Pathophysiology(Unit-4)

B.Pharma 2nd semester

* Inflammatory bowel disease :-

Inflammatory bowel disease refers to chronic inflammation of the digestive tract.

Types :-

- Crohn's Disease: Can affect any part of the digestive tract, often deeper layers of the bowel.
- Ulcerative Colitis: primarily affects the colon (large intestine), starting from the rectum.

Causes:

Exact Cause unknown; thought to involve immune system malfunction triggered by genetic and environmental factors

Symptoms :-

- Diarrhea
- Abdomin pain
- Fatigue
- Weight loss
- Blood in stool

Diagnosis :-

- Medical history and physical exam
- Blood test (to check for inflammation)
- Colonoscopy or Sigmoidoscopy with biospy.

Treatment:-

- Medications: Anti-inflammatory drugs, immunosuppressants, biologics.
- Lifestyle Changes: Dietary adjustment, stress Management.
- Surgery: In Severe Cases or Complications.

Management:-

- Regular Monitoring with healthcare provider.
- Compliance with medications and treatment plan.
- Support groups for emotional and practical Support.

☆ Jaundice:-

Jaundice is a condition characterized by yellowing of the skin, whites of the eyes, and Mucous membranes due to elevated levels of bilirubin in the blood.

Causes:-

- Excessive breakdown of RBC: Leads to increased bilirubin production
- Liver disease: Impairs bilirubin processing and excretion.
- Obstruction of bile ducts: Block the flow of bilirubin into the digestive tract.

Symptoms:-

- Yellow discoloration of the skin, eyes, and Mucous membranes.

- Dark urine (due to elevated bilirubin excretion)
- pale stoole (Lack of normal bile pigments)

Diagnosis :-

- physical exam (observation of yellowing)
- Blood test (to Measure bilirubin levels and liver function)
- Imaging tests (ultrasound, CT scan) to detect underlying Causes like gallstones or tumors.

Treatment :- Depends on the underlying Cause:

- Liver disease: Treatment of the underlying liver Condition.
- Bile duct obstruction: Surgery or procedures to clear the blockage.
- Hemolytic disorders: Managing the underlying conditions Causing red blood Cell breakdown.

prevention :-

- prevention depends on the Cause: for example, Vaccination against hepatitis viruses can prevent certain types of liver disease.

Pathophysiology(Unit-4)

B.Pharma 2nd semester

A Hepatitis :-

- Hepatitis is Inflammation of liver tissue.

Causes :

- Viral Infections: Hepatitis A, B, C, D, and E viruses are Common Causes.
- Autoimmune Conditions: Where the Immune System Mistakenly attack liver cells.
- Toxic Substance: such as alcohol, certain medications and Chemica
- Other Infections: Like bacteria and parasites.

Types :-

- Hepatitis A: Spread through Contaminated food or Water
- Hepatitis B: Transmitted through body fluids, includ blood & Semen.
- Hepatitis C: Usually spread through blood to blood Contact.
- Hepatitis D: only occurs in those already infected with heptitis B.
- Hepatitis E: spread through Contaminated water in areas with poor sanitation.

Symptoms :-

- Jaundice (yellowing of the skin and eye)
- Fatigue
- Abdominal pain
- Loss of Appetite
- Nausea and vomiting
- Dark urine and pale stool.

Diagnosis :-

- Blood test to detect viral antibodies or genetic Material
- Liver function test to assess liver enzyme and bilirubin lev
- Imaging test like Ultrasound or CT scan may be used to evaluate liver condition.

Treatment :-

- Hepatitis A and E : often resolves on its own with Supportive Care (rest, fluids, proper nutrition).
- Hepatitis B and C : Antiviral medications may be prescribed to manage or suppress the virus.
- Hepatitis D : No specific antiviral treatment, vaccination against hepatitis B is recommended.
- Autoimmune hepatitis : Corticosteroids and other immunoSupressive drug May be used.

Complications :-

- Chronic hepatitis Can lead to Liver Cirrhosis (Scarring) and liver failure.
- Hepatitis B and C Infection Increase the risk of liver Cancer (Hepato Cellular Carcinoma).

Pathophysiology(Unit-4)

B.Pharma 2nd semester

☆ Alcoholic liver disease :-

ALD refers to liver damage caused by long-term, excessive alcohol consumption.

Types :-

- Fatty liver: Buildup of fat in liver cells
- Alcoholic Hepatitis: Inflammation of the liver
- Cirrhosis: Severe scarring of the liver tissue.

Causes :-

Chronic alcohol abuse over many years.

Symptoms :-

- often asymptomatic in early stage
- Jaundice (yellowing of skin and eye) in advanced stage.
- Abdominal pain or tenderness.
- Fatigue and weakness.

Diagnosis :-

- Medical history, physical exam and blood tests.
- Imaging (Ultrasound, CT scan) and sometimes liver biopsy.

Treatment :-

- Abstinence: Essential to halt progression
- Nutritional Support: Balanced diet and supplements (vit.)
- Medications: May be used to manage symptoms and complications.

★ Disease of bones and Joints :-

① Rheumatoid arthritis :-

RA is a chronic autoimmune disorder that primarily affects the joints, causing inflammation, pain and eventually joint damage.

Etiology :-

The exact cause is unknown, but it involves a combination of genetic, environmental and hormonal factors.

Symptoms :-

- Joint pain and swelling
- Stiffness, particularly in the morning or after period of inactivity.
- Fatigue
- Fever
- Loss of joint functions and deformities in advanced stage.

Commonly affected joints :-

- Wrists
- Hands (particularly the small joint)
- Knees
- Feet

Diagnosis :-

- Clinical Evaluation: Based on symptoms and physical examination.

- Laboratory test: Including reh rheumatoid factor, anti-citrullinated protein antibody and various inflammatory Markers (e.g ESR, CRP).
- Imaging: X-rays, ultrasound or MRI to assess joint damage.

Treatment:-

- Medication:-
  - Disease-Modifying antirheumatic drugs: e.g Methotrexate, Sulfasalazine.
  - Biologics: Target Specific part of the Immune system. Eg. TNF Inhibitor.
  - Nonsteroidal anti-Inflammatory drugs (NSAID): For pain redy.
  - Glucocorticoids: To reduce inflammation.
- Physical therapy: To improve joint function and Mobility.
- Surgical options: Joint repair or replacement in severe Case.

Lifestyle Modification:-

- Regular exercise
- Healthy diet
- Stress Management
- Smoking Cessation

(2) Osteoporosis :-

Osteoporosis is a condition characterized by weakened bones that are more prone to fractures and breaks due to reduce bone density and quality.

Causes :-

- primary: often age-related, occuring naturally as people get older.
- Secondary: Resulting from other conditions or medications, such as long term use of corticosteroids or hormonal imbalance.

Symptoms :-

- often asympatomatic until a fracture occurs.
- possible symptoms include back pain, loss of height, and a stooped posture.

Diagnosis :-

- Bone Density Test (DEXA Scan): Measure bone Mineral density.
- Medical history and physical Examination: To assess risk factor and Symptoms.

Treatment :-

- Medication:
  - Bisphosphates (e.g alendronate, risedronate)
  - Hormone Replacement Therapy (For postMenopausal women)
  - Other drugs: Such as denosumab or teriparatide.

- Diet: increase Calcium and vitamin D intake
- Exercise: weight-bearing and resistance exercise to strengthen bones.
- Lifestyle changes: Avoid Smoking and limit alcohol.

#prevention :-

- Balanced diet: Rich in Calcium and vitamin D.
- Regular Exercise: To Maintain bone strength.
- Bone health monitoring: Especially for those at higher risk

(3) Gout :-

Gout is a type of inflammatory arthritis caused by the accumulation of uric acid crystals in the joint, leading to sudden and sever pain, redness and swelling.

#Causes :-

- High Uric Acid Levels: often due to the body producing too much uric acid or not excreting enough.
- Diet: Foods high in purines (e.g red meat, shellfish) can increase uric acid levels
- Alcohol: Especially beer and liquids
- obesity: Can Contribute to higher uric acid Levels.

Symptoms :-

- Sudden pain: Typically starts in one joint, often the big toe.

- Redness and Swelling: Affected joint becomes hot, Swollen, and tender.
- Limited joint Movement: Due to pain and Swelling.

Diagnosis:-

- Clinical Evaluation: Based on symptoms and physical exam.
- Joint Fluid Analysis: Microscopic examination of fluid from the affected joint to detect uric acid crystal.
- Blood test: To Measure uric acid levels, although high level alone don't Confirm gout.

Treatment:-

- Medications —
  - NSAIDs: For pain relief and inflammation (e.g Ibuprofen, naproxen)
  - Colchicine: Reduce inflammation.
  - Corticosteroids: For severe Cases.
  - Urate-lowering therapy: Long term treatment to lower Uric acid level (e.g Allopurinol, Febuxostate).

Lifestyle change:-

- Diet: Limit purine-rich foods and alcohols.
- Hydration: Drink plenty of fluids
- Weight Management: Maintain a healthy Weight.

☆ Principle of Cancers:-

- Cancer is characterized by unregulated cell proliferation that defines the regular cycle of cell divisions. These cells are refered to as cancer cells.
- Signal transduction is used to supervise the growth, proliferation, and cell division of normal cells. However, cancer cells create independent mechnism for growth and reproduction.
- Cancer is disease which turns the normal cell into cancer cell by the process called carcinogenesis.
- Clinically there are many types of cancers, but biologically the origin of cancer is similar, which is due to defect in gene expression.
- There are various factor that cause normal cells to turn into cancer cells. These substance are refered as carcinogenic.
- It is belived that all cells carry certain cancer producing oncogenes.
- The genes that cause tumors to form are known as oncogenes.

Classification of Cancer :-

A tumor can be either benign or malignant.

Benign tumor: A tumor that remains confined to its original location, neither invading surrounding normal tissue nor spreading to distant body sites is known as benign tumor. For example: skin warts.

Malignant tumor: A tumor which is capable of both invading surrounding normal tissue and spreading (Metastasis) throughout the body via the circulatory or lymphatic system is known as Malignant tumor.

- only Malignant tumors are properly reffered to as Cancer.

- pathologically, Cancers are classified into three categories:

① Carcinomas:-

This type of cancer arise from epithelial cells or ectodermal tissues lining the internal surface of the various organs.

For example :- Breast Cancer, Lungs Cancer, Skin Cancer, brain Cancer, Cancer of internal surface of the various organs.

② Sarcomas:-

These Cancer arise from connective and muscular tissue derived from Mesoderm.

For Example:- Bone tumours, muscle tumours, Cancer of lymph nodes.

③ Lymphomas or Leukemia:-

- It is the malignant growth of leucocytes (WBC)
- Person affected with this Cancer show the excessive production of Leucocytes (blood Cancer) and Cancer of bone marrow.

Etiology of Cancer:-

① Environmental factors:

- Tobacco, smokes, diets, environmental pollutants etc.
- Heavy Smoking Cause lungs, oral Cavity and oesophagus Cancer.
- excessive intake of alcohol Cause liver Cancers.

② Chemical Carcinogens:-

- Nickel Compound, Cadmium, arsenic, nitrosamine, trichloroethylene, arylamines, benzopyrene, aflatoxins reactive oxygen radical etc.

③ physical Carcinogens:-

UV rays (ultraviolet), Ionizing radiation (x-ray and gamma rays)

④ Biological Carcinogens:-

- Virus: has also been associated with various type of Cancers. These virus are called oncoviruses.
- Bacteria: Helicobacter pylori.

⑤ Endogenous factors:-

Mutation, change in DNA replication, metabolic reaction generating, reactive oxygen redicals, immune system defects, Ageing.

Pathophysiology of Cancer:-

① Initiation

- Mutation: Genetic changes in normal Cells that Start the Cancer process.

② promotion:

- Cell Growth: Mutaed Cells are stimulated to grow and divide uncontrollably due to various factors (e.g Chronic inflammation, hormonal change.

③ progression:

- Advanced Changes: Accumulation of additional Mutations leads to more aggressive and invasive Cancer. Cells may acquire the ability to invade Surrounding tissue and Spread to other parts of the body (Metastasis).

④ Metastasis :-

- Spread: Cancer Cells break away from the original tumor, travel through blood or lymphatic system and form new tumors in other organs or tissue.

THANK YOU