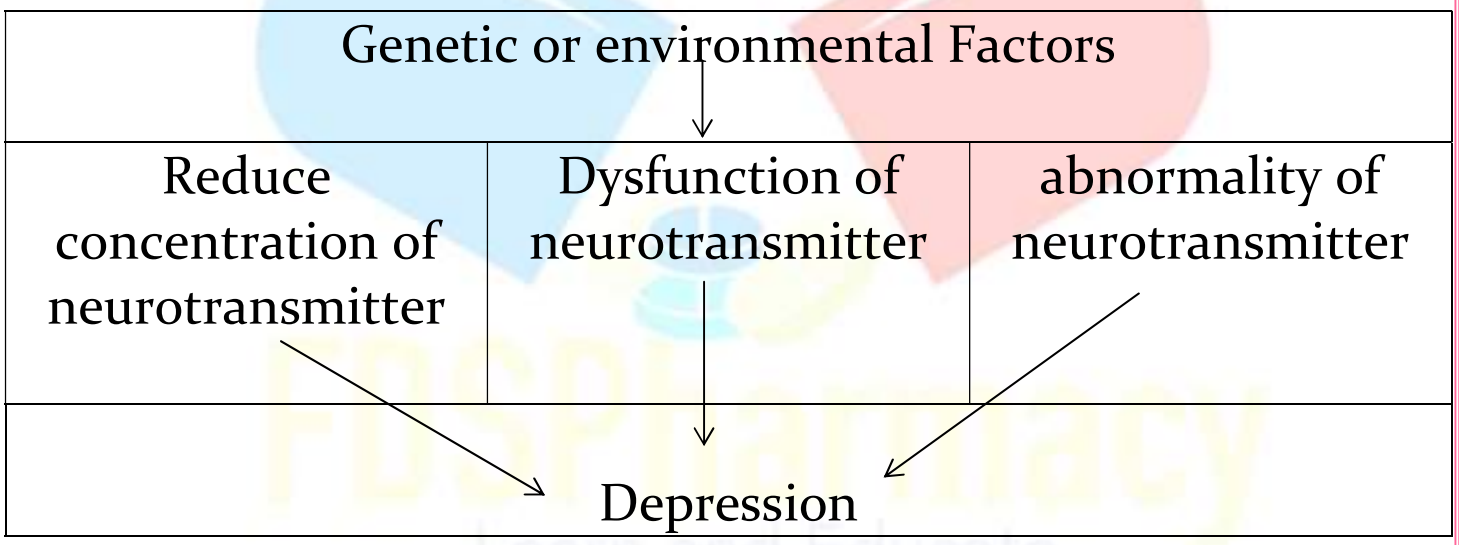
Types of depression

- **Exogenous depression :** This type of depression occurs due to external causes in response to a trauma or emotional stress (may be due to life event like death of any relative , loss of money etc).
- **Endogenous or major or unipolar depression :** This type of depression occurs in response to genetic or biochemical imbalance.

Etiology

- Genetic factors
- Biochemical factors : deficiency of neurotransmitter adrenalin , nor adrenalin , serotonin ,dopamine.
- External causes
- Hormone imbalance (in menopause , pregnancy , postpartum condition).

Pathogenesis



Clinical Manifestations

- Epilepsy (repeated, unpredictable seizures)
- Appetite or weight changes.
- Sleep changes (Insomnia or hypersomnia).
- Anger or irritability.
- Loss of strength, feeling fatigued, sluggish, and physically drained.
- Reckless behaviour.
- Concentration problem.
- Unexplained aches and pains.

Non Pharmacological Managements

- Follow the diet rules and pattern because any disturbance in the digestive activity leads to the mental manifestations.
- Visit the religious and graceful places and try to spending much time on that place.
- Multimedia, internet etc. are one among the cause of the psychiatric disorder, so try to use those such things with proper time and need.
- Avoid the overthinking and bad habits and try to always indulges with your own work, which makes you pleasant.
- Regular practice of yoga and meditation it is the most important factor for managing the psychiatric disorders.

Pharmacological Management

- **Monoamine Oxidase Inhibitors (MAOIs) :** Phenelzine is an effective antidepressant which inhibit Monoamine Oxidase Enzyme (this enzyme prevents Neurotransmitters to bind with their receptors)
- **Tricyclic Antidepressant (TCAs)**
    - **Nor adrenaline and Serotonin reuptake inhibitors :** Amitriptaline , Imipramine.
    - **Non adrenaline reuptake inhibitors :** Amoxapine.
- **Serotonin reuptake inhibitors :** Fluoxatine , Citalopram , escitalopram.
- **Atypical Antidepressant :** Trazodone , mianserin.

Anxiety

→ Anxiety is a feeling of fear, dread, and uneasiness (as a normal reaction to stress) that might make an individual sweat, feel restless, tense, and have a rapid heartbeat.

→ For example, an individual might feel anxious in case of a difficult problem at work, before taking a test, or before making an important decision. This however can help the individual to handle the situation as anxiety may give a boost of energy or help to focus. But in patients of anxiety disorders, fear is not temporary and can be irresistible.

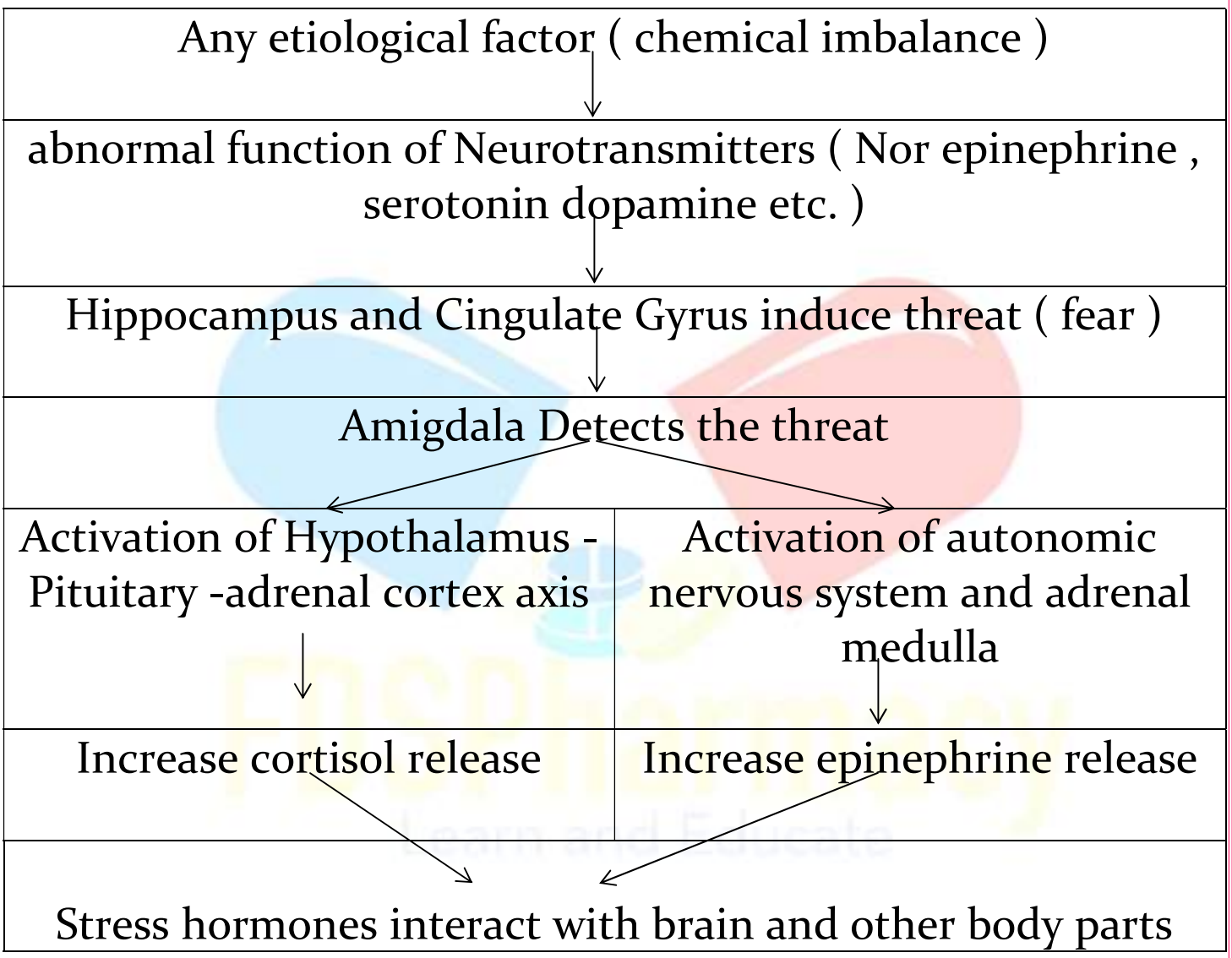
Types of Anxiety

- Panic disorder
- Phobia
- Social anxiety disorder
- Separation anxiety disorder
- Illness anxiety disorder
- Post Traumatic stress disorder (PTSD)

Etiology

- Chemical imbalance
- Environment factor
- Heredity

Pathogenesis



Clinical Manifestation

- Cold or sweat hands
- Dry mouth
- Rapid heartbeat
- Feeling of fear and uneasy
- Difficulty in sleep
- Nausea.

Non Pharmacological Management

- Exercise
- Sleeping enough
- Meditation
- Healthy died
- Avoiding alcohol cigarette and caffeine substance
- Cognitive behavioural therapy

Pharmacological Management

- **Anti anxiety drugs :** Benzodiazepines like Alprazolam ,diazepam , Nitrazepam clonazepam.
- **Anti-depressant drugs :** Amitriptaline , fluoxatine
- **Beta blockers like :** Propranolol This is used to reduce some physical symptoms of anxiety disorder like rapid heartbeat shaking and trembling.

Psychosis

- → Psychosis refers to loss of contact with reality, including delusions (false ideas about what is happening or one's own personality) and hallucinations (seeing or hearing things that do not exist), and thus affecting the way brain processes information.
- → Psychosis patients may hear, see, feel, or believe unreal things.

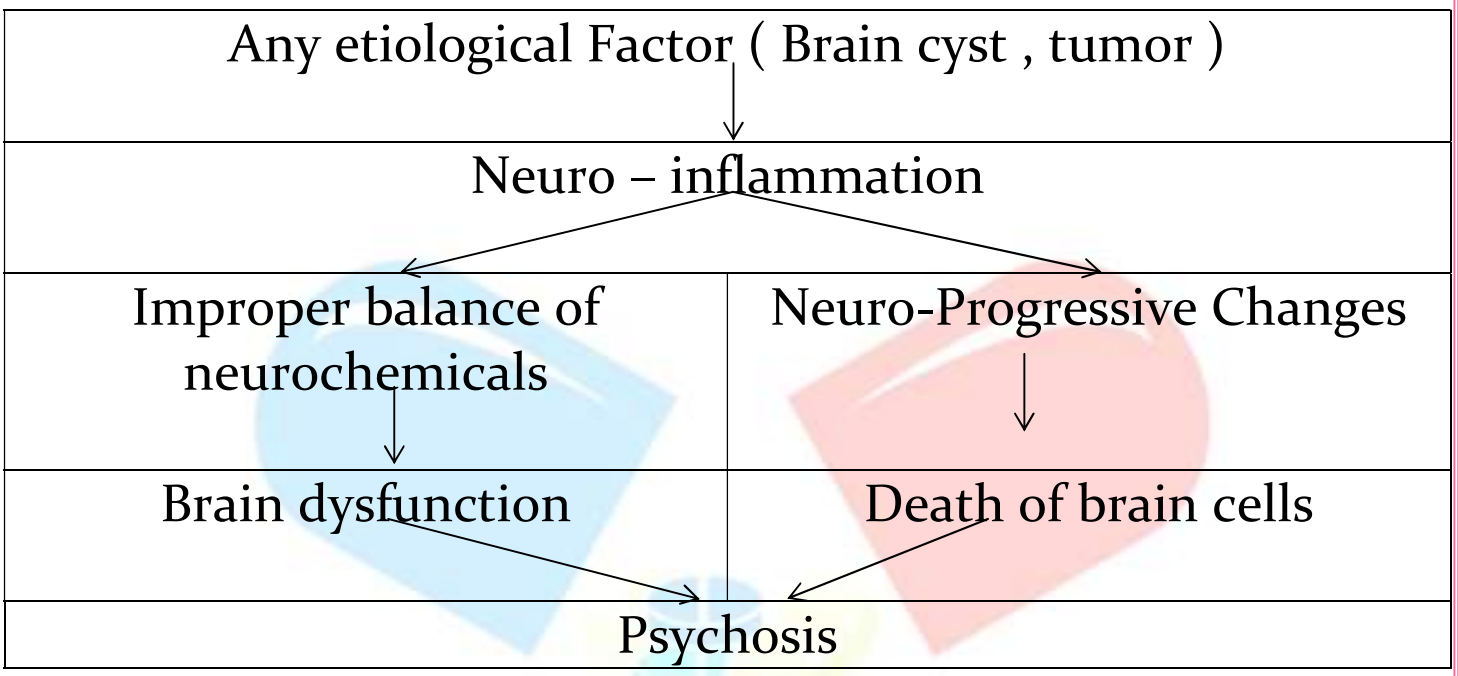
Types

- Bipolar Disorder
- Brief Psychotic Disorder
- Drug-induced Psychosis
- Schizophrenia etc.

Etiology

- Brain cysts or trauma .
- Certain type of epilepsy
- Alcohol and methamphetamine
- Stroke
- Genetic
- Brain injury
- Certain drugs (steroids , stimulant)

Pathogenesis



Clinical Manifestations

- Unusual and extremely slowed movements.
- Incoherent or disorganised speaking.
- Hallucinations, usually related to hearing voices or strange sounds.
- Isolating behaviour.
- Feeling suspicious paranoid or afraid.
- Not caring about their hygiene and appearance.
- Depression anxiety and suicidal thought.

Non Pharmacological Managements

- Changing the environment
- Proper caring by family members
- Exercise

Pharmacological Managements

- **Typical antipsychotics :**
  - Haloperidol ,
  - Chlorpromazine ,
  - Thiothixen ,
  - Fluphenazine
- **Atypical antipsychotics :**
  - Clozapine
  - Olanzapine
  - Risperidone
  - Aripiprazole

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